

**AN ASSESSMENT OF THE APPROPRIATENESS OF
AGRICULTURAL EXTENSION EDUCATION IN SOUTH AFRICA**

by

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in the Centre for Environment, Agriculture and Development,
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DECLARATION

I declare that the dissertation hereby submitted in fulfilment of a Doctor of Philosophy in Agriculture in the Centre for Environment, Agriculture and Development, School of Environmental Sciences, Faculty of Science and Agriculture at the University of KwaZulu-Natal, Pietermaritzburg is my own independent work and has not been submitted by me at another university or faculty.

SH Worth

Date

Prof. AT Modi, Supervisor

Date

Abstract

This thesis is about agricultural extension education. The context is agricultural extension in South Africa. It addresses the following questions:

- To what extent does current agricultural extension education in South Africa adequately reflect the current and changing educational and developmental imperatives?
- To what extent does it adequately equip extension officers and other agricultural development practitioners to deliver relevant support to farmers and farming communities?

In short, how relevant is the training received by South African Agricultural Extension practitioners?

The South African government has made significant changes in the policy environment governing agriculture. While the majority of the policy changes fall outside the scope of this research, it can be safely argued, as noted in the current Strategy for South African Agriculture, that the changes are fundamental. The changes redirect agriculture to the majority population which has hitherto been marginalised and generally denied meaningful access to the agricultural sector of the South African economy. To implement these changes, the agricultural sector will need appropriate skills – skills which, it is submitted – are largely lacking within the agricultural extension service and, more relevantly to this study, in Agricultural Extension curricula.

In addition to the foregoing, assumptions about farmers and their roles in technology and information creation and consumption, assumptions about the roles of tertiary institutions in the triad of teaching, extension and research and indeed about the triad itself need to be challenged. A system of education which has its origins in the 1800s (before even the industrial revolution, much less the digital revolution) needs, *per force*, to be interrogated regularly to ensure that it delivers according to the demands of the exigencies of the time. Similarly, assumptions about the aim of development and in particular agricultural development have been questioned in many parts of the world. And yet it is submitted that in South Africa, the basic extension methodologies have not changed in any fundamental way; rather they have adopted some of the outer trappings of new approaches, without assessing the fundamentals of the core extension approach. It is believed that extension is in need of a serious review and that it is timely to do so.

Recent research in Africa and elsewhere in the world indicates that extension needs be reconstructed on a different set of operational objectives led by a different vision. The extension strategy herein presented is built around a vision which places the focus on the farmer (and other land users) in the context not of technology, but of creating prosperity.

The vision implies that the purpose of agricultural extension is to facilitate the establishment of self-reliant farmers who are contributing to widespread prosperity. The dual outcomes of self-reliant farmers and widespread prosperity are meant to be realised through a new set of ‘rules of engagement’. Prosperity is derived out of farmers working together, sharing information, and learning together. Self-reliant farmers are an outcome of a learning partnership between farmers and extension practitioners.

This study was conducted in a series of stages. The first thrust examined the nature of Agricultural Extension and the assumptions on which it is predicated. The result of this interrogation was to propose a new concept for Agricultural Extension – Agriflection – which is a learning-based concept aimed at improving the sustainability of the livelihoods of farmers through iterative development processes fostered through a learning agenda that is facilitated by an appropriately trained Agricultural Extension practitioner.

To realise such a vision, it is essential that the mission of the extension service be recast to reflect the dynamics of the implications of the vision. The key elements of the mission are, therefore, client-responsiveness and partnerships. The power to realise the vision rests in three critical aspects. First is the capacity of the extension service to engage with its clients as genuine partners in a shared learning agenda. The second is the capacity of the extension service to engage with the many other agencies and organisations which supply goods and services to farmers and land users. The third is ensuring that engagements with farmers support sustainable development, that is, that production of food, fibre and fuel is socially just, economically sustainable and environmentally sustainable.

This new vision and mission lay the foundation for a fundamental shift in the way agricultural extension is positioned, resourced, implemented and evaluated. The strategic goals, principles and values presented in this strategy are built on this foundation, and they, in turn, create the framework for constructing the operational plans of the extension service as well as for management and measurement of the service.

The second thrust of the study was to filter the Agriflection concept through South African educational and agricultural policy. Given that the agricultural frontier is subject

to change in focus and priorities, it was reasoned that the training and education of would-be extension practitioners needs to be able to respond to changes in methods and in the field. The National Government has adopted the outcomes-based model as the general structure for curriculum development. Further sustainable development/livelihoods has been adopted as the general framework for development. Outcomes-based education and sustainable development/livelihoods provide a framework for studying and developing curricula. A tool that enables curriculum analysis and development which allows for adjustment to changing imperatives while maintaining integrity in terms of education and development, would be valuable for tertiary institutions training extension officers. The result of this second thrust was the development of curriculum markers that encapsulated what non-technical knowledge and skills (i.e. Agricultural Extension knowledge and skills) were needed to be able to deliver on the imperatives of the transformation agenda of current agricultural policy. Thirty-four markers were identified.

The third thrust of the study was to create a credible method to evaluate Agricultural Extension curricula and to capture and analyse data. A detailed review of methods and approaches was made resulting in fashioning the Theory-led Instructional-Design Curriculum Evaluation (TICE) method. One of the primary facets of this six-process method is questioning of the assumptions on which the discipline of Agricultural Extension is based. Such a questioning would lead to a new theory to govern the evaluation of curriculum.

Ancillary to the TICE method were the methods of data collection and analysis. The study consolidated these in presence and efficacy factors. These factors measured the presence of the 34 markers in Agricultural Extension curricula and the extent to which they were addressed, if present.

The fourth thrust of the study was the detailed evaluation of curricula of qualifications most commonly held by public sector Agricultural Extension practitioners. The study examined the curricula of agricultural diplomas, of three- and four-year agricultural degrees and of one-year postgraduate qualifications offered by Colleges of Agriculture and selected Universities and Universities of Technology.

The fifth thrust was to conduct corroborative investigations in the public sector. This was done by surveying Agricultural Extension practitioners asking them to evaluate the extent to which they believed they have knowledge and/or skill represented by the 34 curricula markers. In addition, a brief analysis was made of Agricultural Extension

practitioner job descriptions used in the public sector. This was done to determine what knowledge and skills were expected of Agricultural Extension practitioners and comparing this to the 34 markers.

The study revealed that there is very limited Agricultural Extension training offered in the curricula of qualifications held by the majority of public sector Agricultural Extension practitioners. Further, using the 34 markers as the touchstone, it was determined that the current curricula do not adequately equip public sector Agricultural Extension practitioners to deliver on the agenda of current South African agricultural policy. Without extensive revision of curricula in terms of both the quantity and content of extension training, the South African public sector Agricultural Extension service will not be able to realise the intended transformation of agriculture. Its key operatives will not have the knowledge and skills needed to do so.

This is a unique study. No study of its kind has ever been conducted in South Africa. Numerous studies have been conducted into the training needs of Agricultural Extension practitioners. None have gone to the extent of questioning the assumptions on which Agricultural Extension is based. None have made a critical examination of curricula in the light of current educational and agricultural policy. This study found that there is an urgent need for serious attention to be given the purpose, scope, outcomes of Agricultural Extension higher education in South Africa to ensure that it can contribute to the positive and sustainable transformation of agriculture.

Preface

This thesis is the consolidation of nearly three decades of learning. It has its roots in the gem-like words of Bahá'u'lláh (1817-1892), who was exiled and imprisoned for over 40 years for proposing radical changes to the structure of human society. Although he died a prisoner of little account to outward seeming, his words remain. It has its roots also in the words of 'Abdu'l-Bahá (1844-1921), who shared Bahá'u'lláh's exile and imprisonment and who carried on the work of Bahá'u'lláh after his passing. Their words are my principle source of inspiration.

Words such as those set out below animated my research and galvanised my quest to understand why, after so many years of technological development, so little progress had been made in the advancement of smallholder farmers in Africa.

First and foremost is the principle that to all the members of the body politic shall be given the greatest achievements of the world of humanity. Each one shall have the utmost welfare and well-being. To solve this problem we must begin with the farmer; there will we lay a foundation for system and order because the peasant class and the agricultural class exceed other classes in the importance of their service.¹

...it is fitting that the economic problem be first solved with the farmer, for the farmer is the first active agent in the body politic.²

“Regard man as a mine rich in gems of inestimable value. Education can, alone, cause it to reveal its treasures, and enable mankind to benefit therefrom.”³

“Man is the supreme Talisman. Lack of a proper education hath, however, deprived him of that which he doth inherently possess.”⁴

“Noble have I created thee.... Rise then unto that for which thou wast created.”⁵

“All men have been created to carry forward an ever-advancing civilization.”⁶

¹ 'Abdu'l-Bahá, Foundations of World Unity, p. 39

² 'Abdu'l-Bahá, Cited in Lights of Guidance, p. 547

³ Bahá'u'lláh, Gleanings from the Writings of Bahá'u'lláh, p. 259

⁴ Bahá'u'lláh, Gleanings from the Writings of Bahá'u'lláh, p. 259

⁵ Bahá'u'lláh, The Arabic Hidden Words, No 22

⁶ Bahá'u'lláh, Gleanings from the Writings of Bahá'u'lláh, p. 214

“Let each morn be better than its eve and each morrow richer than its yesterday. Man’s merit lieth in service and virtue and not in the pageantry of wealth and riches.”⁷

These simple phrases, and others like them, provided the foundational thinking and moral basis for my engagement in development amongst resource-challenged farming communities. These words were the first dots in an extensive ‘connect-the-dots’ exercise. These words were the beginning of my learning.

The second source of inspiration for the research came from the many years I lived and worked among the Batswana in what is now the North West Province of South Africa. It was there that I learned about creating a livelihood with whatever assets one had. It was through that experience that I developed a desire to make a true and genuine contribution to the prosperity of rural farming families. People like Cornelius Khunou, Stanlake Kukama Kukama, Santo Solly Mohapi, Ephens Senne, Edwin Seochwareng, the late David Beuster, the late Elsie Klaas, the late Sinah Mooka and many others too numerous to name, taught me countless lessons about the struggles and hardships and hopes of rural poverty and of the dignity of human beings. Living at the farm station in Mooifontein and the village at Taung and travelling and working in Ganyesa, Kudumane, Thaba ‘Nchu and the Kalahari opened my eyes to the reality of the life and livelihoods of farmers.

I was never formally trained in Agricultural Extension except through on-the-job training. More by accident than by design I was thrust into managing ever-increasing staff components of Agricultural Extension practitioners, livestock inspectors, veterinarians, conservation officers, development workers, farm managers and subject matter specialists. It was through dealing with their efforts to facilitate development among the rural poor that I gained much insight and understanding of the realities of extension in practice. It was through that service that I understood that farming was not about technology, but about people; that farming was not about crops and livestock, but about farmers and their families and their livelihoods.

At one time I managed over 400 staff who provided extension services to over 1 million people spread over 3 million hectares. We presided over multi-million Rand annual budgets funding a wide range of development interventions from community gardens and rural micro-enterprises to 70000 ha estate farms. We provided advice and

⁷ Tablets of Bahá’u’lláh, p. 138

support to dozens of farmers associations and cooperatives. We built roads, installed solar water pumps, erected community halls, established economic infrastructure and developed innovation centres. We managed drought relief and disaster relief programmes. We lived with intermittent water and electricity and no phones.

These varied sources of inspiration and learning led ultimately to this research. And although a PhD is not meant to be the culmination of a life's work, it is most assuredly a significant turning point in the life of one who set out as a young man with no greater ambition than to live and work and serve amongst the rural peoples of Africa.

What has been learned, has been learned with humility and gratitude.

DEDICATION

To my wife

Karen

To my children

Ellery, Kiara, Sabelo, Cunningham and Anderson

To my 'foster' children

Anis, Daniel, Samora, S'bonelo C, S'bonelo M, Sipho and Thembinkosi

From whom I have learned so much

And to whom I owe so much

May the love of God shine in your hearts,
even as my love for you shines in mine.

Acknowledgements

It is tradition to acknowledge those who have contributed to the completing one's thesis. I like tradition. And it is with no small measure of delight that I am able to record the names of those who have aided in the completion of this task. Few people outside the university knew I was working on PhD. By intention I made it a private matter, thus some mentioned here may not know they contributed to its completion.

To Prof. Rijkenberg for hiring me and forcing me to register; he wanted me to become South Africa's leading expert in agricultural education;

To Prof. Albert Modi for agreeing to be my supervisor; I was (and suppose I remain) a difficult person and student to rein in – but he prevailed;

To Prof. MaryAnn Green who at first frightened me because of her sheer capacity, but who became my true mentor in academics and a great and trusted friend;

To Prof. Zacharias for doing his best to keep me safe from university encumbrances, for handing me a big piece of the agricultural education portfolio, for adding my name to lists I did not deserve to be on, and gently asking about my 'storybook';

To Anusha Maikoo, who managed my working life, guarded my time, sorted my priorities and secretly colluded with my wife to plan breaks and holidays that I would otherwise have ignored;

To Daniel Bailey, Gastau Lukano, Rethabile Nchee, and Flavio Zaqueu whom it was my privilege to supervise, and who, by their own efforts to complete their qualifications inspired me to complete mine;

To Enge Dzebu and Mfundo Ndlovu who, in addition to being inspirational students, helped me carry the workload in teaching;

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To Esther Mungai who gave me so much confidence as a teacher;

To Monique Salomon, who understood the meaning of mirrors;

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To Colletah Chitsike at ICRA for the honour of her considering us like-minded;

To my daughter, Kiara, who learned late in the process that I was working on this, for offering so much time to take other work off my shoulders and for being such a bright light – few have struggled more to find their space; her struggle was a source of inspiration; and

To my wife, Karen, who I dragged from the comfortable life of concerts, recitals and white-picket fences of the Chicago North Shore to the sparse and remote parts of rural South Africa, for managing our home, our many children, my life and me, and for insisting that I finish this project.

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Table of Contents

DECLARATION	i
Abstract.....	ii
Preface.....	vi
DEDICATION.....	ix
Acknowledgements.....	x
List of Tables	xvii
Chapter 1: Introduction	1
1.1. Introduction	1
1.2. Description of the research conducted	5
1.2.1. Agricultural policy	5
1.2.3. Sustainable development/livelihoods	7
1.3. Scope and aim of the study.....	8
1.3.1. Primary research question	9
1.3.2. Secondary research questions.....	10
1.3.3. Current agricultural policy	10
1.3.4. Outcomes-based education.....	10
1.3.5. Sustainable livelihoods.....	11
1.3.6. Sustainable livelihoods and Agricultural Extension	11
1.4. Outcomes of the study.....	11
1.5. Methodology	12
1.5.1. Phase 1: Study of literature	12
1.5.2. Phase 2: Interrogation of extension curricula and interpretation of results	13
1.6. Importance of the study.....	13
1.7. Assumptions and limitations	14
1.8. Structure of the Thesis.....	15
1.9. Conclusion.....	16
References.....	18
Chapter 2: Agriflection: a learning model for Agricultural Extension in South Africa. ...	19
2.1. Introduction	19
2.2. The challenge of a new model for Agricultural Extension for South Africa	23
2.3. Understanding what Agricultural Extension is	25
2.4. An Agricultural Extension framework	26
2.5. Sustainable livelihoods approaches and Agricultural Extension.....	28

2.6.	The Agriflection model	32
2.7.	Themes and concepts emerging from the Agriflection model	32
2.8.	Conclusion.....	37
	References.....	39

Chapter 3: The South African education agenda: Identifying markers for rewriting Agricultural Extension curricula.....43

3.1.	Introduction	43
3.2.	Agricultural Extension education in South Africa	43
3.3.	Current South African education policy.....	46
3.4.	OBE principles for curriculum and instructional design.....	47
3.5.	OBE identifies new roles for Agricultural Extension.....	54
3.6.	Conclusions	57
	References.....	61

Chapter 4: Developing Curriculum Markers for Agricultural Extension Education in South Africa.....64

4.1.	Introduction	64
4.2.	Harmonising Agricultural Extension and education theory	65
4.3.	Agricultural Extension in the new South Africa	65
4.4.	Outcomes-based education as the underpinning to Agricultural Extension education	68
4.5.	The National Education and Training Strategy for Agriculture and Rural Development in South Africa: a framework for curricula change in Agricultural Extension.....	72
4.6.	Curriculum markers for Agricultural Extension education.....	75
	References.....	82

Chapter 5: Establishing a Method for Evaluating Higher Education-Level Curricula for Agricultural Extension in South Africa.....84

5.1.	Introduction	84
5.2.	Themes in understanding curricula as a guide to evaluation.....	86
5.3.	Defining evaluation and its purpose.....	88
5.4.	Toward evaluating curriculum	89
5.5.	Evaluation methods	89
5.5.1.	Pseudoevaluations	90
5.5.2.	Questions/Methods-oriented evaluation approaches.....	90
5.5.3.	Improvement/Accountability-oriented evaluation approaches	90
5.5.4.	Social Agenda-directed/Advocacy approaches	91
5.5.5.	Identifying the most appropriate models.....	91
5.6.	Curriculum evaluation models	92
5.6.1.	Eight-year study model	93
5.6.2.	The Tyler and Taba models.....	93

5.6.3.	Discrepancy evaluation model	94
5.6.4.	Countenance and responsive evaluation models	95
5.6.5.	Context, Input, Process, Product (CIPP) Model.....	95
5.6.6.	Educational connoisseurship and criticism	96
5.7.	Learning from evaluation in practice	97
5.7.1.	Sasakawa Africa Fund for Extension Education (SAFE)	97
5.7.2.	The case of the University of Vienna	98
5.7.3.	The case of the United States National Research Council	100
5.7.4.	The case of the Baccalaureate Educational Assessment Package	102
5.8.	Insight from Bloom's taxonomy of educational objectives	103
5.9.	Factoring in outcomes-based education	105
5.10.	Other factors to consider	106
5.11.	Formulating a method for evaluating curriculum.....	107
5.11.1.	Instructional design	107
5.11.2.	Theory-driven evaluation	109
5.11.3.	The challenge of reform	110
5.12.	Crystallising a method for evaluating Agricultural Extension curricula.....	114
5.13.	Final comment on the method	118
5.14.	Conclusion.....	119
	References.....	120

Chapter 6: Methods of Data Collection and Analysis for the Evaluation of Agricultural Extension Curricula in South Africa..... 126

6.1.	Introduction	126
6.2.	Methods of data collection	126
6.2.1.	Data collection at higher education institutions	126
6.2.2.	Data collection from extension practitioners.....	133
6.2.3.	Data collection from Departments of Agriculture.....	134
6.3.	Method of data analysis.....	134
6.3.1.	Interpreting data from institutions of higher education.....	135
6.3.1.1.	Presence factors	138
6.3.1.2.	Efficacy analyses	140
6.3.1.3.	Basic analysis of efficacy	142
6.3.1.4.	Minimum and potential efficacy analyses.....	144
6.3.1.5.	Individual marker analyses.....	145
6.3.1.6.	Using the efficacy factors.....	145
6.4.	Selection of modules to be included in the study.....	146
6.5.	A benchmark for Agricultural Extension curriculum.....	147
6.6.	Interpreting data from extension practitioners	149
6.7.	Conclusion.....	149
	References.....	151

Chapter 7: Findings from the Colleges of Agriculture.....	153
7.1. Introduction	153
7.2. The framework for the interpretation of data	154
7.2.1. PFE scores	154
7.2.2. PFI scores	155
7.2.3. INSHE _Q scores	155
7.2.4. INSHQ _Q scores	156
7.2.5. INSHE _Y scores	156
7.3. Findings from participating colleges of agriculture	157
7.3.2. Cedara College of Agriculture (Cedara).....	161
7.3.3. Fort Cox Agricultural College (Fort Cox).....	166
7.3.4. Glen Agricultural College (Glen).....	169
7.3.5. Grootfontein College of Agriculture	172
7.3.6. Lowveld College of Agriculture.....	175
7.3.7. Owen Sithole College of Agriculture (OSCA).....	177
7.3.8. Potchefstroom College of Agriculture (Potch).....	180
7.3.9. Other Colleges of Agriculture	182
7.4. Summary of findings from Agricultural Colleges.....	183
Chapter 8: Findings from Universities and Universities of Technology	187
8.1. Introduction.....	187
8.2. Findings from the Universities and Universities of Technology	187
8.2.1. University of Fort Hare (Fort Hare)	190
8.2.2. University of the Free State (UFS).....	199
8.2.3. University of KwaZulu-Natal (UKZN).....	203
8.2.4. University of Limpopo (ULIM)	210
8.2.5. North West University (NWU)	214
8.2.6. University of Pretoria (UP)	224
8.2.7. Stellenbosch University (SU).....	231
8.2.8. Tshwane University of Technology (TUT).....	235
8.2.9. University of Zululand (UNIZUL).....	247
8.3. Summary from universities and universities of technology	252
8.4. Summary and conclusions from findings at institutions of higher education (colleges of agriculture, universities and universities of technology).....	253
References.....	255
Chapter 9: Findings from Public Sector Agricultural Extension.....	256
9.1. Introduction	256
9.2. Findings from Agricultural Extension practitioners.....	256
9.3. Assessment of generic job descriptions.....	265
9.4. Summary of findings from the public sector.....	271
<u>References.....</u>	<u>271</u>

Chapter 10: Summary, Conclusions and Recommendations	273
10.1. Introduction	273
10.2. The changing conceptualisation of Agricultural Extension	274
10.3. Evaluating Agricultural Extension curricula	276
10.4. Current Agricultural Extension offerings and the changing agricultural and educational landscape	278
10.4.1. PFE scores	278
10.4.2. PFI and INSH scores	280
10.4.3. General implications	284
10.4.4. Implications from specific key markers	286
10.5. Agricultural Extension education in the workplace	289
10.5.1. Perceptions of extension practitioners	289
10.5.2. Implications of extension job descriptions	290
10.5.3. Summary from the workplace	290
10.6. Learning about the methodologies	291
10.6.1. Theory-led instructional design curriculum evaluation and design	291
10.6.2. Learning from methods of data collection and analysis	292
10.6.3. Expanded TICE	294
10.7. Conclusions	296
10.7.1. Extension's mismatch	297
10.7.2. A broader curriculum	298
10.7.4. Additional learning	302
10.8. Summary of conclusions	304
10.9. Consolidation of Recommendations	306
10.9.1. Extent of Extension in AET	306
10.9.2. The Concept of Agricultural Extension	306
10.9.3. Agricultural Extension curriculum	307
10.9.4. Broader curriculum for Agricultural Extension	308
10.11. Recommendations for further study	310
10.12. Weaknesses and limitations of the study	312
10.12.1. Weaknesses	312
10.12.2. Limitations	313
References	315
Appendix 1: Curriculum Markers	317
Appendix 2: Institutional Scorecard	318
Appendix 3: Agricultural Extension Practitioners Questionnaire	321
Appendix 4: New Higher Education Qualifications Framework	326
Appendix 5: PFE Scores for all institutions	327
Appendix 6: CIAT INSH Scores	341
Appendix 7: Glen INSH Scores	345
Appendix 8: Fort Hare PFE Scores	354
Appendix 9: UKZN PFE Scores	372
Appendix 10: NWU PFE Scores	380
Appendix 11: UP PFE Scores	392
Appendix 12: Stellenbosch PFE Scores	398
Appendix 13: TUT PFE Scores	404
Appendix 14: UNIZUL PFE Scores	420

Appendix 15: Survey of Agricultural Extension practitioners.....	431
--	-----

List of Tables

Chapter 2

Table 2.1: Roles of Partners in a livelihoods based extension model.....	31
--	----

Chapter 3

Table 3.1: Opportunities and constraints of the PCD process	50
---	----

Chapter 4

None

Chapter 5

Table 5.1: USNRC framework for curricula evaluation.....	101
--	-----

Table 5.2: USNRC approaches to curricula evaluation.....	102
--	-----

Chapter 6

Table 6.1: Efficacy Analyses	143
------------------------------------	-----

Chapter 7

Table 7.1: Interpretation of INSHE _Q scores.....	155
---	-----

Table 7.2: Interpretation of INSHQ _Q scores	156
--	-----

Table 7.3: PFE scored for the CIAT Diploma in Extension	160
---	-----

Table 7.4: Five highest INSHE _Q and INSHQ _Q scores for the CIAT Diploma in Extension	161
--	-----

Table 7.5: PFE Ratings for the Cedara Higher Certificate in Agriculture.....	164
--	-----

Table 7.6: PFE Ratings for the Cedara Diploma in Agriculture.....	165
---	-----

Table 7.7: PFE Ratings for the Fort Cox Higher Certificate (Agri-business)	168
--	-----

Table 7.8: PFE Ratings for the Fort Cox Higher Diploma (Agri-business)	168
--	-----

Table 7.9: PFE scores for the Glen Higher Certificate	171
---	-----

Table 7.10: PFE scores for the Glen Diploma in Agriculture.....	171
---	-----

Table 7.11: Five highest markers in the Glen Higher Certificate and Diploma	172
---	-----

Table 7.12: PFE Ratings for the Grootfontein Diploma	175
--	-----

Table 7.13: PFE Ratings for the OSCA Diploma in Agriculture	179
---	-----

Table 7.14: Highest INSHE _Q and INSHQ _Q scores for the OSCA Diploma in Agriculture	180
--	-----

Table 7.15: PFE scores for South Africa's colleges of agriculture offering higher education programmes	183
--	-----

Table 7.16: Consolidated PFI Scores for all colleges offering Diplomas in Agriculture	184
---	-----

Table 7.17: Consolidated list of the five highest INSHE _Q and INSHQ _Q scores.....	184
---	-----

Chapter 8

Table 8.1: Overview of undergraduate agricultural and extension offerings at Universities and Universities of Technology in South Africa	188
--	-----

Table 8.2: PFE scores for the Fort Hare B Agric.....	193
--	-----

Table 8.3: PFE Score for the Fort Hare B Agric Hons.	193
---	-----

Table 8.4: PFE Score for the Fort Hare B Agric & B Agric Hons. combined	193
Table 8.5: Seven highest INSHE _Q and INSHQ _Q scores for the Fort Hare B Agric (Ext)	195
Table 8.6: Seven highest INSHE _Q and INSHQ _Q scores for the Fort Hare B Agric Hons	195
Table 8.7: Five highest INSHE _Q and INSHQ _Q scores for the Fort Hare B Agric (Ext) and B Agric Hons combined.....	195
Table 8.8: PFE Scores for the Fort Hare B Sc Agric (Ag Econ/Econ)	198
Table 8.9: PFE scores for the Fort Hare B Sc Agric (Plant Production/Extension)	198
Table 8.10: Five highest INSHE _Q and INSHQ _Q scores for the Fort Hare B Sc Agric (Plant Production/Extension).....	199
Table 8.11: PFE scores for the FSU B Agric	202
Table 8.12: The PFE scores for the FSU B Sc Agric.....	202
Table 8.13: PFE scores for the UKZN B Agric (ARD).....	206
Table 8.14: PFE scores for the UKZN B Agric Hons.....	206
Table 8.15: Six highest INSHE _Q and INSHQ _Q scores for the UKZN B Agric (ARD)....	207
Table 8.16: Five highest INSHE _Q and INSHQ _Q scores for the UKZN B Agric Hons.....	208
Table 8.17: Six highest INSHE _Q and INSHQ _Q scores for the UKZN B Agric (ARD) and B Agric Hons combined	208
Table 8.18: Potential PFE scores for the UKZN B Sc Agric (Agribusiness or Soil Science)	210
Table 8.19: Potential PFE scores for the UKZN B Sc Agric (Agricultural Economics).	210
Table 8.20: Credit allocation for the main specialisations in the ULIM B Sc Agric.....	212
Table 8.21: PFE scores for ULIM B Sc Agric (Ag Econ).....	213
Table 8.22: PFE scores for ULIM B Sc Agric (Animal Production).....	213
Table 8.24: PFE scores for ULIM B Sc Agric (Soil Science)	213
Table 8.25: Allocation of credits to specialisations of the NWU B Sc Agric	217
Table 8.26: PFE scores for the NWU B Sc Agric (Agricultural Economics).....	218
Table 8.27: PFE scores for the NWU B Sc Agric (Animal Health)	218
Table 8.28: PFE scores for the NWU B Sc Agric (Animal Science)	218
Table 8.29: PFE scores for the NWU B Sc Agric (Crop Science)	219
Table 8.30: Six highest INSHE _Q and INSHQ _Q scores for the NWU B Sc Agric (Ag Econ)	220
Table 8.31: PFE scores for the NWU PGDip Agricultural Extension.....	221
Table 8.32: PFE scores for the NWU B Sc Hons Agricultural Extension.....	222
Table 8.33: Six highest INSHE _Q and INSHQ _Q scores for the NWU B Sc Hons (Ext)	223
Table 8.34: Credit loads for the UP B Sc Agric	226
Table 8.35: PFE scores for the UP B Sc Agric (Agricultural Economics)	228
Table 8.36: PFE scores for the UP B Inst Agar Hons (Ext)	228
Table 8.37: Highest INSHE _Q and INSHQ _Q scores for the required modules in the UP B Inst Agar Hon (Ext)	229
Table 8.38: PFE Ratings for the Stellenbosch B Agric	233
Table 8.39: Five highest INSHE _Q scores for the Stellenbosch B Agric.....	234
Table 8.40: Credit allocations for selected SU B Sc Agric specialisations	235
Table 8.41: Credit allocation for the TUT National Diploma Agriculture: Crop Production, Commercial Mixed Farming and Development and Extension	238
Table 8.42: Credit allocation for the TUT National Diploma Agriculture: Animal Production	238
Table 8.43: PFE scores for the TUT Diploma Agric: Crop Production/Commercial Mixed Farming.	239

Table 8.44: Ten highest INSHE _Q and INSHQ _Q scores for the TUT Diploma Agric: Crop Production/Commercial Mixed Farming	240
Table 8.45: PFE scores for the B Tech: Crop Production.....	241
Table 8.46: The six highest INSHE _Q and INSHQ _Q scores for the TUT B Tech: Crop Production	241
Table 8.47: The nine highest INSHE _Q and INSHQ _Q scores for the combined Diploma Agric: Crop Production/Mixed commercial Farming and B Tech: Crop Production.....	242
Table 8.48: PFE scores for the TUT Diploma Agric: Development and Extension.....	243
Table 8.49: The nine highest INSHE _Q and INSHQ _Q scores for the TUT Diploma Agric: Development and Extension	244
Table 8.50: PFE score for the TUT B Tech Agric: Development and Extension.	244
Table 8.51: The 14 highest INSHE _Q and INSHQ _Q scores for the TUT B Tech Agric: Development and Extension	245
Table 8.52: PFE scores for combined TUT qualifications Diploma Agric and B Tech Agric: Development and Extension	246
Table 8.53: The eight highest INSHE _Q and INSHQ _Q scores for the combined TUT Diploma and B Tech Agric: Development and Extension.....	246
Table 8.54: PFE Scores for the UNIZUL B Consumer Science (ERD)	249
Table 8.55: Five highest INSHE _Q scores for the UNIZUL for the B Consumer Science	250
Table 8.56: PFE Scores for the UNIZUL B Sc Agric.....	251
Table 8.57: Seven highest INSHE _Q and INSHQ _Q scores for the UNIZUL BSc Agric ...	251

Chapter 9

Table 9.1: Numbers and qualifications of extension practitioners in public service in South Africa	257
Table 9.2: Curriculum markers which participants claimed “adequate”, “more than adequate” or “proficient” knowledge and skills	258
Table 9.3: Curriculum markers for which respondents claimed “some”, “very little” or “no” knowledge and skills	259
Table 9.4: Acquired curriculum markers identified by 50% or more of the respondents as being learned as a part of their qualification.....	262
Table 9.5: Acquired curriculum markers identified by 50% or more of the respondents as not being learned as part of their qualification	262
Table 9.6: Proficiency of skill and knowledge as a part of learning in a qualification ...	263

Chapter 10

Table 10.1: PFE _Q scores for Diplomas in Agriculture.....	279
Table 10.2: PFE _Q scores for B Agric	279
Table 10.3: PFE _Q scores for fourth year qualifications	279
Table 10.4: PFE _Q scores for B Sc Agric	279
Table 10.5: PFE _Q scores for combined first degree and relevant fourth year.....	280
Table 10.6: Overall presence rating of markers by qualification.....	281
Table 10.7: Overall efficacy rating of markers by qualification.....	283
Table 10.8: Details of the Extension Carousel of Learning (non-Extension elements)...	301

List of Figures

Chapter 1

None

Chapter 2

Figure 2.1: A basic Agricultural Knowledge and Information System (AKIS).27

Figure 2.2: Agriflection concept33

Chapter 3

Figure 3.1: Participatory Curriculum Development Model **Error! Bookmark not defined.**

Chapter 4

Figure 4.1: The dynamics of the curricula to farmer process 70

Figure 4.2: The dynamics of the relationship between the curricula to farmer process and the facets of integration of agricultural and educational policy into Agricultural Extension 71

Chapter 5

Figure 5.1: Components of curricula 86

Figure 5.2: TICE: Theory-led Instructional-Design Curriculum Evaluation..... 116

Chapter 6

Figure 6.1: Example PFE table 139

Chapter 7

None

Chapter 8

None

Chapter 9

None

Chapter 10

Figure 10.1: TICED method of curriculum evaluation and design295

Figure 10.2: The Agricultural Extension Carousel of Learning300

Abbreviations

<u>Acronym</u>	<u>Meaning</u>
ADDIE	Analysis, Design, Development, Implementation, and Evaluation Model
AET	Agricultural Education and Training
Ag Econ	Agricultural Economics
AgriSeta	Agricultural SETA
AKIS	Agricultural Knowledge and Information System
ARDRI	Agricultural and Rural Development Research Institute (Fort Hare)
AUDip	Advance University Diploma
B Ag Mgmt	Bachelor of Agricultural Management
B Agric	Bachelor of Agriculture
B Agric Hons	Bachelor of Agriculture (Honours)
B Inst Agrar	Baccalaureus Institutionis Agrariae (Bachelor of Institutional Agriculture Honours)
B Inst Agrar Hons	Baccalaureus Institutionis Agrariae Honores (Bachelor of Institutional Agriculture Honours)
B Sc Agric	Bachelor of Science in Agriculture
B Sc Agric Hons	Bachelor of Science in Agriculture (Honours)
B Tech	Bachelor of Technology
CEAD	Centre for Environment, Agriculture and Development
CHE	Council on Higher Education
CIAT	Cape Institute for Agricultural Training
CIPP	Context, Input, Process, Product Model
DBSA	Development Bank of Southern Africa
DFID	Department for International Development of the United Kingdom
DoA	(South African) National Department of Agriculture
DoE	(South African) Department of Education
FAO	Food and Agriculture Organisation of the United Nations
FET	Further Education and Training
GADI	Grootfontein Agricultural Development Institute
GDP	Gross Domestic Product
GTZ	German Agency for Technical Co-operation
HC	Higher Certificate
HE(T)	Higher Education (and Training)
HEQF	Higher Education Qualifications Framework
HESA	Higher Education South Africa
ID	Instructional Design
IFAD	International Fund for Agricultural Development
INSH	Individual Marker Notional Study Hours
INSHE	Individual Marker Notional Study Hours within an Extension Curriculum
INSHQ	Individual Marker Notional Study Hours within a Curriculum for a qualification
KZN	KwaZulu-Natal
KZNATI	KwaZulu-Natal Agricultural Training Institute
M Inst Agrar	Magister Institutionis Agrariae (Master of Institutional Agriculture)

NGO	Non-Governmental Organisation
NLH	Notional Learning Hours
NQF	National Qualifications Framework
NSH	Notional Study Hours
NWU	North West University
OBE	Outcomes-Based Education
ODI	Overseas Development Institute
OSCA	Owen Sithole College of Agriculture
PAAR	Planning, action and reflection
PDA	Provincial Department of Agriculture
PCD	Participatory Curriculum Development
PFE	Presence Factor: Extension
PFI	Presence Factor: Indicator
PGDip	Postgraduate Diploma
Potch	Potchefstroom College of Agriculture
PTD	Participatory Technology Development
SAFE	Sasakawa Africa Fund for Extension Education
SAQA	South African Qualifications Authority
SAQA D:QAD	SAQA Directorate: Quality Assurance and Development
SAUVCA	South African Universities Vice-Chancellors Association
SETA(s)	Sectoral Education and Training Authority(ies)
SL(A)	Sustainable Livelihoods (Approach)
SU	Stellenbosch University
TICE	Theory-led Instructional Design Curriculum Evaluation
TICED	Theory-led Instructional Design Curriculum Evaluation and Design
TUT	Tshwane University of Technology
UD/UDip	University Diploma
UFS	University of the Free State
UKZN	University of KwaZulu-Natal
ULIM	University of Limpopo
UNDP	United Nations Development Programme
UNIZUL	University of Zululand
UP	University of Pretoria
USNRC	United States National Research Council

Chapter 1

Introduction

1.1. Introduction

This thesis is about Agricultural Extension education. The context is Agricultural Extension in South Africa. It addresses the following questions:

- To what extent does current Agricultural Extension education in South Africa adequately reflect the current and changing educational and developmental imperatives?
- To what extent does it adequately equip Agricultural Extension practitioners and other agricultural development practitioners to deliver relevant support to farmers and farming communities?

In short, how relevant is the training received by South African extension practitioners?

Research was conducted and findings are presented on at least two levels: practical and theoretical. On the practical level, the thesis will examine extension curricula offered by South African universities and agricultural colleges. These curricula will be filtered through a number of cardinal points derived from three areas of focus: outcomes-based education (as reflected in South African educational policy); sustainable livelihoods; and South African agricultural policy (as reflected in national agricultural strategy).

In conducting the practical research, this thesis seeks to establish a model and method for examining, evaluating and recasting Agricultural Extension curricula. It offers a two-sweep filtering process. The first sweep (curricula through the filter) identifies what gaps there are in curricula.

The study will not address the debate which surrounds outcomes-based education. It assumes that this policy will endure as the South African educational framework. This study will not debate the agricultural priorities adopted by the government of the day. They will be accepted as they are presented. Only national policies will be examined as, in general, provincial agricultural policy is largely aligned to national policy. This study will also not debate the merits of sustainable livelihoods as an approach. Use of the livelihoods framework is growing in popularity and appears ever more frequently in

government, NGO and even private sector policy in South Africa, and thus demands that Agricultural Extension also be reconfigured in its wake.

In conducting the theoretical research, this thesis seeks to present a fresh look at the assumptions made when engaging in curriculum development for Agricultural Extension. Agriculture Extension has been the subject of much discussion in South Africa and in the world. It appears that discussions and investigations have examined Agricultural Extension from an operational or delivery perspective, from a 'best practice' perspective, and to a lesser extent from an educational or curricular perspective. In each of these interrogations, the fundamental assumptions informing Agricultural Extension appear not to have been questioned. Thus, while on the surface there appears to be, and in some cases there indeed is, significant change, on the whole the result is more shifts in methods than shifts in purpose and approach.

A large percentage of South Africa's population resides in rural areas and is still largely dependent on primary agricultural activities as their primary livelihood strategy. Agricultural development and extension to this sector of the population seems to have focussed on technology transfer around primary production without adequate reference to some crucial issues relevant to farmers and land users. In particular, issues of food (in)security, (un)sustainable livelihoods, farm management and natural resource management are inadequately addressed. Agricultural development and extension to this sector appears not to have taken into account the many opportunities presented by smallholder producers in terms of their capacity to produce food, fibre and fuel and in terms of their capacity to contribute to the creation of prosperity in rural areas.

It is proposed that part of the reason for the gap in addressing these and other issues relevant to the rural population is that the curricula which provide the training background for the officials employed by extension providing agencies (e.g. the Departments of Agriculture and NGOs) emphasises its science content and teaches extension methodologies which are based on an outmoded paradigm.

Further, Agricultural Extension and the curricula which inform it are based on a number of assumptions:

- Assumptions about farmers and their roles in technology and information creation and consumption,
- Assumptions about the roles of tertiary institutions in the triad of teaching, extension and research,

- Assumptions about the triad itself, and
- Assumptions about the aim of development in general and agricultural development in particular.

All these assumptions have been questioned and queried in many parts of the world (Vanclay 1994; Vanclay & Lawrence 1994; Cowen & Shenton 1996; Davidson & Ahmad 2003:131; Shepard 2005). But it appears they have not yet been interrogated in South Africa. The basic extension methods have not changed in any fundamental way. Rather one might say some of the ‘outer trappings’ of new approaches have been adopted (most notably participatory approaches), without assessing the fundamentals of the core extension approach. Lip service is paid to the implied fundamental shifts, but in reality, the extension approach, the extension agenda and its purpose remain essentially unchanged. It is technology centred, not people centred. It is production centred, not development centred.

This study was conducted on the submission that extension is in need of a serious review and that it is timely to do so. The changes to agriculture and education predicted by van Rooyen *et al* (1996) have come about. Black South Africans do have greater access to the agricultural sector of the economy. Land reform, unfettering of agricultural markets, and restructuring of agricultural support systems have and are all taking place. And, as also predicted, extension is viewed as one of those “important instruments to promote reconstruction in the agricultural sector” (van Rooyen *et al* 1996:717). The South African strategies for agricultural transformation and for agricultural education and training bear witness to the restructuring begun after the post-apartheid elections in 1994 (NDA 2001, 2005). Van Rooyen *et al* (1996:129) further predicted that extension education and training would need “substantive reorientation in order to serve a much wider clientele”. They argued for greater integration of training, research and extension and for agricultural specialists to be trained in “a range of human capital skills” (van Rooyen 1996:129). They argue further for the adjustment of agricultural education and training to accommodate the more holistic approach that would have to be adopted to cope with the anticipated changes in Agriculture in South Africa.

In a similar vein, Bembridge (1994:6) argued that agricultural education at higher education level needed to broaden its curricula “from a focus on food production to that of sustainable and productive rural development”. He also proposed that “agriculture

needs to move away from a commodity focus to an emphasis on the development of new agricultural systems” which need to be integrated into a wide range of other elements that influence “farming households”. He directly challenges universities and colleges to consider “new ways of knowing as well as new kinds of knowledge and its diffusion”, including a “student-centred curricula” which moves away from a content approach to one which nurtures a student to be a “thinking person with the ability to solve problems” (Bembridge 1994:6).

On a broader spectrum addressing agricultural education in Sub-Saharan Africa, Wallace (1997) argued for the broadening of content and approach. He stressed the need for extensive review of agricultural education and training. He highlighted the need for the integration of agricultural policy and curricula with a clear understanding of the needs of the agricultural sector as a prerequisite for both. He favoured a learner-centred, experiential approach to agricultural education, including at higher education level. Finally, he stressed the need for intensive research into agricultural education in Sub-Saharan Africa.

Notwithstanding the cogent arguments put forward by Bembridge (1994), van Rooyen *et al* (1996), Wallace (1997) and others for the broadening of the training menu for Agricultural Extension, there has been little substantive change in the fundamentals of extension curricula, and arguably little research into the field of agricultural education and training. In particular, the aforementioned assumptions have remained unchallenged. The research presented in this thesis challenges those assumptions in the light of the very educational, agricultural and development-related policies and objectives previously anticipated and now driving the transformation processes in South Africa.

Having challenged these assumptions and, emanating from a renewed purpose for extension, the research proposes Agriflection as a new theory (initially referred to as a model and approach) for Agricultural Extension to meet the agenda of South Africa’s current stage in development. This new theory was then reflected back on to the curriculum in which future extension practitioners are trained. The process of reflection results in the development of a new method for evaluating Agricultural Extension curricula and in devising an approach to collecting and analysing data that could be applied to all the higher education institutions offering extension related qualifications.

The reflection leads to recommendations for specific changes in curriculum and a new framework for developing curricula for Agricultural Extension education. Armed with

this new approach and framework, the Departments of Agriculture in partnership with Higher Education institutions and the Departments of Education, will be in a stronger position to ensure that the practitioners they train and hire are able to contribute meaningfully toward meeting the objectives set for agricultural and rural development.

1.2. Description of the research conducted

Given that the agricultural frontier is subject to change in focus and priorities, it stands to reason that the training and education of would-be extension practitioners need to be able to respond to changes both in the methods used and in the field. This research establishes a framework for appropriate Agricultural Extension curriculum which, while holding to certain principles, can respond to specific changes in focus and priorities.

The study examines existing curricula in the light of principles as they are presented in three sources driving South Africa's agricultural and educational agendas:

- Agricultural Policy
- Outcomes-based education (OBE)
- Sustainable Livelihoods (in the context of sustainable development)

1.2.1. Agricultural policy

The National Strategy for South African Agriculture is the base policy document guiding the focus and direction of the agricultural transformation agenda. It is a long-term strategy. The strategy identifies the following strategic objectives (NDA 2005):

- Fair reward for effort, risk and innovation
- Security of tenure for present and future participants
- Equitable access to resources and production factors
- The sustainable use of natural and biological resources
- Sound research, science, knowledge and technology systems
- Market forces to direct business activity and resource allocation
- A clear regulatory framework and effective government services
- Policy consistency and predictability
- Responsive partnerships between the private and public sector in policy formulation and service delivery.

The strategy also identifies the following outcomes which are expected to flow from the successful pursuit of the strategic objectives (NDA 2001):

- Increased creation of wealth in agriculture and rural areas
- Increased sustainable employment
- Increased incomes and increased foreign exchange earnings
- Reduced poverty and inequalities in land and enterprise ownership
- Improved farming efficiency
- Improved national and household food security
- Stable and safe rural communities, reduced levels of crime and violence, and sustained rural development
- Improved investor confidence leading to increased domestic and foreign investment in agricultural activities and rural areas
- Pride and dignity in agriculture as an occupation and sector

These outcomes can be used as indicators of principles for outcomes of Agricultural Extension education curricula.

1.2.2. Outcomes-based education (OBE)

OBE is the educational model adopted by the South Africa National Government as the general structure for curriculum development. While there is a debate around the implementation of OBE, as a policy, OBE provides a set of “critical cross-field outcomes” for learning (Nata 2002) which can inform and be incorporated into curricula both as learnable skills relevant to Agricultural Extension and as an educational model. These outcomes include the following (Malcolm 2001):

- Identify and solve problems by using creative and critical thinking;
- Organise and manage themselves and their activities responsibly and effectively;
- Work effectively with others in a team, group, organisation and society;
- Collect, analyse, organise and critically evaluate information;
- Use science and technology effectively and critically, showing responsibility towards the environment and the health of others;

- Understand that the world is a set of related systems. This means that problem-solving contexts do not exist in isolation; and
- Demonstrate awareness of the importance of effective learning strategies, responsible citizenship, cultural sensitivity, education and career opportunities and entrepreneurial abilities.

1.2.3. Sustainable development/livelihoods

Sustainable development and/or sustainable livelihoods approaches have also been adopted as the framework for development. Again, while there may be debate about the implementation of these particular approaches, they also can provide a set of core principles about development which can inform Agricultural Extension theory and practice, and which can be incorporated into curricula as learnable skills relevant to Agricultural Extension. The core principles are:

- **People-centred:** Livelihoods reflect the choices people make given their unique circumstances. Therefore, understanding how people sustain their lives and the choices they make is the point of departure for the sustainable livelihoods approach (de Satgé *et al* 2002).
- **Participatory:** Working with people, using a battery of participatory methods, to analyse their livelihoods rather than extracting information at a distance is central to the sustainable livelihoods approach (de Satgé *et al* 2002).
- **Holistic:** People do not live “discretely defined” lives. They are not only farmers or only family members. Each person lives within a complex system involving multiple strategies for living and are usually integrated parts of larger socio-economic systems outside their individual or family lives. Taking cognisance of this systems reality is vital to the sustainable livelihoods approach (Ashley & Carney 1999).
- **Differentiation:** Households are unique and differ one from another; likewise the members of a single household. Understanding the variations that exist

enable tailoring of interventions to make them “sensible” (de Satgé *et al* 2002);

- **Dynamic:** Livelihoods are dynamic in nature and are subject to influences which are also dynamic. Understanding the ever-changing landscape fosters the development of interventions that allow flexibility and adaptability. An “ongoing learning” approach is paramount (Ashley & Carney 1999);
- **Building on strengths:** Start with people’s strengths not needs. This implies a recognition of everyone’s potential, and calls for efforts to remove constraints to the realisation of this potential.” This is a very different starting point than is traditionally used in Agricultural Extension;
- **Macro-micro links:** Development activity needs to balance and bridge macro and micro foci. Higher-level policy needs to be informed by local level insights (Ashley & Carney 1999); and
- **Sustainability:** Sustainability for both development in general and of livelihoods in specific rests on several dimensions, including environmental, economic, social and institutional (Ashley & Carney 1999).

Drawing on the principles and other factors relevant to agricultural policy, education policy and sustainable livelihoods, this study develops a range of curriculum markers which are used to assess the efficacy of extension curricula at key tertiary institutions in South Africa. The markers are meant to represent learning areas critical to making training of extension practitioners relevant to present-day South Africa.

1.3. Scope and aim of the study

The objectives of agricultural policy and the principles entrenched in OBE and sustainable livelihoods can substantially contribute to the examination of current Agricultural Extension education curriculum and to the creation of a curriculum framework which allows for adjustment to changing imperatives while maintaining integrity in terms of education and development. Such a framework would be a valuable

tool for tertiary institutions training extension officers to transform their respective offerings to meet the aims of post-apartheid South Africa.

The study aims to achieve the following outcomes:

- Provide both the relevant Departments of Agriculture and tertiary institutions offering training in the field of Agricultural Extension with an objective analysis of the compatibility of curricula with educational and agricultural priorities.
- Present a curriculum development framework which will allow tertiary institutions to maintain educational and developmental structural integrity while allowing course content to adapt to changing priorities.
- Create a curriculum model which uses Sustainable Livelihoods and a learning agenda (driven by the principles of OBE) as the context in which relevant content (both science and process) in Agricultural Extension is learned.
- Propose a new extension concept applying the principles of Sustainable Livelihoods.

1.3.1. Primary research question

South Africa is in the midst of a process of fundamental transformation. In every aspect society has changed and is continuing to change. How South Africans view themselves, access to resources, the structure of the economy, residential patterns, the educational system, the legal environment, the focus of agricultural development – all have changed, reflecting a new South African culture. The provision of support to farmers (e.g. Agricultural Extension) should likewise change to meet the challenges of transformation.

It is then essential to investigate the following questions:

- To what extent does current Agricultural Extension education in South Africa adequately reflect the current and changing educational and developmental imperatives?

- To what extent does it equip extension officers and other agricultural development practitioners to deliver relevant support to farmers and farming communities?

Having understood the efficacy of current Agricultural Extension education curricula in the light of agricultural policy, OBE and sustainable livelihoods, the study addresses what changes in curricula would be needed to align it with the imperatives of the new vision.

1.3.2. Secondary research questions

The secondary research questions addressed in this study follow a more detailed examination of Agricultural Extension curricula in the light of current agricultural policy, OBE and Sustainable Livelihoods. The issue of livelihoods is also used to examine current Agricultural Extension theory and practice with a view to proposing a new approach that is relevant to the changing South African agricultural landscape.

1.3.3. Current agricultural policy

Part of the changes in South Africa includes the adoption of new visions for agriculture and its role in the economy and society. Some of these changes are fundamental and represent a major departure from the aims, objectives and purposes of previous agricultural policy. In order to align training of Agricultural Extension with current agricultural policy, the study examines the following:

- The extent to which current Agricultural Extension education in South Africa reflects the principles enshrined in current agricultural policy; and

1.3.4. Outcomes-based education

In order to align training of Agricultural Extension practitioners with the principles enshrined in national education policy, the study explores the extent to which current Agricultural Extension education in South Africa meets the learning principles enshrined in the theory supporting outcomes-based education (OBE).

- The study examines how Agricultural Extension education curricula can meet the OBE framework as articulated in South African educational policy

Further, the study investigates the extent to which Agricultural Extension education curricula provide graduates knowledge and skills to facilitate the acquisition of these skills by farmers and other clients of extension practitioners.

1.3.5. Sustainable livelihoods

In order to align training of Agricultural Extension with current development imperatives, the proposed research will examine the extent to which Agricultural Extension curricula in South Africa meets the principles of the Sustainable Livelihoods Approach.

1.3.6. Sustainable livelihoods and Agricultural Extension

In addition to the impact of sustainable livelihoods on Agricultural Extension education curricula, the principles of the sustainable livelihoods approach, as a foundation for development, suggests a review of extension methods in the light of sustainable livelihoods and related development theory. Thus the study researches how the adoption of these approaches to development affects how Agricultural Extension should be practiced in South Africa.

The purpose of this facet of the research is to capture the full extent of the transformation opportunities and challenge at both the training end and the delivery end. This ensures a macro-micro link between theory, teaching and practice. This takes cognisance of recent surveys into Agricultural Extensions. The results of this facet of the proposed research will provide a framework for interpreting that and similar surveys into Agricultural Extension in South Africa. It will also be helpful in devising an appropriate implementation plan stemming from these surveys.

It will further take cognisance of the South African National Strategy for Agricultural Education and Training. In this connection, it will augment its aims and will contribute to the adjustments to agricultural education and training proposed in that strategy.

1.4. Outcomes of the study

The study aims to achieve the following outcomes:

- Provide both the relevant Departments of Agriculture and tertiary institutions offering training in the field of Agricultural Extension with an objective analysis of the compatibility of curricula with educational and agricultural priorities.
- Present a curriculum development framework which will allow tertiary institutions to maintain educational and developmental structural integrity while allowing course content to adapt to changing priorities.
- Create a curriculum model which uses Sustainable Livelihoods and a learning agenda (driven by the principles of OBE) as the context in which relevant content (both science and process) in Agricultural Extension is learned.
- Propose a new concept for extension applying the principles of Sustainable Livelihoods.

1.5. Methodology

The study was approached in two phases. These are discussed briefly below. More details of the research methodology are discussed in Chapters 5 and 6.

1.5.1. Phase 1: Study of literature

First will be a detailed study of literature to provide a solid theoretical foundation and framework for conducting the inquiries into Agricultural Extension and Agricultural Extension education curricula as influenced by the principles of outcomes-based education and the sustainable livelihoods approach. A review of relevant National government policy documents in education and agriculture will be included in this review. Also included will be an overview of agriculture, Agricultural Extension and Agricultural Extension education in pre- and post-apartheid South Africa.

The study of literature was conducted in three stages and is presented in three separate chapters. Each stage addressed a different element of the research framework. Each literature review resulted in identifying curricula markers used in the second phase of the study. A significant element of this phase is a theoretical examination of Agricultural Extension methods applying the principles of Sustainable Livelihoods. This results in a recommended extension model for South Africa.

1.5.2. Phase 2: Interrogation of extension curricula and interpretation of results

As noted above, the literature review is used to identify the range of data to be gathered in second phase of the research. The second phase involved primary research conducted largely along the following lines:

- Consolidate the curricula markers to be used to examine extension curricula
- Identify all institutions in South Africa which offer Agricultural Extension education.
- Develop a scorecard to interrogate the curricula of identified institutions. The scorecard will be structured on the criteria identified in the review of literature.
- Engage the identified institutions in interviews using the scorecards to provide the raw data for the research.
- Consolidate data and develop a method of data analysis.
- Contrast the findings with sample surveys among extension practitioners and job descriptions of public extension practitioners.
- Draw conclusions and make recommendations for changes in curricula.

1.6. Importance of the study

Prosperity – continuous and sustainable wealth creation -- is an elusive goal in South African smallholder agriculture. This study suggests that Agricultural Extension can facilitate realising this objective if an appropriate approach to extension can be developed. The level of poverty and the lack of progress, as admitted by the South African Government in its agricultural strategy (NDA 2005), is a clear indictment of the failure of Agricultural Extension to deliver on the transformation agenda in agriculture. Extension practitioners, tertiary institutions that train them and agencies that employ them, need to understand the underlying problems and issues creating the impasse in rural and agricultural development. The livelihoods of hundreds of thousands of smallholder farmers are at stake.

This study provides the State and relevant tertiary institutions with a theoretical framework for assessing Agricultural Extension and Agricultural Extension education curricula. It provides an assessment of current Agricultural Extension education curricula offerings and makes recommendations for changes. Beyond this, it develops an assessment tool which is constructed on principles which are aligned to the vision of the new South Africa.

The study provides a deeper understanding of the role Agricultural Extension can play in fulfilling the aims and objectives of national agricultural strategy. And it creates a foundation for realigning Agricultural Extension itself. It provides for the integration of Agricultural Extension with educational objectives of the State.

The proposed changes to Agricultural Extension education and to Agricultural Extension as a practice are fundamental and somewhat sweeping in nature. It is submitted that without such changes, rural livelihoods will continue to deteriorate and the promulgated agricultural policy will not come to sustainable fruition. Thus this study should make a meaningful contribution to addressing this vital aspect of sustainable development in South Africa.

1.7. Assumptions and limitations

Tertiary institutions operate in a competitive environment. They compete for students, for funding and for government subsidies. Thus access to some tertiary institutions is limited. Attempts were made to contact all of the relevant institutions; however, not all were able or willing to participate. Thus the data, information and conclusions drawn are limited by participation.

Further, in working with the participating institutions, it is assumed that the respondents are competent to respond and are trustworthy in their responses. Access to details of specific modules is a sensitive issue and therefore was also limited.

The sampling of extension practitioners for the purpose of contrasting data was deliberately small. Its main purpose was to provide a context for deeper analysis of the evaluation of curricula. It was not meant to present conclusive findings on the capabilities of extension practitioners.

Likewise, the use of standard job descriptions for extension functionaries was done deliberately. The study is not intended to present an exhaustive interrogation of jobs and

posts and their respective employment criteria. Job descriptions are used to provide a second context for analysis of the data generated by the evaluation of curricula.

The study does not interrogate the efficacy of the South African Government's agricultural and educational policies. In particular the debate around OBE is not interrogated in depth. It is used as a *de facto* construct in the development of the educational framework and of specific curricular markers. More attention is given to the South African Strategy for Agriculture; however, again, its efficacy is not challenged as this is beyond the scope of this study.

Similarly, issues of service delivery, structuring of extension, funding, and the debate around the location of extension services in the private and public sectors are all excluded from the study. While these are topical and important issues facing Agricultural Extension, they fall outside the scope of this study.

Due to the theoretical nature of much of this study, peer reviewed references were often lacking. *Per force*, there is much reliance on position papers, occasional papers, and conference proceedings. The researcher contends that this in no way detracts from the efficacy of the conclusions developed particularly in the literature review. Quite the contrary; the use of more topical references in conjunction with peer reviewed research demonstrates and highlights the dynamic nature of the subject being examined.

1.8. Structure of the Thesis

The thesis is structured with ten chapters. Several of the chapters are developed as articles for publication – Chapters 2 and 3 have been published; Chapter 4 is in press; Chapter 5 has been submitted for publication; an earlier version of Chapter 10 has been published in the proceedings of the annual conference of the South African Society for Agricultural Extension. Each chapter has its own list of references.

Chapter 1 is an introductory chapter. Through the integration of agricultural policy and development and sustainable livelihoods theory, Chapter 2 addresses the approach to Agricultural Extension. It proposes Agriflection as a new concept for Agricultural Extension. Finally, it lays the groundwork for developing curriculum markers.

Chapter 3 develops the first set of curriculum markers. These are derived primarily from educational policy as seen in the context of agricultural development.

Chapter 4 expands and consolidates the curricula markers used in the study. It includes the markers established in Chapter 3 and draws from agricultural development

policy and agricultural education and training policy to determine the balance of the markers.

Chapter 5 sets out the methods used to evaluate Agricultural Extension curricula. It provides the theoretical underpinnings to the research. It introduces the Theory-led Instructional-Design Curriculum Evaluation TICE method of curriculum evaluation.

Chapter 6 presents the methodologies developed to collect and analyse data. It provides a common framework used at colleges, universities and universities of technology.

Chapter 7 presents the findings of the research conducted at the Colleges of Agriculture. It provides a profile for each tertiary institution included in the study. It further provides an assessment of each institution's Agricultural Extension curricular offerings based on the markers outlined in Chapter 4.

Chapter 8 presents the findings of the research conducted at the Universities and Universities of Technology that offer agricultural qualifications. It also provides a summary and initial conclusions from the findings from the colleges and universities.

Chapter 9 presents the findings of the corroborative research conducted among public sector Agricultural Extension practitioners and a review of job descriptions of public sector Agricultural Extension. It also provides a summary and initial conclusions from all the research.

Chapter 10 sets out the conclusions and presents recommendations. It also identifies additional research to be conducted and specific learning points in terms of the research process in this study.

Each chapter has its own set of references. This approach was adopted to facilitate the development of publishable articles as well as to facilitate the location of references in each chapter. Consequently, there are some repetitions in references from chapter to chapter.

1.9. Conclusion

This study represents a unique body of research in South Africa. It brings together the disciplines and theories of Agricultural Extension, education and sustainable livelihoods. Through a process of integrating these disciplines and theories, the study presents a framework for evaluating extension curricula at the major tertiary institutions at which

agriculture is taught. It challenges the *status quo* in South African extension thinking and presents a learning based model for extension. The recommendations made range from simple to groundbreaking. It is intended that the discoveries made in this study will provide a beneficial impetus to the much-needed transformation of Agricultural Extension in South Africa.

The study makes a number of contributions to new learning in the co-fields of Agricultural Extension and Agricultural Education. The research findings are the main technical contribution. Clearly from the research presented, much work is needed if South African Agricultural Extension curricula are to enable the extension practitioners it trains to deliver on the intended outcomes of current agricultural policy.

It introduces Agriflection as a new theory for Agricultural Extension challenging for the first time in a genuine way, the way South Africa understands and practices Agricultural Extension. This initial challenge sets the stage for challenging the curricula underpinning Agricultural Extension training and education. In so doing, this study proposes TICE as a new method for examining Agricultural Extension curricula. The post-study analysis expands this new method to include curriculum design. This method can be applied to any educational programme. The key and unique element is its deliberate questioning of fundamental assumptions that underpin and drive Agricultural Extension and, by default, Agricultural Extension curricula.

The study also proposes an approach to Agricultural Extension curriculum by presenting a 'carousel of Agricultural Extension curriculum'. The aim of this is to help ensure that Agricultural Extension practitioners are able to deliver on the goals and imperatives of current South African agricultural policy.

Ultimately, it is hoped that the research presented in this thesis will be taken on board by higher education institutions for the benefit of all those working in the aligned fields of Agricultural Extension and rural development. It provides a sound foundation for far-reaching transformation of Agricultural Extension education in South Africa, without which there is little hope of ever achieving the intentions of policy.

References

- Ashley, C. and Carney, D., 1999. *Sustainable Livelihoods: Lessons from early experience*. Department for International Development, London.
- Bembridge, T., 1994. Agricultural education: policy neglect. *Matlhasedi*, 13 (1), 3-6.
- Cowen, M., and Shenton, R.W., 1996. *Doctrines of Development*. Routledge, London
- Davidson, A.P. and Ahmad, M., 2003. *Privatization and the Crisis of Agricultural Extension: The Case of Pakistan*. Ashgate Publishing, Hampshire.
- De Satgé, R., Holloway, A., Mullins, D., Nchabaleng, L., and Ward, P., 2002. *Learning about Livelihoods: Insights from Southern Africa*. Periperi Publications, Cape Town.
- Malcolm, C., 2001. Implementation of outcomes-based education approaches to education in Australia and South Africa: a comparative study. In Sayed, Y. and Janson, J. (2001) *Implementing Education Policies: The South African Experience*. University of Cape Town Press, Cape Town.
- Nata, R., 2002. *Progress in Education*. Nova Publishers, New York.
- NDA (South African National Department of Agriculture), 2001. The Strategic Plan for South African Agriculture. Department of Agriculture, Pretoria.
- NDA (South African National Department of Agriculture), 2005. National Education and Training Strategy for Agriculture and Rural Development in South Africa (AET Strategy). Department of Agriculture, Pretoria.
- Shepard, C.J., 2005. Agricultural Development NGOs, Anthropology and the encounter with cultural knowledge. *Culture & Agriculture* 27(1), 35-44
- Vanclay, F. 1994. A crisis in agricultural extension? *Rural Society*. 4(1), 10-13
- Vanclay, F. and Lawrence, G., 1994. Farmer rationality and the adoption of environmentally sound practices: a critique of the assumptions of traditional agricultural extension *European Journal of Agricultural Education and Extension* 1(1) 50-59
- Van Rooyen, J., Barnard, R. and van Zyl, J., 1996. Agricultural education and training in South Africa: an overview. *Development Southern Africa*, 13 (5), 713-31.
- Wallace, I., 1997. Agricultural education at the crossroads: present dilemmas and possible options for the future in Sub-Saharan Africa. *International Journal of Educational Development*, 17 (1), 27-39.

Chapter 2

Agriflection: a learning model for Agricultural Extension in South Africa⁸

2.1. Introduction

Although this thesis is about agricultural extension education, it is more fundamentally about agricultural extension. As submitted in Chapter 1, the researcher had observed that agricultural extension in practice in South Africa among the disenfranchised masses for many years had largely failed. As a manager of three large extension contingents, he observed with increasing clarity the failure of extension to deliver its intended results. Earlier research published in his Masters Thesis (Worth 1994) – *The Management of Agricultural Development in Bophuthatswana since 1977* – established that agricultural development had failed to achieve its stated objectives. There was a significant disconnect between what was to *be* achieved and what *was* achieved.

During that period of research, the researcher was given specialised extension training in what he refers to as the behavioural model. Düvel (1999:28), author of the training indicated that extension is “the business of behavior intervention or change facilitation”. In that training it was argued that farmers needed to be convinced to adopt technology by breaking down their resistance to adoption. Düvel further argued that farmers were fundamentally irrational in their decision making and needed to be guided by the extension officer to make rational decisions (Düvel 2001). Betru and Long (1996:16) citing Röling (1990) noted: “Because countries use extension to achieve different objectives, there is no one definition for it. However, in all cases, there is a considerable emphasis on the use of extension for the development of human beings to increase their capacity for rational decision making”.

Prior to the training cited above, the researcher had been trained in extension through a method he refers to as the communications model. This model had been developed by Bembridge in an effort to assist disenfranchised black farmers. (Bembridge 1991a;

⁸ This chapter is adapted for this thesis from: Worth, S. (2006) *Agriflection: a learning model for agricultural extension in South Africa. The Journal of Agricultural Education and Extension. 12 (3) pp. 173-193*

1991b). Bembridge's work was considered to be breaking "new ground to prepare what is the first attempt at conveying the 'how' of extension, at least in Southern Africa." (Brand in Bembridge 1991:5). It was grounded in the 'Training and Visit' model with adaptations for Southern Africa.

Although Bembridge speaks frequently of education and learning and of human behaviour, the majority of his work focuses on communication with the view to technology adoption. He argued that "adoption of farming practices, yield increases, and production levels," were "partial indicators" for evaluating extension. He offered no other indicators.

The apparent failure of extension using these two aforementioned approaches gave rise in the mind of the researcher to the question of the suitability of these approaches. Granted, there are a host of other factors that contributed to this failure, but as Ngomane (2006) noted, the technology transfer approach has not met the needs of small holder farmers in Africa and other developing areas. Simpson and Owens (2002) earlier cited learning as a key element – in this case a failed element – in successful extension in the context of Farmer Field Schools.

Van den Ban (2006:417) took the argument a step further. He submitted that "the changes in the role of agricultural extension, which are needed require different competencies from the agricultural extension agents as most of them do not have at this moment. He identified "partnership and learning" as "Two key concepts in modern thinking agricultural extension, development and innovation" (van den Ban 2006:414) and highlighted the role of the extension practitioner as a facilitator of the learning relationship and as one who "stimulates" learning. He alluded to the need for an "education programme which teaches these competencies."

Thus, if the study was to look at the effectiveness of agricultural extension curricula, the question then arose: What extension approach should be used to as the framework for interrogating curricula? The conscious decision was taken to use none of the established systems of extension, but to research extension itself and evolve at least a theoretical 'best model' which could be used to generate the areas of learning needed for an extension curriculum. Thus the thesis, perhaps out of step with conventional research, presents new theory early in its development. However, having such a model (or concept as it evolved) fit into the idea of theory-led curriculum development discussed in Chapter 5.

Further, the context of this study is poverty among South African smallholder farmers. Some 3.24 million households in South Africa operate on smallholdings and engage with agriculture and farming for reasons that run along a continuum of essential food production on the one end and 'for profit' on the other. Few households use their land exclusively for food production or exclusively for profit; the majority use their land for a combination with a wide and changing mix of reasons along the continuum (NDA 2001).

Typically, these households are resource poor and can be classified as materially poor. Many of these smallholder farmers see themselves as trapped, without options. Indeed, they are 'trapped' by circumstance, by force of history, by disadvantage, and by a host of access issues (Machethe 2004; IFAD 2001; DoA 2001). Beyond these material/practical encumbrances, their poverty can be characterised by an emotional disconnection from the factors influencing hope, vision, and concepts of wealth; answers to their poverty lie outside themselves (Thomas 2000).

In South Africa, Agricultural Extension and its research companion have generally offered technology as the answer to wealth creation among materially poor smallholder farmers. Technology is made the centrepiece of poverty alleviation and wealth creation. However, the burgeoning poverty extant among smallholder farmers, despite the dissemination of a plethora of scientifically researched technologies, suggests that answers to fostering prosperity among smallholder farmers lies beyond mere development and adoption of technologies (Machethe 2004).

The FAO and World Bank (2000) suggest that focussing on issues such as creating partnerships with farmers in agricultural knowledge and information systems rather than on mere technology transfer. They argue the value of the farmer as a partner in development and extension instead of simply being a recipient of these.

Richards (2004:73-74) noted that it had been established that "transformation of the agricultural sector is considered a prerequisite for the eradication of poverty. She argued that education of farmers supported by "applicable training programmes" would be an important element of the desired transformation.

This paradox inspires creative research into Agricultural Extension (particularly for smallholder farmers) to transform constraining perceptions, assumptions and output of extension and research. To this end, this chapter proposes that part of the answer to fostering prosperity lies in the approach taken to engage farmers in improving their farming and livelihoods. It further proposes that part of the answer lies in understanding

how to support, strengthen and build on the given resources and current livelihood strategies of smallholder farmers to facilitate profitability and sustainability.

This chapter explores new ways to engage farmers in scientific enquiry. It presents a learning model for extension called Agriflection that incorporates critical elements of sustainable, people-centred development and reflects the growing mass of evidence advocating iterative, incremental, reflective development processes based on assets, partnerships, and a genuine commitment to learning. The model identifies partnerships, determines development pathways and illustrates a facilitated learning agenda that governs the relationship particularly between farmers and extension practitioners.

The model challenges a number of long-standing traditions in extension in South Africa, particularly in the arena of information and technology development and adoption. To apply the model in practice would require fundamental changes to the way extension is carried out, supported, and evaluated.—changing what is measured to determine success in extension, and, therefore, changing what is done and the kind of results that can be obtained.

The Agriflection model proposes that farmers should be engaged in genuine partnerships with researchers, extension workers, funders and policy makers for the purpose of learning. The first learning is about what farmers do, why they do it, and how they can make their current farming systems more profitable and sustainable. In following this approach, farmers are full partners in research and innovation that can create technologies (including hard technologies, methods and processes) that can directly impact on the profitability and sustainability of participating farmers. This frames a prosperity pathway and, by engaging with learning, a farmer begins to travel the pathway.

The outcomes of applying such an extension approach would include:

- Knowledge about smallholder agricultural systems and what is needed to assist smallholder farmers improve the sustainability of their farming livelihoods from the point of view of the farmer;
- Knowledge about the technical agricultural options available to smallholder farmers which will enable farmers to improve the contribution of their agricultural activities to the sustainability of their household and farming livelihood systems, again from the point of view of the farmer; and
- Methods and systems to actively engage and support smallholder farmers with continuous inquiry into technical agricultural science (e.g. technology

development, innovation, agricultural practices, research) as it impacts on their livelihoods.

The intended result of the approach is to foster a cadre of innovative farmers who have the capacity and skills to continue innovating, whose farming systems are more profitable and sustainable, and who, instead of being the target of extension, are an integral part of extension.

This part of the research is at the heart of the primary research question. It is submitted that before one can address the question of the effectiveness of Agricultural Extension education in South Africa, it is first necessary to address the last secondary research question, namely, how should Agricultural Extension be pursued in the light of current development theory and the framework of Sustainable Livelihoods?

2.2. The challenge of a new model for Agricultural Extension for South Africa

Extension has been an active force in agriculture since the 1800s. The primary focus of extension was and has remained technology transfer. In recent years, concept and practice of Agricultural Extension has expanded to include more participatory approaches that are more inclusive of farmers as active players in the Agricultural Extension mix and issues of poverty alleviation and food security (Swanson *et al* 1997, Rivera 2003).

Much of the current thinking around poverty centres on livelihoods – linking poverty alleviation to strengthening human livelihoods. Agriculture plays an important part in the livelihoods of millions of rural dwellers (NDA 2001). Korten (1990) identified agricultural intensification and diversification, together with far-reaching rural reforms from education to infrastructure as essential elements of poverty alleviation and sustainable economic growth.

The current South African agricultural agenda seeks to move beyond poverty alleviation to wealth creation (NDA 2001). In this chapter, this is expanded to prosperity. Given the inclusion of livelihoods and prosperity agendas in the expected outcomes of extension, an examination of the means by which extension contributes to these agendas is necessary. That extension should contribute to strengthening livelihoods and prosperity is evident, but how extension could do this requires investigation. This is particularly important to South Africa where millions of people living in rural areas experience chronic food insecurity and poverty, despite national food security (Bonti-Ankomah

2001; DoA 2001). This interrogation presents a challenge to develop a new model for Agricultural Extension.

The Strategic Plan for South African Agriculture (NDA 2001) outlines the intended outcomes for South African agriculture:

- Increased creation of wealth in agriculture and rural areas;
- Increased sustainable employment;
- Increased incomes and increased foreign exchange earnings;
- Reduced poverty and inequalities in land and enterprise ownership;
- Improved farming efficiency;
- Improved national and household food security;
- Stable and safe rural communities, reduced levels of crime and violence, and sustained rural development;
- Improved investor confidence leading to increased domestic and foreign investment in agricultural activities and rural areas; and
- Pride and dignity in agriculture as an occupation and sector.

The Strategic Plan for South African Agriculture (NDA 2001) clearly highlights the poverty, wealth and livelihoods agendas and identifies extension services, whether state, private, or NGO-based, as one of the key partners in the realisation of these objectives. The outcome is clear, but the means to achieve the objectives requires further investigation.

For at least a decade, international reviews of extension have explored and established theoretical and practical relationships between extension and sustainability in general, and livelihoods in particular. Röling (1990) and Engel and Röling (1991) supported definite links between extension and livelihoods. Such linkages were cited as critical to fulfilling the potential of rural populations. Scoones and Thompson (1994) attributing the concept to Chambers *et al* (1989) introduced into extension theory the more specific concept of Sustainable Livelihoods (SL) addressing the complexities of household, family and community livelihood strategies. This is confirmed in later research by the Neuchâtel Group (1999) and Christoplos *et al* (2000).

Internationally, principles of SL approaches are being ever more widely applied. There is also growing evidence of the applicability of SL approaches to various facets of poverty alleviation, rural wealth creation and restructuring of rural livelihood dynamics

(Ashley & Carney 1999; UNDP 2001; Franks 2002; Toner 2002). FAO (2002) noted that livelihoods approaches are increasingly being used by governments and development agencies as means of addressing food insecurity and poverty.

The parallels between the SL agenda and that of the Strategic Plan for South African Agriculture warrant a structured examination of the application of SL approaches to extension. The examination needs to be conducted along both theoretical and practical lines. This chapter seeks to address initial considerations of theoretical aspects of the parallels. What is desired is an extension approach that incorporates essential elements and intended outcomes of SL approaches while remaining focussed on agriculture.

The objective of such an exploration would be to reshape principles and assumptions so that Agricultural Extension can be re-cast in such a way that it can strengthen the capacity of people engaged in agriculture and thereby tap the agricultural potential of rural communities. Such an approach would need to give practical expression to South Africa's policies to revitalise rural agrarian communities, putting them on a pathway to enduring prosperity.

2.3. Understanding what Agricultural Extension is

Röling (1995) identified three approaches to Agricultural Extension: linear models, advisory models and facilitation models. Linear models focus on technology transfer with extension officers being conduits to farmers. Advisory models remain technology based, but places greater onus on farmers for accessing information about technology and provides access to technical advice and support.

In contrast, facilitation models stress the engagement between and amongst researchers, extension officers and farmers in the pursuit of knowledge/technology development. In facilitation models, research develops principles of sustainable agriculture, the curricula for “discovery learning” and learning tools (Röling 1995). Farmers engage as partners in a learning process facilitated by extension officers.

Fulton *et al* (2003) confirmed Röling's (1990, 1991) assertions that the purpose of extension is to develop and enrich livelihoods. They further state that the focus of extension should be on rural people realising their full potential. Hanyani-Mlambo (2000) further noted the contribution extension makes as a catalyst to agricultural and rural development.

Literature reveals a wide range of opinions about the role of farmers in extension. On the one end, farmers are seen as recipients of extension. On the other end, farmers are seen as partners in extension. Petheram (1998) identified farmers as beneficiaries of extension. Düvel (2000) identified farmers as participants in extension. Schuh (2000) implied farmers are learners, arguing that education puts farmers in the position of being able to use their resources more efficiently. Roberts *et al* (2002) recognised farmers as “co-learners”; through this role, gaining knowledge was expedited.

Swanson *et al* (1997) suggested that extension should integrate technology transfer with human resource development; that farmers need to acquire skills beyond merely using a particular technology. They need to acquire skills that foster insight into problems and alternatives. The skills required may vary from community to community, but extension clearly has a role in human resource development amongst farmers.

2.4. An Agricultural Extension framework

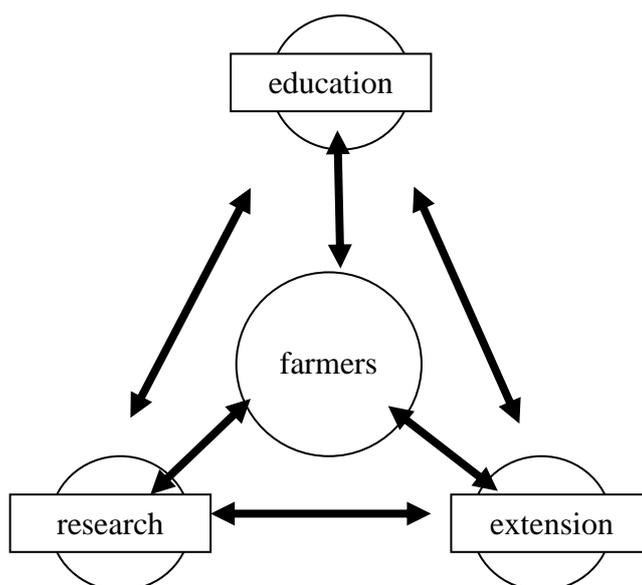
Extension officers require a clear framework within which to make decisions to ensure that services are relevant to farmers and communities, are relevant to State priorities, and are flexible and able to respond to the dynamics of farming, communities and development.

Extension thinking is often captured in the AKIS (Agricultural Knowledge and Information Systems) model as set out in Figure 2.1. AKIS models traditionally demonstrate the relationship between the role-players in the extension mix and highlight the need for strengthening relationships among contributors to extension processes. AKIS models also provide a useful foundation on which to create a new understanding of ‘extension’. In the context of this chapter, the AKIS model is used as a framework for exploring learning and learning relationships in extension.

The ultimate choice of an AKIS will be a function of at least the following:

- Perception of the farmer (end-user or equal/balanced partner);
- Perception of the role of research (fountainhead or learning enabler);
- Perception of extension (transfer of technology or mutual learning);
- Policy intention of extension action; and
- Locus of innovation (scientist or farmer or partnership).

Figure 2.1: A basic Agricultural Knowledge and Information System (AKIS).



Source: FAO and World Bank (2000)

Pivotal to the relational framework is assumptions about innovation. This touches on the distinction between research and extension, and between innovation and technology transfer/adoption. The locus of innovation is a critical factor in both the AKIS and the extension method it supports. Where innovation is seen as emanating primarily from scientists, the linear extension method is the likely choice of method and the attending AKIS of “scientist to farmer-as-passive-end-user” will likely ensue (Röling 1995).

However, Alders *et al* (1993) and Shrestha (2000) confirmed that farmers are experimenters, innovators and active participants in change. This being the case, extension must necessarily accommodate and foster active engagement of farmers in experimentation, innovation and change. Such a method would be a facilitation method. However, in acknowledging and giving space to local (indigenous) knowledge and innovation, complexity is created. Drawing from Röling (1995), the AKIS (i.e. learning relationship) needed to support complexity is one which comprises a loose network of mobile trained facilitators who have access to technical and other backup support and who are able to visit farmers on a regular basis. It would also incorporate networks of trained farmers who can exchange experience and stimulate each other to continue to learn.

2.5. Sustainable livelihoods approaches and Agricultural Extension

SL approaches provide a useful learning framework, and have positive implications for extension. As noted previously, Röling (1990; 1991), Scoones and Thompson (1994), the Neuchâtel Group (1999) and Christoplos *et al* (2000) each confirmed the relevance of a livelihoods or SL approach to extension.

Briefly, the SL approach developed by DFID is a way of thinking about the objectives, scope and priorities for development, in order to address poverty (Ashley & Carney 1999). It operates on an understanding that people operate within systems: household systems, community systems, social systems and, in particular, livelihood systems. Starting with people and the way they lead their lives, SL seeks to find practical ways to investigate individual and collective social and economic advancement, to organise information relevant to that advancement and to genuinely engage the ‘poor’ themselves in the entire process of creating wealth.

SL approaches submit that fostering sustainable livelihoods is the key to poverty alleviation, wealth creation and sustainable development. Livelihoods comprise people and their capabilities, material assets (including food and income), social assets and activities required for a means of living (Chambers & Conway 1992; Ashley & Carney 1999). Chambers and Conway (1992:6) noted that a livelihood is sustainable when it can “cope and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.”

SL frameworks are structured around key principles which are particularly relevant to extension:

People-centred: Livelihoods reflect the choices people make given their unique circumstances. Understanding how people sustain their lives and the choices they make is the point of departure for SL approaches (de Satgé *et al* 2002).

Participatory: Working with people, using participatory methods to analyse their livelihoods rather than extracting information at a distance, is central to SL approaches (de Satgé *et al* 2002).

Holistic: People do not live “discretely defined” lives. They live within complex systems involving multiple strategies for living and are usually integrated parts of larger socio-economic systems outside their individual or family lives. Taking cognisance of these systems is vital to SL approaches (Ashley & Carney 1999: 45).

Differentiation: Households are unique and differ one from another; likewise the members of a single household. Understanding the variations that exist enables tailoring interventions to make them sensible (de Satgé *et al* 2002).

Dynamic: Livelihoods are dynamic and subject to influences which are also dynamic. Understanding the ever-changing landscape fosters the development of interventions that allow flexibility and adaptability. A continuous learning approach is paramount (Ashley & Carney 1999).

Building on strengths: According to Ashley and Carney (1999: 45) a SL approach “starts with people’s strengths not needs. This implies a recognition of everyone’s potential, and calls for efforts to remove constraints to the realisation of this potential.”

Macro-micro links: SL strategies dissolve the distinction between micro- and macro development activities (De Gruchy 2004). Noting there is often a bias either toward micro- or macro-level when considering development policy and action, Ashley and Carney (1999) argued that government policy (macro) needs to be informed by the local level (micro) and vice-versa.

Sustainability: The key concern is that development should not be short-lived, but enduring. This requires addressing sustainability along a wider scope including social, economic, environmental and institutional sustainability (Ashley & Carney 1999).

Analysing assets and vulnerabilities is a key practice in SL approaches. Assets are anything, e.g. skills, capacities, and/or social arrangements that a person may have or have access to. Typically, assets are divided into five categories; human, social, financial, physical and natural. Vulnerabilities are factors that either reduce productivity or value of the asset or threaten to cut off the asset or access to it (Ashely & Carney 1999; Nicol

2000; de Gruchy 2004). Building on assets and strengths is a distinguishing feature of SL approaches and is a very different starting point than is traditionally used in extension. Building on strengths rather than focussing on needs leads to more sustainable development and action, and reduces vulnerability and dependency (Kretzmann & McKnight 1993; Friedland 1996). The implication for extension is that analyses focus on what people do and what they have rather than on their problems or needs.

SL approaches offer useful frameworks for developing extension models and for identifying learning and training requirements for promoting livelihoods that are more sustainable. The opportunity is presented to pass the concept of extension through the principles and frameworks of SL approaches to identify opportunities for adjustment to extension.

Applying livelihoods approaches to extension can assist farmers move from merely escaping poverty to helping them “thrive” (Farrington et al 2002). Applying SL approaches to realise improved assets, reduced vulnerability and prosperity, requires that all relevant role-players engage fully in the process. The role-players are the ‘enablers’, ‘service providers’ and ‘clients’.

“Enabler” is the term given to the collection of public and private institutions (including politicians, government departments, donors, etc.) that shape the environment in which extension takes place. Policies, laws, procedures and the public and private institutions responsible for them must also adapt to this framework to strengthening livelihoods of farmers (GTZ Undated).

In the case of extension, ‘service providers’ refers to extension services. In this connection, extension requires direction for both farmers and extension workers, and a clear framework within which choices and decisions can be made. Extension needs to be organised and supported in such a way that services rendered are relevant to farmers and communities. Services also need to be relevant to State priorities, yet flexible and able to respond to the dynamics of farming, communities and development (GTZ Undated).

‘Clients’, in this case, farmers, are also equal partners in the extension mix. Farmers take responsibility for understanding their livelihood strategies and the supporting asset base. They take responsibility for contributing to, drawing from and acting upon whatever is learned through the engagement with the enablers and, especially, with the service providers (GTZ Undated).

The responsibilities or roles of the three principle partners in a livelihoods-based extension model are captured in Table 2.1.

Farrington *et al* (2002:66-67) identified that extension has the scope to “to build links between extension and poverty reduction”, needs to redefine its “*raison d’être*” to embrace the poor as “more than just producers”, as people who also often need other advice and service to be safely included in development. Extension needs to partner with “other actors in the commodity chain” to reach farmers. They noted further the importance of “analysing and supporting the information, advisory and skill needs of a wider range of actors in and around the agricultural sector, rather than only producers” and “re-assessing the roles of demand and supply sides in the provision of extension and other services”.

Table 2.1: Roles of Partners in a livelihoods based extension model

Partner	Roles
Enablers	<ul style="list-style-type: none"> • Identify and alter policies, laws and institutional procedures that impacts negatively on farmers • Set clear objectives that harmonise with livelihood objectives of farmers • Identify new opportunities for farmers • Coherently link policies, organisational structures and practice • Suggest changes in laws and institutional procedures that support farmers’ objectives
Service providers	<ul style="list-style-type: none"> • Help farmers analyse their assets and identify their strengths • Identify stresses that can be reduced to make farmers less vulnerable • Help farmers design action plans based on their “best entry points” • Facilitate access to services needed to support action plans • Facilitate improved negotiating position of farmers with stakeholders in farming (e.g. markets, suppliers, service providers) • Enhance participation of farmers in decision-making processes at all levels. • Look beyond agricultural production and productivity to identify the most suitable and feasible ways to reduce vulnerability and increase wealth among farmers
Farmers	<ul style="list-style-type: none"> • Analysing their assets and prioritising their “best-bet entry points” • Involvement in action planning, negotiation, implementation and evaluation • Contributing to, drawing from and acting upon whatever is learned through the engagement with the enablers and service providers.

Developed from GTZ (Undated)

The above findings of Farrington *et al* (2002:66-67) reinforce the need for partnerships among extension stakeholders as identified by GTZ (Undated). They also highlight the need to broaden the reach of extension beyond mere production advice. This gives further impetus to reformulating extension theory and practice.

2.6. The Agriflection model

Through synthesising of the concepts and principles of SL with an adaptation of the AKIS framework in which the individual elements of education, research and extension are more fully integrated, a new model for extension can be formulated. The aim of the new model would be to acknowledge and work within complex farming and food production systems of farmers and the even more complex systems of livelihood strategies. The new model must define and explain the nature and purpose of the partnerships among role-players.

The proposed model termed “Agriflection” is depicted in Figure 2.2. It holds significant potential for realising the human and agricultural aims of current South African agricultural policy. It also presents a theoretical framework for examining the training of Agricultural Extension practitioners needed to realise the broadened aims of extension.

However, it should be noted that Agriflection is not being proposed as a model replace other models or approaches to Agricultural Extension. Rather it is intended to consolidate thinking around non-technology based approaches to Agricultural Extension. It broadens the arena of theory and practice.

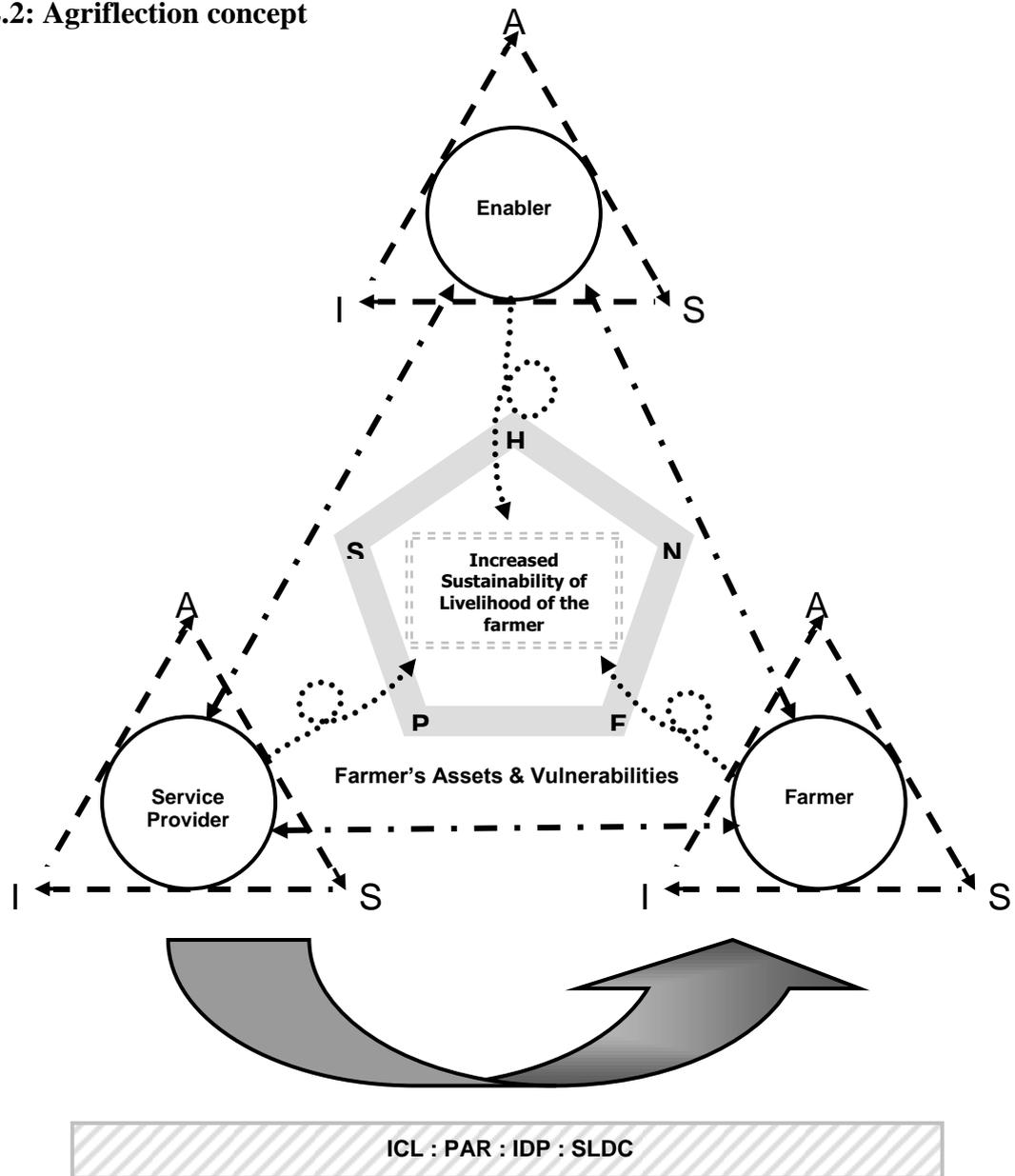
2.7. Themes and concepts emerging from the Agriflection model

The term “Agriflection”⁹ was chosen to indicate that the proposed extension model adopts a reflective learning approach to agricultural development, underscoring that it is a learning model. It is a complex model. The primary message being conveyed is dynamic, conscious learning by and among the role players with the express intention of improving

⁹ While the term “Agriflection” was chosen because the primary focus of this research is Agricultural Extension, in theory the model (perhaps with a different name) could apply to other areas of development

the sustainability of the farmer's livelihood. The model illustrates a number of key themes and concepts:

Figure 2.2: Agriflection concept



Key
 The learning process: Investigation (I) >>> Assimilation (A) >>> Sharing (S)

Assets & Vulnerabilities Pentagon: **F** = Financial (includes Economic) **S** = Social
H = Human **N** = Natural **P** = Physical

The facilitated learning agenda (Extension Practitioner with Farmer); Theory and Skills in

SLDC

- ICL: Individual and collective learning
- PAR: Planning, action and reflection
- IDP: Iterative Development Pathways
- SLDC: Sustainable livelihoods and development concepts

Source: Adapted from Worth, 2002

- *Development is both incremental and iterative:* Overall, the model depicts an entrenched iterative approach to progress. This reflects the ‘dynamic’ and learning principles in SL approaches. Rather than event driven, development is driven by a process fed by learning and characterised by a repeated, deliberate pattern of planning, action and reflection. The looping arrows extending from each role player toward the livelihood centre depict the iterative and deliberate increase in the sustainability of the livelihood of the farmer.
- *Equal/balanced partnerships:* (See Figure 2.2 for explanation.) The large triangle positions the primary role-players; enablers, service providers and farmers. The double-headed arrows indicate the equality of the partners.
- *The learning process:* (See Figure 2.2 for explanation) The “IAS” triangle encasing each partner in the model depicts the learning process drawn from the basic AKIS structure. Replacing research, education and extension, Agriflection suggests a learning process of investigation, assimilation or application and sharing or service (hence, IAS). Essential to the Agriflection model is the ownership by all three partners of a learning and service/sharing paradigm. As with established educational models such as Kolb’s (1984) experiential learning and Bruffe’s (1993) active learning that take learners through knowledge, understanding and skills, in the Agriflection model, knowledge is acquired through investigation, understanding through application and assimilation. Skills are acquired through sharing and service.
- *Individual and collective learning:* As depicted by the large IAS triangle, each partner must be committed to the learning and service/sharing paradigm. In such a paradigm, mere transfer of technology has no place. It is not a paradigm of technology adoption, but of individual and collective investigation, application and service/sharing. This embedded learning opens options to farmers, who, far from being passive, are active participants in change (Shrestha 2000), and whom Alders *et al* (1993) confirm are experimenters and innovators.

- *Building on assets:* (See Figure 2.2 for explanation.) This model supports research indicating that progress is best made through identifying farmers' assets, assessing vulnerabilities and then taking steps either to enhance and strengthen those assets or to reduce vulnerabilities (Kretzmann & McKnight 1993; Friedland 1996; Ashley & Carney 1999). Hellin *et al* (2003) underscored the value of using the livelihoods asset framework. While the importance financial, natural, human and physical assets to a farmer may be obvious key among these assets is social capital. Pretty and Ward (2001:5) identified social capital as "an important part of the basis for sustainable livelihoods." They further submit that social capital acts as a resource "for individuals to use to realise their personal interests." There is evidence indicating that farm households with greater social capital have great prosperity (Pretty 2003). Pretty (2003:1913) further identifies four aspects of social capital: "relations of trust; reciprocity and exchanges; common rules, norms, and sanctions; and connectedness in networks and groups". The overall asset base is represented by the pentagon in the centre of the figure.

- *Facilitated learning agenda:* (See Figure 2.2 for explanation.) This is represented by the curved arrow linking extension practitioners with farmers. It implies that extension practitioners have a mission and an objective to achieve: facilitating learning on the part of farmers. The agenda comprises:
 - Participating in and fostering individual and collective learning;
 - Planning, action and reflection (reflective learning) by all stakeholders in the pursuit of fostering sustainable prosperity among farmers;
 - Forging iterative development pathways to support farmers in the pursuit of prosperity; and
 - Sustainable livelihoods development concepts as they apply to farmers' farm/livelihood systems.

The foregoing highlights the following innovations in the theory and practice of Agricultural Extension relevant at least to the South African context:

- *The context and locus of learning:* Learning takes place within the farmer's systems. The farmer's livelihood system is the centre of the learning agenda;

- *What is learned:* Adoption of a technology is not at issue. What is at issue is the degree to which farmers:
 - understand their farming/livelihood and value systems and desired outcomes;
 - command an investigative learning process around those systems and within those desired outcomes; and
 - are conscious of the choices farmers make and the consequences thereof;
- *Who is learning:* farmers, service providers and enablers share an equal responsibility for individual and collective learning (replacing the extension-to-farmer technology transfer paradigm)
- *The learning process:* Learning is a deliberate process of investigation, application and sharing which dissolves the traditional boundaries of research and extension; and
- *Culture of continuous reflective learning:* Through engaging with a learning agenda, farmers (as well as extension practitioners) adopt a culture of learning supported by specific skills (notably reflection). This fosters a culture of learning in which farmers continuously and systematically engages with scientific inquiry and thereby generates knowledge which can be tested and shared.

These factors shift the extension agenda from technology-centred to learning-centred. It expands the ownership of and responsibility for research, innovation, technology development and sharing (dissemination) to include farmers in addition to researchers/extension practitioners. It implies that the work of extension practitioners is that of facilitating the acquisition of skills by farmers to engage with scientific inquiry while simultaneously sharing their knowledge and information. It implies also that extension practitioners are equally responsible for their own scientific inquiries; for their own learning. Although technology is still on the agenda, how technology is developed (through a process of learning) is the primary concern. This is not technology transfer in the sense that it is not adoption that is at stake, but rather *i)* a shift from transfer to innovation (learning); and *ii)* a shift from a researcher-to-farmer paradigm to a collaborative/partnership paradigm.

Further, the proposed Agriflection model identifies partnerships and determines an iterative development pathway: sharing, planning (based on assets), implementing, and reflecting. The facilitated agenda implies incorporation of the values of partnership and collaboration emphasised by AKIS and participatory approaches. By design the model supports the people-centred approach underscored by both sustainable livelihoods theory and current agricultural policy.

The model entrenches the important function of the macro-micro link learned from experiences with SL approaches – consciously linking farmers, service providers and enablers in a three-way learning paradigm in such a way that IAS experiences of farmers and service providers can inform the policies of enablers and IAS experiences of enablers can inform the decisions of farmers and service providers.

Perhaps most important in the Agriflection model is the commitment to learning, an essential element of ‘extension’ as identified in Participatory Extension Approaches (PEA) (Moyo & Hagman 2000). Inherent in this model is the assumption that all three partners are committed to learning through a process of investigation, assimilation and sharing; individually in their separate actions and collectively in their partnership engagements. Sharing is also an important part of learning. It fits into Bloom’s (1964:182) taxonomies for the affective domain in education. Sharing is part of the valuing taxonomy under the commitment sub-category. Bloom argues that sharing is a part of demonstrating certainty about what has been learned.

2.8. Conclusion

Educational and agricultural landscapes in South Africa are being reshaped by extensive policy changes. In the context of these and in the proposed renewed construct for Agricultural Extension – the Agriflection model – extension practitioners become less messengers of extension messages, and more developers and facilitators of specific learning processes, content and outcomes which will drive their engagement with farmers as ‘learners’. This approach promotes a culture of continuous reflective learning and suggests shifts in the context and locus of learning to that of extension practitioners and farmers. It further suggests shifting what is learned, and the learning process.

The Agriflection model is submitted as an appropriate, albeit currently theoretical model for Agricultural Extension, particularly for resource-poor smallholder farmers. In

keeping with international trends and South African agricultural development policy, Agriflection incorporates key and essential elements of sustainable, people-centred development. It reflects the growing mass of evidence advocating iterative, incremental, reflective development processes based on assets, partnerships and a genuine commitment to learning.

Further, the Agriflection model presents both theoretical and practical markers which can be employed to assay the efficacy of extension policy, practice and education. Public and private extension services can use these markers to transform and realign policy, practice and structures. Educational institutions can use these markers to transform extension curricula and educational offerings

The proposed model is by no means definitive. It merely begins a creative interrogation of the definitions, purposes and functions of extension. More significantly, the proposed model and its intended implications, opens a portal to a candid and perhaps audacious interrogation of the assumptions about people and development on which extension theory and practice is formulated.

References

- Alders, C., Haverkort, B. and van Veldhuizen, L. (Eds.), 1993. *Linking with Farmers: Networking for Low external-input and Sustainable Agriculture*. Intermediate Technology Publications, London.
- Ashley, C. and Carney, D., 1999. *Sustainable Livelihoods: Lessons from early experience*. Department for International Development, London.
- Bembridge, T.J., 1991a. *The Practice of Agricultural Extension*. Development Bank of Southern Africa, Halfway House.
- Bembridge, TJ, 1991b. *Practical Guidelines for Agricultural Extension Workers: a Field Manual*. Development Bank of Southern Africa, Halfway House.
- Betru, T., Long, J.S., 1996. Agricultural Extension as a development strategy for war-torn countries: the case of Lebanon. *Journal of International Agricultural and Extension Education*, (3)2, 11-22.
- Bonti-Ankomah, S., 2001. Addressing food insecurity in South Africa. Paper presented at the SARPN conference on Land Reform and Poverty Alleviation in Southern Africa. 4-5 June 2001.
- Bruffee, K.A., 1999. *Collaborative Learning: Higher Education, Interdependence, and the Authority of Knowledge*. 2nd Ed. Johns Hopkins University Press Baltimore.
- Chambers, R. and Conway, G., 1992. Sustainable rural livelihoods: Practical concepts for the 21st Century. IDS Discussion Paper 296, IDS, Brighton.
- Christoplos, I., Farrington, J., and Kidd, A.D., 2000. The Neuchâtel Initiative 2000: Extension, Poverty and Vulnerability. Inception Report. London, ODI Rural Policy and Environment Group. www.odi.org.uk/rpeg/P%20&%20E%20inception%20final%20Dec%202000.pdf. Accessed January 2002.
- De Gruchy, S., 2004. The Contribution of Universities to Sustainable Livelihoods. In: Fincham, R, George, S. and Nielsen, E.S. (Eds.), 2004. *Sustainable development and the university: New strategies for research, teaching and practice*. Brevitas, Howick. pp. 53-74.
- De Satgé, R., A Holloway, D., Mullins, L. Nchabaleng, and Ward, P., 2002. *Learning about Livelihoods: Insights from Southern Africa*. Periperi Publications, Cape Town.
- Düvel, H., 1999. Trends in Agricultural Extension: A philosophical touch line perspective. *Proceedings of the 15th Annual Meeting of the Association for International Agricultural and Extension Education*, Trinidad~Tobago, March 22-26, 1999.
- Düvel, G., 2000. Towards an appropriate extension approach for agricultural and rural development in South Africa. *South African Journal of Agricultural Extension*, 29, 10-23.

Düvel, H., 2001. President: South African Society for Agricultural Extension. Personal communication, 24 October 2001.

Engel, P.G.H and Röling, N., 1991. The development of the concept of agricultural knowledge information systems: implications for extension. In: Rivera, W.M. and D.J. Gustafson (Eds.), 1991. *Agricultural Extension: Worldwide institutional evolution and forces for change*. Elsevier, Amsterdam.

FAO, 2002. A Livelihoods Approach to Communication and Information to Eliminate Poverty. FAO, Rome. <http://www.fao.org/waicent/portal/outreach/livelihoods/en/live-en.html>. Accessed 25 June 2004.

FAO and World Bank, 2000. Agricultural Knowledge and Information Systems for Rural Development (AKIS/RD). Strategic Vision and Guiding Principles. FAO, Rome.

Farrington, J., Christoplos, I., and Kidd, A.D., 2002. Extension, Poverty and Vulnerability: The scope for policy reform. Final report of a study for the Neuchâtel Initiative. London, ODI Rural Policy and Environment Group. www.odi.org.uk/publications/working_papers/wp155_a.pdf. Accessed September 2005.

Franks, T., 2002. Livelihood approaches - what difference do they make? A case study from Usangu, Tanzania Workshop paper presented at Supporting Livelihoods, evolving institutions, Bradford Centre for International Development, University of Bradford, 29th –30th May 2002. <http://www.brad.ac.uk/acad/bcid/GTP/franks.pdf>. Accessed June 2004.

Friedland, L.A., 1996. Electronic Democracy and the New Citizenship. *Media, Culture & Society*, (18): 185-212.

Fulton, A., Fulton, D., Tabart, T., Ball, P., Champion, S., Weatherley, J., and Heinjus, D., 2003. Agricultural Extension, Learning and Change: A report for the Rural Industries Research and Development Corporation. May 2003. RIRDC Publication No 03/032. RIRDC Project No RDP-1A. Rural Industries Research and Development Corporation. Canberra, Australia. [Http://www.rirdc.gov.au/reports/HCC/03-032.pdf](http://www.rirdc.gov.au/reports/HCC/03-032.pdf). Accessed November 2005.

GTZ. Undated. Sustainable Livelihoods as a Framework for Extension. Working paper. <http://www2.gtz.de/agriservice/download/sustainable-livelihoods.pdf>. Accessed June 2004.

Hanyani-Mlambo, B.T., 2000. Strengthening the pluralistic Agricultural Extension system: a Zimbabwe case study. FAO, Rome.

Hellin, J., Rodriguez, D. and Coello, J., 2003. Measuring the livelihood impact of farmer-to-farmer extension services in the Andes. Paper presented at the Enterprise Development Impact Assessment Information Service (EDIAIS) conference on new directions in impact assessment for development: methods and practice held November 24 - 25, 2003, Manchester, UK.

IFAD. 2001. *Rural Poverty Report 2001: The challenge of ending rural poverty*. Oxford University Press, Oxford.

Kolb, D.A., 1984. *Experiential Learning: Experience as the source of learning and development*. Prentice Hall, Englewood Cliffs.

Korten, D., 1990. *Getting to the 21st Century: Voluntary action and the global agenda*. Kumarian Press, West Hartford.

Kretzmann, J.P. and McKnight, J.L., 1993. *Building communities from inside out*. IPR Publications, Evanston.

Machethe, C.L., 2004. Agriculture and poverty in South Africa: can agriculture reduce poverty? Paper presented at the Overcoming Underdevelopment Conference held in Pretoria, 28-29 October 2004.

Moyo, E. and Hagman, J., 2000. Facilitating competence development to put learning process approaches into practice in rural extension. In: FAO, 1999. *Human resources in agricultural and rural development*. FAO, Rome. www.fao.org/DOCREP/003/X7925M/X7925M14.htm. Accessed February 2002.

NDA (South African National Department of Agriculture), 2001. The Strategic Plan for South African Agriculture. Department of Agriculture, Pretoria.

Neuchâtel Group, 1999. *Common framework on Agricultural Extension*. Paris, Neuchâtel Group. www.odi.org.uk/rpeg/cf_en.pdf. Accessed January 2002.

Ngomane, T 2006, Research and extension processes and practices in relation to smallholder agriculture in Africa: Present, past to present. *South African Journal of Agricultural Extension*, 35 (2): 199-220

Nicol, A., 2000. *Adopting a Sustainable Livelihoods Approach to Water Projects: Implications for policy and practice*. Overseas Development Institute. London

Petheram, R.J., 1998. Review of Evaluation in Agricultural Extension. Publication No 98/136. Project No VCA-3A. Barton, Rural Industries Research and Development.

Rivera, W.M., 2003. *Agricultural Extension, Rural Development and the Food Security Challenge*. FAO, Rome.

Roberts, K.C., Coutts, J., Ayers, F.J., and Bilston, L., 2002. Co-learning in the development of lotus pasture technology in Australia. *Australian Journal of Experimental Agriculture*. (42), 527-533

Röling, N., 1990. The agricultural research-technology transfer interface: a knowledge systems perspective. In: Kaimowitz, D. (Ed.), 1991. *Making the link: Agricultural research and technology transfer in developing countries*. Westview Press, Boulder.

Röling, N., 1995. What to think of extension? A comparison of three models of extension practice. *AERDD Bulletin* (Francophone issue). December 1995.

Schuh, G.E., 2000. Why rural human development matters. Extension Education: Reshaping African Universities and Colleges for the 21st Century. Workshop proceedings 4-6 September 2000, Ghana.

Scoones, I. and Thompson, J. (Eds.), 1994. *Beyond Farmer First*. ITDG Publishing, London.

Shrestha, R.B., 2000. Trees: farmers' response to change. *ILEIA Newsletter* (12) 1, 20.

Simpson, B. M., and Owens, M. (2002). Farmer field schools and the future of agricultural extension in Africa. *Journal of International Agricultural and Extension Education*, 9 (2), 29-36.

Swanson, B.E., Bentz, R.P. and Sofranko, A.J. (Eds.). 1997. *Improving Agricultural Extension: A Reference Manual*. FAO, Rome.

Thomas, A., 2000. Poverty and 'end of development'. In: Allen, T. and Thomas, A. (Eds.), 2000. *Poverty and Development: into the 21st Century*. Oxford University Press. Oxford. pp. 3-22.

Toner, A., 2002. Sustainable livelihoods approaches: Can they transform development? BCID Research Paper No. 2. Bradford Centre for International Development, University of Bradford.

UNDP, 2001. Second country cooperation framework for the Syrian Arab Republic (2002-2006) Executive Board of the United Nations Development Programme and of the United Nations Population Fund, New York.

van den Ban, A.W. (2006) Conclusions: changes needed in extension programmes and extension research needed to support these changes. In: van den Ban, A.W. and Samanta, R.K. (2006). *Changing roles of agricultural extension in Asian nations*. B.R. Publishing Corporation, Delhi. pp. 409 - 422.

Worth, S.H., (2002). Sustainable extension: not transformation but renewal. *Proceedings of the 18th Annual Conference of Association for International Agricultural Education and Extension*. May 2002. Durban, South Africa. pp 473-480.

Chapter 3

The South African education agenda: Identifying markers for rewriting Agricultural Extension curricula¹⁰

“Regard man as a mine rich in gems of inestimable value. Education can, alone, cause it to reveal its treasures, and enable mankind to benefit therefrom”.
(Bahá'u'lláh 1983)

3.1. Introduction

One of the challenges facing Agricultural Extension in South Africa is the challenge to reshape Agricultural Extension curricula to ensure that extension officers and other agricultural development practitioners are equipped to deliver relevant support to farmers and farming communities. To effect the intended reshaping requires, in part, interrogating Agricultural Extension curricula against educational policy and theory.

This chapter builds on Chapter 2 which presented a new concept for agricultural extension – Agriflection – that takes into account current agricultural and development policy. Agriflection provides the theoretical launching point for the theory-led curriculum evaluation which will be discussed in Chapter 5.

The chapter proposes to challenge Agricultural Extension curricula in the light of current South African educational policy. It identifies the key principles for education and how they might impact on Agricultural Extension curricula as they address both the theory and practice of Agricultural Extension. This examination will yield a number of key indicators which, in turn, can be used when examining Agricultural Extension curricula. This, in turn, lays the groundwork for establishing the indicators for agricultural extension curricula developed in Chapter 4.

3.2. Agricultural Extension education in South Africa

Agriculture has long been an intricate part of South African life. Even in the face of agriculture's declining contribution to South Africa's GDP, it still remains a significant factor in the lives of many rural communities and families. Control of land and the

¹⁰ This chapter is adapted for this thesis from Worth, S. (2007) The South African education agenda: identifying markers for rewriting agricultural extension curricula. *The Journal of Agricultural Education and Extension*, 13 (2), 131-145

economic value of agricultural production has been a central issue in the wider political history of South Africa. Much of the provision of service to agriculture focused on farmers producing for the market. A number of setbacks to agriculture, particularly with reference to access to land, finance and markets, were directly linked to fear on the part of the white community of any growing economic empowerment of the black community. Thus, agriculture was highly politicised (Bundy 1988, DoA 1998).

Agricultural Extension was formally established in 1924. However, prior to the 1950s the state was not generally engaged with planned agricultural development amongst South Africa's indigenous population (DoA 1998). Settlers and missionaries used agriculture as one of the means of 'civilising' the country, including keeping African men at home to participate in church activities. As early as 1915 documentation records the introduction of the plough and other technologies such as crop rotation and plant spacing. Concern was raised that the local population should be trained in proper (Western) agriculture rather than be allowed to continue with traditional livelihoods and methods (Kington 1915).

Bundy (1988) noted that the geopolitical entity of South Africa evolved in broad sweeps from indigenous governance, the arrival of European settlers, colonial governance, the apartheid era, to the current democratic state. As this history unfolded, agriculture expanded in both the black and white communities. Tribal-based agriculture gave rise to peasant farming among the black communities; the white settlers pursued commercial farming. Advances in agriculture in the black community were often met with increasingly restrictive measures designed to ensure that white farmers were the first beneficiaries of the agricultural capacity of the land and which lead to the general demise of black peasantry to sub-subsistence farming, farm labour and migrant labour to the service the white cash economy (Bundy 1988).

Once the basic structures of separate development and apartheid were in place, the state began formally providing support to black agriculturalists (in their reserved territories). As is noted by the DoA (1998) a parallel system of extension developed, one for commercial white farmers, and one for subsistence black farmers. This extended to the agricultural colleges and university agricultural faculties established in the first half of the 20th Century. Other policies limiting access by non-whites to education and economic infrastructure widened the divide between black and white producers.

Parastatal organisations to promote agricultural development emerged, particularly in the so-called homelands of the South African apartheid era. They largely pursued an

agenda of commercialisation of smallholder farming based on state managed or state supported, capital intensive production schemes. In the homelands, these agencies worked in tandem with the homeland extension services. The agricultural parastatals were developed to compensate for the generally low level of skills among extension practitioners trained in the colleges, universities of technology and universities (Worth 1994; Machethe 2004; DBSA 2005).

A review of stated mission statements of the various institutions in South Africa offering agricultural training indicates that the primary focus of training was to serve the interests of commercial agriculture. Universities trained in agricultural science and research. Colleges and universities of technology trained in practical agriculture. Issues of small-holder agriculture, food security, rural livelihoods, etc. do not feature on the agricultural educational agenda.

The National Department of Agriculture (DoA 1998) stated that Agricultural Extension needed reform. The DoA (1998) identified five key problems in the provision of Agricultural Extension to smallholder, black farmers (who lived primarily in the erstwhile so-called homelands of apartheid South Africa):

- The low qualification of Agricultural Extension practitioners serving the homelands
- The difficulty of delivering service to these farmers due partly to the wide diversity of systems, needs and contexts they presented
- Poor communication within the extension service
- Lack of accountability to farmers
- Lack of vision and focus about the purpose and client

The framework for reforms (DoA 1998) covers six elements:

- Targeting: with smallholder farmers being the principal focus of government Agricultural Extension, with special emphasis on subsistence farmers food-deficit households
- Accountability: including improving proximity of access, being responsive to farmers' needs and a range of funding options including public-private partnerships
- Realigning the salary: operational budget ratio from 5:95 to 30:70
- Incentives: with a focus on rewarding performance which is subject to review

- Gender: addressing the fact that a significant proportion of the smallholder farmers are women and the fact that the majority of Agricultural Extension practitioners are male.

The DoA (1998) also indicated that reforms would be implemented through three areas of action relevant to the needs of smallholder and resource-constrained farmers:

- Improving research-extension links;
- Training and retraining of extension staff; and
- A new approach to the delivery of extension.

Reform proposals are silent on the curricular offerings for Agricultural Extension at tertiary institutions. Emphasis is placed on the retraining of extension staff currently employed by the government. However, an examination of the reforms proposed for Agricultural Extension highlights four broad issues to be incorporated into the development of Agricultural Extension curriculum (DoA 1998):

- 1) Qualities needed in an Agricultural Extension practitioner, specifically: inspirational capacity; listening skills and problem-solving skills;
- 2) Skills in communication and participatory approaches;
- 3) Specific technical (agricultural) training; and
- 4) Skills in programme planning, implementation and monitoring and evaluation skills.

Further, implied in the DoA's training reform is a linking of Agricultural Extension to sound knowledge of the client farmers and their situations and to developing and executing an extension plan.

3.3. Current South African education policy

Since the advent of democratic elections in South Africa, education policy has changed significantly. The primary theory driving current education policy is outcomes-based education (OBE). The intention is to develop an educational system which is relevant to the so-called new South Africa (DoE Undated).

Fakier and Waghid (2004:55) establish that OBE is an educational system that is learner-centred and result-orientated. Its premise is that all “individuals have the capacity to learn, as well as to demonstrate learning after having completed an educational activity.” It intended to foster “independence of mind” which implies that “learners are to develop, through a system of fixed outcomes, into autonomous beings” (Fakier & Waghid 2004:55).

Killen (1999) noted that South Africa’s OBE approach is one which focuses on outcomes that are relevant to the future life-roles of learners. Killen cited the South African Department of Education (DoE 1997:10) noting that the aim is to enable learners to gain the skills, knowledge and values that will allow them to contribute to their own success as well as to the success of their family, community and the nation. Education in the post-apartheid era is intended to contribute to the social development of the greater South Africa through promoting innovation and economic growth. This will occur when learners have been exposed to and acquired the thinking and learning skills demanded by the society enshrined in the South African Constitution (Curriculum 2005 Review Committee 2000).

3.4. OBE principles for curriculum and instructional design

In connection with curriculum design for OBE, Killen (1999) and Genis (2001) expanded on four principles earlier identified by Spady (1994). Genis (2001:2) noted that the principles must be “applied consistently, systematically, creatively and simultaneously.” Taken together, Killen and Genis indicate that outcomes-based education can be developed around five principles:

- *Clarity of the culminating outcomes/clarity of focus:* in which the skills and competencies learners should be able to demonstrate from any given curriculum should be reflected in specific outcomes.
- *Designing back:* in which clear definition of the significant learning to be achieved is the starting point for all curriculum design. In this way curriculum design is worked backwards from the outcomes resulting from the application of the first principle (Killen 1999).
- *Downwards curriculum design and development:* Rather than extensive revision of existing curricula, OBE calls for setting aside the current curricula

and creating new curricula using the purpose of the qualification as the framework. Primacy is given to those outputs which are genuinely relevant to the qualification (Genis 2001).

- *The potential for every person to succeed at some level:* in which success is built into the learning process of which student are active partners, learning starts from where the students are in terms of knowledge and skill, that the learner, not the content, is the focus of the learning agenda, and where “learners are responsible for their own learning and progress” (Cockburn 1997:6).
- *Expanded opportunities:* Because all learners cannot learn the same thing in the same way, teachers must provide more opportunities for learners to learn and master the outcome in a timeframe and in a manner suited to the learner (Killen 1999; Fakier & Waghid 2004). This has implications for scheduling, frequency, duration, modes of learning, and assessment criteria.

In brief, the outcomes-based programme must have a clear focus on significant learning outcomes that are stated clearly and unambiguously. These outcomes should be practical, useful, and morally and ethically defensible. Curriculum and instructional design are derived from these significant outcomes. The outcomes should be challenging, and all students should be expected to achieve them at high performance levels. Time should be used as a flexible resource that allows teachers to accommodate differences in student learning rates and aptitudes. Learners should be given more than one uniform, routine chance to receive instruction and to demonstrate their learning. Assessment should be an integral component of instruction and should, as far as possible, be authentic (i.e. use real-world situations in which to test applications of knowledge and skills). Learners should be expected to take some (if not most) responsibility for their learning (Cockburn 1997; Killen 1999; Genis 2001; Fakier & Waghid 2004).

In summing up the intent of OBE Halloun (1998:9) explains that in OBE “learners are actively engaged in the learning process through hands-on and reflective activities”. This sentiment and the concepts set out above, readily lend themselves to application in extension practice, which implies that they would need to be applied in extension education and training.

The focus on learner driven learning indicates a need for OBE-based curricula to include knowledge and practice of how learners learn. Kolb (1984) provides a useful theory and practice set in the area of learning styles. Röling (1988), cited by Paine (1995), noted the link between extension, learning and learning styles.

Taylor (1998) introduced another dimension. Similar to Genis (2001), Taylor noted the need for curriculum to be dynamic and that it should be driven by educational objectives and by learning experiences established to deliver on the objectives. Taylor (1998) noted further that there would be a need for continuous updating and refinement of curriculum to accommodate new objectives and new understandings of relevant learning experiences. Specifically, curriculum should be influenced by and accommodate changes to the social context.

To facilitate such a dynamic curriculum Taylor (1998) proposed a radical departure from traditional curriculum development and recommended wide departure from the top-down, content-based and exclusionary approach. Instead Taylor proposed participatory curriculum development (PCD) as a viable alternative citing the value of engaging stakeholders in genuine dialogue around all aspects of curriculum. Farmers, Agricultural Extension practitioners, researchers, educators, and policy makers are among the stakeholders identified to be included in developing Agricultural Extension curriculum.

Table 3.1 presents the opportunities and constraints of the PCD process identified by Taylor (1998). PCD offers opportunities to enhance the success of curriculum through engaging a wide range of stakeholders, entrenching a reflective process, and fostering shared responsibility among stakeholders. However, Taylor noted that implementing PCD may be costly, logistically difficult, ideologically complex and may raise unrealistic expectations among stakeholders. Implementing PCD is particularly complex in countries which have recently experienced major political change because of the polarisation of stakeholders that such change tends to engender. South Africa would clearly fall into this category. Notwithstanding these limitations, PCD is proposed as the most efficacious means for developing successful curricula.

Table 3.1: Opportunities and constraints of the PCD process

Opportunities	Constraints
<ul style="list-style-type: none"> • Increased opportunities for networking of groups and individuals • Inclusion of normally marginalised groups and individuals in negotiations and dialogue • Increased opportunities for discussion and reflection • Increased chances for a successful outcome from the curriculum development • Creation of a framework for a dynamic curriculum development process as new linkages and lines of communication are established • Increased motivation and commitment arising from the responsibility gained by stakeholders for various stages of the curriculum development process. 	<ul style="list-style-type: none"> • Unrealistic expectations of stakeholders may be raised at an early stage and may not be met • Involvement of stakeholders may be costly in terms of their time and efforts, considering their meagre level of income • Stakeholder involvement may be tokenist in some cases, creating resentment • Bringing groups of people together has logistical implications that may be beyond the capacity of the training organizations • Creation of a mechanism by which different stakeholders can work and interact on an equal basis is complex as a result of different perceptions, experiences, educational backgrounds and understandings of the wider curriculum development process

(Source: Taylor 1998: no page numbers)

A number of principle arguments against OBE need to be raised. One argument is the linking of OBE to economic growth (DoE Undated). Jansen (1999) and Luckett and Webbstock (1999) raise concerns that OBE is excessively linked to economic growth. Noting that this link is largely unsubstantiated, Luckett and Luckett (1999) and Fakier and Waghid (2004) warn, however, about over strict application of OBE. Applied too strictly OBE will result in an excessive focus on technology outcomes which may be counterproductive to encouraging creativity so vital to independent and critical thinking (Fakier & Waghid 2004). Applied too strictly, OBE may detract from the desired quality of education which is the underlying purpose of OBE (Luckett & Luckett 1999).

Soudien and Baxen (1997) identify a number of problems with OBE, particularly as it has emerged in South Africa. One concern is that South African policy overtly links OBE with issues of redress and equity without substantiating how this will be achieved. They identify two levels of criticism. “The first is essentially process-related while the second focuses on the theoretical assumptions that frame the government’s policy” (Soudien &

Baxen 1997:452). There is question about the preparedness of teachers to implement OBE and high level of uncertainty within the educational community regarding OBE. The theoretical criticism centres on “an anxiety about the pedagogical form and logic of the OBE reform proposals” (Soudien & Baxen 1997:452).

Serious criticism is found in Australia, where OBE has been in the effect since the early 1990s. Berlach and McNaught (2007:9) question the veracity of the OBE approach, and echo Soudien and Baxen that there are theoretical and implementation concerns surrounding OBE”. They argue that while the rhetoric resonates well and the “principles appear benign and perhaps even educationally efficacious”, there is little to guide the ideal in practice (Berlach & McNaught 2007:3) The lofty ideals do not fit into the practical reality of managing large student numbers, time-bound timetables, chronological approach of qualifications and the bureaucratic nature of schools. They cite the case of the 46th Illinois School District that abandoned OBE as unworkable. They argue that if any success is to be found in OBE, it must be accompanied by a master plan that addresses the following (Berlach & McNaught 2007:5):

- Interprets OBE philosophy for the immediate context
- Describes precisely what changes are to be instigated;
- Indicates how these changes are to be implemented;
- Provides appropriate levels of professional development for key stake-holders; and
- Adequately funded the total process.

It is noted with some irony that Spady (2008) the so-called author of OBE suggests that the current educational course in South Africa is not actually OBE and should not be called thus. He asserts that OBE is defined as: “Defining, designing, building, focusing, and organizing everything in an education system on the things of lasting significance that we ultimately want every learner to demonstrate successfully as the result of their learning experiences in that system” (Spady 2008 :7-8). He argues that what is wrong with South African OBE is not inherent to OBE, but are peculiar to South Africa’s misinterpretation of a number of aspect of OBE – in particular the issue of OBE being transformational.

The truth of these concerns does not vitiate the principles – particularly the learning principles – of OBE and the intention of Spady’s definition. As demonstrated by Lockett

and Lockett (1999) and Killen (1999) a broad interpretation of OBE provides a useful foundation for planning and structuring of curriculum. Specifically, Lockett and Lockett (1999) identified the following useful aspects of OBE in curriculum development:

- Setting goals;
- Being explicit about what the programme (curriculum) will achieve;
- Aligning the aims of the programme with ‘real world’ development needs in context;
- Paying attention to detail and to align learning outcomes/capabilities with assessment criteria;
- More accurately describing (and judging) the levels of learning which learners achieve; and
- Improving transparency and validity of assessment procedures.

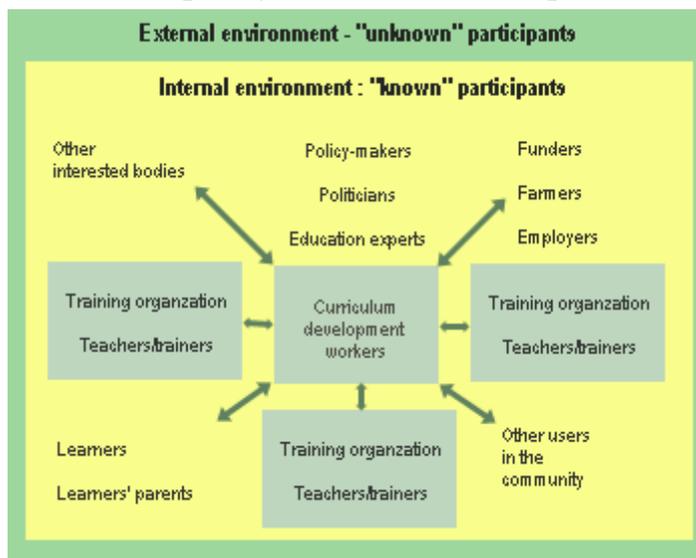
The application of the concepts, principles and aspects of OBE to Agricultural Extension practice is self-evident. Agricultural Extension is a system of education; the origin of extension is rooted in extending education to adults (Pretty & Vodouhê 1997; Jones & Garforth 1997). Lindley (1999) citing Rogers and Taylor (1998) confirms expressly that curriculum development in Agricultural Extension must be participatory if extension is to be able to engage purposefully with the changes in technology, culture and society that extension practitioners will inevitably encounter. Thus it is valuable to apply the educational transformation agenda to Agricultural Extension. Simplistically, but effectively, one can replace extension practitioner for teacher and farmer for learner. As will be discussed in the following section, in making this simple substitution, it becomes evident that extension should be a facilitated learning activity with all the underpinnings relevant to education as set out above.

As in the case of an outcomes-based education teacher, to facilitate the type of learning agenda and outcomes relevant to farmers in post-apartheid South Africa within the context of PCD will require the Agricultural Extension practitioner to be a key role player in the development of Agricultural Extension “curricula”. As developers of curricula, farmers will also be key role players in curricula development. In this case, curricula would identify the intended outcome of extension programmes, the content of such programmes and the learning processes employed. Figure 3.1 depicts the elements of the participatory development model. It underscores the extent to which extension

practitioners and farmers, among others must be engaged in the process of developing extension curricula, a condition Taylor notes is still uncommon and would appear to comprise part of the radical departure anticipated. A notable exception it inroads being made in South Africa where, Taylor (1998) states, “Farmers and rural community members are helping to guide the direction of new agricultural education and training programmes from which they can derive benefits to pursue their own goals for economic development and progress”.

PCD is closely linked with experiential learning. Taylor (1998) argues that the aim of PCD “is to develop a curriculum from the exchange of experiences and information between the various stakeholders in the education and training programme.” Farmers and extension practitioners are both included in Taylor’s list. As will be highlighted in the following section, in the case of Agricultural Extension PCD applies in the development of curricula for training extension practitioners. As noted earlier, farmers and extension practitioners would work together to determine the outcomes of extension, outcome of extension programmes, the content of such programmes and the learning processes employed. Therefore, knowledge and skill in both the theory and practice of PCD emerges as a learning outcome for Agricultural Extension curricula.

Figure 3.1: Participatory Curriculum Development Model



Source: Taylor 1998: no page numbers

3.5. OBE identifies new roles for Agricultural Extension

Given that Agricultural Extension is a system of education, it should comply with the principles of OBE, the essence of which is that education should be learner centred, learning centred and outcomes focused. In this sense, Agricultural Extension should be driven by a learning agenda rather than a teaching agenda. In the sharing of knowledge with farmers, the extension practitioner should be expected to recognise and act on farmers' experience, knowledge and skills. Extension practitioners need also to be able to ensure that learning is integrated into the farmers' lives, learning styles, and priorities (Malcolm 2001), and their perception of the physical world (Halloun 1998).

Malcolm (2001:14) outlined the "critical outcomes" of South Africa's approach to outcomes-based education which constitute OBE's contribution to the South African human resource vision: "Learners should be able to successfully demonstrate their ability to:

- Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation.
- Identify and solve problems by using creative and critical thinking
- Organise and manage themselves and their activities responsibly and effectively.
- Work effectively with others in a team, group, organisation and society.
- Collect, analyse, organise and critically evaluate information
- Use science and technology effectively and critically, showing responsibility towards the environment and the health of others.
- Understand that the world is a set of related systems. This means that problem-solving contexts do not exist in isolation.
- Demonstrate awareness of the importance of effective learning strategies, responsible citizenship, cultural sensitivity, education and career opportunities and entrepreneurial abilities."

Malcolm (2001:6) further highlighting key elements in the educational paradigm, noted: "learner-centred education requires that teachers be curriculum designers. They are the only ones in the education system who know the learners directly, understand the

contexts in which the learners operate and are aware of the resources available. Curriculum materials that are designed centrally cannot suit everyone.” Curriculum, context and materials within an understood resource base are presented as the domain of the teacher. The teacher has a powerful role in curriculum development to ensure that learning, while leading to clearly articulated outcomes, is relevant, is not restrictive (Luckett & Luckett 1999) and does not stifle creativity (Fakier & Waghid 2004).

Putting the Agricultural Extension practitioner in the role of the teacher and applying the concept of learner-centred education with a learning agenda changes significantly the role and status of the Agricultural Extension practitioner from what is currently the case in South Africa. South African extension generally follows what Röling (1995) termed technology-centred linear and advisory models. In the models of extension which are extant in South Africa, knowledge (including technology) held by the Agricultural Extension practitioner is held as paramount. The primary skill of the ‘teacher’ is conveyance of the knowledge and transference of the technology and skill to the ‘learner’. If the farmer adopts the technology, the extension worker is successful; if not, the extension practitioner has failed. In contrast, in a farmer-learning-centred model, success may be measured across a broader band of outcomes of the engagement between the Agricultural Extension practitioner and the farmer – one key element of which will be learning.

OBE thus points to three significant changes in Agricultural Extension: 1) as a learning programme, Agricultural Extension should have a clear set of learning outcomes for farmers; 2) the range of outcomes and the curriculum developed to meet them must be developed in a participatory manner with all relevant stakeholders, in particular farmers; and 3) the range of outcomes should reflect the critical outcomes specified in South Africa’s OBE policy and which support the South African DoA human resource vision as outlined by the DoA (DoA undated).

To adapt Malcolm’s (2001) outcomes to outcomes relevant for an Agricultural Extension curriculum in a learning model, as posited in Chapter 2 it would be useful first to identify what should be the outcomes for a farmer having engaged with an extension programme. Reflection on the “critical outcomes” as applied to a farmer produces a range of outcomes which would include the ability of the farmer to:

1. Identify and act on farming problems by using creative and critical thinking;
2. Organise and manage his farming enterprises responsibly and effectively;

3. Collect, analyse, organise and critically evaluate information relevant to his farming enterprises;
4. Effectively participate in the development of agricultural technology and use it effectively, showing responsibility towards the environment and the health of others;
5. Understand that he operates within a set of related systems and make choices about his agricultural enterprises which take cognisance of those systems; and
6. Participate as partner in the learning agenda, as an investigator, generator, sharer and user of agricultural knowledge, technologies and skills.

The issue of technology development in outcome 4 above requires further explanation. As argued by the UNDP (undated), technology development, especially as it relates to livelihoods, must be participatory in nature where the community, in this case, farmers, effectively become researchers and analysts; hence the wording of outcome 4 above.

The foregoing outcomes also afford a number of positive spin-offs. In the context of extension being less about technology transfer and more about learning, the outcomes will enable farmers to adapt their farming systems to changes in the market – seeking that which is the most profitable. Further, developing learning skills will position farmers contribute to policy formulation, to participate in cooperative action and to have more power in the marketplace. Finally, as the contribution of Agriculture to GDP declines, it may be necessary for farmers to be able to identify alternative means of livelihoods. The outcomes identified above are transferable and can facilitate such an adaptation of livelihood.

To support such a learning agenda for farmers implies a training programme for Agricultural Extension practitioners as facilitators of this learning. Agricultural Extension practitioners would require skills not currently part of Agricultural Extension curricula. Working from the farmer learning outcomes, seven critical learning outcomes emerge for an Agricultural Extension curriculum:

1. Identify and act on farming problems by using creative and critical thinking (i.e. problem solving);
2. Collect, analyse, organise and critically evaluate information relevant to his extension responsibilities;

3. Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others (e.g. Participatory Technology Development¹¹);
4. Understand that he and the farmers he works with operate within a set of related systems and to make choices about his extension work which take cognisance of those systems (e.g. systems thinking);
5. Participate as partner in the learning agenda, as an investigator, generator, sharer and user of agricultural knowledge, technologies and skills.
6. Facilitate among farmers creative and critical thinking for problem solving within systems; and
7. Facilitate acquisition by farmers of a range of skills including farm organisation and management, critical use of information, critical and responsible engagement with technology development and use, and participating as a partner in learning agenda, as an investigator, generator, sharer and user of agricultural knowledge, technologies and skills.

In addition to the foregoing outcomes aligning extension with the identified learning agenda, they also provide flexibility for extension practitioners. It is observed in South Africa that extension skills are no longer the sole domain of the state. Numerous NGOs, agricultural companies and consulting firms are requiring extension skills covering a broader area than just farming *per se* – embracing more generic rural development. The proposed learning outcomes will position extension practitioners to fill this growing demand in the job market.

3.6. Conclusions

Both the educational and agricultural landscapes in South Africa are being reshaped by extensive policy changes. In this context, and building on the learning approach to agricultural extension argued in Chapter 2, the Agricultural Extension practitioner in South Africa becomes less the messenger of an extension message, and more the

¹¹ In relating technology development to Agricultural Extension curriculum, the knowledge and skill of Participatory Technology Development (PTD) provides a suitable learning set. PTD is an established approach to technology development in which the innovation capabilities of farmers are coupled with those of formal research and development institutions (Röling & Pretty 1997). As a learning outcome, Agricultural Extension curricula would need to include knowledge and practice in participatory technology development.

developer and facilitator of the specific learning process, content and outcomes which will drive his engagement with farmers as ‘learners’. This approach promotes a culture of continuous reflective learning and suggests shifts in the context and locus of learning to that of the Agricultural Extension practitioner/farmer. It further suggests shifting what is learned, the locus of leaning and the learning process.

To develop a culture of reflective learning amongst farmers Agricultural Extension practitioners require new skills. To provide these skills requires a critical examination of Agricultural Extension curricula in the light of OBE and agricultural priorities with a view to rewriting extension curricula. The foregoing initial theoretical examination of Agricultural Extension education in the light of South African education policy yields two sets of learning-outcome indicators to benchmark the required interrogation of extension curricula. The first set is described as content indicators; the second set is call process indicators.

The indicators were developed through an abstract process akin to Soft Systems Methodology (SSM). Systems thinking is eminently suited to curriculum development in the Higher Education sector (Ison 1999). The process involved following the seven basic steps of SSM devised by Checkland (1981) but adapted for this research in the context of curriculum evaluation (and later development):

1. Describe the situation in general terms
2. Develop a rich picture to visualise the manifold aspects of the situation
3. Formulate the root definitions of the system
4. Develop a conceptual model
5. Compare the conceptual model with the ‘real world’ through debate with colleagues
6. Identify the changes that the comparison precipitated
7. Define the work to be done to improve the situation.

The conceptual model required in stage 4 was Agriflection (Chapter 2). Stages 5 and 6 were an iterative process, perhaps less clearly separated as they might be in a more rigid application of SSM. The process was to look at each of element of Agriflection and debate it in terms of how it would translate into areas of learning. The ‘work to be done’ is effectively the introduction of the indicators se into the Agricultural Extension curricula.

Content indicators address learning outcomes around a discrete body of knowledge and practice which is applicable in its own right in practice. Process indicators address learning outcomes around the process of learning. While they also represent discrete content, the distinction as process markers emphasises the learning pathway and the dynamics thereof in the extension practitioner's engagement with farmers. Process indicators relate, for example, to the way in which a content learning outcome is achieved.

Content indicators:

1. Theory and practice in problem solving;
2. Collect, analyse, organise and critically evaluate information relevant to his extension responsibilities;
3. Theory and practice in Participatory Technology Development and innovation; and
4. Theory and practice in systems (systems thinking), including but beyond farm systems;

Process indicators:

5. Theory and practice in learning facilitation;
6. Theory and practice in participatory 'curriculum' (extension outcomes, content and process) development; and
7. Theory and practice in learning and learning styles.

Examining current extension curricula in the light of these seven educational indicators and the required skills they represent (Section 3.2.) would expose gaps in curricula. Employing these seven educational indicators would enable tertiary institutions, agricultural education curriculum developers and state educational qualification agencies to objectively examine and adjust curricula to ensure Agricultural Extension practitioners are equipped to deliver relevant support to farmers and farming communities. In effect, such an examination would provide a foundation and framework for developing Agricultural Extension curricula for South Africa which addresses agricultural imperatives (delineated in agricultural policy as discussed in Chapter 2) within the

context of outcomes-based education (delineated in educational policy). Further, the process of examination can be used to develop a model for the evaluation and development of curricula in any country and in any agricultural setting. Such a model could then be employed facilitate continuous adjustment of curricula to the changing landscape in agriculture.

References

Bahá'u'lláh, 1983. *Gleanings from the Writings of Bahá'u'lláh*. Bahá'í Publishing Trust, Wilmette.

Berlach, R. G. and McNaught, K., 2007. Outcomes based education? Rethinking the provision of compulsory education in Western Australia. *Issues in Educational Research*, 17(1), 1-14. <http://www.iier.org.au/iier17/berlach.html>

Bundy, C., 1988. *The rise and fall of South African Peasantry*. David Phillip, Cape Town.

Checkland, P.B., 1981. *Systems Thinking, Systems Practice*. John Wiley & Sons Ltd,

Cockburn, P., 1997. Building a brighter future: Curriculum 2005. South African Department of Education. Pretoria.

Curriculum 2005 Review Committee, 2000. Critical factors for curriculum change and implementation in SA Curriculum for 21st Century. In: Curriculum Review Committee, 2000. *A South African curriculum for the Twenty-first Century: Report of the review committee on curriculum 2005*. Presented to the Minister of Education, Professor Kader Asmal, Pretoria, 31 May 2000.

DBSA (Development Bank of Southern Africa), 2005. *2005 Development Report: Overcoming underdevelopment in South Africa's second economy*. DBSA, Halfway House.

DoA (South Africa National Department of Agriculture), Undated. Lifelong Learning. DoA. Pretoria. URL: <http://www.nda.agric.za/docs/landcarepage/The%20new%20Curriculum.htm>. Accessed October 2002.

DoA (South Africa National Department of Agriculture), 1998. Agricultural policy in South Africa: a discussion document. Internet document. URL: <http://www.nda.agric.za/docs/policy98.htm>. Accessed July 2004.

DoA (South African National Department of Agriculture), 2000. Service to agriculture since 1910. <http://www.nda.agric.za/docs/NDAfunctions/NDAhistory>. Accessed October 2004.

DoE (South African National Department of Education), 1997. Curriculum 2005: Specific outcomes, assessment criteria, range statements. Grades 1 to 9. Department of Education, Pretoria.

DoE (South African National Department of Education), Undated. Curriculum 2005: Lifelong learning for the 21st Century: A User's Guide. Pretoria, Department of Education. Internet document: <http://www.polity.org.za/govdocs/misc/curr2005.html>. Accessed 3 July 2001.

Fakier, M., and Waghid, Y., 2004. On outcomes-based education and creativity in South Africa. *International Journal of Special Education*. (19) 2, 53-63.

Genis, E., 2001. Principles and practice of outcomes-based education. Paper presented at the Conference of the Association of Principals of Agricultural Colleges, 15-17 October 2001, Kruger National Park. www.mantec.ac.za/APA. Accessed July 2004.

Halloun, I.A., 1998. Interactive Model-based Education: an alternative to Outcomes-based education in Physics. *South African Journal of Science*. 94 (July 1998), 313-318.

Hendrick, R.M., 1999. Guidelines for the Development of an Experiential Training Guide for the Agriculture Management Course at Technikon SA. Vista University, Pretoria.

Ison, R., 1999. Applying Systems Thinking to Higher Education. *Systems Research and Behavioral Science*, (16), 107–112

Jansen, J. D., 1999. Globalization, Curriculum and the Third World State: In: Dialogue with Michael Apple. *Current Issues in Comparative Education*, 1(2)—response article. <http://www.tc.columbia.edu/cice/articles/jj112.htm>. Accessed September 2005.

Jones, G.E., and Garforth, C., 1997. The history, development, and future of Agricultural Extension. In: Swanson, B.E., Bentz, R.P., and Sofranko, A.J. (Eds.), 1997. *Improving Agricultural Extension. A reference manual*. Food and Agriculture Organization of the United Nations. Rome. pp. 3-12.

Killen, R., 1999. Outcomes-based education: some issues to consider in the South African context. Paper prepared as an overview of OBE for a series of workshops presented at Vista University and ML Sultan Technikon during May/June 1998 as part of the AUSAID funded Australia-South Africa Institutional Links Project No. 2-007.

Kingon, J. R. L., 1915. Native Agriculture. *South African Journal of Science*. 12 (5), 178-191.

Kolb, D., 1984. *Experiential Learning*. Prentice-Hall, New Jersey.

Lindley, W.I., 1999. Constraints and potentials of training mid-career extension professionals in Africa. Paper presented at the International Workshop on Innovative Training Programmes for Mid-Career Agricultural Extension Field Staff in Sub-Saharan Africa, Addis Ababa, Ethiopia, 6-8 July 1999.

Luckett, K. and Luckett, S., 1999. Implementing Outcomes-based Education in a South African University. *Academic Development*, 4 (1), 125-154.

Luckett, K and Webbstock, D., 1999. Tensions between Systems and Lifeworld: the imposition of a National Qualifications Framework on the Humanities in South Africa. *Continuous Improvement Monitor*. (1) 4. <http://lanes.panam.edu/journal/library/Vol1No4/luckett.html>. Accessed September 2005.

Machethe, C.L., 2004. Agriculture and poverty in South Africa: can agriculture reduce poverty? Paper presented at the Overcoming Underdevelopment Conference held in Pretoria, 28-29 October 2004.

Malcolm, C., 2001. Implementation of outcomes-based education approaches to education in Australia and South Africa: a comparative study. In: Sayed, Y. and Janson, J., 2001. *Implementing education policies: the South African experience*. University of Cape Town Press, Cape Town.

Moyo, E. and Hagman, J., 2000. Facilitating competence development to put learning process approaches into practice in rural extension. In: *Human resources in agricultural and rural development*. 1999. FAO, Rome. URL: www.fao.org/DOCREP/003/X7925M/X7925M14.htm. Accessed February 2002.

Paine, M.S., 1995. Learning in farm management: a New Zealand experience. *Journal of Agricultural Education and Extension*, (2) 1, pp 29-36

Pretty, J.N. and Vodouhê, D.S., 1997. Using rapid or participatory rural appraisal In: Swanson, B.E., Bentz, R.P. and Sofranko, A.J. (Eds.), 1997. *Improving Agricultural Extension. A reference manual*. Food and Agriculture Organization of the United Nations. Rome. pp. 47-55.

Rogers, A. and Taylor, P., 1998. *A Guide to Participatory Curriculum Development in Agricultural Education and Training*, FAO, Rome.

Röling, N., 1995. What to think of extension? A comparison of three models of extension practice. *Agricultural Extension & Rural Development Department Bulletin* (Francophone issue). AERDD, Reading, UK. December 1995.

Röling, N., and Pretty, J.N., 1997. Extension's role in sustainable agricultural development. In: Swanson, B.E., Bentz, R.P. and Sofranko, A.J. (Eds.), 1997. *Improving Agricultural Extension. A reference manual*. Food and Agriculture Organization of the United Nations. Rome. pp. 181-192.

Soudien, C. and Baxen, J., 1997. Transformation and Outcomes-Based Education in South Africa: Opportunities and Challenges. *The Journal of Negro Education*, (66) 4, 449-459

Spady, W., 2008. It's Time to End the Decade of Confusion about OBE in South Africa. *South African Journal for Science and Technology*. (English Translation made available through the Education Library Blog@University of Pretoria) http://www.up.ac.za/pup/web/resources/up/research/img_gallery/resrep2005/Output/11478.html. Accessed October 2008.

Taylor, P., 1998. Participatory curriculum development for agricultural education and training: experiences from Viet Nam and South Africa. In: Van Crowder, L. (Ed.), 1998. *Training for Agriculture and Rural Development: 1997-98*. FAO, Rome. <http://www.fao.org/sd/EXdirect/EXan0026.htm>. Accessed December 1995.

Worth, S.H., 1994. The Management of Agricultural Development in Bophuthatswana. Masters Thesis. University of Natal. Pietermaritzburg.

Chapter 4

Developing Curriculum Markers for Agricultural Extension Education in South Africa¹²

4.1. Introduction

As detailed in Chapters 2 and 3, agricultural and educational landscapes in South Africa are being reshaped by extensive policy changes. This chapter sets a framework for evaluating Agricultural Extension curricula in South Africa in the light of these changes. It is based on a review of South Africa's current macro-agricultural development policy, its educational policy and its strategy for agricultural education and training. The particular context is Agricultural Extension. Thus this chapter will address issues relating to the role of Agricultural Extension, the explicit and implicit outputs of Agricultural Extension education, and the intended outcomes of agricultural development policy which, in part, is delivered through the Agricultural Extension service.

The chapter builds on Chapter 2 and briefly examine outcomes-based education (OBE) as the framework for all educational undertakings in South Africa. It will specifically draw attention to the application of OBE to Agricultural Extension at both the curricular level and the service delivery level. Related to this will be an overview of the National Agricultural Education and Training Strategy, again with specific reference to its relevance to Agricultural Extension and Agricultural Extension curricula.

By implication, if Agricultural Extension is expected to operate in the territories outlined by the policies to be reviewed, it will be necessary to ensure that extension practitioners have the relevant skills needed to deliver what is expected. Ultimately, therefore, the aim of the chapter is to develop a set of markers which can be used to evaluate Agricultural Extension curricula so that adjustments can be made to ensure that extension practitioners deliver on the desired outcomes of policy.

¹² This chapter is adapted for this thesis from Worth, S.H., (2008). Developing Curriculum Markers for Agricultural Extension Education in South Africa. *Journal of Agricultural Education and Extension*. 14 (1), 21-34.

4.2. Harmonising Agricultural Extension and education theory

Training in Agricultural Extension, as is training in any formal discipline, is the product of an educational process which has its unique scientific content. Additionally, however, Agricultural Extension is, in its own right, a system of education. Both training in Agricultural Extension and the practice of Agricultural Extension must necessarily incorporate principles of education.

Shen and Jones (2005:29), citing Sparks (1993) define education as a “process through which individuals assimilate and discover information, skills and understanding”. They identify two levels of education: Professional Technical Skills; and Professional Practical Skills, and assert that gaining proficiency in both types of skills the learner will know what and how (from the former and will know why from the latter – i.e. will be able to think as a professional. They further assert that to achieve this, learners “need to take responsibility for their own education and have the opportunity to take an active role in learning” rather than being passive receivers of information (Shen & Jones 2005:30). Current educational theory also supports a competency-based approach to education – this for both issues of good accountability as well as good learning (Killen 1999). In South Africa, this approach has been formalised through the adoption of outcomes-based education (DoE Undated, Genis 2001). It is relevant, therefore, that Agricultural Extension curricula (as well as Agricultural Extension practice) should be competency-based.

Further, Udin and Acker (2000) confirmed that educational systems must be evolved within the context of the unique setting of its intended operation. Taylor (1998) likewise asserts that curricula should be influenced by and accommodate changes to the social context. Thus the development of markers for Agricultural Extension education unique to the South African context is a valid, if not essential, exercise.

4.3. Agricultural Extension in the new South Africa

The first key factor in developing markers for Agricultural Extension education is South Africa’s agricultural policy. The context in which South African agriculture exists is in a state of flux. Fundamental issues such as land reform, agricultural finance, market access and regulatory functions are all, to greater or lesser extents, in a process of transformation. The opening of access to land, credit, markets, etc. carries with it a

parallel agenda of building capacity among those previously excluded to translate the legal reality into a practical reality. Ensuring the ability, for example, of newly-settled land owners to engage in sustainable and economically viable agriculture and generally to pursue the industry with success, poses important questions for extension education in South Africa.

The current South African agricultural agenda seeks to move beyond poverty alleviation to wealth creation (NDA 2001). The Strategic Plan for South African Agriculture (NDA 2001) clearly highlights the poverty, wealth and livelihoods agendas and identifies extension services, whether state, private, or NGO-based, as one of the key partners in the realisation of these objectives. Current thinking for agricultural education and training specifically highlights the need for the concept of Agricultural Extension “to be expanded to issues not traditionally associated with Agricultural Extension” (NDA 2005:12). Agricultural development is seen primarily as a human resource development programme. Rather than merely increased yields, technology adoption and economic growth being the aim of agricultural development, increased human capacity (particularly among farmers) to engage with a wide range of concepts and practices associated with farming and agriculture is a key element of current agricultural policy in South Africa.

In brief, current South African Agricultural policy and current development praxis indicate that extension practitioners should be, as noted in Chapter 2 “less messengers of extension messages and more developers and facilitators of specific learning processes, content and outcomes which will drive their engagement with farmers as ‘learners’”. Such an approach to Agricultural Extension implies, again as noted in Chapter 2 “a culture of continuous reflective learning and suggests shifts in the context and locus of learning to that of extension practitioners and farmers. It further suggests shifting what is learned, and the learning process”.

Among the goals of the current South African policy is the aim to correct inequities and anomalies of the past. These include:

- Constrained competitiveness and low profitability;
- Skewed participation;
- Low investor confidence in agriculture;
- Inadequate, ineffective and inefficient support and delivery systems; and
- Poor and unsustainable management of natural resources (NDA 2001:6).

Overall, three strategies are identified to:

- Enhance equitable access and participation in the agricultural sector;
- Improve global competitiveness and profitability; and
- Ensure sustainable resource management (NDA 2001:6).

Finally, a specific priority with direct bearing on education and training is:

- Transforming agricultural research, transfer of technology, education and extension to be more responsive to markets (NDA 2001:7).

The Strategy also outlines the following outcomes which are “expected to flow from the successful pursuit of the strategic objectives” (NDA 2001:11):

- Increased wealth creation in agriculture and rural areas;
- Increased sustainable employment in agriculture;
- Increased incomes and increased foreign exchange earnings;
- Reduced poverty and inequalities in land and enterprise ownership;
- Improved farming efficiency;
- Improved national and household food security;
- Stable and safe rural communities, reduced levels of crime and violence, and sustained rural development;
- Improved investor confidence and greater domestic and foreign investment in agricultural activities and rural areas; and
- Pride and dignity in agriculture as an occupation and sector.

Each of the foregoing anomalies, strategies, priorities and outcomes has a bearing on the content and method of agricultural education. They imply a need for a careful examination and detailed evaluation of agricultural education curricula – including Agricultural Extension. They also provide a useful framework for developing markers for making such an examination and evaluation.

4.4. Outcomes-based education as the underpinning to Agricultural Extension education

A second key factor in developing markers for Agricultural Extension education is South Africa's educational policy. Current South African educational policy is structured around outcomes-based education (OBE). OBE is learner-centred and result-oriented and is aimed less at specific content than at increasing the learning ability of the learner (Fakier & Waghid 2004). It is intended that education should be aimed at equipping learners with skills, knowledge and values that will allow them to contribute to personal, family, community and national progress (DoE 1997).

Agricultural Extension is an adult education system. Therefore, as argued in Chapter 3) it should comply with prevailing educational policy. This being the case, the premise of this chapter is that the relationship between an extension practitioner and a farmer is essentially the same as that between an educator and a learner. Thus the integration of agricultural policy (which will direct content) and educational policy (which will direct process) with Agricultural Extension praxis, is essential if Agricultural Extension is going to keep pace with the changes taking place in South Africa and in South African agriculture in particular.

The overall aim of the integration of agricultural and educational policy into Agricultural Extension would be to ensure that Agricultural Extension and extension practitioners deliver to farmers a service (i.e. an educational process) that complies with the learning process of OBE while simultaneously delivering on the intended outcomes of South African Agricultural Policy. In the case of Agricultural Extension, it is further submitted that the integration process demands a four-faceted process:

- Understanding how Agricultural Extension as a profession or discipline of study must change in order to deliver on the South African agricultural agenda;
- Translating the recast Agricultural Extension and the expectations of OBE into knowledge and skills requirements for extension practitioners;
- Determining what changes need to be made in curricula designed to produce 'recast' extension practitioners; and

- Determining what would be the learning outcomes of farmers who have been assisted by Agricultural Extension.

The outputs of the integration process and the implementation of the findings would be:

- Agricultural Extension curricula which is relevant to both educational and agricultural policy;
- Extension practitioners who have the knowledge and skills to engage with farmers in such a way as to ensure that the aims of agricultural policy are realised;
- Agricultural Extension programmes created and/or adapted to deliver the intended outcomes of agricultural policy; and
- Farmers who have the knowledge and skills to achieve for themselves the learning required for them to contribute to their own progress and to the progress of their families, the community and the nation.

It is further submitted that these four facets should not be addressed in isolation, or in a sequential manner. Each facet of the process influences and is influenced by each of the other facets. Figures 4.1 and 4.2 attempt to depict the relationship among these four facets of the integration process with one another, as well as with the identified outputs. Figure 4.1 depicts the ultimate process of curriculum delivery to farmer. At the core of the process is a logical cascading from curriculum to competent practitioners to extension programmes to competent farmers.

The process is hardly unidirectional. For each element in the process there should be a feedback loop ensuring that previous elements are informed by experience gained from a subsequent element. Figure 4.1 underscores this dynamic nature of the relationship between the elements in the curriculum to farmer process. This is in keeping with Genis (2001) who noted that OBE policy challenges curriculum development to, in part, be the result of engaging stakeholders.

Figure 4.2 depicts the relationship between the curricula-to-farmer process and the four facets of the process of integrating agricultural and educational policy into Agricultural Extension. Again, the aim is to demonstrate the dynamic nature of this relationship. Each 'level' interacts with each other level in both processes. According to

Genis (2001), this is an essential part of curriculum development. It is also in keeping with the provisions of the National Agricultural Education and Training Strategy (NDA, 2005) and of the current agricultural development policy (NDA, 2001).

Figure 4.1: The dynamics of the curricula-to-farmer process

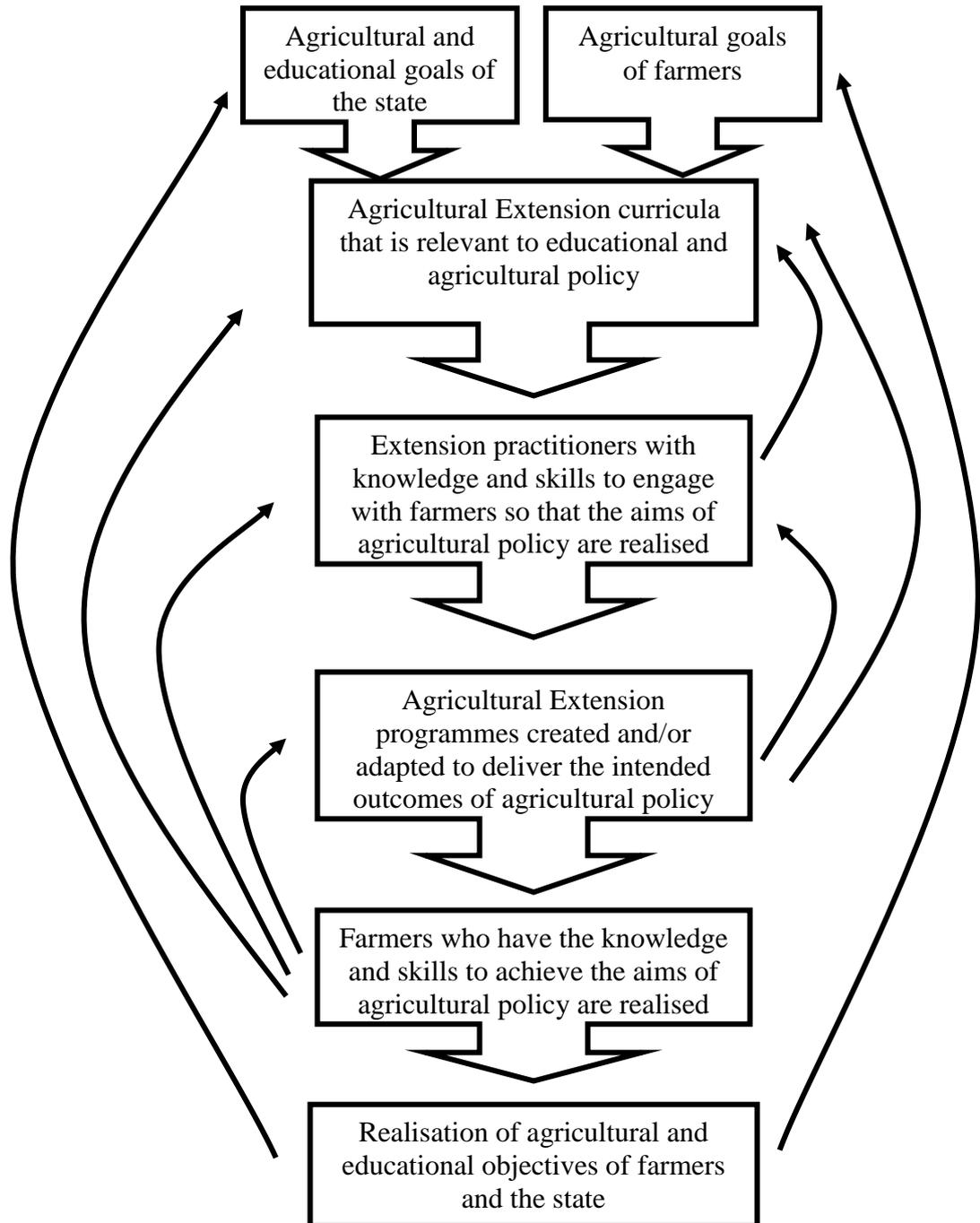
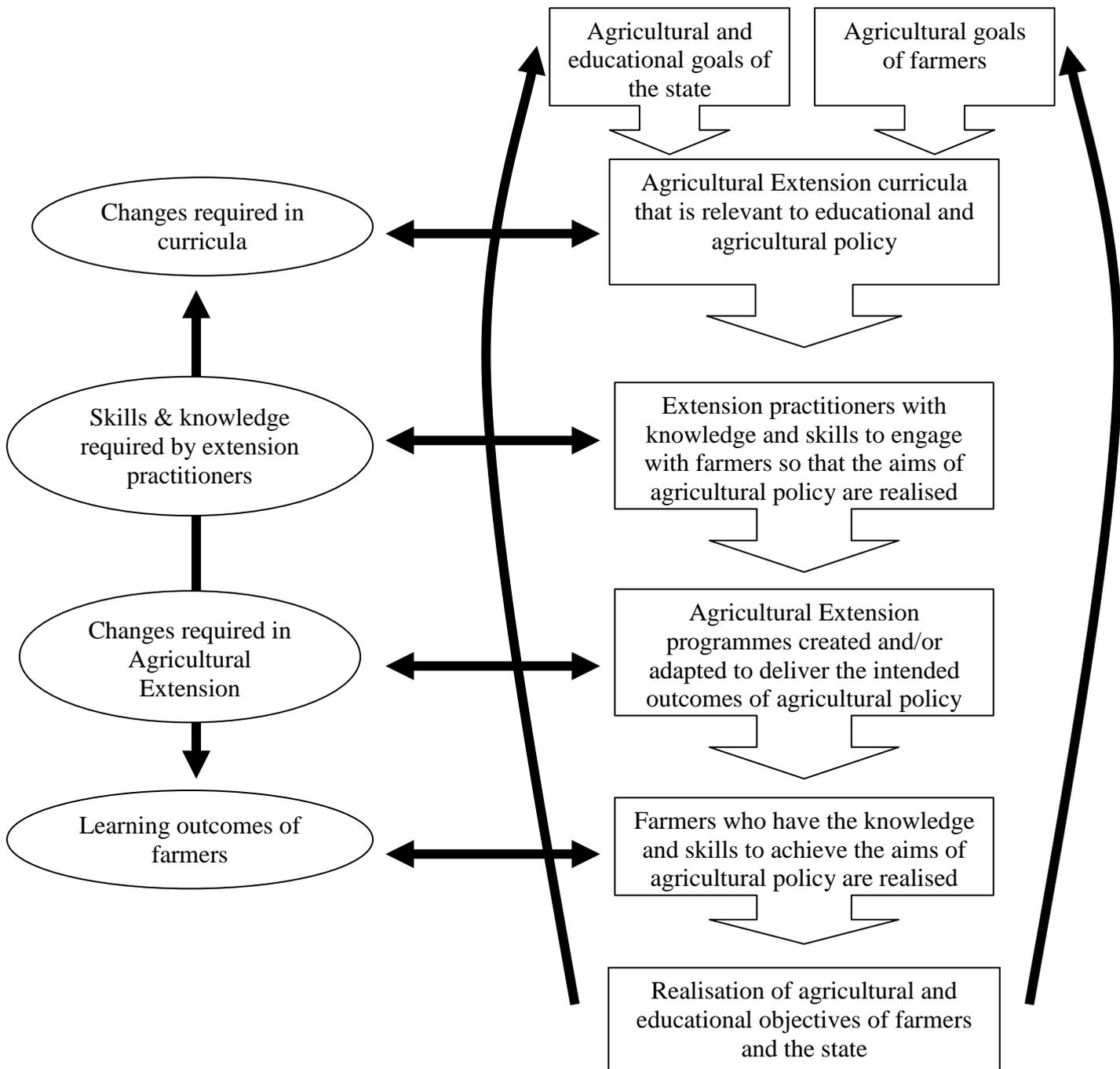


Figure 4.2: The dynamics of the relationship between the curricula-to-farmer process and the facets of integration of agricultural and educational policy into Agricultural Extension



4.5. The National Education and Training Strategy for Agriculture and Rural Development in South Africa: a framework for curricula change in Agricultural Extension.

South Africa has taken an initial step in the direction of integrating an education agenda into Agricultural Extension. In 2005, the National Department of Agriculture (DoA) launched the National Education and Training Strategy for Agriculture and Rural Development in South Africa (known as the Agricultural Education and Training (AET) strategy) (Didiza 2005). This is a third key factor in the development of curriculum markers for Agricultural Extension education.

The AET strategy was the result of a consultative process engaging many stakeholders over a broad spectrum of agricultural sector. Farmers, State, private and NGO service providers, farm workers, agricultural colleges, universities as well as the formal structures governing the development of training and educational programmes (known as Sectoral Education and Training Authorities (SETAs)) were all engaged in the development of the AET Strategy (DoA, 2005).

The DoA (2005:5) noted that the AET Strategy “represents the first effort to address agricultural education and training holistically in a manner that engages all role players to develop and maintain an effective and well coordinated AET that is integrated at all levels and responding appropriately to South African Agriculture.” The AET Strategy for agricultural education and training should ultimately contribute to “effective agricultural and economic development” (DoA 2005:13). A specific intervention called for in the AET Strategy is to “review the alignment of AET Curricula at all levels to support the development of effective agricultural science, agricultural practice and Agricultural Extension skills and expertise” (DoA, 2005:24). It further expresses a need for regular reflection and adaptation to meet changes as they arise in the agricultural sector (DoA, 2005:14)

An integral part of the AET strategy is the articulation of key principles which should underpin, among other things, curricula (DoA 2005:14):

1. “While the context for AET is improvement and increased sustainability of South African Agriculture, it is primarily a programme of Human Resources Development, which recognises the inherent nobility and dignity of every individual touched by AET, whether as a service provider or as its user

2. AET is committed to operating in a paradigm of continual partnership-based learning through a conscious linkage to research, education and extension (outreach), each informing and enhancing the other through a partnership between service provider and client, thereby promoting an active process of planning, action, reflection and learning
3. Planning and implementation of AET will take into consideration the practical reality that the more independent a farmer is, less intervention should be required/expected from the State and more support be provided by the private sector—the reverse is also true—underscoring the partnership relations
4. AET is committed to the principles of integrity, trustworthiness, but these are only measured by deeds rather than by words
5. AET should result in a wide range of developed human resources engaged at all levels of agriculture
6. AET should be harnessed to deal with short, medium and long-term issues facing agriculture in South Africa, ranging from micro issues of household food security to international issues of global competitiveness of South African agricultural products
7. AET should make a genuine contribution to the realisation of the strategic outcomes of the prevailing agricultural strategy.”

It is clear from the foregoing, that agricultural education and training is meant to include Agricultural Extension as an integral part of the educational and learning processes. Further, the AET Strategy specifically targets Agricultural Extension as a key competency and skill set needed to meet the demands of the agricultural development agenda as well as to integrate such issues as rural change, HIV/Aids, and household livelihood systems (DoA, 2005). While it is beyond the scope of this chapter, the AET Strategy suggests that agricultural economists, agricultural engineers and agricultural scientists all be equipped with “The skill of engaging farmers, producers and small-scale value-adders in technology development...” (DoA, 2005:12).

One of the goals of the AET strategy is to “Ensure the alignment of AET curricula with urgent challenges facing South African agriculture” (DoA, 2005:21). Further, it should deliver on “a wide range of developed human resources engaged at all levels of agriculture” (DoA, 2005:4). Three key areas are identified as starting points to adjust the

content of curricula at various levels to reflect these “urgent challenges” in the agricultural sector (DoA, 2005:15):

- Sustainable development and land care;
- Food Security and water harvesting; and
- Rural wealth creation

Other skills which are specifically identified in relation to meeting the current agricultural agenda as a reflection of the current needs in the sector are (DoA, 2005:12):

- Agricultural Extension;
- Sustainable livelihoods;
- Food security;
- Resource management;
- Agricultural law and policy;
- Land care; and
- Environmental management.

The policy later expands the list to include sustainable agriculture and sustainable development. These and the foregoing skills are specifically targeted for Agricultural Extension at both the service delivery level and the higher education level (DoA 2005).

Drawing on the foregoing, in addition to the particular range of learning that should be included in Agricultural Extension education curricula, the following qualitative elements give some direction to the method and ethos of learning adopted:

- Partnership-based learning;
- A conscious linkage to research, education and extension (outreach), each informing and enhancing the other through partnerships between service provider and client;
- An active process of planning, action, reflection and learning;
- Principles of integrity, trustworthiness, measured by deeds rather than by words; and
- Making a genuine contribution to the realisation of the strategic outcomes of the prevailing agricultural strategy.

4.6. Curriculum markers for Agricultural Extension education

The foregoing overview of South African agricultural policy, educational policy, and agricultural education strategy, creates a framework and provides many elements to be included in agricultural education. Further, the various theories, practices, policies and viewpoints discussed previously can be translated into learning agenda capabilities – that is, technical knowledge and practice and a theoretic framework. Further, in the case of Agricultural Extension, these competencies must translate into farmer capabilities, which if the aims of the National Strategy for agriculture are to be achieved, must be at a level appropriate to their farming and livelihood strategies. The extension worker, then, needs skills to facilitate the acquisition of these skills by farmers.

It should be noted that the term ‘capability’ is used here and not ‘competency’. While van den Ban (2006) refers to competencies for Agricultural Extension, the concept of capabilities is more useful developing curricula (and in creating job specifications; See Chapter 6) because of their integrative nature.

According to Lockett and Lockett (1999:5) a capability “integrates a repertoire of skills, useable knowledge, attitudes and aptitudes in professional praxis, in such a way that these are combined and applied appropriately for successful performance in real world contexts.” Similarly, “holistic capabilities represent the link between disciplinary knowledge and professional skills (Bowden & Marton 1998:12).

Stephenson (1998:2) citing Stephenson (1992) identified four basic “abilities” that define the concept of capability. These are:

- “Take effective and appropriate action;
- Explain what they are about;
- Live and work effectively with other; and
- Continue to learn from their experiences as individuals and in association with others, in a diverse and changing society.”

He argues that “capable people not only know about their specialisms, but they also have the confidence to apply their knowledge and skills within varied and changing situations and to continue to develop their specialist knowledge and skills long after they have left formal education (Stephenson 1998:3).

It is in such a context that Bowden and Marton (1998:105) argue that narrow capabilities such as those that are commonly developed for Agricultural Extension are

narrow and require a level of precision of understanding of the “specific workplace competencies” that is not possible to achieve. Given the level of dynamism in agriculture, it may not even be desirable.

An effort to consolidate and integrate the ideas set out in these instruments, results in the following set of markers for Agricultural Extension. These proposed markers are grouped into four broad groupings: Meta markers; Learning Content markers; Process markers; and Practical Content markers. Where the term “theory and practice” is used, this is taken to include theories, principles, processes, and skills as well as the concomitant understanding and attitudes. Ultimately theory and practice represent linked but separate learning outcomes.

Meta markers: Meta markers address cross-cutting factors in the learning agenda. While they represent a discrete body of knowledge and practice, they also present the overarching context in which all other learning in the curriculum takes place. Thus they are grouped separately.

- *Individual and collective learning*

Individual and collective learning implies that each participant in the learning process is responsible for his or her own learning – individually and collectively. Further, learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. The educator is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. The student is an equal partner in the learning process. Curricula in general should be structured around this principle and, further, the principle itself should be an explicit learning outcome of the curricula.

- *Planning, action and reflection (PAAR)*

Planning, action and reflection (PAAR) is based on one of the key underpinnings of learning: that learning should be reflective. Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. This is here presented in the three-stage format of planning, then acting and then reflecting, leading to recurring cycles of planning, action and reflection. It implies that learning is iterative, experiential, linked to action and, above all,

continuous. Since extension should be implemented as a facilitated learning process, extension practitioners will need to understand and practice PAAR. As a principle, PAAR should be infused throughout extension curricula as the general approach to learning and PAAR should be included as a learning outcome.

- *Iterative Development Pathways*

Like learning, development is iterative, experiential, linked to action and continuous. Development is understood to be a learning process, following the same three-stage format. This marker addresses development as a concept, process and an outcome. Since extension has been linked directly by policy to development, extension practitioners will need to understand and practice this concept. Because development is a key context of practice, it must likewise be a key context for learning – hence is it a meta marker. Further, because development is a specific theory and skill set in its own right, iterative development pathways should be a technical learning outcome in extension curricula.

- *Sustainable livelihoods and development concepts*

While Sustainable Livelihoods is identified by the government as a technical competency, upon reflection, and especially when viewed in the overall context of development, sustainable livelihoods is a meta factor. This is justified by the primacy of a livelihood as the foundation of social and economic development. As a learning marker, sustainable livelihoods and development concepts provides a learning context for curricula as well as a technical learning outcome.

Learning Content markers: Learning Content markers, like Meta markers, are underpinning markers. In this case they address theory and practice in areas that impact on all other learning outcomes in the curricula.

- *Theory and practice in problem solving*

Learning should, by design, result in action which is purposeful. The South African AET strategy seeks to ensure that learning should develop capacity “to deal with short, medium and long-term issues facing agriculture in South Africa, ranging from micro issues of household food security to international issues of global competitiveness of South African agricultural products” (DoA 2005:14). This is

interpreted here as capacity for problem solving. It is a practical skill as well as a mind-set which needs to be incorporated into curricula.

- *Theory and practice in participatory technology development and innovation*
Participatory technology development and innovation is a fundamental underpinning to sustainable progress. Rather than teaching the capacity to persuade farmers to adopt a particular technology, the AET points in another direction. Its explicit directive is to develop in those supporting farmers the “skill of engaging farmers, producers and small-scale value-adders in technology development...” (DoA, 2005:12). Technology adoption on its own promotes conformity, while technology innovation promotes experimentation, exploration and creativity. As a learning marker it should be included as a technical learning outcome with the understanding of its creative potential.
- *Theory and practice in systems/systems thinking*
Farming is all about systems. Successful farm management requires successful systems management. To act otherwise negatively impacts on sustainability. This has particular implications for the introduction of technologies. Further, agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. Beyond the farm however, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. Thus systems thinking is a critical element in Agricultural Extension education as a learning marker. Therefore, systems thinking should be included as a specific learning outcome.
- *Theory and practice in sustainable agriculture*
Sustainability is a fundamental element of development, livelihoods, economy and similar pursuits. Agriculture cannot be an exception. Sustainable agriculture is a particular collection of holistic learning which contextualises agricultural production in social, economic, environmental and technical sustainability. As a learning marker sustainable agriculture should be included as a specific learning outcome both as a mindset and as a skill.

Process markers: Process markers refer to facets of the learning process which need to be included in the Agricultural Extension curricula. Both OBE and extension theory stress that learning, rather than teaching or adoption, is the central aim of education and extension respectively. Thus range of markers emerge as important elements of curriculum.

- *Theory and practice in learning facilitation*

Learning facilitation is a concept which describes the relationship between extension practitioners and farmers. Learning facilitation also describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. It implies that extension practitioners will be trained with both the attitude and skills which will foster learning and the owning of learning in the farmer.

- *Theory and practice in 'curriculum' development*

This marker is derived from OBE and translated into extension in the context that Agricultural Extension is an educational programme. OBE indicates that teachers (i.e. extension practitioners) should participate in the development of curricula. In the case of Agricultural Extension 'curricula' is interpreted as the outcomes, content and processes involved in the execution of extension both generally and in specific engagement with farmers. Capacity to engage in curriculum development requires both theoretical and practical learning content.

- *Theory and practice in the process of investigating, applying and sharing*

The process of investigating, applying and sharing describes to the learning process to be used in extension engagements. It denotes a cyclical process which is meant to be applied by extension practitioners in their own learning processes (including research), by extension practitioners in facilitating learning among farmers and in engagements with other stakeholders. It stresses, in particular, the importance of sharing knowledge gained through the process of investigation and application.

- *Theory and practice in learning and learning styles*

Learning emerges as a fundamental marker. It denotes the shift from content-based education, to learner-based education. It underscores the nature of the exchange between extension practitioners and the farmers. Learning models such as Kolb (1984) emphasise understanding how people acquire knowledge; this is seen as essential to extension in its engaging with farmers. Understanding and being able to work with experiential learning and learning styles related to the theory is particularly useful given the dynamic nature of agriculture and development.

The markers outlined above comprise essential learning for extension practitioners in addition to the particular technical learning required (as implied in agricultural policy) – it is the framework for facilitated learning. These markers address the essence of extension which may operate in a variety of contexts. Thus, in this chapter the specific technical markers have been excluded. Issues such as rainwater harvesting, food security, collective organisations, and specific agricultural and related sciences and practices such as agronomy, irrigation, economics, livestock production, etc. are deliberately excluded.

Further, several of the markers, fit into more than one of the three categories identified above. They are placed into their respective categories to underscore the particular learning required. For example, learning and learning styles is listed as a process marker. This emphasises the role of this area of learning as both an understanding and a skill to be applied in practice.

4.7. Conclusion

This chapter has sought to bring together the previous three chapters in a coherent set of curriculum markers that can be used to evaluate agricultural extension curricula. It has integrated the idea that agricultural extension should be seen primarily as an instrument of learning as argued in Chapter 2. As an educational programme, as argued in Chapter 3, agricultural extension, and in the South African context, needs also be regarded in the context of South African education policy and imperatives.

The markers developed are a result of the synthesis of a renewed understanding of agricultural extension, educational principles and the transformation goals of South African agricultural policy. The meta, content and process markers thus conceived

comprise the detail of the interrogation of South African agricultural extension curricula which comprises the balance of this thesis. How they will be used in the evaluation of curricula is discussed in Chapters 5 and 6.

As noted earlier, this chapter did not discuss technical markers for evaluating curriculum. Although it is beyond the scope of this study, the research and analysis conducted evoked the realisation that there would be value in understanding the interplay between these more purely extension markers and technical makers.

Van Crowder (1996) raised the concern that in extension training, greater emphasis and perhaps value is place on technical training in agricultural sciences. Extension is often diminished or minimised in the curriculum and thus graduates – while technically capable, lack the knowledge and skills needed to work within a development context. Hillison (1996) specifically raises the question of how much agricultural science needs to be included in agricultural education curricula.

Additional research is recommended to determine the ratio or mix of the learning framework and the technical learning. Based on the work done for this chapter, it is anticipated that this ratio will be dynamic and will reflect the actual work required by the extension practitioners and the profile of the farmers with whom they engage.

References

- Bowden, J. and Marton, F., 1998. *The University of Learning: Beyond Quality and Competence in Higher Education*. RoutledgeFalmer, London.
- Didiza, T. 2005. Speech by the Minister of Agriculture and Land Affairs, Ms Thoko Didiza, at the official launch of National Strategy on Education and Training for Agriculture and Rural Development; 30 September 2005. Pretoria. <http://www.info.gov.za/speeches/2005/05100415451004.htm>. Accessed May 2006.
- DoA (South African National Department of Agriculture), 2001. The Strategic Plan for South African Agriculture. Department of Agriculture, Pretoria.
- DoA (South African National Department of Agriculture), 2005, National Education and Training Strategy for Agriculture and Rural Development in South Africa (AET Strategy). Department of Agriculture, Pretoria.
- DoE (South African National Department of Education), Undated. Curriculum 2005: Lifelong learning for the 21st Century: A User's Guide. Pretoria, Department of Education. Internet document: <http://www.polity.org.za/govdocs/misc/curr2005.html>. Accessed 3 July 2001.
- DoE (South African National Department of Education), 1997. Curriculum 2005: Specific outcomes, assessment criteria, range statements. Grades 1 to 9. Department of Education, Pretoria.
- Fakier, M., and Waghid, Y., 2004 On outcomes-based education and creativity in South Africa. *International Journal of Special Education*, 19 (2), 53-63.
- Genis, E., 2001. Principles and practice of outcomes-based education. Paper presented at the Conference of the Association of Principals of Agricultural Colleges, 15-17 October 2001, Kruger National Park. URL: www.mantec.ac.za/APA. Accessed July 2004.
- Hillison, J., 1996. The origins of agriscience: or where did all that scientific agriculture come from? *Journal of Agricultural Education*, (37) 4, 8-13.
- Killen, R., 1999. Outcomes-based education: some issues to consider in the South African context. Paper prepared as an overview of OBE for a series of workshops presented at Vista University and ML Sultan Technikon during May/June 1998 as part of the AUSAID funded Australia-South Africa Institutional Links Project No. 2-007.
- Kolb, D.A., 1984. *Experiential Learning: Experience as the source of learning and development*. Prentice Hall, Englewood Cliffs.
- Luckett, K. and Luckett, S., 1999. Implementing outcomes-based education in a South African university. Presented at the SAARDHE Conference, 1997.
- Shen, D. S., and Jones, B. L., 2005. A New Implication for China's Rural Education Reform: Organizational Learning Theory. *The Journal of International Agricultural Education and Extension*, 12 (1), 27-34.

Stephenson, J., (1998). The concept of capability and its importance in higher education. In: Stephenson, J. and Yorke, M. (Eds.), 1998. *Capability and Quality in Higher Education*. RoutledgeFalmer, London.

Taylor, P., 1998. Participatory curriculum development for agricultural education and training: experiences from Viet Nam and South Africa. In: van Crowder, L. (Ed.), 1998. *Training for Agriculture and Rural Development: 1997-98*. FAO, Rome. <http://www.fao.org/sd/EXdirect/EXan0026.htm>. Accessed December 1995.

Udin, V. A. and Acker, D. G., 2000. The Iowa State University/National Agricultural University of Ukraine Linkage Project. *Journal of International Agricultural and Extension Education*, 7(1), 17-22.

van Crowder, L., 1996. Assessment of Pre-Service and In-Service Extension Education. Sustainable Development Department, Food and Agriculture Organisation of the United Nations. <http://www.fao.org/sd/EXdirect/EXan0001.htm>. Accessed July 2004.

Chapter 5

Establishing a Method for Evaluating Higher Education-Level Curricula for Agricultural Extension in South Africa

“Curriculum evaluation plays a more important role than ever before. It is also a more difficult role. Its central purpose is to monitor learning achievement of students as the key function of the system. It is no longer sufficient to measure learning achievements solely in cognitive terms. The demands of citizenship have increased. The requirements of employment have become more complex. The decisions needed for individual living are more varied. Thus, evaluation is required to measure a much greater range of human achievements and capacities as well as to monitor the effectiveness of teachers, of schools, and of education systems. Over the past three decades, experience and the results of research have delivered the means to increase the power and effectiveness of evaluation. To achieve this increase in practice is the challenge for educators, administrators and politicians” (Hughes 2001:58).

5.1. Introduction

Chapters 3 and 4 build and ultimately present a set of curriculum markers that can be used to evaluate South African agricultural extension curricula. This chapter will frame a method with which to employ the curriculum makers in the evaluation of South African agricultural extension curricula.

This chapter is also a response to Hughes’ (2001:58) and similar challenges. It is further a response to Zinnah *et al* (1998) who note that even though Agricultural Extension is touted as essential to resolving the agricultural issues facing the African continent, training and education of Agricultural Extension practitioners is often out of touch with the realities those practitioners face. As if in collusion with the problem, higher education institutions are “consistently unresponsive” and “rarely offer extension training programmes that address the changing demands of the work environment” (Zinnah *et al* 1998:18). The frequent marginalisation of Agricultural Extension by African institutions of higher learning further fuels this chapter.

The context of this chapter is the evaluation of Agricultural Extension curricula offered at higher education institutions in South Africa. However, in addition to documenting and defending the methods used for a particular research project, it seeks to provide a useful framework for future evaluations of curricula in other countries or similar fields of study such as environmental education, science education and

community development. In the course of developing and conducting the research for which the methodologies were devised, it was found that there is no accepted or even coherent approach to evaluating curricula training learners on the confluence of technical and human science. This chapter will propose a model which, it is hoped, will contribute towards the development of such a framework that will allow rigorous interrogation of curricula at any level.

Developing a relevant method for examining curricula has presented a significant challenge for this study. Opinions about curricular evaluation abound and yet there appears to be little agreement on the methods to be used. This chapter outlines in some detail various methodologies employed in evaluating curricula. It presents a number of approaches used in various part of the world. It diverges as it attempts to learn about curriculum evaluation by looking at aspects of curriculum design and evaluation. It then resolves by developing the methods used in this study.

The approach used to develop a method is effectively a hybrid of two perspectives: educational and social. The research was intended to be essentially pragmatic to position higher education-level extension education so that it could produce practitioners who are able to facilitate the transformation of South African agriculture and achieve the objectives of South African agricultural policy. This point of departure evoked the following basic approach to the research:

- a) Interrogating agriculture extension to establish the framework for training and curricula;
- b) Using the interrogation of extension and the resulting framework to identify what extension should deliver;
- c) Translating that into learning outcomes to be incorporated into a curriculum; and
- d) Using the outcomes to interrogate the curricula of existing training programmes at colleges and universities looking for those outcomes.

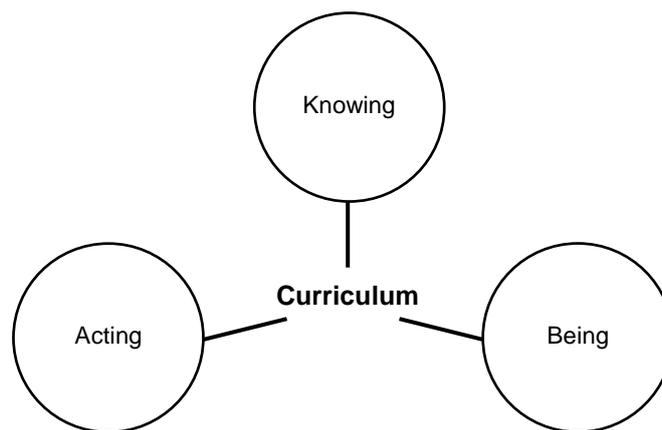
The method needed to look at both educational factors as well as development policy factors. It needed to be fairly simple so that it could evolve into a tool that could be used for future interrogations of a similar focus. While the four steps appear linear, and to some degree are, it is in the nature of the research that each step informs the other. Further, while this chapter deals largely with developing a method for Step d) (Steps a),

b), and c) having been addressed in Chapters 2, 3 and 4, the process has influenced the first three steps.

5.2. Themes in understanding curricula as a guide to evaluation

Before one can evaluate curricula, one must have a reasonable idea of what the concept curriculum comprises. In their discussion of frameworks for curricula, Barnett and Coate (2005:70) use a construct in which curricula addresses three distinct but “integrated components” – knowing, being and acting. Figure 5.1 depicts this construct.

Figure 5.1: Components of curricula



Source: Adapted from Barnett & Coate (2005)

Barnett and Coate (2005) applied the construct shown in Figure 5.1 to curricula for Arts and Humanities, Sciences and Technologies, and Professional subjects to illustrate the patterns found in the curricula for each area of learning. In each, the ‘size’ of the individual components varies. In the arts and humanities, ‘knowing’ was the largest, followed by ‘being’ and then ‘acting’. For the sciences and technologies, the largest is also ‘knowing’, but is followed by ‘acting’; ‘being’ is perceived as relatively much smaller. In professional studies, ‘acting’ is the dominant aspect of curricula and ‘knowing’ and ‘being’ are of similar size. The point of their discourse is that “a curriculum in which the domain of being and acting are not integrated with knowing offers a fragmented learning experience....” (Barnett & Coate, 2005:93). They warn that this may over-emphasise performance rather than encouraging the learner to engage deeply and, by implication, purposefully with knowledge. This argument suggests that curricula evaluation should interrogate the degree to which the curriculum addresses a

balance of learning that is relevant to the particular area of practice. It would, when juxtaposing this with the position argued in Chapters 2 and 3 regarding extension as a learning exercise grounded in education, support the idea that curriculum should be judged on its strength of developing learning skills.

Again using curriculum design as a path to evaluation, additional clues are found from Nind (2005:6) who defends a dynamic and “interactive curriculum” which is “shaped by pupils themselves as they share and negotiate power.” This has obvious application both to extension curricula at educational institutions, as well as to the approach to be used by extension practitioners in the ‘educator’ role with farmers in the ‘pupil’ role. It supports a learning approach to extension.

Nind (2005:7) also defends a “process-based curriculum” where process rather than content drives the learning agenda. In this way curricula are planned in a holistic way encompassing the world’s views and social environment as well as the specific disciplines as “contexts of experience”. Within these contexts, learners can “engage in personally relevant work.” Nind (2005:8) stresses the need for balance between “subject-related processes, general processes and learning to learn processes.” As with Barnett and Coate (2005), this suggests that one of the key elements in evaluation should be the degree to which a curriculum is balanced and represents a process of learning rather than merely reflecting an appropriate content.

Drawing in broad discussions on curricula, Cappell and Kamens (2002:488) found little consensus among lecturers as to what “constitutes a good curriculum.” This included disagreements on issues such as “knowledge content, key purposes, course design and pedagogical practices”. They noted that there is a direct proportional relationship between the level of consensus and curriculum coherency. They submitted that efforts to foster and coordinate consensus would benefit learning programmes.

Echoing elements of Cappell and Kamens (2002), Earnest (2006:7) identifies a particular challenge for curricula in countries – such as South Africa – that are in a state of transition. Educational reform – which in large measure would be reflected in curricula – would need to incorporate “development-related functions” and “will involve changes ranging from subsistence-based activities, to equipping young people with a skill base applicable to modern and industrial technological contexts and the development of skills conducive to environmental preservation, combating of disease and self-employment.”

Put succinctly, it is suggested that curricula should reflect state agendas, particularly in societies in transition.

The importance of consensus in curricula is particularly relevant to South Africa where so much is at stake in terms of its development objectives. The findings of Cappell and Kamens (2002) and Earnest (2006) suggest that:

- There is good cause for the state to facilitate consensus to foster curricular coherence;
- There is need to equate or at least harmonise curricula with development objectives;
- There is validity in designing (and evaluating) curricula in the light of the state's transformation agenda; and
- Curricula itself should engender the mindset of transformation as an outcome of learning.

Together, these justify the starting point of the research – to position higher education level extension to deliver on state objectives for agriculture. Further, these four points suggest a reflective process in which learners, educators and the state collaborate to reflect and adjust curricula on a sufficiently and frequent basis to ensure learning is kept coherent and relevant.

5.3. Defining evaluation and its purpose

Evaluation is essentially a study aimed at assessing the worth of a project. Stufflebeam (2000a:35) refers to evaluation as “a study designed and conducted to assist some audience to assess an object's merit or worth”. Similarly, Sang (1995:2) defines evaluation as: “a study to determine worth, quality and in general, the desirability of a project for a given purpose”.

The purpose of evaluation is to assess performance with a view to improving it (Bamberger & Valadez 1994; Babie & Mouton 1998). According to Taylor (2001:25), in the context of education, the aim of curriculum evaluation should be to improve curriculum. Similarly, Harris and Bretag (2003) cite Dadds (1998:41) who notes “the main purpose of the enquiry is to shed light on aspects of that work with a view to bringing about some benevolent change.” It is worth noting that Harris and Bretag (2003) seem to favour evaluations that are not revolutionary, while Earnest (2006) suggests that goals of the state should be considered when examining and developing curricula. In a

country such as South Africa, where radical transformation is a fundamental goal of the state, it would stand to reason that, contrary to Harris and Bretag (2003), evaluation may not be a comfortable exercise.

5.4. Toward evaluating curriculum

At the onset of devising a method to evaluate curriculum, it is important to expose one's biases which are inevitably brought to the evaluation process. Townsend and Adams (2003:7 citing Rebien 1997:2) note, "This awareness and recognition will frame theoretical considerations as well as establish, 'the advantages and limitations of what is chosen, as opposed to what is disregarded...'" Those conducting evaluations must also be conscious of the strengths and shortcomings of different methods and approaches to evaluation. They must make conscious efforts to guard against setting up their particular approach or method as inherently better than others (Townsend & Adams 2003).

In the spirit of awareness, the sections that follow will review evaluation methods and models that influenced the development of an appropriate method for evaluating extension curricula in South Africa. The review is by no means exhaustive, but it intended to create the framework within which the proposed model was crafted.

5.5. Evaluation methods

In reviewing literature on evaluation methods, the work *Evaluation Models: Viewpoints on Educational and Human Services Evaluation* edited by Stufflebeam, Madaus and Kellaghan was found to be particularly useful in that it concisely covered a wide range of methods and enabled the researcher to obtain the overview required to guide the process of developing an evaluation method for this research.

Stufflebeam (2000a:35) argues that methods to evaluate curricula have evolved considerably over the last 50 years. Some 22 approaches to the evaluating of educational and related programmes can be identified and described. Each of these approaches is categorised into four broad groupings:

- Pseudoevaluations;
- Questions/Methods-oriented evaluation approaches (Quasi-evaluation studies);
and
- Improvement/Accountability-oriented evaluation approaches
- Social Agenda-directed/Advocacy approaches (Stufflebeam 2000a).

5.5.1. Pseudoevaluations

Pseudoevaluations include Public-relations inspired studies and Politically controlled studies. Stufflebeam (2000a:37) decries pseudoevaluations as “objectionable”. He includes them in his survey because they are very prevalent in current society. They are often used as a means to substantiate claims of one’s success or of another’s failure. He warns that to give them countenance is to “promote and support injustice” and to “mislead decision making”.

5.5.2. Questions/Methods-oriented evaluation approaches

Included in this category are: Objectives-based studies; Accountability studies; Objective testing programmes; Outcomes Evaluation as value-added assessment; Performance testing; Experimental studies; Management information systems; Benefit-cost analysis; Clarification hearing; Case study evaluations; Criticism and connoisseurship; Programme theory-based evaluation; and Mixed-methods studies. Stufflebeam (2000a:40) refers to question/methods-oriented evaluations as quasi-evaluations. While they may use recognised methodologies, the methodologies and questions may not be appropriate to produce information which can actually substantiate claims. They tend to focus on a few “pointed questions” and avoid a “broad assessment of something’s merit and worth.” They are quasi-evaluations because they occasionally, more by accident than by design, provide a substantive assessment. They should be used and weighed critically.

5.5.3. Improvement/Accountability-oriented evaluation approaches

Stufflebeam (2000a:61) groups three approaches under this heading: Decision/Accountability-oriented studies; Consumer-oriented studies; and Accreditation/Certificate approach. He describes these approaches as “expansive” and notes that they try to be comprehensive in evaluating a programme. They engage stakeholders, address technical and economic factors, and look for “relevant outcomes, not just those keyed to program objectives.” They generally use both qualitative and quantitative methods to cross-check findings. They conform to Stufflebeam’s (2000a) definition of evaluation cited earlier, implying that they effectively assess a programme’s merit and worth.

5.5.4. Social Agenda-directed/Advocacy approaches

Stufflebeam (2000a:68) explained that social agenda-directed approaches “are directed to making a difference in society through program evaluation.” The primary concern is equal access by all stakeholders, with a bias toward the disadvantaged, to “educational and social opportunities and service.” He cautions that the emphasis on the social agenda may lead to these approaches not meeting “the standards of a sound evaluation”. Still they come highly recommended because of their strong democratic approach, their desire for equity, and their participatory and inclusive nature. Included in this range are: Client-centred studies; Constructivist evaluation; Deliberative democratic evaluation; and Utilization-focused evaluation.

5.5.5. Identifying the most appropriate models

Stufflebeam (2000a:80) argues that nine of the methods discussed are appropriate for programme evaluation in the 21st century. They are, in order of preference: Decision/Accountability; Consumer orientation; Accreditation; Utilisation-focussed; Client-centred; Democratic deliberative; Constructivist; Case study; and Outcome monitoring/Value-added. They were rated on the basis of utility, feasibility, propriety and accuracy – summing with an overall rating. Stufflebeam (2000a:81) argues that evaluators need to be “keenly sensitive to their own agenda for the study, as well as those that are held by the client and the other right-to-know audiences.” He urges exposure of the “selected approach’s logic, rationale, process and pitfalls” (2000a:83) – implying that evaluators should be conscious of the efficacy and limitations of each approach. He stresses that, irrespective of approach, the focus must never stray from the purpose of evaluating a programme’s merits and worth, and that evaluations are enhanced “when evaluators key their studies to professional standards for evaluation and obtain independent reviews of their evaluations” (2000a:83).

The standards stressed by Stufflebeam (2000a:83) are elucidated by Stufflebeam (2000b:447-448) in his identification of four types of standards: utility; feasibility; propriety; and accuracy. The utility standard seeks to ensure that evaluations “will serve information needs of intended users” (Stufflebeam 2000b:447). Elements of this standard include: stakeholder identification; evaluator credibility; information scope and selection; values identification; report clarity; report timeliness and dissemination; and evaluation impact.

The feasibility standard seeks to ensure that evaluations “will be realistic, prudent, diplomatic and frugal” (Stufflebeam 2000b:447). Elements of this standard include: practical procedures; political viability; and cost effectiveness.

The propriety standard seeks to ensure that evaluations “will be conducted legally, ethically, and with due regard for the welfare of those involved in the evaluation, as well as those affected by the results” (Stufflebeam 2000b:447). The elements of this standard include: service orientation; formal obligations; rights of human subjects, human interactions; complete and fair assessment; disclosure of findings; conflict of interest; and fixed responsibility.

The accuracy standard seeks to ensure that evaluations “will reveal and convey technically adequate information about the features that determine worth or merit of the program being evaluated” (Stufflebeam 2000b:448).

Whether or not one accepts Stufflebeam’s assessment of evaluation approaches and his discussion on evaluation standards, the point is made that evaluations need to be structured, unambiguous, transparent and grounded in both outcomes and stakeholders. Further, evaluations must also be grounded in values or standards that ensure the veracity and efficacy of the evaluation. Evaluations must have a purpose and be meaningful, and they must follow a clearly identified and articulated process.

5.6. Curriculum evaluation models

Having looked at generic approaches to evaluation and touched on the framework and standards for programme evaluation, a review of specific education evaluation models will provide more detailed insight for the development of an appropriate model for evaluating Agricultural Extension curricula in South Africa. In the 1930s Tyler established the paradigm of curriculum and evaluation in which curriculum was viewed as “a set of broadly planned school experiences designed and implemented to help students achieve specified behavioral outcomes” (Stufflebeam *et al* 2000:8). He introduced “educational evaluation” and defined it broadly as measuring “the extent to which objectives had been achieved as a part of an instructional program” (Stufflebeam *et al* 2000:8). Since Tyler, numerous models emerged for evaluating curricula have emerged. Some of the more prominent of them are:

- The Eight-year Study Model
- The Tyler and Taba Models
- Discrepancy Evaluation Model
- The Countenance and Responsive Evaluation Models
- Context, Input, Process, Product (CIPP) Model
- Educational Connoisseurship and Criticism

5.6.1. Eight-year study model

The Eight-year Study Model began in the 1930s under the direction of the Aikin Commission “to address the needs of non-college-bound students while also providing better coordination between high schools and colleges for those students who continued their postsecondary education” and to help high schools “serve youth more effectively” (Kridel 2007:1). One of its overall goals was to establish a greater connection between secondary and higher education institutions to help guide the reshaping of secondary school curriculum (Aikin, 1942). The programme did not interrogate higher education-level curricula, but focused on secondary-level curricula.

5.6.2. The Tyler and Taba models

The Tyler Model emerged in 1949. In its essence, the Tyler Model is about achieving objectives. As Stufflebeam *et al* (2000:8) noted the aim of the Tyler Model was to assess “the extent to which objectives had been achieved as a part of an instructional program”. In developing this model, Tyler raised four critical questions that effectively framed curriculum development and thereby its evaluation. These questions, which became known as the “Tyler rationale for creating curriculum” were: “(a) What educational purposes should the school seek to attain? (b) What educational experiences can be provided that are likely to attain these purposes? (c) How can these educational experiences be effectively organized? (d) How can we determine whether these purposes are being attained?” (Hunkins & Hammill 1994:7). The model is a very linear one, based on a cause and effect approach driving curriculum development in essentially a value-neutral context. Assumptions on which the curricula were designed were not challenged; and the suggestion of such a challenge was frowned upon (Hunkins & Hammill 1994).

In 1962, according to Hunkins and Hammil (1994), Taba expanded on the Tyler Model. The expansion largely retained Tyler's linear approach, but introduced the new concept that teachers should participate in curriculum development. She identified seven steps for curriculum development: 1) Diagnosing needs; 2) Formulating objectives; 3) Selecting content; 4) Organising content; 5) Selecting learning experiences; 6) Organising learning experiences; and 7) Evaluating. Hunkins and Hammill (1994:10) note, "Like Tyler, Taba's final step engaged the curriculum planner in determining just what objectives had been accomplished."

5.6.3. Discrepancy evaluation model

In developing the Discrepancy Evaluation Model, Provus (1971-1972) proposes that successful evaluation requires clear and agreed standards and argues that setting standards is the most important feature in evaluation. The effective use of such standards, however, depends on a formal, structured, managed system to apply them. The Discrepancy Evaluation Model is proposed as just such a system which ensures a continuous check of reality against standards. It can be used to evaluate a single programme or to compare programmes. (Provus 1971-1972; Householder & Boser 1991). The model consists of three main facets driving programme design: inputs, referred to as "resources and conditions"; process, referred to as "treatments or transactions"; and outputs, referred to as "products and performance" (Provus 1971-1972:41). When such standards are agreed and owned by the relevant stakeholders, it becomes possible "to use evaluation as a powerful device for institutional change compatible with the tenets of a democratic society" (Provus 1971-1972:36).

The Discrepancy Model has three key steps: define standards for the programme; establish if there is a discrepancy between the standards and the performance of the programme; and use the discrepancy to effect a change in either the programme or the standard. The model is applied in five stages: design, installation, process, product, and comparing the programme with other programmes (an optional step). Applying the model leads to four possible outcomes: continue the programme without change; change the performance of the programme; change the standards for the programme; or end the programme (Householder & Boser 1991).

5.6.4. Countenance and responsive evaluation models

According to Deepwell (2002:84-85), the Countenance Model developed by Stake “aims to capture the complexity of an educational innovation or change by comparing intended and observed outcomes at varying levels of operation.” It provides a basic framework of where the learner started (antecedents), what educational work is to be/was done (“transaction”) and what outcomes are/were to be achieved. The degree of congruity between what was intended and what was observed “provides the basis for judging the success or otherwise of the innovation” (Deepwell 2002:85). In applying this model, two sets of information were prescribed: descriptive and judgmental, the former observing and the latter judging using the antecedents-transactions-outcomes framework (Nevo 1983). In expanding the model to the responsive Evaluation Model Stake “suggested a continuing ‘conversation’ between the evaluator and all other parties associated with the evaluand. He specified 12 steps of dynamic interaction between the evaluator and his audiences in the process of conducting an evaluation” (Nevo 1983:122).

According to Nevo (1983:120) citing Guba and Lincoln (1981), Guba and Lincoln expanded Stake’s approaches indicating that evaluators should “generate five kinds of information: (a) descriptive information regarding the evaluation object, its setting, and its surrounding conditions, (b) information responsive to concerns of relevant audiences, (c) information about relevant issues, (d) information about values, and (e) information about standards relevant to worth and merit assessments”.

It is worthy of note that Stake (1981) objected to his work being referred to as a model. He argues that a model “helps you decide some things to include. The literature is full of these persuasions. A good evaluation study depends on many things a model fails to indicate” (Stake 1981:84).

5.6.5. Context, Input, Process, Product (CIPP) Model

According to Stufflebeam (2002:1), “the CIPP Evaluation Model is a comprehensive framework for guiding evaluations of programs, projects, personnel, products, institutions, and systems.” CIPP has evolved in five stages since it was first introduced in 1966. It first “stressed the need for process as well as product evaluations” (Stufflebeam 2002), then expanded to include evaluations of context and input and “emphasized that goal-setting should be guided by context evaluation, including a needs assessment, and that program planning should be guided by input evaluation, including assessments of

alternative program strategies” (Stufflebeam 2002:1). In its current form, which includes being encapsulated in a “systems, improvement-oriented framework” CIPP now also unpacks the education product.

According to Nevo (1983:120), “Stufflebeam's CIPP Model suggests that evaluation focus on four variables for each evaluation object; (a) its goals, (b) its design, (c) its process of implementation, and (d) its outcomes. According to this approach an evaluation of an educational project, for example, would be an assessment of (a) the merit of its goals, (b) the quality of its plans, (c) the extent to which those plans are being carried out, and (d) the worth of its outcomes”.

Perhaps the most significant element introduced by the CIPP model is that it demanded an examination of the context in which the evaluation was to be conducted. This approach is consistent with the model proposed for the evaluation of extension curricula.

5.6.6. Educational connoisseurship and criticism

Eisner's Educational Connoisseurship and Criticism Model is essentially an arts-based approach to evaluating education. Eisner (1976:149) argued that “educational connoisseurship and educational criticism represent two modes through which we come to understand and express what we come to know.” The model first suggests appreciation of knowledge, where appreciation is defined as “an awareness and an understanding of what one has experienced” (Eisner 1976:140). It then suggests that criticism by an evaluator is required; where the evaluator “describes, one interprets, and one evaluates or appraises what one sees” (Eisner 1976:142).

Eisner's (1976:149) Connoisseurship Evaluation Model challenged the status quo in education where one “conceives of knowledge as scientific and believes that precision is a function of quantification.” Eisner identified four major problems with educational evaluation. First, Eisner (1976:136-137) notes that “scientific assumptions” and “scientifically oriented inquiry” lead to “oversimplification” where uniqueness (and by implication diversity) is filtered out in order to determine “general tendencies” and “main effects” and where complexity, “through a process of reduction”, becomes characterized “by a single set of scores.” Eisner (1976:137) then notes, “the technological orientation” when applied to practice emphasises “the achievement of some future state” and when applied to the process “tends to undermine the significance of the present.” His third

concern is that the technological approach to education causes knowledge to be objectified. Eisner's (1976:138-139) fourth concern is that "when one seeks laws governing the control of human behavior, it is not surprising that one would also seek the achievement of a common set of goals for that behavior. When one combines this with the need to operationalize such goals quantitatively, the use of standardized tests becomes understandable."

Eisner (1976:149) argued that there was a need to "to widen our epistemology". He saw this as "recognizing that the forms which humans create, the forms of art as well as the forms of science, afford unique opportunities for conceptualization and expression, and hence for communication."

5.7. Learning from evaluation in practice

In addition to learning from the cascading of models as they have evolved over the years, learning was sought from evaluation in practice. Three cased studies were reviewed to glean deeper understanding about curriculum evaluation.

5.7.1. Sasakawa Africa Fund for Extension Education (SAFE)

Starting in 1993, and revised in 1997, the Sasakawa Africa Association, in partnership with universities in Ghana and Ethiopia and the Winrock International Institute for Agricultural Development implemented the Sasakawa Africa Fund for Extension Education (SAFE) programme. The aim of the SAFE programme was to revitalise Agricultural Extension training in sub-Saharan Africa, with a particular emphasis on curriculum. The programme focused on mid-career Agricultural Extension practitioners, helping them to obtain a B Sc in Agricultural Extension.

The SAFE programme identified six steps in its curriculum reform programme (Zinnah *et al* 1998:19):

- “Step 1.** Informal discussion among stakeholders to help them to understand the challenges of training mid-career Agricultural Extension staff.
- Step 2.** Clarification of the vision for a responsive Agricultural Extension training programme.

- Step 3.** Agricultural Extension training needs assessment - factual or quantitative data as well as subjective aspects of the need for training mid-career extension staff.
- Step 4.** Workshop for stakeholders to discuss the findings of the Agricultural Extension training needs assessment and related issues.
- Step 5.** Development of the curriculum itself; consensus about the structure and the content's balance between theory and practice.
- Step 6.** Establishing a strong network among institutions and agencies committed to the revitalization of Agricultural Extension curricula”.

In an approach similar to the CIPP model discussed earlier, the SAFE programme sought to determine the specific context which the reformed curriculum would serve. It was specifically intended that the curriculum should be able to respond to the needs of those being trained, reflect the real work environment of extension practitioners, and engage theory and practice in a dynamic way. To achieve these ends, the method employed was holistic in approach involving dialogue and collaboration between stakeholders (Zinnah *et al* 1998).

However, to whatever extent the context was explored, there appears to be little evidence that the fundamental assumptions about Agricultural Extension were challenged. The process was deliberately demand-driven. In this case the demand is made by those practicing in the field upon the higher education institutions that control the curricula that produce the practitioners. In this sense, there is a great similarity of approach between the SAFE programme and this study. Both seek to shift the position of higher education institutions from the sole arbiters of curriculum often severed from reality to open, collaborative partners in the honest and objective exploration, evaluation and reformation of Agricultural Extension curriculum (Zinnah *et al* 1998).

5.7.2. The case of the University of Vienna

Spiel *et al* (2006), in reporting on curricular evaluations conducted at the University of Vienna, note that the most common means of evaluating curricula is student evaluations. However, such evaluations are limited in terms of the efficacy of results. Curriculum evaluations need also to examine “goals, conditions, and long-term effects of university education” Spiel *et al* (2006:431). Spiel *et al* (2006:431), citing Spiel (2001),

suggest that an “ideal evaluation process” for evaluating curricula is comprised of the following five phases:

- a) baseline evaluation of the current curriculum to identify its weaknesses and strengths;
- b) prospective evaluation of the concept of the new curriculum—developed with respect to the results of the baseline evaluation—to assess the new curriculum’s feasibility;
- c) formative evaluation of the implementation process of the new curriculum;
- d) summative evaluation of the results of the new curriculum (in comparison to the results of the baseline evaluation); and
- e) impact evaluation of the new curriculum’s results in terms of long-term consequences.

They note that because of costs and human resource requirements needed to conduct such an exhaustive exercise, as well as specific problems associated with individual enquiries, such investigation are generally not conducted. Finally, Spiel *et al* (2006:434-436) propose the following parameters for a sound base-line evaluation of curriculum:

- 1) What should be evaluated?
- 2) What is the frame of reference for the evaluation?
- 3) What perspective should be evaluated?
- 4) Who are the participants of evaluation?

What should be evaluated?: Spiel *et al* (2006) suggest that the means to determine what should be evaluated would be to interview current students, current teachers, graduates practicing in the workplace, and supervisors of practicing graduates first to determine areas of expertise and second to actually measure competency in each area. They add to this the need to assess students’ learning approaches and capacity.

What is the frame of reference for the evaluation?: Spiel *et al* (2006) submit that the frame of reference for curricula evaluation is views of teachers and views of learners which are seen respectively as external ratings which are objective and self ratings which are subjective. The key issue investigated is the effectiveness of teaching and curricula.

What perspective should be evaluated?: Spiel *et al* (2006) state that it is important to measure both the objectives of the curriculum and the attainment of these objectives. They establish the teachers as experts who can comment on the extent to which curriculum should deliver on the areas of expertise referred to earlier. This is meant to represent the ideal situation. Learners are engaged to evaluate what is actually taught. This is meant to represent the real situation. Effectively they pursue the questions “What should be taught?” and “What is actually taught?”

Who are the participants of evaluation?: As implied earlier, Spiel *et al* (2006) indicate that current students (especially those about to complete the programme), current teachers, graduates practicing in the workplace, and supervisors of practicing graduates should be the key participants in the evaluation.

While Spiel *et al* (2006) suggest that an evaluation should measure the objectives of curricula, they make no reference to the assumptions on which curricula are based as a factor in evaluating curricula. The goals of the curriculum are challenged only in terms of what teachers think should be taught and the perceptions of graduated learners regarding the extent to which what should have been taught was taught. The goals are not challenged in terms of any other perspective. This is a critical limitation to the evaluation approach suggested by Spiel *et al* (2006). Nevertheless, their four parameters for evaluation are useful in creating a framework for developing a method for evaluating Agricultural Extension curricula.

5.7.3. The case of the United States National Research Council

Confrey (2006:197-198) outlined that the United States National Research Council (USNRC) proposed that curricula evaluation should address “program components, implementation components and student outcomes” which were “to correspond roughly to the intended, the enacted, and the achieved curricula.” In addition, “secondary components” that impact on the effectiveness of curricula were also identified as an important part of curricula evaluation. Table 5.1 provides a brief explanation of each of these elements in the USNRC framework for curricula evaluations.

Table 5.1: USNRC framework for curricula evaluation

Evaluation elements	Aspects addressed
Programme components	Discipline/subject content Curricular design elements
Implementation components	Resources Processes Contextual influences
Student outcomes	Assessment Enrolment patterns Attitudes
Secondary components	Systemic factors Intervention strategies Unanticipated influences

Confrey (2006:199) further elaborates that the USNRC method embraces four approaches or types of evaluation: content analyses, comparative studies, case studies, and syntheses. Table 5.2 provides details of each of these approaches.

In sum, Confrey (2006:210) identifies a number of important theoretical findings from the USNRC study about evaluating curricula:

- Curricular evaluation is inherently complex;
- Curricular evaluation is value-laden;
- Conclusions must be “explicitly, rigorously, and systematically” linked to “reliable and valid sources of data”;
- Conclusions will be continually evolving;
- Evaluation methodologies used must adhere to the identified framework;
- Evaluation methodologies used must conform to the definition of scientifically valid studies; and
- Evaluation methodologies used must include a review and synthesis of existing evaluations.

Table 5.2: USNRC approaches to curricula evaluation

Approach	Explanation
Content analysis	Documents the coverage of curricula: 1) Disciplinary perspectives: clarity, comprehensiveness, accuracy, depth of inquiry and reasoning, organisation, and balance. 2) Learner-oriented perspectives: Engagement, timeliness and support for diversity, and assessment. 3) Teacher- and resource-oriented perspectives: pedagogy, resources, and professional development.
Comparative studies	A study in which two (or more) curricular treatments are investigated over a substantial period of time and a comparison of various curricular outcomes examined using statistical tests.
Case studies	Case study research to provide insight into: 1) Mechanisms at play that are hidden from a comparison of student achievement. 2) To understand how curricula (input) causes an outcome in learning.
Synthesis	Attempts to aggregate the findings of the content analyses, comparative studies, and case studies.

Finally, Confrey (2006) notes two important factors:

- Curriculum evaluation requires clear and unambiguous standards by which effectiveness of curricula can be considered effective enough to adopt; and
- Curriculum evaluation “is not a straightforward calculation of positive and negative results” (Confrey 2006:210).

5.7.4. The case of the Baccalaureate Educational Assessment Package

Similar to the research conducted by the University of Vienna, cited earlier, research evaluating the US Baccalaureate Educational Assessment Package (BEAP) engaged learners in the system and graduated learners and their employers working in the profession – in this case social work. In conducting the research, it was noted that BEAP uses six instruments to assess the efficacy of the educational programme. In this case, teachers were not part of the evaluation. According to Buchan *et al* (2004:244) these instruments are:

- 1) An entrance survey conducted upon learners declaring a major

- 2) A social work values inventory pre-test also conducted upon declaration of a major
- 3) An exit survey conducted at graduation
- 4) A social work values inventory post-test conducted at graduation
- 5) An alumni survey conducted two years after graduation
- 6) An employer survey also conducted two years after graduation

According to Buchan *et al* (2004:245), the aim of the assessment is to answer 5 questions:

- 1) Are education programmes delivering what they say are? (i.e. do students gain the knowledge, skills, and values the programme is intended to deliver?)
- 2) Are institutions delivering the programme to whom they say they are?
- 3) What are student and alumni perceptions of programme process and climate? (Covering issues such as student perception of faculty availability, faculty interest in advising, and the overall department climate)
- 4) Do students' values change during the process of their education in the major as measured by the social work values inventory?
- 5) How do programme graduates fare in the employment market, and do they seek additional education, licensing, and professional development?

Again, as in the case of the Vienna University, no effort is made to interrogate the essential assumptions on which the original curriculum was based. Evaluations are made solely on the perceptions of learners and employers. In this case, even the views of teachers are not included.

5.8. Insight from Bloom's taxonomy of educational objectives

No examination of approaches to curriculum evaluation can ignore Bloom's taxonomy of educational objectives as a fundamental framework for evaluating the efficacy of curricula. Bloom (1956) identified three domains relevant to education: cognitive, affective and psychomotor. The cognitive domain refers to "objectives which deal with the recall or recognition of knowledge and the development of intellectual abilities and skills (Bloom 1956:7). The affective domain deals with "objectives which describe changes in interest, attitude, and values, and development of appreciations and adequate adjustment." (Bloom 1956:7), Bloom (1964:7)) also noted that the affective

domain presents objectives which “emphasize a feeling tone, an emotion, or a degree of acceptance or rejection”. The psychomotor domain deals with motor skills (Bloom 1956), “manipulation of material and objects, or some act which requires a neuromuscular co-ordination” (Bloom 1964:7).

Bloom developed taxonomies for the cognitive and affective domains. As little attention was given to motor skills at secondary and tertiary levels, a taxonomy for the psychomotor domain was not required. For the cognitive domain, the taxonomy is: knowledge, understanding, application, analysis, synthesis and evaluation (Bloom 1956:201-207). For the affective domain the taxonomy is: receiving (attending), responding, valuing, organisation, and characterisation by a value or value complex. (Bloom 1964:176-185).

Bloom (1956:25) also presents four “problems of developing curriculum” which centre on the purpose of the curriculum, the learning experiences that would lead to fulfilling that purpose, the organisation the experiences into a coherent, integrated whole, and assessment. The latter three facets are conditioned upon the “purpose”. This, perhaps obviously, implies that clearly understanding the purpose of a learning programme is critical to the design of a curriculum and therefore to its evaluation.

Anderson and Krathwohl (2001) proposed a revised cognitive taxonomy incorporating learning, teaching and assessing. Their new hierarchy includes: remember, understand, apply, analyse, evaluate and create – create being the most significant variation. Referring to Anderson and Krathwohl, Conklin (2005:157) noted “the newly created taxonomy now provides a framework for educators to include the latest theory and research in the field of human cognition”. This, combined with the taxonomy for the affective domain, has powerful implications for curricula evaluation in that it challenges the objectives of curricula. The new taxonomy supports a learning approach to curricula. It fosters a shift from content-driven curricula to learning driven curricula; a shift from a teaching-driven approach to learning-learning driven approach.

When the new educational taxonomy is applied to extension (in the context of extension being an educational programme), it implies a shift from technology transfer to farmer learning as proposed in Chapter 2. This obviously has a direct bearing on the curricula for Agricultural Extension and needs to be factored into the interrogation of current curricula. Further, it is consistent with the conclusion in Chapter 2 that Agricultural Extension as a system of education and as an instrument of development

should focus on generating (creating) knowledge which is to be shared. Bengtson (2004:13) submits that “when knowledge is shared, it grows.” Sharing of knowledge is acknowledged as an essential element of learning; it contributes to the advancement of education and discovery (Magnanti 2006) and to “improved learning and development, and increased productivity and growth” (Soller *et al* 2004:1). As noted in Chapter 2, sharing also forms part of Bloom’s (1964) taxonomy for the affective domain – it is part of how one demonstrates commitment to what has been learned.

While sharing of knowledge is perhaps implicit in education, Bengtson (2004) noted that in an economic world, knowledge is often not shared for fear of loss of value in its sharing. Similarly, Jump and Jump (2006:51) noted that “when knowledge is shared for a common good then people participate and share knowledge which is motivated by moral obligation and community interest; however, when knowledge is perceived as being for private good then learners are more reluctant to share, and act out of self interest rather than any form of social responsibility”. In organisations there is often resistance to sharing knowledge; “people do not like to share their best ideas because doing so dilutes their standing in the organisation, and can impede their ability to get ahead” (Ramirez 2007: no page numbers). Ramirez further argues for “developing a knowledge sharing culture” in the wider context of knowledge creation and capturing. Echoing the sentiment of the power of sharing knowledge, the resistance to sharing knowledge, and acknowledging the need to cultivate the practice of sharing, it is proposed here that a seventh element in the taxonomy hierarchy for education should be ‘sharing’.

5.9. Factoring in outcomes-based education

Given that Outcomes-based Education is the overarching framework for education in South Africa, it is practical to draw from it when designing a method to evaluate South African curriculum. Killen (1999) explains that South Africa’s OBE approach focuses on outcomes that are relevant to the future life-roles of learners. Chapter 3 noted that the intention of OBE in South Africa is to ensure that curricula are relevant to the aims of the new democracy, implying that education is part of the country’s transformation process. This is consistent with the findings of Cappell and Kamens (2002) and Earnest (2006) cited earlier that curricula should reflect development objectives, be aligned with the

state's transformation agenda and should engender the mindset of transformation as an outcome of learning.

Giving clear implications for curricular evaluation for Agricultural Extension, Chapter 3 established earlier that “the outcomes-based programme must have a clear focus on significant learning outcomes that are stated clearly and unambiguously. These outcomes should be practical, useful, and morally and ethically defensible. Curriculum and instructional design are derived from these significant outcomes. The outcomes should be challenging, and all students should be expected to achieve them at high performance levels. Time should be used as a flexible resource that allows teachers to accommodate differences in student learning rates and aptitudes. Learners should be given more than one uniform, routine chance to receive instruction and to demonstrate their learning. Assessment should be an integral component of instruction and should, as far as possible, be authentic (i.e. use real-world situations in which to test applications of knowledge and skills). Learners should be expected to take some (if not most) responsibility for their learning (Killen 1999; Genis 2001; Fakier & Waghid 2004).”

5.10. Other factors to consider

Barnett and Coate (2005:25) indicate that through curricula, “beliefs and principles in relation to learning, understanding, knowledge, disciplines, individuality and society are realized.” They note further that, while this is implicit, the issues are rarely if ever discussed as a part of the development of curricula. Thus it stands to reason that in interrogating curricula, it is important that such issues be exposed and addressed openly.

In a similar vein, Briggs and Sommefeldt (2002:115) “confirmed Everard and Morris’ (1996) six stages for a ‘systematic approach to change’. The stages, to be carried out sequentially are:

1. A preliminary *diagnosis* or reconnaissance, leading to a *decision* to undertake a change programme: is the change sound? Is it inherently likely to succeed?
2. Determining the *future*: what do we want to happen? What will happen if we do nothing?
3. Characterising the *present*: what are we here for? What are the demands on us? What is stopping us? What is working for us?

4. Identifying the *gaps* between present and future to determine the work to be done to close them: who is resistant? Who can help the change? Who should manage it?
5. Managing the *transition* from present to future: who does what by when? How will we gain commitment?
6. Evaluating and monitoring the change: was success achieved/will the change endure? What has been learned?"

The initial framework for the research, discussed earlier, is consistent with the first four of the steps cited above. The latter two fall outside the scope of the research, but would clearly fall within the intention of the application of the research in enabling extension curricula to contribute to South African agricultural and transformational objectives.

With specific reference to Agricultural Extension curricula, Taylor (2001:25) suggests that curricula evaluation should engage a wide range of stakeholders, including managers, graduates, farmers and extension practitioners. Evaluation should address both content and teaching methods. Engaging stakeholders in the evaluation is reinforced by Taylor's (1998) promotion of Participatory Curriculum Development which, by definition demands the participation of stakeholders and is often an outgrowth of an existing curriculum which is evaluated as a 'new' curriculum is being developed. This is consistent with the arguments of Spiel *et al* (2006) that a wide range of stakeholders should participate in the evaluation.

5.11. Formulating a method for evaluating curriculum

Drawing on the foregoing, this section will address formulating a method for evaluating curriculum. This is done both from the perspective of education in general and of Agricultural Extension in South Africa in particular.

5.11.1. Instructional design

Given the basic approach to the research set out above, the overall method falls into the ambit of Instructional Design which Berger and Kam (1996:1) defines as, "the science of creating detailed specifications for the development, implementation, evaluation, and maintenance of situations that facilitate the learning of both large and small units of subject matter at all levels of complexity." De Lisle (1997) indicates that instructional

design provides a world's view, provides a way of finding solutions, links theory to practice as a way of showing how theory can address the problem and embeds theory as the touchstone for ensuring coherency and integrity of solutions.

Instructional Design drives the design of curriculum from the overall objective of the curriculum to specifying lessons to material development. It is very prescriptive and not overly learner friendly. In most cases it appears to focus at the more micro level. This is most certainly the case with the Dick and Carey Instructional Design Model which emphasises the instructional aspect of design (McGriff 2001).

A second system is the ADDIE Model. It describes an iterative process of curriculum development or instructional design involving analysis, design, development, implementation, and evaluation (McGriff, 2001). The superstructure of the ADDIE model presents a less cumbersome approach to curriculum design than the Dick and Carey Model.

A third system is the Kemp Model for Instructional Design (Kemp & Smellie 1994). It is comprised of nine key elements which are intended to be engaged in a continuous process of planning, design, development and assessment (McGriff, 2001). As with the other models it is very much linked to instruction.

All three models follow a similar pattern of “analysis, strategic development and evaluations” (McGriff, 2001: no page numbers). Further, it seems that analysis is focused on what needs to be learned and is predicated on the predictability of learning. The chief critics challenge Instructional Design arguing that “the elusive and complex nature of human consciousness make it impossible to describe, let alone predict, what will happen in learning situations” (de Lisle, 1997: no page numbers).

Notwithstanding these criticisms, Instructional Design provides a useful framework for an evaluation method. It is consistent with the overall framework of the study which is designed premised on what learners of Agricultural Extension need to learn. However, the methods used in this research offer two aspects which are not found to be part of Instructional Design theory. First, the intention of the research is not to lead to a particular set of instructions to evoke a particular learning outcome. It is rather merely to establish the learning outcomes which are then plugged into an entirely different approach to instruction which is embedded in the Agriflection model proposed in Chapter 2). Second, the proposed method deliberately questions the assumptions on which the curriculum is based.

Gale and O'Pray (1981) found that it was those evaluating curricula would have to make discriminating choices regarding gathering, analysing and interpreting data. They recommended the creation of frames of reference as a means of guiding the evaluation process. One such frame of reference can be evolved from Barnett and Coate (2005:3) who, in addressing curriculum design, provide useful constructs for curriculum evaluation – which is effectively the flip-side of design. Barnett and Coate (2005:3) submit that, in practice, curriculum design should be an imaginative process that results in learning spaces that will engender “new energy” among learners and should be understood as the imaginative design of spaces as such, spaces that are likely to inspire learners and generate new energies among them to fulfil their “triple engagement” with learning: knowing, acting and being.

5.11.2. Theory-driven evaluation

, Rossi (1980), Chen (1990), Larabee (1998), Stufflebeam (2000a) and Chen and Donaldson (2003) would cast the ‘discriminating choices’ suggested by Gale and O'Pray into theory-driven evaluation – and there is a strong case for it. Theory-driven evaluation is more effective than method-driven evaluation in delivering on determining which parts of a programme are most effective and reconcile the programmes processes with role-players that “moderate the relationships between a program and its outcomes” (Donaldson 2003:114). Chen and Rossi (1990:111) specifically argue that “the evaluator should actively search for and construct a theoretically justified model of the social problem in order to understand and capture what a program really can do for a social problem”. In this way, they note, “social science knowledge and theory become crucial in the evaluation process”. Larabee (1998:10) asserts, on the one hand, that universities are often over pressured by consumer demand and are rarely free to “enjoy the luxury of pursuing” an evaluation driven by theory which might lead them away from what consumers demand. However, Larabee also argues, on the other hand, that theory-driven research would ultimately see researchers “working on issues that matter, both for the individual actors within education (like teachers and students) and for the larger society”.

Donaldson (2003:114) describes theory-driven evaluation as a process with three basic steps: “developing programme theory”; “formulating and prioritizing evaluation

questions”; and “answering evaluation questions”. This study is particularly interested in the first of these three steps. Donaldson (2003:114-115) proposes that theory could and perhaps should be derived from previous research done in the field, “implicit theories” held by those working closest to the issue, observing the implemented programme, “exploratory research to test critical assumptions about the nature of the program”. He describes the process of theory development as “interactive” and “non-linear”. The shaped theory then becomes a foundation and touchstone for formulating questions and selecting methods for conducting the evaluation. Method choice is informed by the developed theory. In effect, the theory becomes the guiding light of the evaluation (Stufflebeam 2000a; Donaldson 2003). This is also consistent with the implication of Bloom’s (1956:25) approach to curriculum development which requires identifying the “educational purposes or objectives” of the programme.

The wide variety of approaches to curriculum evaluation highlighted the reality that a unique approach to evaluating extension curricula was needed. As noted earlier, notwithstanding the apparent limitations of the approach suggested by Spiel *et al* (2006), the approach was found useful as a framework for the evaluation of extension curricula. Hence the research methods used were organised along these lines:

- 1) What should be evaluated?
- 2) What is the frame of reference for the evaluation?
- 3) What perspective should be evaluated?
- 4) Who are the participants of evaluation?

5.11.3. The challenge of reform

One caveat that cuts across all four of the elements described above is the caveat of context and assumptions. Nevo (1983:121) argued that while there is substantial agreement among evaluation specialists that evaluation criteria “must be determined within the specific context of the object and the function of its evaluation”, the evaluator often does not have the power to decide amongst the possible criteria. He affirms that “it is the evaluator's responsibility that such a choice be made and that he be able to provide a sound justification for the choice, whether it is made by him or by somebody else” (Nevo 1983:121).

Notwithstanding Nevo's reciting of the evaluator's responsibility, it has been difficult to find an existing curriculum evaluation model which explicitly seeks to challenge the accepted context or assumptions of the context in which the curriculum operates. This challenge will emerge in the following discussion and will provide a thread of consistency throughout the proposed model.

In South Africa, the headwaters of the context is transformation legislation adopted to forge a new state. Curriculum reform is as an important feature within in this helix of the country's transformation. State policy governing higher education is replete with goals, objectives and motivations for educational and its commensurate curriculum reform (Clark-Unite & Nel 2004; NDE 1997). The South African White Paper on Higher Education specifically calls on higher education to "serve a new social order, to meet pressing national needs, and to respond to new realities and opportunities" (DoE 1997:7). It specifically calls for a review of curriculum "in terms of content, relevance, design and delivery" (DoE 1997:23). Diamond (1997) challenges higher education to face "hard questions" and to "overcome resistance and inertia" that inhibit reform. His list of factors that have militated against curriculum reform imply the need for curricula to incorporate setting "goals for instruction" and stating these in "measurable terms." Further, curricula should be designed so that each student is given the chance to acquire an agreed range of core knowledge and skills. With specific reference to South Africa, Kgaphola (1999) argues that curricula must have two complementary goals: training professionals; and preparing students for postgraduate education. It must also blend learning in both the technical and human sciences. The required relevance and goals for extension curricula as well as the blending of human and technical sciences are found in South African agricultural transformation policy as previously discussed in Chapters 2, 3 and 4.

Van Rooyen *et al* (1996:129) further predict that extension education and training will need "substantive reorientation in order to serve a much wider clientele". They argue for greater integration of training, research and extension and for agricultural specialists to be trained in "a range of human capital skills" (van Rooyen 1996:129). They argue further for the adjustment of agricultural education and training to accommodate the more holistic approach that would have to be adopted to cope with the anticipated changes in Agriculture in South Africa. Similarly, Bembridge (1994:6) argued that agricultural education at higher education level needed to broaden its curricula "from a focus on food production to that of sustainable and productive rural development.

On a broader spectrum addressing agricultural education in Sub-Saharan Africa, Wallace (1997) argued for the broadening of content and approach. He stressed the need for extensive review of agricultural education and training. He highlighted the need for the integration of agricultural policy and curricula with a clear understanding of the needs of the agricultural sector as a prerequisite for both. He favoured a learner-centred, experiential approach to agricultural education, including at higher education level. Finally, he noted the need for intensive research into agricultural education in Sub-Saharan Africa.

Given the basic contextual framework the four key curriculum evaluation questions can be answered:

What should be evaluated?

In keeping with the overall approach to the research discussed earlier, it was decided that in this investigation three elements needed to be evaluated. Two were directly related to curricula: the inclusion or presence of extension in agricultural curricula; and the nature and efficacy of the extension offerings where they were present. The third was more fundamental: examining what extension should be in the South African context. It is thus evident that the intention was not only to interrogate curricula as proposed by Spiel *et al* (2006) but also the assumptions upon which the curricula were based.

What is the frame of reference for the evaluation?

Again at variance with Spiel *et al* (2006) who see the frame of reference being defined as views of teachers and learners, this research postulated that part of the problem faced by South African extension is that there was no external, objective interrogation of offerings. The construct suggested by Spiel *et al* (2006) is too simplistic and runs the risk of being self-serving. In effect, one could indeed measure progress along a pathway towards some known goal, without ever enquiring as to whether the pathway or even the goal was the correct one.

Bengston (2004:29) argued that there is a need to focus on “education outputs rather than inputs” and that there is a further “urgent need to rethink and redefine what these outputs should be in the 21st knowledge society. Finally he stresses that stakeholders outside the prevailing education system should be part of shaping the outcomes.

Therefore, the frame of reference must necessarily include an external examination of the field of study for which the curriculum is being evaluated. Although clearly intended for the analysis stage of Instructional Design, Dick *et al* (Undated: 15) noted that “the instructional goal may be derived from a list of goals, from a needs assessment, from practical experience with learning difficulties of students, from the analysis of people who are doing a job, or from some other requirement for new instruction.” While perhaps unintended, this generally supports the idea of an open interrogation of the assumptions reigning within the field of study for which the curriculum is being evaluated.

Of the eight curriculum evaluation modules discussed earlier, only the CIPP model includes an element similar to questioning of assumptions called for in the proposed model. The context evaluation aspect of the CIPP model is conducted for the express purpose of providing “a rationale for the determination of objectives” (Stufflebeam 1971 cited by Oliva (1988:478)). In this it confirms the model proposed in this research. Further, in its evaluation stage the CIPP model takes into consideration the context established earlier. Further in the input evaluation stage of the CIPP model it calls for a comparison with other programmes and approaches

What perspective should be evaluated?

Again the dictates of the research challenged Spiel *et al* (2006), who derive perspective from educators and learners. The premise of the research demanded that the perspective could not be limited to those teaching and learning. Because of the external impact and the role of extension practitioners in addressing development issues, the perspective had to include something external to the curricula.

One element of the external perspective was captured in the theory-led nature of the research – which theory itself was evolved for the purposes of the research. A second element was the introduction of ‘sharing’ as an inherent part of the taxonomy of educational objectives. A third element was the perspective of the workplace – defined by job descriptions for extension officials. The balance was the perspectives offered by agricultural policy and education policy. This approach is consistent with the “expansive” Improvement/ Accountability-oriented evaluation approaches and the Social Agenda-directed/Advocacy approaches which are “are directed to making a difference in society” Stufflebeam (2000a:68).

Who are the participants of evaluation?

Taylor (2001) supported engaging a wide range of stakeholders. Spiel *et al* (2006) include current students, current teachers, graduates practicing in the workplace, and supervisors of practicing graduates. As anticipated by Spiel *et al* (2006), financial, time and access limitations drove some of the selection of categories of participants for the proposed South African evaluation. Participation needed to touch on three key elements: the higher education institutions (to cover the ‘teachers’ component), individual extension practitioners (to cover practicing graduates) and the Department of Agriculture (to cover the ‘supervisors’ component).

5.12. Crystallising a method for evaluating Agricultural Extension curricula

Reflection on the evaluation models, methods and approaches that have been discussed thus far, exposes a number of elements that support the development of a new method for evaluating extension curricula in South Africa:

- Evaluation of curricula appears centred on performance of teachers, students and institutions on delivering outcomes rather than on the curriculum itself. In almost all cases, evaluation is not separated from student assessment.
- Evaluation models have generally been developed in the context of primary and secondary education and only marginally at higher education level. South African educational policy demands review at higher education level.
- Evaluations must have a purpose and be meaningful, and they must follow a clearly identified and articulated process.

In brief, the overall framework (repeated here for ease of reference) is consistent with the literature reviewed:

- a) Interrogating agriculture extension to establish the framework for training and curricula.
- b) Using the interrogation of extension and the resulting framework to identify what extension should deliver.
- c) Translating that into learning outcomes to be incorporated into a curriculum.
- d) Using the outcomes to interrogate the curricula of existing programmes at colleges and universities looking for those outcomes.

Following these parameters and drawing on the input of the authors cited thus far, it was found that an evaluation of extension curricula in South Africa needed firstly to take into account South Africa's transformation agenda for agriculture. In that South African education policy uses the OBE framework, the evaluation would be effectively a summative evaluation (that is, measuring the outcomes of the curriculum). Further, the evaluation needed to be theory-led; this was fundamental in order to challenge the status quo of assumptions about extension. Thus, as noted earlier, it implied the necessity of interrogating extension theory ultimately to create a frame of reference as noted by Spiel *et al* (2006) and Gale and O'Pray (1981). A second frame of reference was the ability of extension curricula to deliver on policy. This points to a logical extension of Confrey's (2006) contention that curricula is value-laden; that the evaluation must assess the extent to which the values of the curricula are relevant to the intention of policy. Finally, as noted earlier, evaluations need to be structured, unambiguous, transparent and grounded in both outcomes and stakeholders.

In applying the foregoing, the method assumed Agriflection (Chapter 2) as the theory-leading element in the evaluation. This extension concept brings together the South Africa's agricultural and educational policies into a general theory which led the evaluation method in determining what extension should deliver. From this, ultimately 34 learning outcomes were developed. The outcomes were then used to interrogate 1) curricula at relevant higher education institutions, 2) knowledge and skills of graduated practitioners, and 3) job descriptions of extension positions in the public sector. The practical application of this approach was described in Chapter 4 and is captured in Figure 4.1 It shows the articulation of policy and farmers' goals into curricula; the translation of learned curricula into applied practice which fulfils the goals of the state and farmers, and the learning from that process being fed back to policy and farmers – at the same time showing the feedback loops at each step.

Chapter 4 (See Figure 4.2) Worth (in press: no page numbers) then provides detail on the grand feedback loop which is described thus: “the dynamics of the relationship between the curricula-to-farmer process and the facets of integration of agricultural and educational policy into Agricultural Extension”.

Consolidating the approach to the research with the forgoing description of the process from policy to realisation via curricula, a new evaluation model is proposed. It largely falls into the band of Instructional Design in that it drives curriculum towards

predetermined outcomes based on an analysis of needs. However, what the new model does that Instructional Design does not appear to do, is to include a prior analysis step to the analysis that leads to learning outcomes. The proposed model is a marriage of theory-led evaluation and a modified Instructional Design. It unpacks the work done to get from state and farmer goals to curricula as depicted in Figures 4.1 and 4.2 in Chapter 4.

Figure 5.2 provides graphic description of the model which is termed Theory-led Instructional-Design Curriculum Evaluation (TICE). The following is a description of the model which takes into account its similarities and distinctions from traditional Instructional Design and which is particularly intended for a State in transition.

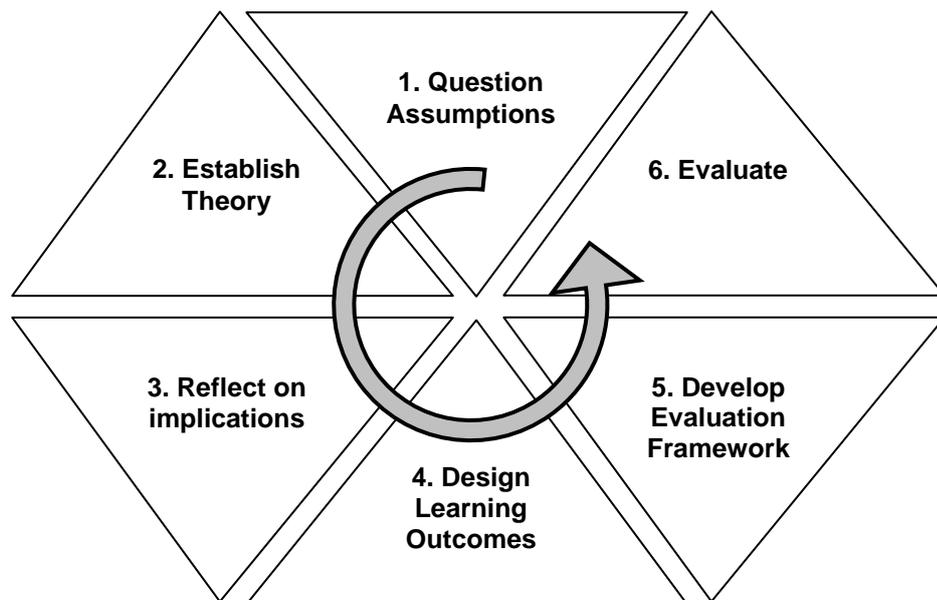


Figure 5.2: TICE: Theory-led Instructional-Design Curriculum Evaluation

Process One: Question assumptions

In this proposed model, the first process is to ‘Question Assumptions’ driving learning in the field being examined (in this case Agricultural Extension). As noted earlier, this is a critical element of the model. It involves identifying the goals of the state, extrapolating what is required to achieve those goals in terms of knowing, being and acting (deliverables), and comparing with existing theory to identify possibilities. As the diagram suggests, it would include an evaluation of existing curricula to contribute to

identifying and critically testing assumptions. The aim is to form a foundation for a new or modified theory driving the field of study for which the curriculum is being evaluated.

Process Two: Establish theory

The second process is to affirm, modify or formulate a new theory for the field of study for which the curriculum is being evaluated. It is an assimilation and synthesis of learning and creative extrapolation unbounded by previous assumptions. As noted earlier, it takes also into account state goals, assessed needs and input from practitioners in the field. However, the process of establishing theory is not an end unto itself. If the process of questioning and synthesis leads to an affirmation of current theory, then this too makes it possible for curriculum design and evaluation to be carried out with greater integrity.

Process Three: Reflect on implications

Process three calls for reflecting on the implications of the established theory. This becomes the space for the traditional analysis phase of Instructional Design. This is a critical step in the method as it must be approached with as little bias as possible (Baker 1969) but openly acknowledging whatever bias does exist (Townsend & Adams 2003). It calls for creative and imaginative extension of the theory into processes, knowledge and skills that might emanate from the theory irrespective of what is currently in place in curricula or the work place.

Process Four: Design learning outcomes

Process four is designing learning outcomes – again a traditional part of Instructional Design. The design takes into account results from the reflection on implications. The aim of this process, according to Dick *et al* (Undated: 15) is “to determine what it is that you want learners to be able to do when they have completed your instruction.” In short, this process determines what is to be learned. In this model the learning outcomes are drawn from a wider perspective and fully informed by the new, modified or affirmed theory for the field of study for which the curriculum is being evaluated.

Process Five: Develop the evaluation framework

Process five addresses the development of programmes and materials. It deviates from Instructional Design in that instead of developing a curriculum or programme, the TICE

method creates an evaluation framework. More in keeping with Donaldson (2003) the theory becomes the guiding light of the evaluation, helping to formulate the questions to be asked and influencing the methods of data collection and analysis.

Process Six: Evaluation

The sixth and final process is evaluation. Traditional Instructional Design would evaluate whether instruction (implementation) delivered on the learning objectives. The TICE method specifically evaluates curricula based on the framework derived from theory to ensure students and future practitioners are able to deliver on learning outcomes derived from theory, State goals and the iterative process. The primary question regarding curriculum would be: to what extent has curriculum adapted itself to accommodate the new theory and learning outcomes?

5.13. Final comment on the method

The critical element of the model is that it is led by a deliberately constructed theory. In this the model satisfies Donaldson's (2003) call for exploratory research to test critical assumptions. It also addresses Chen and Rossi's (1990) assertion that the evaluator should search for and construct a theoretically justified model. Finally, it helps achieve Larabee's (1998) freedom to work on issues that matter rather than just on consumer demands.

Another crucial element of the model is that it is reflexive. It starts with an evaluation and exploratory research. And it is intended that this process be a continuous one to ensure that Agricultural Extension curricula stay relevant and grounded in tested theory and practice.

Thus, it would be incautious, as Townsend and Adams (2003) warned, to assume that the 'new' theory is a fixed theory. The proposed evaluation module is predicated on questioning the assumptions on which the field of study is based, thus the 'new' theory itself remains subject to questioning.

Notwithstanding the questioning nature of the model, evaluations stemming from it need to be structured, unambiguous, transparent and anchored in specified outcomes and stakeholder perceptions. Further, evaluations must be grounded also in values or standards that ensure the veracity and efficacy of the evaluation. Evaluations must have a purpose and be meaningful, and they must follow a clearly identified and articulated

process. In the application of the proposed model, each process will need to be unpacked, tested and refined.

5.14. Conclusion

This chapter has argued the creation of TICE as a method to guide the evaluation of Agricultural Extension curricula in South Africa. This method has emerged from the convergence of educational evaluation theory and practice with practical agricultural imperatives facing South African and an interrogation of Agricultural Extension. Being a theory-led method, it first and foremost suggests that curriculum evaluation and development needs to be predicated on an unbiased challenge of the assumptions underpinning the foundations of extension and extension education.

In the evolution of the model, the chapter proposes confirms and supports the argument in Chapter 2 that Agricultural Extension in South Africa needs to shift from technology transfer to farmer learning. It complies with the outcomes-based approach entrenched in South African educational policy and of Instructional Design theory. It also complies with the international trend for participatory curriculum development and suggests the evaluation of extension curriculum – at least in part –on these grounds.

Finally, its overall aim is to provide a framework that drives Agricultural Extension curriculum into an iterative arena consciously linking needs of a State in transition with the realities of agriculture and the realities and aspirations of South African farmers. The result is a potentially powerful tool to evaluate and develop appropriate Agricultural Extension curricula that is structured and rigorous yet flexible and suited to the changing needs of South African agriculture.

References

- Aikin, W. M., 1942. *Adventure in American Education Volume I: The story of the eight-year study: With conclusions and recommendations.* Harper & Brothers. New York. <http://www.8yearstudy.org/>. Accessed October 2007.
- Anderson, L.W. and Krathwohl, D. (Eds.), 2001. *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives.* Addison Wesley Longman, New York.
- Babie, E. and Mouton, J., 1998. *The Practice of Social Research.* Oxford University Press, Oxford.
- Baker, R.L., 1969. Curriculum Evaluation. *Review of Educational Research*, 39 (3), 339-358.
- Bamberger, M. and Valadez, J., 1994. *Monitoring and Evaluating Social Programmes in Developing Countries - A Handbook for Policymakers, Managers and Researchers.* World Bank, Washington D.C.
- Barnett, R. and Coate, K., 2005. *Engaging the Curriculum in Higher Education.* Open University Press, Maidenhead.
- Bembridge, T., 1994. Agricultural education: policy neglect. *Matlhasedi*, 13 (1), 3-6.
- Bengston, J., 2004. The quality of education at the beginning of the 21st century Paper commissioned for the EFA Global Monitoring Report 2005, 'The Quality Imperative' 2004. UNESCO, Geneva. 2004, pp. 53-59 www.ibe.unesco.org/curriculum/GulfStatesProjectsPdf/omanIIhug.pdf. Accessed August 2007.
- Berger, C. and Kam, R., 1996. Definitions of Instructional Design (Adapted from Training and Instructional Design) University of Michigan. <http://www.umich.edu/~ed626/define.html>. Accessed September 2007.
- Bloom, B. (Ed.), 1956. *Taxonomy of Educational Objectives: Book 1 Cognitive Domain.* Longman, London.
- Bloom, B. (Ed.), 1964. *Taxonomy of Educational Objectives: Book 2 Affective Domain.* Longman, London.
- Briggs, A.R.J. and Sommefeldt, D., 2002. *Managing Effective Learning and Teaching.* Sage Publications, London.
- Buchan, V., Rodenhiser, R., Hull, G., Rogers, J., Pike, C., Ray, J. and Smith, M., 2004. Evaluating an assessment tool for undergraduate social work education: analysis of the Baccalaureate Educational Assessment Package. *Journal of Social Work Education* 40 (2), 239-253.

- Cappell, L. and Kamens, D.H., 2002. Curriculum Assessment: a case study in Sociology. *Teaching Sociology* 30 (4), 467-494.
- Chen, H.T., 1990. *Theory-Driven Evaluation*. Sage Publications, Newbury Park.
- Chen, H.T. and Rossi, P.H., 1980. The multi-goal, theory-driven approach to evaluation: a model linking basic and applied social science. *Social Forces*, 59 (1), 106-122.
- Clark-Unite, C. and Nel, L., 2004. Students' perceptions of curriculum reform: a case study of the UPE Development Studies Master's programme. *Africanus* 34 (1), 96-104.
- Cockburn, P., 1997. *Building a brighter future: Curriculum 2005*. South African Department of Education, Pretoria.
- Confrey, J., 2006. Comparing and contrasting the National Research Council Report "On evaluating curricular effectiveness" with the what works clearinghouse approach. *Educational Evaluation and Policy Analysis*, 28 (3), 195-213.
- Conklin, J., 2005. A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives: A review. *Educational Horizons* Spring 2006, 154-159.
- Dadds, M., 1998. Supporting practitioner research: a challenge, *Educational Action Research*, 6(1), 39-52.
- de Lisle, P., 1997. What is instructional design theory? <http://hagar.up.ac.za/catts/learner/peterdl/ID%20Theory.htm>. Accessed October 2007.
- Deepwell, F., 2002. Towards capturing complexity: an interactive framework for institutional evaluation. *Educational Technology & Society*, 5 (3), 83-90.
- Diamond, R.M., 1997. Broad curriculum reform is needed if students are to master core skills. *The Chronicle of Higher Education*, August 1, 1997, B7. <http://www.math.duke.edu/~das/essays/reform/>. Accessed October 2007.
- Dick, W., Carey, L. and Carey, O.J., Undated. The systematic design of instruction. on.nl/Docs/Faculteiten/OW/O22411_the%20systematic%20design%20of%20instruction.pdf Accessed September 2007.
- DoE (South African Department of Education), 1997. Education White Paper 3-A Programme for Higher Education Transformation. Government Gazette, 386 (18207), Pretoria.
- Donaldson, S.I., 2003. Theory-driven Program Evaluation in the New Millennium. In: Donaldson, S.I., and Scriven, M., 2003. *Evaluating Social Programs and Problems*. Laurence Erlbaum Associates, 109-144.

Earnest, J., 2006. Science Education Reform in a transitional society: the case of Rwanda. In: Earnest, J, and Treagust, D. (Eds.), 2006. *Education Reform in Societies in Transition: International Perspectives*. Sense Publishers Rotterdam. pp. 129-142.

Eisner, E.W., 1976. Educational connoisseurship and criticism: their form and functions in educational evaluation. *Journal of Aesthetic Education* 10 (3/4), 135-150.

Everard, K.B. and Morris, G., 1996. *Effective School Management*, 3rd edition, Paul Chapman, London.

Fakier, M., and Waghid, Y., 2004. On outcomes-based education and creativity in South Africa. *International Journal of Special Education* 19 (2), 53-63.

Gale, J. and O'Pray, M., 1981. The development and implications of frames of reference in curriculum evaluation programmes: the experience of a British school of medicine. *British Journal of Educational Technology*, 12 (1), 49-63.

Genis, E., 2001. Principles and practice of outcomes-based education. Paper presented at the Conference of the Association of Principals of Agricultural Colleges, 15-17 October 2001, Kruger National Park. www.mantec.ac.za/APA. Accessed July 2004.

Guba, E. G., & Lincoln, Y. S., 1981. *Effective evaluation*. Jossey-Bass, San Francisco.

Harris, H., and Bretag, T., 2003. Reflective and collaborative teaching practice: working towards quality student learning outcomes. *Quality in Higher Education* 9 (2), 179-185.

Householder, D., and Boser, R. 1991, Assessing the effectiveness of the change to technology teacher education. *Journal of Technology Education* 2 (2), 1-17.

Hughes, P., 2001. The monitoring and evaluation of curriculum reforms. In: Rassekh, S. and Thomas, J. (Eds.), 2001. *The Management of Curriculum Adaptation for Curriculum Specialists in the Gulf region* Muscat, Oman, 17-21 February 2001 Final report of the seminar. International Bureau of Education, Geneva. www.ibe.unesco.org/curriculum/GulfStatesProjectsPdf/omanIIhug.pdf. Accessed October 2007.

Hunkins, F.P. and Hammill, P.A., 1994. Beyond Tyler and Taba: reconceptualizing the curriculum process. *Peabody Journal of Education*, 69 (3), 4-18.

Jump, L., and Jump, R., 2006. Learning academic skills online: Student perceptions of the learning process. Proceedings of The First International LAMS Conference 2006: Designing the Future of Learning. http://lamsfoundation.org/lams2006/pdfs/Jump_Jump_LAMS06.pdf. Accessed October 2007.

Kemp, J. and Smellie, D., 1994. *Planning, producing, and using instructional technologies*. Seventh Edition. HarperCollins College Publishers. New York.

Kgaphola, M.R., 1999. Restructuring Higher Education in South Africa: a case for development-oriented curriculum structure. Science and Technology Policy Series.

Killen, R., 1999. Outcomes-based education: some issues to consider in the South African context. Paper prepared as an overview of OBE for a series of workshops presented at Vista University and ML Sultan Technikon during May/June 1998 as part of the AUSAID funded Australia-South Africa Institutional Links Project No. 2-007.

Kridel, C., 2007. Eight-Year Study: purpose, method, results. Education Encyclopedia – StateUniversity.com. <http://education.stateuniversity.com/pages/1947/Eight-Year-Study.html>. Accessed October 2007.

Larabee, D.F., 1998. Educational Researchers: living with a lesser form of knowledge. *Educational Researcher*, 27 (8), 4-12.

Magnanti, T., 2006. Testimony of Dr. Thomas Magnanti, Dean of the MIT School of Engineering before the Commission on the Future of Higher Education February 3, 2006. <http://www.ed.gov/about/bdscomm/list/hiedfuture/3rd-meeting/magnanti.pdf>. Accessed October 2007.

McGriff, S., 2001. ISD Knowledge Base/Instructional Design & Development/Instructional Systems Design Models. PennState Website <http://www.personal.psu.edu/faculty/s/j/sjm256/portfolio/kbase/IDD/ISDModels.html#dickcarey>. Accessed September 2007.

Nevo, D., 1983. The conceptualization of educational evaluation: an analytical review of the literature. *Review of Educational Research*, 53 (1), 117-128.

Nind, M., 2005. Models and practice in inclusive curricula. In: *Curriculum and Pedagogy in Inclusive Education: Values into Practice*. RoutledgeFalmer, London. pp. 1-10.

Oliva, P.F., 1988. Developing the Curriculum, 2nd. Ed., Addison-Wesley Educational Publishers, New York.

Provus, M., 1971-1972. Evaluation as Public Policy. *Curriculum Theory Network*, No. 8/9, Monograph Supplement: Curriculum Evaluation: Potentiality and Reality. pp. 33-44.

Ramirez, A., 2007. To blog or not to blog: understanding and overcoming the challenge of knowledge sharing. *Journal of Knowledge Management Practice*, 8 (SI 1), May 2007. <http://www.tlinc.com/articlsi2.htm>. Accessed October 2007.

Rebien, C. (1997). Development assistance evaluation and the foundations of program evaluation. *Evaluation Review*, 21(4), 436-460.

Sang, H. 1995. *Project Evaluation: Techniques and Practices for Developing Countries*. Ashgate Publishing Limited, Avebury.

Soller, A., Guizzardi, R., Molani, A. and Perini, A. 2004. SCALE: Supporting Community Awareness, Learning, and Evolvment in an Organizational Learning Environment International Society of the Learning Sciences (ISLS). Proceedings of the 6th International Conference of the Learning Sciences, Santa Monica, CA, 2004.

<http://www.cscl-research.com/Dr/documents/Soller-etal-ICLS04.pdf>. Accessed October 2007.

Spiel, C., 2001. Program evaluation. In: Smelser, N.J. and Baltes, P.B., 2001. *International Encyclopedia of the Social & Behavioral Sciences*. Elsevier Science. Oxford, pp. 12169-121173.

Spiel, C., Schober, B. and Reimann, R., 2006. Evaluation of curricula in higher education: challenges for evaluators. *Evaluation review*, 30 (4), 430-450.

Stake, R., 1981. Persuasions, not models. *Educational Evaluation and Policy Analysis*, 3 (1), 83-84.

Stufflebeam, D.L., 1971. *Educational Evaluation and Decision Making*. F.E. Peacock, Itsasca.

Stufflebeam, D.L., Madaus, G.F. and Kellaghan, T. (Eds.), 2000. *Evaluation Models: Viewpoints on Educational and Human Services Evaluation*. Kluwer Academic Publishers, Boston.

Stufflebeam, D.L., 2000a. Foundational models for 21st century program evaluation. In: Stufflebeam, D.L., Madaus, G.F., Kellaghan, T. (Eds.), 2000. *Evaluation Models: Viewpoints on Educational and Human Services Evaluation*. Kluwer Academic Publishers, Boston. pp. 33-83.

Stufflebeam, D.L., 2000b. Professional standards and principles for evaluations. In: Stufflebeam, D.L., Madaus, G.F., Kellaghan, T. (Eds.), 2000. *Evaluation Models: Viewpoints on Educational and Human Services Evaluation*. Kluwer Academic Publishers, Boston. pp. 439-455.

Stufflebeam, D., 2002 CIPP Evaluation Model Checklist: A tool for applying the fifth instalment of the CIPP Model to assess long-term enterprises. <http://www.wmich.edu/evalctr/checklists/cippchecklist.htm>. Accessed October 2007.

Taylor, P., 1998. Participatory curriculum development for agricultural education and training: experiences from Viet Nam and South Africa In: Van Crowder, L. (Ed.), 1998. *Training for Agriculture and Rural Development: 1997-98*. FAO, Rome.

Taylor, P., 2001. 10 Key Stages Towards Effective Participatory Curriculum Development. Publication No. 2: Experience and Learning in International Cooperation. Helvetas, Zürich.

Townsend, D. and Adams, P., 2003. Program evaluation models and practices: a review of research literature. *AISI Online Clearinghouse*. http://education.gov.ab.ca/k_12/special/aisi/pdfs/UofLEvalModels_2003.pdf. Accessed October 2007.

Wallace, I., 1997. Agricultural education at the crossroads: present dilemmas and possible options for the future in Sub-Saharan Africa. *International Journal of Educational Development*, 17 (1), 27-39.

Zinnah, M.M., Steele, R.E. and Mattocks, D.M., 1998. From margin to mainstream: revitalization of Agricultural Extension curricula in universities and colleges in sub-Saharan Africa. In: van Crowder, L. (Ed.), 1998. Training for Agriculture and Rural Development: 1997-98. FAO Rome.18-28. <http://www.fao.org/sd/EXdirect/EXan0027.htm>. Accessed January 2006.

Chapter 6

Methods of Data Collection and Analysis for the Evaluation of Agricultural Extension Curricula in South Africa

6.1. Introduction

This chapter provides a detailed overview of the method developed and applied in evaluating Agricultural Extension curricula at relevant institutions in South Africa. It first explains the development of the methods of data collection from three sources. It then discusses how methods of data analysed were developed and the data ultimately analysed. Finally it provides a brief discussion of what was learned from the process of developing and applying the data collection and analysis methods.

6.2. Methods of data collection

Data for this study were collected from three primary sources: higher education institutions offering relevant agricultural qualifications; extension practitioners; and Departments of Agriculture. Data from higher education institutions was the primary focus of the study. Data from extension practitioners was used to cross check the existence of the capabilities represented by the 34 curricula markers used in the study. Data from Departments of Agriculture captured the competency requirements for extension practitioners from the primary employer of extension practitioners.

6.2.1. Data collection at higher education institutions

The curricula markers used in this study were derived from an analysis of agricultural and educational policy in South Africa. They were also derived through an examination of Agricultural Extension theory which resulted in the development of a learning model for Agricultural Extension (Chapter 2). From this model, Chapter 3 developed 21 curriculum markers. The initial attempts to apply these markers revealed that the markers prefaced by “theory and practice” had to be split into separate markers. A number of institutions teach one, but not the other. Thus, in order to obtain the most

accurate and richest picture of the Agricultural Extension curricula landscape, 34 markers were used. (See Appendix 1.)

The steps followed in collecting data for this study were as follows:

- Step 1: Establish the means by which curricula will be interrogated using the 34 curricula markers
- Step 2: Identify higher education institutions that are relevant to the study
- Step 3: Obtain information on the Agricultural Extension related qualifications offered at the selected institutions
- Step 4: Identify relevant qualifications within each selected institution
- Step 5: Assess the curricular structure of the identified qualifications including a complete list and description of all modules included in the completion of the qualifications
- Step 6: Identify modules within each curriculum that are most relevant to the study
- Step 7: Interrogate identified modules
- Step 8: Prepare data for analysis

While these are listed sequentially and were for the most part followed sequentially, a number of steps further down the list required the research to re-examine previous steps. In this way there was a constant reiterative process which informed and refined the method as the research was conducted. Further, consistent with Chen (2005) who indicates that theory-led evaluations will tend to use both quantitative and qualitative data, this study has followed suit. He suggests that the evaluation should collect data that identifies the determinant(s) of the outcomes. Applied to intervention programmes, the determinant is discovered through the evaluation. In this study, which is looking at curriculum and not the outcomes, the determinant is learning as expressed in the Agriflection (Chapter 2) theory leading the evaluation. In applying Chen's model to this study, the research (and therefore the data collection and analysis) sought to establish the presence, and the efficacy of that presence, of the determinants established by theory.

Step 1: Establish the means by which curricula will be interrogated using the 34 curricula markers

This study employed an action research orientated approach that attempted to apply the ideal where “knowledge is developed through critical reflection and experiential learning” (Gonsalves *et al* 2005: no page numbers). While action research *per se* could not be rigorously followed, the method of data collection was, nonetheless, directly affected by the analysis of that data. As data were collected and analysed, questions arose about the method of collection and interrogation of curricula. Participants were consulted as to the most effective and practicable way to collect and examine data. In this way they directly influenced the construction process. The process derived the anticipated benefits of generating information and solutions which were immediately applicable to the study at hand and caused, or at least opened the door to, change in the ‘real-world’ of the participants (Gonsalves *et al* 2005).

It was important to use this approach because of the dominance of what one might call ‘primacy of technical information’ that was encountered in this research. As the research proceeded, it was observed that approaches to curriculum were largely conventional and the status quo in curricula were assumed as a given. The approach used in the study required changing the assumptions about extension, extension education and extension curricula. In this way it was consistent with action research which requires participants to engage in the process using a different framework (Gonsalves *et al* 2005).

The other phenomenon encountered in this research was the universal use of modules comprised ostensibly around clearly defined learning content. These modules were offered in semesters or parts of semesters (usually called terms). While the study did not specifically examine these factors, no particular premise or justification for this approach to packaging learning. More than anything, it appeared to be a convenient way to manage.

An initial method looking simply at the presence of the 34 markers in modules included in the curriculum of a particular qualification. The markers were incorporated into a scorecard using a simple Likert scale from zero to six (0 – 6). The scale was linked to whether the module was a full-credit or half-credit module, and whether a learner was required or had the choice to take the module. This appeared to work well with the first institution studied. However, interrogation of modules at the second institution demonstrated that the initial approach was too limited. While the collection of data were

easily accomplished, the analysis of the data were too confined to produce information that would be of real value both to the study and to the institutions participating in the study.

From reflection on the results of the first generation interrogation scorecard, a more detailed method of data collection was developed. This evolution was in effect an extension of the scorecard to include the year in which the module is taken. This second generation scorecard also included a factor (called a focus factor) which attempted to given an indication of the extent to which the particular marker was addressed in the module.

The application of the second scorecard worked for the first two institutions and was applied to the third institution. It was in this round, after lengthy discussions with lecturers at each of the institutions, that a method was developed which would work in all the institutions. As noted above, the collection method was directly linked to the analysis methods used described in Chapter 5. In brief, modules were examined on the basis of the notional study hours dedicated to the 34 markers used in this study. Notional study hours, it was found, is used or can be applied to all of the institutions in the study. In fact, notional study hours is the norm within prevailing higher educational policy (DoE 2007). The concept of notional study hours is discussed in more detail in Section 6.3.1.

The increasing detail of a data collection, driven by the analysis of data, served to highlight a number of factors found to be important to curriculum design and evaluation. The first of these was the presence factor the aim of which was to establish whether or not the curriculum marker was present at all in the curriculum, by year and within the whole qualification. The second was the efficacy factor which was intended to give an indication of the depth of attention given to the curriculum marker. To capture the efficacy factor, it was necessary to adjust the method of data capturing to ensure data could be extracted in a range of permutations including the following:

- Tracking an individual marker anywhere in the curriculum
- Tracking an individual marker with individual modules
- Tracking all the markers within individual modules
- Tracking individual markers across a year of study
- Tracking all markers across a year of study
- Tracking individual markers across a whole qualification
- Tracking all markers across a whole qualification

In each case, to allow for efficacy analysis, data had to be captured, in part, in notional study hours. An institutional scorecard was designed to capture this information. (See Step 7 and Appendix 2.)

Step 2: Identify higher education institutions that are relevant to the study

The South African Agricultural Digest (2001) notes that agricultural training can be found at primary schools, secondary schools, colleges of agriculture, universities of technology and universities. By 2005, agricultural training had been removed from primary schools (DoA 2005a).

This study, however, focuses on higher education in Agricultural Extension and thus engages curricula from relevant colleges of agriculture, universities of technology and universities. This selection is supported by figures adapted from DoA (2005b) which indicated that of the extension practitioners employed by the provincial Department of Agriculture 68,2% hold a certificate or diploma in agriculture, 17,6% hold an Advanced Diploma, Bachelor of Technology or a Bachelors in agriculture and 10,4% hold a Bachelor of Science Honours degree. Only those institutions which offered Agricultural Extension in their curriculum were included in the study. To establish the list of relevant institutions, an initial scoping was made of all higher education institutions offering agricultural education and training in order to identify those that met the criteria.

One issue of note is that most of the higher education institutions offering agricultural qualifications historically provided training and education to either white-only or non-white only learners. It was therefore important to this study that the institutions finally included in the study reflected both sets of institutions. Key institutions from both sets were identified from each type of institution and efforts were made to ensure that those institutions participated.

Thus the effective criteria for inclusion in the study were as follows:

- Higher education institution offering Agricultural Extension in their curricula;
- Representation of former black and former white institutions; and
- Representation from colleges of agriculture, universities of technology and universities.

All the relevant institutions were initially included in the study. However, not all institutions responded to the invitation. Therefore, the inclusion of institutions in the

study was limited to those willing and able to participate or for which sufficient information could be gathered using secondary data. Willingness and ability to participate manifested itself at different stages of the research. Steps 3-7 each required either access information or to a key informant in the institution. Where information could not be obtained, the institution could not be included in the study.

Step 3: Obtain information on the Agricultural Extension related qualifications offered at the selected institutions

Each institution that was willing to cooperate with the study was approached for information relevant to the agricultural qualifications it offered. Such information included the names, structure, entrance requirements, credit load, and curricula for each agricultural qualification. This generally came in the form of 'handbooks' or 'calendars' published by the institution for students to use to register for qualifications and modules. And as noted above, if information was not forthcoming, then secondary sources were used where possible.

Step 4: Identify relevant qualifications within each selected institution

The information obtained from each participating institution was then reviewed to identify qualifications relevant to the study. This primarily involved examining 'handbooks' or other relevant documents which listed qualifications offered.

As noted in the discussion on Step 2, drawing on the fact that the majority of extension practitioners in South Africa hold an undergraduate diploma or degree, it was concluded that the majority of the training was done by those institutions who offer Agricultural Extension at an undergraduate or honours level. Thus only undergraduate and honours qualifications were included in the study. By virtue of this decision, a number of willing institutions, but that offered extension only from Masters level, were excluded from the survey.

Based on this information, qualifications relevant to the study were identified. Stratified sampling of qualifications was done, limiting the selection to those qualifications most commonly found amongst extension practitioners in South Africa – Diplomas, Bachelor of Agriculture, Bachelor of Technology in Agriculture, Bachelor of Science in Agriculture, Bachelor of Agriculture Honours, Post-Graduate Diplomas and similar two-, three- and four-year qualifications in agriculture. Not included in the study

were qualifications such as the Bachelor of Consumer Science (Extension) offered at the University of Zululand.

Step 5: Assess the curricular structure of the identified qualifications including a complete list and description of all modules included in the completion of the qualifications

Again using mostly ‘handbooks’ and similar material, information about the curricula for each of the qualifications to be included in the study was accessed and sorted. Rules of combination were studied to form an overall understanding of the structure of the various qualifications on offer.

Step 6: Identify modules within each curriculum that are most relevant to the study

Not all modules in a qualification needed to be examined. Modules were initially selected or eliminated on the basis of the description of the module in terms of content and/or topics covered. This was also stratified sampling based on isolating those modules most directly related to Agricultural Extension. Step 7 below opened the possibility to the participating institution to include additional modules.

Step 7: Interrogate identified modules

For each institution included in the study, the following sub-steps were followed:

- 7a) Using the final method developed as described in 1 above, a module specific scorecard was created for each identified module (See Appendix 2);
- 7b) The scorecards together with an explanation of the method and steps to completing the scorecards and a blank scorecard were sent to a key informant at the selected institution; and
- 7c) Where possible, follow-up visits or calls were made to key informants to go over the completed scorecards and to otherwise confirm information relevant to the study. It was this stage that additional modules were identified.

Step 8: Prepare data for analysis

The data collected from the various institutions was captured into spreadsheets created for each institution. The results of these calculations were then analysed using the methods described in Section 3.

6.2.2. Data collection from extension practitioners

As a means of cross-checking skills in the Agricultural Extension sector, three efforts were made to gain input from extension practitioners in South Africa. This part of the research was not meant to be exhaustive, but rather to provide some insight and point of reference for testing the outcomes of the evaluation of curricula. Respondents were selected using convenience sampling (Leedy & Ormond 2005). Questionnaires were distributed at three events attended by public sector Agricultural Extension practitioners: the 40th Annual Conference of the South African Society for Agricultural Extension (SASAE) in May 2006; the 41st Annual SASAE Conference in May 2007; a training programme conducted by the researcher for Agricultural Extension officials in November 2007. No respondent completed more than one questionnaire, so there was no duplication of response. (See Appendix 3.)

In all 132 Agricultural Extension practitioners completed questionnaires which interrogated the degree to which they perceived themselves to have the knowledge and/or skills reflected in the 34 curricula markers. Data from these surveys were captured using EXCEL[®].

The purpose of the questionnaire was to assess the perception of current Agricultural Extension practitioners in the public sector as to their proficiency in terms of the 34 markers developed for this study. It further sought to establish to what extent their proficiency was gained as a part of their respective qualifications. Thus the questionnaire was very simple. The study needed respondents to consider each of the 34 markers and declare their perceived level of knowledge and skill for each marker.

Given this framework, the researcher, in consultation with colleagues, developed an initial questionnaire that captured demographic information including employer, job title, information about their highest qualification, gender, home language and age. It presented each of the 34 markers and response options of None; Very little; Some; Adequate; More than adequate; and Proficient. These options were presented as a Likert scale (0-5). The questionnaire was tested with 20 extension practitioners with whom the researcher was associated. This test suggested the addition of the of question about whether the knowledge and skill was obtained as a part of their formal qualification or not. This revision was incorporated into the final questionnaire as a simple yes or no response set opposite each marker. (See Appendix 3)

6.2.3. Data collection from Departments of Agriculture

Also as a means of cross-checking skills with curricula, efforts were made to obtain job descriptions for four types of Agricultural Extension posts: extension technician; and extension officers, extension supervisors and extension managers. While there are various other extension posts such as junior and senior technician, junior and senior extension officer, etc. this part of the study was also not meant to be exhaustive, but rather to provide an indication of the range of skills perceived by the major employer of extension practitioners. Figures adapted from DoA (2001) indicated that 88.6% of all extension practitioners employed by the various provincial Departments of Agriculture are employed in one of these four types of posts.

Upon contacting a number of provincial Departments of Agriculture, it was learned that the government recently completed a set of draft job descriptions for extension posts. Copies of these were obtained through the KwaZulu-Natal Provincial Department of Agriculture. They were analysed using the Content Analysis Method looking for core competencies that would translate back to expected learning outcomes (Leedy & Ormond 2005). In other words, the generic job descriptions were used to identify what the department expects their extension practitioners to know and what skills they expect them to have. This would provide a basis for comparison with the learning markers used in the study. In addition to serving as a cross reference to the evaluation of extension curricula, it was anticipated that it would reveal in a very practical way the State's assumptions about and understanding of Agricultural Extension.

Ultimately, the data captured and analysed from Department of Agriculture generic job descriptions for Agricultural Extension practitioners could inform the stakeholders in Agricultural Extension practice, training and education about core capabilities. As discussed in Chapter 2 and demonstrated in Chapters 3 and 4, this approach is eminently suited for the learning framework proposed in this study.

6.3. Method of data analysis

This section describes the approach taken to analyse the data from the three primary sources: data from higher education institutions; data from Agricultural Extension practitioners; and data from the State extension service.

6.3.1. Interpreting data from institutions of higher education

In addition to the influence of the action research approach on data collection and analysis processes, the analysis process was also influenced and guided by national frameworking extant within the South African educational system. The principles governing higher education in South Africa rest in the Higher Education Act (Act No. 101 of 1997) and its subsequent Higher Education Qualifications Framework (HEQF) which, although in public domain in draft form for a number of years, was officially gazetted only in October 2007 (DoE 2007). Additionally, the analysis of data from higher education institutions was informed by the South Africa Qualifications Authority (SAQA) Act (Act No. 58 of 1995) and the National Qualifications Framework (NQF) to which the SAQA Act gave rise.

Each of these abovementioned instruments and the regulations, guidelines and policies they engendered are aimed largely at the same things: to provide coherence of learning nationally with clearly demarcated learning pathways; to meet the challenges facing South African education; to make education of realistic and planned benefit to the country socially and economically; to restore dignity to all South Africans (particularly by correcting the injustices of the past); and to create equity for all in all spheres of education. Behind the rhetoric, there are some solid technical structures and processes which drive in particular the equity process. One powerful aspect of this is establishing norms for learning that are intended to be universally applied in all levels of education and training.

Among the equalising elements is the concept of notional study hours which is embedded in the HEQF. The framework is explicit on the issue of learning being related to credits rather than on years of study. It defines credits as “the measure of the volume of learning required for a qualification and not academic years of study.” The framework explains further the volume of learning is “quantified as the number of notional study hours required for achieving the learning outcomes specified for the qualification. The application of this system is meant to be universal irrespective of mode of delivery, e.g. contact or distance learning. The framework confirms the credit-rating system as 10 notional study hours equalling one credit (DoE 1997:7). Thus a module or course bearing 1 credit would represent 10 notional hours of learning. Similarly, a qualification such as

the Bachelor of Agriculture carrying 128 credits would mean that the learner has notionally engaged in 1280 hours of learning.

The notional study hours approach to packaging learning and programmes is confirmed by the South African Universities Vice-Chancellors Association (SAUVCA) now replaced by Higher Education South Africa (HESA). They express some reservations about application of the system at post-graduate level, sounding a warning that the system needs to be applied with consistency if it is going to provide the basis for comparing qualifications (SAUVCA 2004). This, of course, is of value to this study because of the inconsistencies in the credit systems employed by the higher education institutions participating in the study. Further, while the concept of notional study hours provides a useful framework for creating common ground for evaluating curricula across institutions, it must be borne in mind that the study hours are called notional because they are, by definition theoretical. Further, it is understood that the concept of notional study hours is not actually compatible with OBE. As explained in Chapter 3, the “expanded opportunities” principle of OBE suggests mastering outcomes in a timeframe suited to the learner. However, given the current use of time bound modules and semesters extant at least the higher education institutions included in this study, using notional study hours is a practical compromise.

Added to the concept of notional study hours is the concept of National Qualification Framework (NQF) Levels. There are 10 NQF levels; NQF 1 being the lowest and NQF 10 being the highest. Higher education works with NQF levels 5-10 (DoE 1997). The practical translation of this is that NQF 5 is equivalent to first year level study in a higher education qualification at a college, university or university of technology. According to the DoE (1997:10) “the framework has nine qualification types mapped onto the six levels of the NQF occupied by higher education qualifications. Some levels have more than one qualification type.” The HEQF comprises the following qualification types with the corresponding NQF levels:

Undergraduate

- Higher Certificate: Level 5
- Advanced Certificate: Level 6
- Diploma: Level 6
- Advanced Diploma: Level 7

- Bachelors Degree: Level 7

Postgraduate

- Postgraduate Diploma: Level 8
- Bachelor Honours Degree: Level 8
- Masters Degree: Level 9
- Doctoral Degree: Level 10

Two points bear noting. First, the NQF levels represent levels of education. The intention appears to be to bring some coherence to qualifications offered. (See Appendix 4 for one interpretation of the HEQF.) Currently the framework is not applied universally. For example, diplomas were found to be offered at two NQF levels (5 & 6). Second, the framework does not distinguish between three- and four-year bachelors degrees. For example, the Bachelor of Agriculture is a three-year degree and corresponds to NQF level 7 and the Bachelor of Science in Agriculture (BScAgric) is a four-year degree and appears to correspond to an NQF level 8. In practice the BScAgric was found at two NQF levels (7 & 8)

It is also noted that, due to its impact on the efficacy considerations, the intended nomenclature for qualifications is not currently universally in practice. The Higher Education Qualifications Framework (HEQF) indicates that some NQF levels have more than one type of qualification. The intention, therefore, is that a diploma is intended to be two years in duration, carry at least 240 credits (representing 2400 notional study hours) and result in a NQF level 5 qualification. In practice, however, it was found that most of the agricultural diplomas were three years in duration, carried at least 3600 notional study hours (360 credits) and were registered at NQF 6. Other diplomas were two-year qualifications fitting into the intended norm. This distinction is relevant because it drove the need to find a common way of evaluating curricula. Simply using qualification names without looking at years or length of study, levels of study (using the NQF system) and hours of study (nominally represented by credits) would not provide any degree of certainty that one was comparing apples with apples.

The South African Qualifications Authority (SAQA) uses a similar notional concept: notional hours of learning. SAQA's Directorate: Quality Assurance and Development (SAQA D:QAD undated: 31) define notional hours of learning as "the learning time that

it is conceived it would take an average learner to meet the outcomes defined, and includes concepts such as contact time, time spent in structured learning in the workplace and individual learning.” As with the HEQF, in practice, notional hours of learning is also meant to be translated into credits with one credit for every 10 notional hours of learning. It is perhaps worth noting that as SAQA preceded HEQF, the notional concept gravitated from SAQA to the HEQF.

Ultimately, the data obtained from universities, universities of technology and colleges were analysed and interpreted using what have been termed presence factors and efficacy factors. As noted earlier, these factors were developed as a process. Starting with a simple collection and analysis framework, their evolution was informed by the iterations of data collection and analysis.

6.3.1.1. Presence factors

Two types of Presence Factors were identified: PFE¹³ and PFI. PFE represents the presence in a curriculum of modules related to Agricultural Extension. PFI represents the presence of the curricula markers used in this study.

PFE is a simple calculation using credits allocated to modules and qualifications. PFE is calculated as a percentage of credits in a qualification (or year of qualification) allocated to extension and modules related to the study.

$$PFE_Y = \frac{\Sigma \text{ Credits in curriculum devoted to Extension and related learning in a Year}}{\text{Credits required for the year}}$$

Where Y = the year of study.

$$PFE_Q = \frac{\Sigma \text{ Credits in curriculum devoted to Extension and related learning in a Qualification}}{\text{Credits required for the Qualification}}$$

Where Q = the name of the Qualification

¹³ Strictly speaking, PFE and PFI are not acronyms; they are denotations. They roughly translate to Presence Factor: Extension (PFE) and Presence Factor: Individual Marker (PFI).

PFE_Y scores allow one to measure the amount of learning time allocated to extension in a qualification in a given year of study as a percentage of the notional study hours allocated to that year. PFE_Q scores allows one to measure the amount of learning time allocated to extension in a qualification across all the years of the qualification; again as percentage of the notional study hours allocated to the whole qualification.

PFE scores are generated for each institution included in the study. They are recorded in a table such as shown in the example below in Figure 6.1.

Figure 6.1: Example PFE table

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	145	145	0	PFE1
2	16	104	120	13	PFE2
3	0	120	120	0	PFE3
Total	16	369	385	4	PFEQ

In this example, a three-year diploma in Agriculture is being analysed. The table outlines the number of credits per year allocated in the curriculum to extension modules, other modules and total. A PFE score is shown for each year and for the qualification. In this example it is shown that 4% of the notional study hours allocated to the diploma are dedicated to extension learning. This would translate to a total of 160 notional study hours in extension out of a total 3850 notional study hours for the qualification.

The PFE is the starting point for the evaluation. A PFE_Q score of 0 indicates that extension is not included in the curriculum of the qualification. If the PFE_Q score is 0, then there are no extension modules to evaluate.

PFI shows the number and percentage of the identified markers found in the curricula for the whole qualification. They indicate if a marker is found to any extent in the curriculum analysed. Each curriculum will achieve an overall PF of *n* out of 34 and a corresponding percentage, where *n* equals the number of the designated curriculum markers detected in a curriculum. A PF can be established for each year within a qualification (denoted as PFI_Y) and for a qualification (denoted as PFI_Q). A PFI_Y and a PFI_C are determined as follows (where Y = the year of study and Q = the name of the qualification):

$$PFI_Y = \frac{\Sigma \text{ Markers found in curriculum /Year}}{\text{Number of Markers (e.g. 34)}} \times 100$$

$$PFI_Q = \frac{\Sigma \text{ Markers found in curriculum/Total Years in Qualification}}{\text{Number of Markers (e.g. 34)}} \times 100$$

At this stage no attempt is made to evaluate or interpret the significance of this analysis except to say that the higher the factor the greater the presence of the curriculum markers. The PFI is intended only to provide an indication of the presence of the markers in the qualification.

6.3.1.2. Efficacy analyses

An efficacy analysis gives an indication of the depth of attention given to a marker found in the curriculum. This is not intended to be a precise measure, but a general indicator of the degree of attention given to the learning outcome in the qualification analysed. It is essentially an estimation of the number of hours an average learner theoretically spends learning each of the identified markers. It is determined by working with the credits assigned to each module and the attendant notional study hours coupled with the status of the modules as either a required or elective.

Again, to accommodate the variety of actual credits awarded to modules, ‘notional study hours’ on the basis of 10 hours per credit was used to make comparisons. It is noted, however, that such comparisons were not always possible because. As one respondent commented on a nil questionnaire, “...this is not how I teach. It just doesn’t work that way.”

Each of the institutions included in this study presents a somewhat unique approach to assigning credits to modules. The University of Pretoria (2006a:13), uses credits to “represent the quantity of work and the extent of the module.” The University of KwaZulu-Natal (UKZN 2006:27) defines a credit as, “the value assigned to ten (10) notional study hours...of learning and assessment.”

Further, most higher education institutions participating in this study employed some variation of the credit-to-study-hours principle. Some applied it very rigorously, others nominally. Some applied it by starting with the study hours nominally required to cover a particular aspect of learning and allowed that to guide the credit load. Others assigned

credit loads up front and packaged learning (e.g. modules) into preset units of credit. A few simply applied the concept without attempting to match study and learning (nominal or otherwise) with credit loads; they were driven by a 'fixed' curriculum and a 'fixed' credit system, and just made the credits fit. As will be seen, in a few cases there are significant variations in credits awarded to similar qualifications.

In the case of the University of KwaZulu-Natal (UKZN) and the University of the Free State (UFS), the base unit of a whole module is 16 credits. UFS offers only 2 modules in the agricultural curricula with a credit weighting of 8 credits, whereas UKZN offers 107 modules in the agricultural curricula bearing 8 credits. The credit weighting is directly related to notional study hours – notional clearly indicating that it is a theoretical construct. In the case of UKZN, notional study hours is defined as “the learning time that it is conceived it would take to meet the defined outcomes for the module by an average student.” (UKZN 2006:28). Ten (10) study hours is equivalent to 1 credit. Study hours consist of lectures, practicals, tutorials, self-study, assessment, and similar activities (UKZN 2006). Thus a 16-credit module implies 160 notional study hours. Similarly, an 8-credit module implies 80 notional study hours. This is consistent with the HEQF and SAQA standards.

The University of Pretoria (UP) appears to have a more complex system of credit weighting. Whereas UKZN and UFS divide modules into semesters (essentially half a year; 13 weeks), UP divides modules into quarters, semesters and years. That is, some modules take place over the period of one (1) quarter (7 weeks), some over a period of a semester (i.e. 14 weeks/2 quarters), and some over a full year (i.e. 28 weeks/2 semesters/4 quarters). The relative credit weightings are related to learning hours. Learning hours are defined as “the notional number of hours students should spend to master the learning content of a particular module or programme.... Learning hours are calculated on the basis of 40 working hours per week x 28 weeks = 1120 + 80 additional hours for evaluation = 1200. For undergraduate modules, the number of learning hours per module is calculated using the formula of credits (per module) x 10” (UP 2006b: 14). Similar to UKZN, UP's learning hours include lectures, practicals, tutorials, self-study, assessment, and similar activities (UP 2006a). The most common credit weighting of modules at UP are 4, 8, 12 and 16 credits. There are some variations such as 10 and 18 credits. This approach is also consistent with the HEQF and SAQA approach, but also takes into account concerns for

consistency of application raised by SAUVCA regarding calculations based on working hours (SAUVCA 2004).

The Cedara College of Agriculture (CCA 2006) follows the unit standard system within the NQF. In this case, the credits are sorted in multiples of 5, with the range being 5, 10, 15, 20 and 25 credits. The most common weighting is 20 credits (20 modules). Only one module carries 5 credits. The credit weighting is somewhat random and although efforts have been and are being made to align credits to established notional study hours, there is still a significant degree disconnection (Lütge 2007).

The disconnection mentioned above was confirmed in the research. The use of credits was universal and the link between credits and notional study hours was the general policy. However, it was not always clear if the units allocated to modules were in fact based on notional study hours.

6.3.1.3. Basic analysis of efficacy

Notwithstanding the varying applications, notional study hours provided the most common ground for a common evaluation of diverse Agricultural Extension curricula. Effectively then, an efficacy analysis indicates the number of notional study hours dedicated to the curricula markers used in this study. A basic efficacy analysis can be made on various levels and with various permutations. The general approach is to establish the presence of the extension curriculum markers and the extent (in terms of notional study hours) to which they are covered (i.e. efficacy) in a module, a year of study or in whole qualification. Table 6.1 briefly explains and provide the formula for each type of analysis.

Table 6.1: Efficacy Analyses

Type of Efficacy Analyses	Denotation	Explanation & Formula NSH = notional study hours
Individual marker Notional study hours	INSH _M	Gives an indication of the number of notional study hours (NSH) devoted to an individual marker in a particular module. (M = Module name or code) $INSH_M = \sum NSH \text{ for one marker in the module}$
	INSH _Y	Gives an indication of the NSH devoted to an individual curricula marker for a year within a whole qualification. (Y = Year of study) $INSH_Y = \sum INSH_M \text{ for the all modules in a year of study}$
	INSH _Q	Gives an indication of the NSH hours devoted to an individual curricula marker within a whole qualification. (Q = Name of qualification) $INSH_Q = \sum INSH_Y \text{ for the qualification}$
Individual marker within a module	INSHE _M	Gives an indication of the NSH devoted to an individual curricula marker in a selected module as a percentage of the total notional study hours for that module. (M = Module name or code) $INSHE_M = \frac{\sum INSH_M}{NSH \text{ for the module}}$
Individual marker in Extension in a year of study	INSHE _Y	Gives an indication of the NSH devoted to an individual curricula marker across all required* modules as a percentage of the total NSH devoted to extension in an entire year of study within a qualification or specialisation. (Y= Year of study) $INSHE_Y = \frac{\sum INSH_Y}{\text{Extension NSH for the year}}$
Individual marker in Extension in a Whole qualification	INSHE _Q	Gives an indication of the number of NSH devoted to an individual curricula marker across all required modules as a percentage of the total NSH devoted to extension in for all years of study within a qualification or specialisation. (Q = Name of the Qualification) $INSHE_Q = \frac{\sum INSH_Q}{\text{Extension NSH for the qualification}}$

Type of Efficacy Analyses	Denotation	Explanation & Formula NSH = notional study hours
Individual marker in a whole qualification	INSHQ _Q	<p>Gives an indication of the number of NSH devoted to an individual curricula marker across all required modules as a percentage of the total NSH devoted to extension in for all years of study within a qualification or specialisation. (Q = Name of the Qualification)</p> $INSHQ_Q = \frac{\sum INSH_Q}{\text{Total NSH for the qualification}}$

* An explanation of required and elective modules is presented in the following section.

6.3.1.4. Minimum and potential efficacy analyses

Another factor common to the higher education institutions included in this study is that all the institutions use a system of required and elective modules. As implied by the nomenclature, a learner must take a required module and a student has the option to take or nor take an elective module. At some institutions, required modules are further categorised into categories such as “core”, “foundation”, and “fundamental”. But whatever the sub-categorisation, the basic division of curricula within a learning programme is modules learners are required to take and modules learners may elect to take.

This division of modules provides a means by which the minimum and potential efficacy of a qualification can be analysed. Within a given qualification or specialisation, several of the 34 identified markers may appear in required modules, in elective modules or in both required and elective modules.¹⁴ Since learners in a particular programme, qualification or specialisation are required to take required modules, the presence and corresponding efficacy of the 34 markers in required modules determines the minimum efficacy of the module, year of study or qualification.

Similarly, the presence and corresponding efficacy of the 34 markers in elective modules represents the potential efficacy of the module, year of study or qualification. The more elective modules available to the learner that address the 34 markers the greater the potential for increasing the efficacy of the qualification in terms of the outcomes used

¹⁴ In SAQA nomenclature modules are divided into three categories: foundational (basic academic or learning skills); core (disciplinary knowledge); and elective (specialisations) modules – the former two falling into the ‘required’ category used here.

in this study. For each of the efficacy factors, a minimum and potential factor can be determined.

6.3.1.5. Individual marker analyses

The efficacy of an individual marker can be represented by the number of notional study hours dedicated to the particular marker and then as a percentage of a total number of notional study hours dedicated to extension. It effectively expresses the amount and percentage of time spent on a particular marker or learning outcome in a module ($INSH_M$ and $INSHE_M$), in a year of study ($INSH_Y$ and $INSHE_Y$), or in a whole qualification ($INSH_Q$, $INSHE_Q$, $INSHQ_Q$).

The resulting scores would indicate the relative efficacy of a module, a year of study or a whole qualification in terms of the selected learning outcomes (i.e. markers). Numerous permutations were made possible using the notional study hours approach. However, the six types of factors were found to provide sufficient evidence to inform institutions about the efficacy of their curriculum in terms of the identified curriculum markers.

For each qualification examined, the presence of the markers was assessed in terms of the number of notional study hours devoted to a particular marker and the Minimum Efficacy as a percentage of total notional study hours in a module, year of study or across a whole qualification. Potential Efficacy was also calculated by generating $INSH_M$ and $INSHE_M$ factors for each of the qualifying elective modules.

6.3.1.6. Using the efficacy factors

The analyses described above present levels of efficacy regarding the ability of the qualification to deliver on the learning outcomes required by the prevailing agricultural and educational policies in South Africa. The analyses would contribute to curriculum design by exposing the degree of presence (or absence) and the distribution (or concentration) of a particular learning outcome over a number of modules, in a particular year of study or across a whole qualification. In this way, it can help identify the need or value of rationalising learning around one or more learning outcomes (as represented by the 34 curricula markers) and placing them at the appropriate year(s) of learning. This can also be used for curriculum design to identify weak areas, to create space in curricula for missing learning outcomes, and to consolidate, rationalise or expand modules. Further,

this would enable institutions to build modules in ways that are similar to the unit standards approach adopted within OBE and HEQF.

One can easily believe that one's curriculum is delivering on a particular set of issues. Technical analyses such as conducted in this study help to reduce this unconscious bias, thus reducing subjectivity when evaluating curricula. The analyses expose strengths and weakness throughout the qualification. They allow for the identification of gaps to be filled and open the door to considering replacing elements of existing curriculum to make space for missing learning. The resulting Minimum Efficacy scores for a particular institution will allow that institution to quickly evaluate, identify and address those areas of curricula that need to be changed to strengthen the efficacy of the curricula in terms of the curricula markers used in this study. The Potential Efficacy scores for a particular institution provide information about choices and combinations of elective modules that could taken by learners to strengthen a qualification in terms of providing skills to deliver on the aforementioned objectives. Potential Efficacy scores can also be used to identify elective modules that could be made required modules or content from which could be extracted and included in a required module.

In sum, as noted earlier, these scores can be used in curriculum reform and design. They can be used to identify weak areas, to create space in curricula for missing learning outcomes, and to consolidate, rationalise or expand modules. This will enable the relevant higher education institution to provide learners, and thereby existing and potential practitioners, with the knowledge and skills needed to deliver on the prevailing agricultural and development objectives within the spirit of current educational policy.

6.4. Selection of modules to be included in the study

Each of the institutions included in the study have many required and elective modules which agricultural learners might take in completion of a particular qualification. Attempts were made initially to include every module in the study and to scan each module using the 34 curricula markers. This, however, became prohibitive because of the sheer number of modules. It also proved to be unnecessary. In most cases, there were few modules other than those which had handbook/calendar descriptions that indicated some level of potential correlation to one or more of the markers that produced any positive efficacy factors.

As the research progressed through various institutions, key informants made suggestions for improving the study. Ultimately a range of relevant modules to be included in the study were pre-selected by the researcher and were limited to Agricultural Extension and related modules. The modules thus included in the study reflect a fair representation of training received in Agricultural Extension at the institutions participating in the study. By design, they do not represent the technical agricultural training received.

6.5. A benchmark for Agricultural Extension curriculum

The benchmark used in this study refers to the mix of extension and technical learning in the curricula of qualifications used in the selection and appointment of Agricultural Extension practitioners. This is a complex issue influenced by, among other factors, the aptitude of the learner, the farming mix of the client farmers, the policy framework and priorities of the extension service provider, and the prescribed duties (job description) of the post.

Agricultural Extension, particularly in South Africa, is bound up with development. Agricultural Extension is the human development component in agricultural education. Soubbotina, (2000:8) argues that development needs to address both economic and human development and that “to be sustainable, economic growth must be constantly nourished by the fruits of human development such as improvements in workers’ knowledge and skills along with opportunities for their efficient use”. Soubbotina (2000:8) further argues that “slow human development can put an end to fast economic growth” and that since “slower human development has invariably been followed by slower economic growth, this growth pattern was labeled a ‘dead end’”.

In particular the concern is focused on technologies that “focus solely on improving farm productivity” (Bawden 1996: no page numbers). There is a demand that these technologies and the farming systems in which they are applied be revised redress the damage done to rural lives and to the environment. Rural communities need “to learn new ways of thinking and evaluating” in order to develop new and more appropriate ways making their way in the environment in which they carry out their lives and livelihoods (Bawden 1996: no page numbers). Bawden further identified agricultural extension as a major role player in bringing about this change in thought and action. Bawden finally

argues that this transformation requires thinking that encompasses all elements of sustainability: environmental, ethically, socially, economically, culturally and politically. Bawden concludes (1996: no page numbers):

“The development of new systems that ensure rural well being is, therefore, dependent on individuals and groups of people developing the skills to think in terms of sustainable systems and to value that capability. The challenge for agricultural educators is to design learning environments and educational strategies where these new ways of integrating "thinking with acting" can be developed.”

In a similar vein, Zinnah *et al* (1998) and Steele *et al* (1993) argued that there is a critical need for agricultural education in Africa, and there is a commensurate need to upgrade the training of extension practitioners. While the answer clearly rests in agricultural education, Bawden (1996) cautions that the situation is so serious that it cannot be resolved simply by introducing environmental and social science modules into an agricultural curriculum. He argues that the solution is not simply to change curricula to include non-technical modules. He sees it as a “complex strategic crisis that will only be met through serious re-evaluation of the entire purpose, function and organization of institutions of agricultural higher education, including profound review of the very nature of the prevailing models of agricultural science” (Bawden 1996: no page numbers).

There is clearly a need for every extension practitioner to have some level of technical expertise. However, Bawden’s vision appears to refute the assumption that possession of technical knowledge alone automatically makes one suitable and effective as an extension practitioner. As established in Chapters 3 and 4 (which address agricultural and educational factors influencing Agricultural Extension curricula) Agricultural Extension is less a function of technology transfer than it is a function of facilitated learning and innovation. The key is to find the balance. Lindley (1999) argued that in extension qualifications, 75% of the curriculum should address technical and specialist training and 25% of the curriculum should address arts, humanities and the social and behavioural sciences. A similar configuration is suggested by Lockett and Lockett (1999). Thus, 25 is used as the benchmark PFE score.

6.6. Interpreting data from extension practitioners

As discussed earlier, three efforts were made to survey Agricultural Extension practitioners. A total of 132 practitioners participated in the survey.

EXCEL© was used to analyse the responses from the respondents to the extension practitioner's questionnaire. Various permutations of data were analysed to enable comparison with the main body of the study – i.e. the efficacy of extension curricula. These data do not form a central part of the study, but rather provide for enriching the findings of the study.

The questionnaires sought to determine the extent to which the currently active Agricultural Extension practitioners possess the knowledge and skills represented by the 34 markers in the study. They further sought to establish whether the matching knowledge and skills had been learned as a part of their higher education training or on the job after completing their qualification.

The initial findings from the higher education institutions were shared with Agricultural Extension practitioners attending the 41st Annual Conference of the South African Society for Agricultural Extension. The intention here was a) to encourage more practitioners to participate in the survey; b) to solicit feedback to augment understanding of the findings; and c) to encourage debate about the relevance of current Agricultural Extension education and training to the current needs of South African agriculture.

6.7. Conclusion

The methods for collecting and analysing data for this study were developed and evolved through a variation of action research. Participants in the main research – the evaluation of curricula – were engaged throughout the process. Research of this nature had never been done before in South Africa. The SAFE programme had opened the door – at least north of South Africa – to making extension curriculum responsive to the realities of extension practitioners. The SAFE programme suggested, as does this study, that curricula need to be examined objectively, even if it means deviating from known territory and taking the risk to be different (Zinnah *et al* 1998).

To venture this research in South Africa and have it make sense was a significant challenge. South Africa has a long, tried and true history in Agricultural Extension which,

as appears typical of African higher education institutions (Zinnah et al 1998), consistently disconnects itself with the realities of change in South African Agriculture. It has a three tier higher-education system – colleges, universities of technology and universities – all offering qualifications in agriculture which are eventually applied in Agricultural Extension practice. Further, these institutions had historically been divided on race and language. Each grouping in the higher education system engages with teaching and learning differently and from a different premise and for a different purpose. Each approached curriculum differently. And yet, many of their graduates end up holding positions in the same field of service – Agricultural Extension.

The immediate challenge discussed here was to establish a method that would make it possible to collect and analyse data from these disparate systems of higher education. The answer was found in learning; more specifically in notional learning. A common thread, albeit perhaps tenuous, that ran through the higher education institutions included in this study was the concept of measuring learning in term of the anticipated number of hours it took to learn a particular aspect of knowledge and/or skill. Notional study hours, based on the ratio of one credit = 10 notional study hours became the equalising standard. The result was to derive two types of factors to measure the extent to which Agricultural Extension curricula addressed the 34 extension curricula markers developed for the study – Presence Factors and Efficacy Factors.

Presence Factors are designed to give two simple indications. First was the amount of Agricultural Extension training found in qualifications commonly held by South African Agricultural Extension practitioners. The second was the presence of the 34 markers in those qualifications. Efficacy Factors are more complex. They are intended to permit a detailed analysis of curricula within a single module, within a particular year or level of study, and across an entire qualification. Together, these factors are intended to establish the possibility for determining the minimum and potential efficacy of a curriculum.

These methods were developed and adopted to collect and analyse data to support the Theory-led Instructional Design Curriculum Evaluation and Design method employed to evaluate Agricultural Extension curricula in South Africa. In keeping with the nature of this study, these methods will be applied in a reflective and iterative manner. In so doing their application will shed light on the value, both practical and otherwise, of the methods themselves and contribute to learning about the relevance of the Theory-led Instructional Design Curriculum Evaluation and Design method.

References

Bawden, R., 1996. A learning approach to sustainable agriculture and rural development: Reflections from Hawksbury. <http://www.fao.org/sd/EXdirect/EXan0010.htm>. Accessed July 2006.

CCA (Cedara College of Agriculture), 2006. Provisional Prospectus 2007. KwaZulu-Natal Department of Agriculture and Environmental Affairs. Cedara

Chen, H.T., 2005. *Practical Program Evaluation: Assessing and improving planning, implementation and effectiveness*. Sage Publications, Thousand Oaks.

DoA (South African National Department of Agriculture), 2001. Agricultural Digest 2001/2002. Department of Agriculture, Pretoria, South Africa. <http://www.nda.agric.za/docs/Digest2000/Digest8.htm>. Accessed June 2002.

DoA (South African National Department of Agriculture), 2005a. National Education and Training Strategy for Agriculture and Rural Development in South Africa (AET Strategy). Department of Agriculture, Pretoria.

DoA (South African National Department of Agriculture), 2005b. Norms and standards for extension and Advisory services in agriculture. Directorate: Scientific Research and Development. Department of Agriculture. Pretoria.

DoE (South African Department of Education), 1997. Higher Education Act (Act No. 101 of 1997). Department of Education, Pretoria.

DoE (South African Department of Education), 2007. The Higher Education Qualifications Framework. Government Notice No. 928, 5 October 2007. Department of Education, Pretoria.

Gonsalves, J., Becker, T. Braun, A., Campilan, D., De Chavez, H., Fajber, E., Kapiriri, M., Rivaca-Caminade, J. and Vernooy, R. (Eds.), 2005. *Participatory Research and Development for Sustainable Agriculture and Natural Resource Management: A Sourcebook. Volume 1: Understanding Participatory Research and Development*. International Potato Center-Users' Perspectives with Agricultural Research and Development, Laguna, Philippines and International Development Research Centre, Ottawa.

Leedy, P.D. and Ormond, E., 2005. *Practical Research: Planning and Design*. Eighth Edition. Pearson Education International, Upper Saddle River.

Lindley, W.I., 1999. Constraints and potentials of training mid-career extension professionals in Africa, Part 1. Paper presented at the International Workshop on Innovative Training Programmes for Mid-Career Agricultural Extension Field Staff in Sub-Saharan Africa, Addis Ababa, Ethiopia, 6-8 July 1999.

Luckett, K. and Luckett, S., 1999. Implementing outcomes-based education in a South African university. Presented at the SAARDHE Conference, 1997.

Lütge, B. 2007. Deputy Principal Cedara Agricultural College, Director of Higher Education. Personal communication, May 2007.

SAQA (South African Qualifications Authority), Undated. Report on the generation of qualifications for the sub-field Hospitality, Travel, Tourism, Gaming and Leisure. [http://www.saqa.org.za/show.asp?include=docs/qualstds/comment/hospitality/report.html & menu=home](http://www.saqa.org.za/show.asp?include=docs/qualstds/comment/hospitality/report.html&menu=home). Accessed November 2007.

SAQA D: QAD (South African Qualifications Authority Directorate: Quality Assurance and Development), Undated. Terms and Definitions. SAQA Directorate: Quality Assurance and Development Pretoria. www.saqa.org.za/docs/critguide/provider/terms.pdf. Accessed November 2007.

SAUVCA (South African Universities Vice-Chancellors Association) 2004. Consolidated Sector Response to the Draft Higher Education Qualifications Framework (HEQF) Policy. SAUVCA, Pretoria.

Soubbotina, TP, 2000. *Beyond Economic Growth: Meeting the challenges of global development*. The World Bank, Washington DC.

Steele, R.E., Onyango, C.A., Keregero, K.J.B. and Dlamini, B.M., 1993. Preparing African agricultural and extension educators to meet future challenges: an analysis of university programmes in Kenya, Tanzania, and Swaziland. *Proceedings of the 9th Annual Conference of the Association for International Agricultural and Extension Education*, Washington, DC, 18-21 March 1993.

UKZN (University of KwaZulu-Natal), 2006. Faculty of Science and Agriculture Hand Book for 2006. University of KwaZulu-Natal, Durban.

van den Ban, A.W. (2006) Conclusions : changes needed in extension programmes and extension research needed to support these changes In: van den Ban, A.W. and Samanta, R.K. (2006). *Changing roles of agricultural extension in Asian nations*. B.R. Publishing Corporation, Delhi. pp. 409 - 422.

Zinnah, M.M., Steele, R.E. and Mattocks, D.M., 1998. From margin to mainstream: revitalization of Agricultural Extension curricula in universities and colleges in sub-Saharan Africa. In: van Crowder, L., 1998. *Training for Agriculture and Rural Development: 1997-98*. FAO,. Rome Italy. No page numbers. <http://www.fao.org/sd/EXdirect/EXan0027htm>. Accessed January 2006.

Chapter 7

Findings from the Colleges of Agriculture

7.1. Introduction

This Chapter is the first of three chapters that will present the findings of the research conducted into the efficacy of Agricultural Extension education and training at higher education level. This chapter will present the findings from the colleges of agriculture. Chapter 8 will present the findings from the universities and universities of technology. Chapter 9 will present the findings from the verification research within the public sector Agricultural Extension. The approach to the research and the analysis of data were the same for the colleges and the universities. Therefore, the general background information to the study and the explanations of how data were interpreted presented in this chapter applies to Chapter 8 as well.

Drawing on the fact that the majority of extension practitioners in South Africa hold an undergraduate diploma or degree, it was concluded that the majority of the training was done by those institutions who offer Agricultural Extension at an undergraduate level. Thus those institutions that offered extension only from Masters level were excluded from the survey.

There is a wide range of agriculturally related qualifications offered by higher education institutions in South Africa. They range from certificates and diplomas, to first degrees and honours degrees, to Masters and PhDs. Agricultural qualifications are offered for a wide range of specialisations. Most, however, fall into the category of animal science/production, crop science/production and agricultural economics/business. Specialisations include agronomy, conservation, forestry, grassland science, genetics, horticulture, natural resource management, poultry science, viticulture, plant breeding, and plant pathology.

Among the various qualifications offered, the study examined the following as a reasonable cross-section of the complete offering:

- Higher Certificate in Agriculture
- National Diploma in Agriculture;
- Bachelor of Agriculture;

- Bachelor of Science in Agriculture; and
- Bachelor of Agriculture Honours (and similar qualifications).

The rationale is simple: The majority of Agricultural Extension practitioners in South Africa hold one or more of these qualifications. The diplomas are, for the most part, offered at the agricultural colleges. The degrees are offered at universities (including the universities of technology). The results of an examination of these qualifications fairly represent the ‘real world’ situation (NDA 2005).

7.2. The framework for the interpretation of data

To ensure clarity of interpretation, this research looks only at extension learning as defined by the 34 markers developed for this study. (See Appendix 1.) It does not address technical learning areas other than those included in the 34 markers. The assessment of qualifications captured as scores measuring the presence and efficacy of extension learning in the curricula of the respective qualifications. The four main scores tracked are: PFE, PFI, INSHQ_Q, INSHE_Q and INSHE_Y.

7.2.1. PFE scores

PFE scores measure the extent to which extension is addressed in the curriculum of a qualification. It is generally a percentage of the total credits and NSH allocated to a qualification. As discussed in Chapter 6, a score of 25 is taken as the benchmark. Curricula with a PFE_Q score of less than 25 should look at increasing the extension content of the qualification if the qualification is intended to work with farmers. Further, curricula with a PFE_Q score of more than 50¹⁵ would need to examine carefully if the qualification has sufficient technical content to provide adequate support to farmers. Detailed PFE scores for each institution included in the study are found in Appendix 4.

¹⁵ Pending research on the extension-technical mix suggested in Chapter 10. A PFE_Q of 50 applies to undergraduate diplomas and degrees in agricultural extension in the Higher Education band. There may well be post-graduate and Further Education and Training qualifications that are comprised entirely of extension (and no technical) modules – which qualifications would be used to augment the capacity of someone who holds a technical qualification.

7.2.2. PFI scores

PFI scores measure the presence of the 34 markers developed for this study in the curriculum being evaluated. The maximum score is 100. It would generally not be expected that the PFI score for any one year would be 100, but 100 would not be unreasonable to expect across a whole qualification (i.e. PFI_Q).

7.2.3. INSHE_Q scores

INSHE_Q scores measure the efficacy of the 34 markers within the extension content of the curriculum of a qualification. It was beyond the scope of this study to debate the relative importance of each of the 34 curricula markers. Thus, each of the 34 chosen curriculum markers is assumed to be of equal weight in terms of NSH allocation. This assumption can, and should be, interrogated as a part of curriculum reform. At this stage in the application of the TICE method (Chapter 6), the main aim is to determine the presence and the efficacy of these markers in current curriculum as a basis for designing new curriculum.

Based on the assumption of equal weighting, INSHE_Q scores are interpreted as set out in Table 7.1.

Table 7.1: Interpretation of INSHE_Q scores

Score	Rating	Interpretation
0	None	The extension curriculum does not address the marker as an area of learning or as a learning outcome; needs attention
1-2	Low	The extension curriculum addresses the marker to a small extent; needs some attention
3-5	Average	The extension curriculum addresses the marker; attention is adequate
6-8	High	The extension curriculum gives more than adequate attention to the marker
>8	Very high	This marker is a main focus of the extension curriculum

If every one of the 34 markers were allocated the same NSH, then the INSHE_Q score for each would be 3. The highest INSHE_Q score possible is 100. Such a score would indicate that the entire extension curriculum is dedicated to that one marker. This is very unlikely. A score of over 25 for any one marker would indicate that the curriculum is probably insufficiently diversified.

7.2.4. INSHQ_Q scores

INSHQ_Q scores measure the efficacy of the 34 markers against the entire credit and NSH load of the qualification. As with the INSHE_Q scores, if every one of the 34 markers were allocated the same NSH, then the INSHQ_Q score for each would be approximately 3% of the PFE_Q score. The maximum INSHQ_Q score possible would be the PFE_Q score; this would occur when 100% of the NSH are dedicated to that individual marker. If extension comprises 25% the curriculum (i.e. at the benchmark) and each of the markers were allocated the same NSH, then the benchmark INSHQ_Q score for an individual marker would be 0.7. Based on this, the following rating was developed for INSHQ_Q scores; Table 7.2.

Table 7.2: Interpretation of INSHQ_Q scores

INSHQ _Q score		Rating
<0.5	Low	Insufficient attention is being given to the marker
0.5-1.5	Average	Appropriate attention is being given to the marker
>1.5	High	Excessive attention is being given to the marker

7.2.5. INSHE_Y scores

The yearly INSHE scores (i.e. INSHE_Y) the level at which the learning takes places. SAQA does not require that all learning in a particular year of study must be equivalent to the year of study. For example, year 4 is generally NQF level 6¹⁶, but not all modules taken in that year must be at NQF level 6; some may be at NQF level 5. Similarly, year 3 is generally NQF level 5, but not all modules in that year must be at NQF level 5; some may be at NQF level 6. Not all of the institutions participating in this study use NQF ratings for their modules; they simply offer them in a year of study. Therefore, in this study it is assumed that the level of learning is equivalent to the year of study. Thus the following applies:

Year 1 = NQF level 5 learning

Year 2 = NQF level 5 learning

Year 3 = NQF level 6 learning

Year 4 = NQF level 7 learning

¹⁶ At the time of the research, the HEQF had not yet been applied. Thus the NQF levels were 1-8 (instead of 1-10).

The HEQF does say that a particular year is related to a particular NQF level. But in the instance of diplomas and bachelors the correlation between years and NQF levels set out above is implied in the HEQF (DoE 2007). (See Appendix 4)

7.3. Findings from participating colleges of agriculture

All twelve (12) colleges of agriculture in South Africa were considered for this study. They are:

- Cape Institute for Agricultural Training (formerly Elsenburg College of Agriculture)
- Cedara College of Agriculture
- Fort Cox College of Agriculture
- Glen Agricultural College
- Madzivhandila College of Agriculture
- Owen Sithole College of Agriculture
- Potchefstroom College of Agriculture
- Taung College of Agriculture
- Tompi Seleka College of Agriculture
- Tsolo College of Agriculture

Each of the sections that follow are similarly structured: (i) an introduction of the institution; (ii) an introduction the agricultural qualifications offered; (iii) an indication of the structure of the qualification in terms of extension and technical modules; and (iv) an annotated summary of the findings of the examination of the curricula of the selected qualifications.

The profile presented for each college was compiled from handbooks, web sites and other official documents of the named institutions, from key informants and from observations made during visits to the colleges. As the profiles serve only to facilitate context for the curricula, no effort was made to verify or interrogate the accuracy of the statements made in the documents or by individuals interviewed.

As this chapter focuses on the colleges of agriculture, it, therefore, focuses on the Higher Certificate and the National Diploma. Admission to the Higher Certificate in

Agriculture and the National Diploma in Agriculture does not require matriculation exemption. In general, students who have passed matric can gain access to a college of agriculture. Although it is preferred, there is not generally a requirement that the students have written maths or science.

7.3.1. Cape Institute for Agricultural Training (CIAT)

Background

CIAT is located in the Western Cape. It is situated on the farm Elsenburg, 13 km from Stellenbosch on the road to Paarl. It is in the heart of the wine country and actually lies on the wine route. Elsenburg farm houses the College of Agriculture, numerous research facilities, as well as the Western Cape Department of Agriculture's administrative headquarters.

The Departmental programme – Structured Agricultural Training – under which CIAT falls does not own any land and buildings, but has full access to a wide range of educational and training facilities.

In 1898, the South African government bought the farm Elsenburg to use it as an agricultural school for young farmers. In that same year, 22 students enrolled to study at the College, heralding the beginning of scientific agricultural training in the country, as well as on the continent. The Elsenburg College of Agriculture was also the foundation from which the University of Stellenbosch's agricultural training arose in 1917. Until 1975, the Director of the Winter Rainfall Region of the Department of Agriculture was the Dean of the Faculty of Agriculture. After 1994 two other training centres were merged with Elsenburg. Boskop Training Centre for farm workers and Kromme Rhee Agricultural College adjacent to Elsenburg. Kromme Rhee resorted under the former House of Representatives and provided training for coloured farmers and farm workers. In the 1980s relations with the University of Stellenbosch were rebuilt. This led the college offering a B Agric. focussing on production. The college reconstituted itself as the Cape Institute for Agricultural Training (CIAT) in 2004.

CIAT falls under a Programme (Chief Directorate) within the Western Cape PDA. It consists of 2 sub-programmes, namely, Directorate: Further Education & Training and Directorate: Tertiary Education & Training. The Principal has the rank of Chief Director and the HE and FET programmes are each headed by a Director. The Principal reports directly to the Head of Department. A College Board/Council is still to be instituted in

collaboration with relevant stakeholders. A Student Representative Council and Student House Committee are in place, comprising of students selected from both FET and TE streams from first and second year students.

Two separate sets of lecturers engage in HE and FET. There are 27 lecturing staff on the HE programme and eight lecturers in the FET programme; all have qualifications at NQF level 5 and 6.

AET offerings

CIAT offers a Higher Certificate and Diploma in Agriculture and a Diploma in Extension. In association with Stellenbosch University, CIAT also offers a B Agric. Students can articulate from the Higher Certificate and Diploma to the B Agric if certain conditions are met. The Higher Certificate and Diploma students enrol at the college. The B Agric students enrol at Stellenbosch University, but are housed on campus and receive all their lectures and practicals at CIAT. The degree certificate is signed by both the Vice-Chancellor of the University and the Principal of CIAT.

CIAT has facilities for training in dairying, animal production off pastures, vegetable production both in tunnels and on open plots; and especially with regard to training in viticulture, pomology and oenology. They have well established vineyards and a fully fledged modern cellar. Up to 85% of the country's winemakers have studied at the college.

In 2007 CIAT recorded 417 full-time students comprised of 317 B Agric., 76 Higher Certificate and 24 Diploma students. In addition there are 40 learnerships, 35 students attended specialised short courses and approximately 1500 farmers attend 2–5 day training courses. CAIT accommodates 368 of its 417 full-time students in hostels and houses on campus (including the B Agric students).

CIAT also offers learnership short courses in viticulture, vegetable production and fruit production. These are offered at NQF levels 1-4. In 2006 about 40 learners completed these courses. Statistics were not available on the composition of the farmers attending the non-learnership short courses.

CIAT (while it was still Elsenburg College) was originally a 'whites only' college. It is currently open to all races. The 2006 graduates in the Higher Certificate was comprised of 10% black, 21% 'coloured', 69% white, and 90% male. The Diploma was comprised of 0% black, 10.7% 'coloured', 89.3% white, 87.5% male and 12.5% female.

Analysis of the CIAT qualifications

The B Agric will be discussed under the University of Stellenbosch. CIAT's Higher Certificate and Diplomas are structured around the SAQA/NQF system. Each module in the curricula has a credit load which relates to notional study hours. For each module the NQF level is established.

Higher Certificate and Diplomas

The Higher Certificate carries 240 credits of learning, 120 credits per year. It has no Agricultural Extension modules as a part of its curriculum. Therefore, CIAT's Higher Certificate PFE_{HC} score is 0.

The Diploma in Agriculture is an additional year of 120 credits on the Higher Certificate. Except in the specialisation in Extension, there are no Agricultural Extension modules in the Diploma curricula therefore its PFE_{DIP} scores are 0 for all except the Diploma in Extension.

The Diploma in Extension also articulates from the Higher Certificate. The extension modules are all taught in the third year. Table 7.3 sets out the PFE scores for the CIAT Diploma in Extension.

Table 7.3: PFE scored for the CIAT Diploma in Extension

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	120	120	PFE ₁	0
2	0	120	120	PFE ₂	0
3	60	60	120	PFE ₃	50
Total	60	300	360	PFE _{DipE}	17

Of the 3600 NSH allotted to the CIAT Diploma in Extension, 60 NSH are dedicated to extension training and education, giving it a PFE_{BAG} of 17. The PFI scores for the Diploma in Extension are:

<u>Presence Factor:</u> <u>Individual Marker</u>	<u>Score</u>
PFI1	0
PFI2	0
PFI3	94
PFIQ	94

In the Diploma in Extension, the following curricula markers had a $INSHE_Q$ score of 0, i.e. they were not found in the curricula:

- Facilitating the acquisition by farmers knowledge and skills of farm organisation and management
- The theory of ‘curriculum’ development
- The practice of ‘curriculum’ development

The detailed $INSHE$ scores for the CIAT qualifications are recorded in Appendix 5. Table 7.4 shows the five highest $INSHE_Q$ and $INSHQ_Q$ scores for the CIAT Diploma in Extension. According to the benchmark, Agricultural Extension is under represented in the Diploma in Extension. The $INSHE_Q$ scores of the five highest curricula markers found in the curricula for the Diploma in Extension are all covered adequately in the curriculum. The detailed analysis shows that, in all, 11 of the markers are covered adequately in the curriculum. Similarly, the $INSHQ_Q$ scores of the five highest curricula markers found in the curricula show that these markers make up an appropriate proportion of the curricula. The majority of the markers are either not addressed or are not adequately addressed in this curriculum.

Table 7.4: Five highest $INSHE_Q$ and $INSHQ_Q$ scores for the CIAT Diploma in Extension

$INSHE_Q$ Scores	$INSHQ_Q$ Scores	Curricula Marker
6	0.9	The theory of planning, action and reflection (Reflective learning)
4	0.7	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture
4	0.7	The practice of problem solving
4	0.7	The theory of Iterative Development Pathways
4	0.6	The practice of planning, action and reflection (Reflective learning)

7.3.2. Cedara College of Agriculture (Cedara)

Background

Cedara College of Agriculture is located in KwaZulu-Natal Province. It is situated near Howick just north of Pietermaritzburg. The infrastructure is comprehensive. Apart from newly established the lecturing facilities and workshops, Cedara has a farm of approximately 1000 ha, of which about 120 ha is exclusively used by the college. There is a 100 cow breeding herd; 400 sheep; piggery; broiler and layer units; shearing sheds, etc.

Cedara was established, initially as the “School of Agriculture and Forestry”, in 1905. It is the second oldest agricultural college in South Africa – the oldest being the Cape Institute of Agricultural Training (originally Elsenburg Agricultural College). The land on which the proposed college was to be built was bought by the Natal Government in 1902. The foundation stone of the "School of Agriculture and Forestry" was laid on 28 April 1905. Renovations to the original 1905 building, which has accommodated many students, were completed in 1994 and the building was then declared a national monument. The building today serves as the corporate headquarters of the College and houses most of the academic staff.

In the early years the students lived and worked as true farmers and were only allowed very short vacations. Lectures were in the late afternoons and in the early evenings so that the students could do ordinary farm work during the day. They had to be in their rooms by 21:30 and lights had to be out by 22:00. Students under 18 years were not allowed to smoke and students were not permitted to visit a bar.

Cedara has grown from its initial humble beginnings to a well-known and sought-after institution. The Cedara complex is not only the home of the College; it is also the head office of the KwaZulu-Natal Department of Agriculture and Environmental Affairs. It also carries out research, advisory services and conservation service.

Both Cedara and Owen Sithole (see Section 99) Colleges of Agriculture fall under the KwaZulu-Natal PDA. The intention has been to bring the two Colleges closer together and this is being done by the colleges conferring regularly and correlating their procedures and courses, as far as is practical. This has partly been achieved through the proposed formation of a Training Directorate. However, the actual formation of the KZN Agricultural Training Institute (KZNATI) has not been realized.

Cedara receives relatively good support from the KwaZulu-Natal PDA. There is an extraordinarily long managerial line to the Head of Department comprised of the Principal reporting to the Manager: Training reporting to the General Manager: Strategic

Support reporting to the Chief Business Officer reporting to the Head of Department. All funding is provided through the KwaZulu-Natal PDA.

In addition to the PDA governance structure, the college has an internal management structure and a Student Representative Council. It has academic and research links with the University of KwaZulu-Natal, principally through the Centre for Environment, Agriculture and Development in the School of Environmental Sciences and additionally through the School for Agricultural Science and Agribusiness.

Cedara has 6 administrative and 15 academic staff. They report there are a number of vacancies still to be filled; the total number of academic staff is meant to be about 20.

AET Offerings

Cedara currently offers a Higher Certificate and a Diploma in Agriculture. Both are fully accredited at NQF levels 5 and 6 respectively. It has approximately 180 students across the three years of study. The programmes were originally aimed at training farmers – drawing students largely from among the English-speaking farming families along the Eastern seaboard of South Africa. More recently, however, the focus has shifted to training extension practitioners and technical specialists for private-sector agriculture on both the primary (production) and secondary (processing) levels.

The Higher Certificate is designed to provide learners with the following capabilities:

- Analyse and apply agricultural resources for sustainability;
- Select, design and analyse sustainable production/farming systems, taking note of all their requirements in a dynamic market environment; and
- Source, process and utilise information relevant to the agricultural sector.

The Diploma is designed to provide learners with the following capabilities:

- Evaluate and manage agricultural resources for sustainability;
- Select, design, implement and manage sustainable production/farming systems, taking note of all their requirements in a dynamic market environment; and
- Source, process and utilise information relevant to the agricultural sector.

The original training programme covered a range of agricultural and related subjects. In 1998 the college focused its training programme to offer two basic specialisations: Animal Production and Crop Production. At the same time the collage introduced a credit system with modules each being assigned a specific credit weighting. A student needed

675 credits to obtain a Higher Certificate in Agriculture and a further 300 credits to obtain a Diploma in Agriculture. This credit rating is currently under revision to bring it into line with the South African Qualifications Authority (SAQA) and the National Qualifications Framework (NQF) regulations.

The college has also trains farmers at the FET level (NQF 1-4) and provides retraining Extension Officers of the KwaZulu-Natal PDA along commodity lines. Further, it has been tasked with training in support of the Comprehensive Agricultural Support Programme and Landcare projects. They report training approximately 3000 farmers and 250 Extension Officers in 2006 and 2007.

Cedara was originally a ‘whites only’ college, but since 1995 have been formally open to all races. A statistical breakdown of farmer training was not available. The 2006 intake for the Higher Certificate was comprised of 63.8% black, 1.4% ‘coloured’, 32.6% white, 71.6% male and 28.4% female. The Diploma programme was comprised of 50% black, 2.4% ‘coloured’, 47.6% white, 78.6% male and 21.4% female.

Analysis of the Cedara Qualifications

Tables 7.5 and 7.6 present Cedara’s PFE ratings for Cedara’s Higher Certificate and Diploma. All Higher Certificate and Diploma students take one communications course in first year. Of the 3200 NSH allocated to the Higher Certificate, 100 NSH are devoted to Agricultural Extension related learning, giving it a PFE_{HC} score of 3. Of the 4850 NSH allocated to the Diploma, 100 NSH are devoted to Agricultural Extension related learning, giving it a PFE_{DIP} score of 2. Further, in terms of the curricula in place for the Higher Certificate and the Diploma, the PFI, $INSHE_Q$ and $INSHQ_Q$ scores were all 0.

Table 7.5: PFE Ratings for the Cedara Higher Certificate in Agriculture

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total	PFE_1	
1	10	165	175	PFE_1	5
2	0	145	145	PFE_2	0
Total	10	312	320	PFE_{HC}	3

Table 7.6: PFE Ratings for the Cedara Diploma in Agriculture

Year	Credits			Presence Factor:	
	Extension	Other	Total	Extension	
1	10	165	175	PFE ₁	5
2	0	145	145	PFE ₂	0
3	0	165	165	PFE ₃	0
Total	10	475	485	PFE _{DIP}	2

However, Cedara presented an anomaly in the study. During the period of this research Cedara's curriculum was undergoing considerable revision. Part of that revision is a result of this study. Part is a result of its apparently close association with the SAQA processes. And part is a result of the college preparing to be the delivery site for the B Agric of the University of KwaZulu-Natal. In the process of revision, Cedara has explicitly used the SAQA approach to establishing specific, critical and exit level outcomes. The critical outcomes were found to be particularly relevant to this study. The critical outcomes for the Higher Certificate and Diploma are as follows:

- Identify and solve problems with critical and innovative thought.
- Effectively partake as a member of a team, group, organization or community.
- Effectively and critically apply science and technology while demonstrating responsibility towards the environment and health of others.
- Communicate effectively with clients and personnel.
- Develop opportunities as an entrepreneur.
- Have command over various strategies enabling him/her to learn and reflect on knowledge.

Cedara's curriculum review, partly in response to this study, presented an alternative way of incorporating some of the curricula markers in non-extension modules. They argue that outcomes such as the following ones can be integrated into any of a number of technical modules.

- Identify and solve problems with critical and innovative thought.
- Effectively and critically apply science and technology while demonstrating responsibility towards the environment and health of others.
- Have command over various strategies enabling him/her to learn and reflect on knowledge.

7.3.3. Fort Cox Agricultural College (Fort Cox)

Background

Fort Cox Agricultural College is located in the Eastern Cape Province. It is situated on the road between Middledrift and Keiskammahoek in the Eastern Cape. The college farm is 1500 ha in size, with 60 ha cultivated lands and the rest is grazing. Usually the large stock number close on 200 and the small stock about 150. The farm also has a small citrus orchard and a large poultry production unit and a piggery. Because it is autonomous there is a strong focus on income generating activities.

In 1926 Eastern Cape leaders recommended that Fort Cox and a portion of land around it be purchased, with a view to establishing what was then termed the “Native Agricultural College”. The school was officially opened in 1934 and the size increased to 1354ha. In 1970 the forestry students and staff of Swartkops College near Pietermaritzburg were transferred to Fort Cox College and a diploma course in forestry was instituted.

Between 1983 and 1993 a new campus was constructed with funding from the Development Bank of Southern Africa. The old campus was converted into the Rural Development Centre to enhance rural livelihoods through in-service training programmes, non- formal educational initiatives, research and outreach.

Of particular significance is the fact that Decree No. 5 of 1991 of former Ciskei granted Fort Cox autonomy, thus making it the only College of Agriculture of its own kind in South Africa to date. The College became affiliated to the University of Fort Hare. A memorandum of agreement by and between the Department of Agriculture, Forestry and Rural Development of Ciskei on the one hand, and the University of Fort Hare on the other, was signed at Fort Cox College on 11 June 1991. In 2002 Fort Cox academic programmes received full accreditation from CHE.

As noted above, Fort Cox is a legally autonomous body. It is governed by a Board of Governance appointed by the Eastern Cape Department of Education in consultation with the Eastern Cape PDA. However it is closely affiliated with and funded by the Eastern Cape PDA. In addition to the Board of Governance, the management structure consists principally of an Academic Council, a Board of Examination, and Executive Committee. The Principal is governed by the Board of Governance which he meets 4 times per year. The Principal also reports annually to the PDA and occasionally, when requested by

PDA, to the Portfolio Committee on Agriculture in the Provincial Legislature. The Board of Governance approved proposed budgets, and it is managed by the Head of College Finance and Registrar. The college undergoes internal and external auditing.

Fort Cox has 5 managerial and 12 academic staff. Only one lecturer has been at the college for more than 2 years (9 years) and 6 lecturers have been there for one year or less.

AET Offerings

Fort Cox offers a three-year diploma on NQF Level 5. It offers specialisations in Social Forestry, Crop Production, Livestock Production and Agri-business. The 2006 enrolment across all three years was about 300 students. According to the college respondents, the diplomas contribute to the HR development in the PDA. They claim that most of the Extension Officers in the Eastern Cape PDA come from Ft Cox. They have practical training. They indicate that a substantial number of the graduates are also absorbed by commercial farms in the province. Some go to NGOs as development facilitators.

In addition to the diplomas, the college offers short courses in agriculture for emerging farmers. The courses run from one to two weeks. About 2000 learners per year participate in the short courses; this includes special tours for schools.

The college has begun its plans to extend training and education to secondary agriculture – processing and value-adding. The college hopes to have its first secondary agriculture students enrolling by the start of 2008.

The college was originally a ‘black’ college, but since 1995 it has been open to all races. However, to date the college still has only black students. In 2006, 65% of the students were male and 35% female.

Analysis of the Fort Cox Qualifications

Tables 7.7 and 7.8 give Fort Cox’s PFE ratings for the Agri-business option in the Higher Certificate and Diploma in Agriculture. The other two specialisations do not have required modules in Agricultural Extension, but extension modules may be taken as electives.

Table 7.7: PFE Ratings for the Fort Cox Higher Certificate (Agri-business)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	145	145	PFE ₁	0
2	16	104	120	PFE ₂	13
TOTAL	16	257	265	PFE _{HC}	6

Table 7.8: PFE Ratings for the Fort Cox Higher Diploma (Agri-business)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	145	145	PFE ₁	0
2	16	104	120	PFE ₂	13
3	0	120	120	PFE ₃	0
Total	16	369	385	PFE _{DIP}	4

Of the 2650 NSH allocated to the Higher Certificate, 160 NSH are dedicated to Agricultural Extension, giving it a PFE_{HC} score of 6. Of the 3690 NSH allocated to the Fort Cox Diploma in Agriculture, 160 NSH are dedicated to Agricultural Extension, giving it a PFE_{DIP} score of 4.

The college did not participate in the survey; therefore it is not possible to generate PFI, INSHE_Q and INSHQ_Q scores. However, a review of the prospectus shows that the focus of the extension curriculum would fit the following marker used in this study:

- Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.

There is also evidence that the curriculum addresses the following outcomes, albeit to a lesser extent:

- Theory of learning and learning styles;
- Practice of learning and learning styles;
- Theory of participatory technology development and innovation; and
- Practice of participatory technology development and innovation.

7.3.4. Glen Agricultural College (Glen)

Background

Glen Agricultural College is located in Free State province. It is situated approximately 25 km north of Bloemfontein. The college and experimental farm comprise approximately 5000 hectares. It houses the Agricultural College as well as some agricultural related Government sections from both Provincial Government and National Department of Agriculture.

In 1891 the Volksraad approved funding to establish a model farm for agricultural education in the Orange Free State. Some seven year later, in 1898 an Agricultural Council was established to advise government regarding the viability of establishing an agricultural school and experimental farm for the Free State. In 1903, the Department of Agriculture of the then Orange River Colony was created and in 1904 two government experimental farms, Tweespruit and Grootvlei, were established. The intention was that young farmers would be trained there, but eventually it was realised that these farms were unsuitable for this purpose and a new facility was needed. Eventually in 1912 farms known as “the Glen” were purchased and the college was fully established in 1919.

Over the decades, Glen farm, as it became known, was expanded. It was eventually also made the head office of the then “Free State Region of the Department of Agriculture”, it served the Southern Free State and a large part of the Northern Cape up to the border of Namibia. The Northern and Eastern Free State at that time were part of the Highveld Region. The Head Office of the Provincial Government of the Free State Province was also located on the farm since 1994, but moved to Bloemfontein City Centre during June 2002, thus leaving the Glen Agricultural College as almost the sole occupant of the premises.

Originally the college was intended for sons of white farmers and was predominately Afrikaans speaking. Currently the student body is entirely black.

The college is functionally a part of the Free State Department of Agriculture in the Extension and Training Chief Directorate. The college principal is an Assistant Director which is one of the lowest rankings in the country for a principal of an agricultural college. The principal reports to the Director: Glen Agricultural Institute who reports to the Chief Director: Extension and Training, who, in turn, reports to the Head of

Department. The college receives its budget from the PDA, but, it appears, with a low priority. The college has 3 managerial, 25 administrative and 14 academic staff.

AET offerings

Glen College offers a two-year Higher Certificate and a three-year Diploma in Agriculture at NQF levels 5 and 6 respectively. In 2006, the college had 106 students in the Higher Certificate programme and 34 students in the Diploma programme. The programmes offer specialisations in Agri-business, Crop Production, and Animal Production. The Diploma was formally launched in 1994 and as with the other colleges, it articulates from the Higher Certificate. The programme focuses on farm enterprise management with a view to produce competent new and young farmers. Emphasis is placed on experiential, practical learning rather than theoretical learning; theory is integrated into practice.

In addition to the formal qualifications, Glen also offers certificated training in wool classing, artificial insemination of sheep and cattle, the control of problem animals, and in sheep handling and shearing. The college also offers courses in sheep and goat judging. Approximately 450 farmers participated and completed these courses in 2006.

As noted earlier, Glen was originally a 'whites' only college, but since 1995 has been open to all races. Currently all its students are black. The composition of farmers who participated in short courses was 75% male and 25% female. The 2006 Higher Certificate was comprised of 72% males and 28% females. The Diploma was 66.7% male and 33.3% female.

Analysis of the Glen Qualifications

Tables 7.9 and 7.10 give the PFE scores for the Glen Higher Certificate and Diploma in Agriculture. Of the 906 NSH allocated to the Glen Higher Certificate, 69 NSH is dedicated to extension training, giving it a PFE_{HC} of 10. No additional extension training is provided in the Diploma. Therefore, of the 906 NSH allocated to the Glen Diploma in Agriculture, 69 NSH are dedicated to Agricultural Extension, giving it a PFE_{DIP} score of 7.

Table 7.9: PFE scores for the Glen Higher Certificate

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	4.6	32.6	37.2	12	PFE ₁
2	2.3	28	30.3	8	PFE ₂
TOTAL	6.9	60.6	67.5	10	PFE _{HC}

Table 7.10: PFE scores for the Glen Diploma in Agriculture

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	4.6	32.6	37.2	PFE ₁	12
2	2.3	28	30.3	PFE ₂	8
3	0	30	30	PFE ₃	0
Total	6.9	90.6	97.5	PFE _{Dip}	7

The PFI scores for Glen are as follows:

Presence Factor:	
<u>Individual Marker</u>	<u>Score</u>
PFI1	47
PF12	56
PF13	0
PFI _{Dip}	76

The following markers have a INSHE_Q score of 0, i.e. they were not found in the extension curricula of the Glen qualifications, i.e.:

- The practice of problem solving
- The practice of systems thinking
- The practice of sustainable agriculture
- The practice of Iterative Development Pathways
- The practice of Sustainable livelihoods
- The practice of learning and learning styles
- The practice of planning, action and reflection (Reflective learning)
- Facilitating the acquisition by farmers knowledge and skills of farm organisation and management

The detailed INSHE scores for the Glen qualifications are recorded in Appendix 6. Table 7.11 shows the five highest INSHE_Q and INSHQ_Q scores for the Glen extension curriculum. The INSHE_Q and INSHQ_Q scores indicate that the main focus of the extension curriculum at Glen is systems thinking followed very closely by a range of development related learning. The long list of markers not included in the curriculum indicates further that the curriculum is probably not sufficiently diversified. All of the highest scoring markers fall into the average category on the INSHQ_Q scores, indicating that sufficient attention is being given even to these markers within the overall curriculum.

Table 7.11: Five highest markers in the Glen Higher Certificate and Diploma

INSHE _Q Scores	INSHQ _Q Scores	Curriculum markers
18	0.8	The theory of systems (systems thinking)
15	0.7	The theory of Iterative Development Pathways
14	0.6	The theory of 'curriculum' development
14	0.6	The practice of 'curriculum' development
13	0.6	The theory of development concepts

7.3.5. Grootfontein College of Agriculture

Background

Grootfontein College of Agriculture (Grootfontein) is located in the Eastern Cape Province. It situated adjacent to the rural town of Middelburg, halfway between Bloemfontein and Port Elizabeth. The college farm is approximately 11 000 ha, of which the college uses about 7 000 ha and the research unit of the National Department of Agriculture the other 4 000 ha. The college is well equipped with lecturing facilities and student accommodation as well as infrastructure for practical training particularly in small stock farming. The college has the capacity to accommodate about 150 higher education students (i.e. approximately 50 per year of study). In addition to facilities at college main campus, Grootfontein also has a number of remote training facilities to take training programmes directly to farmers.

Grootfontein has its origins 1903 when the then British Department of War purchased certain portions of the farms Grootfontein, Leeufontein, Bultfontein and De Poort for the purpose of establishing a military camp and training centre for British troops. When the Union of South Africa was established in 1910, the farm Grootfontein together with some

military buildings and other equipment was purchased from the British Government by the last Minister of Agriculture of the Cape Colony and converted into an agricultural school and experimental station.

The Grootfontein School of Agriculture was officially opened in 1911 with an enrolment of 42 students, 15 professional and technical officers and an administrative personnel of six. The educational facilities and number of staff accordingly increased so that by 1939, Grootfontein could be given College status and became known as the Grootfontein College of Agriculture.

In 1996, the college, although situated within the Eastern Cape Province, was 'transferred' to the Northern Cape Province, since the latter province had no college or regional agricultural establishment. The other provinces had at least one college, and the Eastern Cape had three colleges at the time. Because it served multiple province catering to the extensive small stock industry (particularly sheep), the college was transferred to the National Department of Agriculture in 2000 from where it has since been administered.

The college was originally a 'whites only' college, but is currently open to all racial groups. In 2006, 58.7% of the farmers who took short courses were black, 24.6% were so-called 'coloured', and 18.6% were white – only 10.6% were female. For the Higher Certificate 5.4% were black, 10.8% coloured, 83.8% white and 8.1% female. For the Diploma, 8.1% were black, 2.7% coloured, 89.2% white and 18.9% female. The use of Afrikaans is cited as the primary reason for the predominance of white students.

The college is managed by the National Department of Agriculture (NDA) and forms part of the Grootfontein Agricultural Development Institute (GADI). GADI consists of three sub-directorates of which the college is one. The principal reports to the Director of GADI who is also resident on the complex. Being part of the DoA, the college ultimately has, unlike the other colleges, a direct route to the National Minister of Agriculture; the Director reports to the Chief Director: Sector Services (in Pretoria) who reports through the Deputy Director General: Sector Services and Partnerships to the Director General of the Department of Agriculture who reports to the National Minister. This results in the college being one of the better funded colleges.

The college also has a Student Representative Council that is responsible for student discipline and acts as the representative of the students at management level of the College.

Being a part of GADI, the college staff are largely integrated with the overall staffing of GADI. In all there are 243 posts at GADI of whom six (6) are in management, 31 are scientists and 18 technicians who contribute to the academic programme and the balance are administrative, support and farm staff.

AET offerings

Grootfontein offers a two-year Higher Certificate and a three-year Diploma in Agriculture at NQF levels 5 and 6 respectively. The college is clearly focused on training human resources for the small stock farming sector and related industries. The programme provides training in the principles, techniques and practical skills of animal production and farm management with special emphasis on the specific needs of the small stock farming sector in the extensive sheep farming areas. The programme covers small stock production, agricultural management, environmental management, crop production, agricultural engineering practices on the farm and agricultural organisation and Agricultural Extension.

The college also offers vocational and technical training to farmers in a variety of aspects related to small stock production. The college also offers courses in Gas and Arc welding, Wool classing, Artificial Insemination, Pasture management, Medicinal plants and Computer training.

Grootfontein was originally a 'whites only' institution, but since 1995 has been open to all races. For 2006, of the 887 farmers who participated in short courses, 56.8% were black, 24.6% were 'coloured', 18.6% were white, 89.4% were male and 10.6% were female. In 2006, of the 37 graduates of the Higher Certificate programme 5.4% were black, 10.8% were 'coloured', 83.8% were white, 91.9% were male and 8.1% were female. In the Diploma programme, 8.1% were black, 2.7% 'coloured', 89.2% white, 81.1% male, and 18.9% female.

Analysis of the Grootfontein qualifications

There are no extension modules in the Grootfontein Higher Certificate. Thus its PFE scores are 0. However there are extension modules in the Higher Diploma in Agriculture. Table 7.12 presents the PFE scores for the qualification.

Table 7.12: PFE Ratings for the Grootfontein Diploma

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	120	120	PFE ₁	0
2	0	120	120	PFE ₂	0
3	12	108	120	PFE ₃	10
TOTAL	12	348	360	PFE _{DIP}	3

Of the 2400 NSH allocated to the Higher Certificate, no NSH are devoted to Agricultural Extension giving it a PFE_{HC} score of 0. Of the 3600 NSH allocated to the Diploma, 120 NSH are devoted to Agricultural Extension giving it a PFE_{DIP} score of 3.

Grootfontein did not complete the scorecards about the extension modules. However, the college syllabus indicates that the learning outcomes are primarily about communication, adult learning, group extension methods, technology transfer (referred to as communication of innovations), working with people, community involvement and leadership. The practicals involve practice in communication skills and visits to congresses and farmers day.

These offerings outline a fairly traditional approach to extension, but with a clear emphasis on rural development (as opposed to the more narrow agricultural focus) and with an indication of at least some learning in participatory methods. However, based on the forgoing, the following markers appear to be somewhat addressed:

- Collect, analyse, organise and critically evaluate information relevant to extension responsibilities; and
- Practice of ‘curriculum’ development (extension outcomes, content and process)

7.3.6. Lowveld College of Agriculture

Background

Lowveld College of Agriculture (Lowveld) is located in Mpumalanga Province. It is situated a few kilometres outside Nelspruit. It has a total area of 282 ha of which 100ha is irrigable. All crops are grown under irrigation. It is well positioned for servicing the sub-tropical production areas of eastern South Africa and Mozambique. Proximity to a sizeable town provides a level of infrastructural and social support not generally enjoyed by most of the other agricultural colleges. It also makes it possible to have day students.

During the early 1950s, South Africa was divided into seven agricultural regions for agricultural services. Each of the regions had an Agricultural College. In 1955 the decision was made to establish a new Agricultural College in the former Transvaal Region. Implementation was delayed for nearly 20 years.

Initially the new college was to be situated near Pretoria. But because of agricultural developments in the lowveld area it was agreed that a college was needed for the area. In 1974, Nelspruit was selected as the most strategic location. It was only in 1982 that the farms (comprising 282 ha) needed for the college were finally purchased. The college was built and eventually opened in 1991 to receive its first intake of students.

Being a modern fully planned facility, the college has substantial infrastructure for lecturing, practical training, academic support and student accommodation. It was planned for both male and female students and the three male and one female hostels can accommodate a total of 200 students. Provision has also been made for handling and processing of all the important crops of the lowveld.

The college is part of the Mpumalanga PDA. Its principal has the rank of Deputy Director. He reports to the General Manager Professional Support Service, and the latter reports to the HOD – this being one of the shorter chains of command among the colleges. They are funded entirely by the Mpumalanga PDA. The college has two distinct academic staff structures; one for higher education (which is the original college) and the other is for further education and training (FET). The two units cooperate and support one another in their respective areas of AET delivery.

The college has six (6) managerial staff, 25 academics and 49 administrative and support staff.

AET offerings

Lowveld offers a two-year Higher Certificate in Agriculture at NQF level 5 and a three-year Diploma in Agriculture at NQF level 6. The Diploma articulates from the Higher Certificate. While the standard options of crop and livestock are available, Lowveld offers a specialisation in the production of sub-tropical and tropical crops under irrigation.

In addition, Lowveld also has a growing farmer training programme under its FET unit. The program is decentralised and is offered on three different sites away from the college. They effectively train below NQF level 1.

Lowveld was originally a 'whites only' college, but since 1995 has been open to all races. Data for the number of farmers trained in short courses was not available, but the college claims that the FET unit trains approximately 2500 farmers per year all of whom are black. Of the 198 graduates of the Higher Certificate in 2006, 89.4% were black, none were 'coloured', 10.6% were white, 62.6% were male and 37.4% were female. Of the 45 Diploma students, 77.8% were black, none were 'coloured', 22.2% were white, 84.4% were male and 15.6% were female.

Analysis of the Lowveld qualifications

Neither the Higher Certificate nor the Diploma offered at Lowveld currently has any extension content. Thus the PFE, PFI, INSHE_Q and INSHE_Q scores are all 0. According to the to-be-published prospectus for 2008, the college will offer a specialisation in Agricultural Extension. Included in the programme are the following courses:

- Agricultural Extension I
- Principles of Communication I
- Agricultural Extension II
- Applied Communication II
- Agricultural Extension III
- Group Dynamics and Leadership III
- Program Planning and Evaluation III

However, the study found that the intended qualification has not yet been approved. The modules are also not formally in place. They are to be launched in 2009. They will all be third year modules. Based on the module names, it appears that the majority of the extension curriculum will be focused on the following marker:

- Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.

7.3.7. Owen Sithole College of Agriculture (OSCA)

Background

Owen Sithole College of Agriculture (OSCA) is located in KwaZulu-Natal. It is situated just outside Empangeni, about 30 km inland from Richards Bay in the northern part of the province. This puts the college in part of South Africa's subtropical fruit and

sugar cane regions. It is relatively easily accessible by road, but is rather remote in terms of social amenities.

OSCA, formerly known as Cwaka Agricultural College, was established in 1968. The former name of the college, Cwaka, was derived from the nearby Cwaka stream. In 1985 the college was renamed after the late Inkosi Sigidisabathembu Owen Lancelot Sithole, the first Councillor for Agriculture and subsequently Minister of Agriculture for KwaZulu. In 1990 the management of the college was taken over by the Technikon Mangosuthu and was run as a satellite campus for the training of students in agriculture, nature conservation and home economics. In 1991 the Technikon decided to rationalize and withdrew from Owen Sithole which was thus not open for students. It was used for in-service training of agricultural staff. In 1996 the college reopened for the training of students as a part of the KwaZulu-Natal PDA.

OSCA falls under the KZN PDA. As noted earlier, the intention has been to administer OSCA as a single college together with Cedara Agricultural College. Initially this is being done by the two colleges conferring regularly and correlating their procedures and courses, as far as is practical. Integration of the colleges has been partly achieved through the proposed formation of a Training Directorate within the KZN PDA. However, the actual formation of the KZN Agricultural Training Institute (KZNATI) has not been realized.

OSCA receives relatively good support from the Department. As with Cedara, there is an extraordinarily long managerial line to the Head of Department comprised of the Principal reporting to the Manager: Training reporting to the General Manager: Strategic Support reporting to the Chief Business Officer reporting to the Head of Department. All funding is provided through the KwaZulu-Natal PDA.

Within the college, a college management committee discusses and resolves operational issues at a college level. Strategic issues are handled by senior management of the KZN PDA. OSCA also has a student representative council.

The college has 11 lecturing staff plus five vacancies; nine (9) technical support staff, and 28 administrative staff.

AET Offerings

OSCA offers a two-year Higher Certificate in Agriculture and a two-year Higher Certificate in Agriculture and Home Economics. Both are at NQF level 5. OSCA also

offers a three-year Diploma in Agriculture and a three-year Diploma in Agriculture and Home Economics. The agricultural qualification offer specialisations in Crop or Animal production. Both are at NQF level 6.

In addition, the college offers numerous skill training programmes for farmers. They provide short-course and on-farm training in a variety of disciplines – notably vegetable production and poultry production.

The college has accommodation for 156 resident and 14 day students (180 in total).

Analysis of the OSCA Qualifications

There are no extension modules in the OSCA Higher Certificate; thus the Higher Certificate’s PFE scores are 0. Table 7.13 presents the PFE scores for the Diploma in Agriculture. These scores apply to both the crop and animal streams. The Home Economics qualifications were not examined.

OSCA presents one of the heaviest credit loads of all the qualifications examined in this study; it is nearly twice the credit load of any other Higher Certificate or Diploma. Of the 10200¹⁷ NSH allocated to the Diploma in Agriculture 600 NSH are devoted to Agricultural Extension related learning, giving it a PFE_{DIP} score of 6.

Table 7.13: PFE Ratings for the OSCA Diploma in Agriculture

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	355	355	PFE ₁	0
2	0	305	305	PFE ₂	0
3	60	300	360	PFE ₃	17
Total	60	960	1020	PFE _{Dip}	6

All 600 NSH for extension learning in the Diploma are allocated to a single module. Analysis of this modules resulted in the following PFI scores.

¹⁷ It was noted that this was an unusually high NHS figure. While this seems to demonstrate the inconsistency of application of the NHS concept, it was also discovered through this research that OSCA was ‘over teaching’. Likewise, Cedara was also over teaching; and partly as a result of this study began a serious review of modules, credits, and notional study hours.

Presence Factor:	
<u>Individual Marker</u>	<u>Score</u>
PF11	0
PF12	0
PF13	9
PFIQ	9

Analysis showed a fairly traditional approach to extension. As a result, only three of the curricula markers were found in the curriculum of the OSCA Diploma in Agriculture. Table 7.14 presents the $INSHE_Q$ and $INSHQ_Q$ scores for these markers.

Table 7.14: Highest $INSHE_Q$ and $INSHQ_Q$ scores for the OSCA Diploma in Agriculture

$INSHE_Q$ Score	$INSHQ_Q$ Score	Curriculum marker
25	1.5	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
6	0.4	The theory of 'curriculum' development
6	0.4	The practice of 'curriculum' development

The $INSHE_Q$ and $INSHQ_Q$ scores indicate that that outcome of collecting, analysing, organising and critically evaluating information relevant to extension responsibilities is the main focus of the extension learning in the curricula of the OSCA Diploma. The theory and practice of 'curriculum' development are given adequate attention in the extension curriculum. The high $INSHE_Q$ score for the first marker indicates that the extension curriculum is insufficiently diversified.

In terms of the overall curriculum for the Diploma, excessive attention is given to the first marker in Table 7.14, and insufficient attention is given to the latter two. In general, the curriculum does not adequately address the vast majority of the markers.

7.3.8. Potchefstroom College of Agriculture (Potch)

Background

Potchefstroom College of Agriculture (Potch) is located in the North West Province. It is situated in the town of Potchefstroom about 1 hour's drive west of Johannesburg in the heart of the dryland maize and grain production areas of South Africa. It is effectively part of the town. Unlike most other colleges it has easy access to social and commercial

amenities. It is located on a large agricultural complex which is reported to be the largest single agricultural service point on one terrain in Southern Africa. The centre houses the part of the North West PDA, the Grain Crops Institute, the ARC, the State Veterinary Services as well as the Agricultural College. It has 180 Ha of land used for experiential training.

In 1902, what is now the Potchefstroom College of Agriculture was originally known as the Experimental Farm. It began training in 1909 and became the current Agricultural College in [1939](#). Historically the college was designed to train farmers, but more recently they have identified the need to train agricultural professionals. The college was originally for “whites only” but from 1995 it began taking in black students. Although technically integrated it is still has a predominantly white student body (81.8%); black students report this is largely because Afrikaans is still used extensively in lecturing. Between 1997 and 2006 the college was the delivery site for a Bachelor of Technology offered through the Tshwane University of Technology.

Potch, together with the Taung College of Agriculture, falls under the North West PDA. It has a management committee comprised of five members: the Principal, the Vice-Principal, the Director Academics, Director Non-Formal Training, and the Registrar. The Principal holds the rank of a Deputy Director and reports to the Director: Agricultural Education and Training who reports to a Chief Director: Agricultural Support Services who reports to the Head of Department. All funding comes from the North West PDA.

The college has 30 lecturing staff plus vacancies; 21 technical support staff plus four vacancies, and 34 administrative staff plus 7 vacancies. There is a democratically elected Student Representative Council.

AET offerings

Potch offers a two-year Higher Certificate in Agriculture at NQF level 5 and a three-year Diploma in Agriculture at NQF level 6. The Diploma articulates from the Higher Certificate. Both qualifications have specialisations in Agronomy and Horticulture, Large Stock: Dairy Cattle, Poultry Production and Pig Production. A total of at least 240 credits must be passed during the first two years to qualify for the Higher Certificate. To qualify for the Diploma an additional 128 credits must be passed during the third year. In 2006, 33 students completed the Higher Certificate and 21 completed the Diploma. The college is considering discontinuing the Higher Certificate because, as the numbers show, a

significant proportion of the Higher Certificate graduates do not go on to complete the Diploma.

As noted earlier, between 1997-2006, Potch offered the Bachelor of Technology in Agricultural Management under the auspices of the Tshwane University of Technology. A total of 27 students graduated, after which the programme was returned to the university.

In addition to the formal qualifications, Potch also offers numerous skill training programmes for farmers. They provide short-course and on-farm training in a variety of disciplines, including: Plant production; Poultry production; Dairy production; Farm management; ARC Welding; Broiler Production; Artificial insemination; Pig Production; Cattle management; Dairy cattle management; and Vegetable production.

The college has accommodation for 235 resident full-time learners and 24 short course learners. Lecturing facilities can accommodate 500.

Analysis of the Potch qualifications

A review of the curriculum indicates that there appears to be no extension learning in either the Higher Certificate or Diploma offered by Potchefstroom College of Agriculture. Thus the PFE and PFI scores for both qualifications are 0.

7.3.9. Other Colleges of Agriculture

There are four other Colleges of Agriculture in South Africa: Madzivhandila Agricultural College near Thohoyandou in the Limpopo Province; Taung Agricultural College in the North West Province; Tompi Seleka Agricultural College near Marble Hall in Limpopo Province; and Tsolo Agricultural College near Mthatha in the Eastern Cape Province. Madzivhandila, Tompi Seleka and Tsolo College have all discontinued offering formal higher education programmes. They have been mandated by their respective PDAs to focus solely on farmer training. Interviews with these colleges indicate that each would like to return to the higher education band and resume offering the Higher Certificate and Diplomas of Agriculture. Taung Agricultural College is unique because its higher education programme was suspended for failure to meet SAQA standards on technical grounds. In 2006, the college graduated four (4) students with a Diploma in Agriculture. While it takes the steps required to regain its accreditation, the primary focus of its work is farmer training. These four colleges were not included in the study.

7.4. Summary of findings from Agricultural Colleges

Eight of the twelve of South Africa's Colleges of Agriculture offer the two-year Higher Certificate in Agriculture and the three-year Diploma in Agriculture. Each of them follows a similar configuration of the Higher Certificate forming the first two years of the Diploma. Students who exit the programme after two years can be awarded with the Higher Certificate. Students who remain for the third year, will not be awarded the Higher Certificate, but, upon successful completion of the third year, will be awarded with the Diploma. Table 7.15 consolidates the PFE scores for the eight colleges reviewed in this study. The table shows that Agricultural Extension does not command very much learning time from students writing Higher Certificates in Agriculture and Diplomas in Agriculture. It is only in the Diploma offered at CIAT where any substantial percentage of time is spent in extension.

Table 7.15: PFE scores for South Africa's colleges of agriculture offering higher education programmes

College	PFE ₁	PFE ₂	PFE ₃	PFE _{HC}	PFE _{DIP}
CIAT	0	0	50	0	17
Cedara	5	0	0	3	2
Fort Cox	0	13	0	6	4
Glen	12	8	0	10	7
Grootfontein	0	0	10	0	3
Lowveld	0	0	0	0	0
OSCA	0	0	17	0	6
Potchefstroom	0	0	0	0	0

The PFI scores for the Colleges of Agriculture are consolidated in Table 7.16. Only four of the colleges had any of the markers in their respective curricula.

Table 7.16: Consolidated PFI Scores for all colleges offering Diplomas in Agriculture

College	Presence Factor: Individual Marker Scores			
	PFI1	PFI2	PFI3	PFI _{Dip}
CIAT	0	0	94	94
Cedara	0	0	0	0
Fort Cox	0	0	0	0
Glen	47	56	0	76
Grootfontein	0	0	0	0
Lowveld	0	0	0	0
OCSA	0	0	9	9
Potch	0	0	0	0

The $INSHE_Q$ and $INSHQ_Q$ scores and information gleaned from college prospectuses indicate that the primary focus of most extension curricula within the overall curricula of the Higher Certificates and Diplomas offered by six of the Colleges of Agriculture is collecting, analysing, organising and critically evaluating information relevant to extension responsibilities. The practice and, to a less extent, the theory of ‘curriculum’ development appeared in the curricula of four of the colleges. Table 7.17 clearly demonstrates this point.

The implication of is that the graduates of these programmes who are then hired as Agricultural Extension practitioners are generally ill-equipped to deliver on the transformation agenda for agriculture in South Africa. The impact of this is significant because, as stated in Chapter 1, approximately 25% of all public Agricultural Extension practitioners have a Diploma in Agriculture as their highest qualification.

Table 7.17: Consolidated list of the five highest $INSHE_Q$ and $INSHQ_Q$ scores

$INSHE_Q$ Scores	$INSHQ_Q$ Scores	Curricula Marker
25	1.5	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
6	0.9	The theory of planning, action and reflection (Reflective learning)
18	0.8	The theory of systems (systems thinking)
4	0.7	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture

INSHE _Q Scores	INSHQ _Q Scores	Curricula Marker
4	0.7	The practice of problem solving as outlined above
4	0.7	The theory of Iterative Development Pathways
15	0.7	The theory of Iterative Development Pathways
4	0.6	The practice of planning, action and reflection (Reflective learning)
14	0.6	The theory of 'curriculum' development
14	0.6	The practice of 'curriculum' development
13	0.6	The theory of development concepts
6	0.4	The theory of 'curriculum' development
6	0.4	The practice of 'curriculum' development

References

DoE (South African Department of Education), 2007. The Higher Education Qualifications Framework. Government Notice No. 928, 5 October 2007. Department of Education, Pretoria.

Chapter 8

Findings from Universities and Universities of Technology

8.1. Introduction

This Chapter presents the findings from the universities and universities of technology that were included in the study conducted into the efficacy of Agricultural Extension education and training at higher education level. Most agricultural degrees in South Africa are offered through a university or university of technology – the latter being formerly called technikons. The two sets of institutions offer similar but not the same qualifications. Generally the universities offer academic degrees in the more tradition sense, while universities of technology offer technical degrees. It is beyond the scope of this research to debate the merits of these qualifications. It is noted that for the purposes of this study no material distinction is made between the qualifications beyond the NQF level rating. A four-year bachelors degree at NQF level 6 – whether from a university or university of technology – are treated the same in terms of evaluating Agricultural Extension curricula.

8.2. Findings from the Universities and Universities of Technology

South Africa has 17 universities and six (6) universities of technology (CHE Undated). An initial sweep of these institutions was made to detect Agricultural Extension in their respective agricultural curricula. Table 8.1 presents the overview of the undergraduate agricultural and extension offerings; eleven (11) universities and (4) universities of technology have agricultural programmes. Of these 15 institutions, extension was found in the programmes of all but one university and one university of technology.

Table 8.1: Overview of undergraduate agricultural and extension offerings at Universities and Universities of Technology in South Africa

Institution	Undergraduate Agricultural Offerings	Extension in the curriculum
Universities		
Nelson Mandela Metropolitan University	Diploma/B Tech Agric Management	No
North West University	B Agric B Sc Agric	Yes
Rhodes University	No Agriculture	N/A
University of Cape Town	No Agriculture	
University of Fort Hare	Diploma Agric B Agric B Sc Agric	Yes
University of Johannesburg	No Agriculture	Yes
University of KwaZulu-Natal	B Agric B Agric Mgmt B Sc Agric	Yes
University of Limpopo	B Sc Agric	Yes
University of Pretoria	B Sc Agric B Inst Agrar	Yes
University of South Africa (UNISA)	B Human Ecology (Community Agric)	Yes
University of Stellenbosch	B Agric B Sc Agric	Yes
University of the Free State	B Agric BSc Agric	Yes
University of the Witwatersrand	No agric	N/A
University of Venda	B Ag/B Ag Mgmt B Sc Ag B Hons Extension	Yes Yes
University of Western Cape	No Agriculture	N/A
University of Zululand	B Agric B Sc Agric	Yes
Walter Sisulu University	No Agriculture	N/A
Universities of Technology		
Cape Peninsula University of Technology	Diploma Agric B Tech Agric	Yes
Central University of Technology	Diploma Agric B Tech Agric	No
Durban Institute of Technology	No agric	
Mangosuthu University of Technology	Diploma Agric Diploma community extension	Yes
Tshwane University Technology	Diploma Agric B Tech Agric	Yes
Vaal University of Technology	No agric	N/A

Efforts were made to include all relevant institutions in the study. Ultimately, eight of these institutions (seven universities and including one university of technology) were included in the study:

- The University of Fort Hare
- The University of the Free State
- The University of KwaZulu-Natal
- The University of Limpopo
- The North West University
- The University of Pretoria
- Stellenbosch University
- Tshwane University of Technology
- The University of Zululand

Each of the sections that follow are similarly structured: (i) an introduction of the institution; (ii) an introduction the agricultural qualifications offered; (iii) an indication of the structure of the qualification in terms of extension and technical modules; and (iv) an annotated summary of the findings of the examination of the curricula of the selected qualifications.

The profile presented for each of the institution was compiled from handbooks, web sites and other official documents of the named institutions, from key informants and from observations made during visits to the universities. As the profiles serve only to facilitate context for the curricula, no effort was made to verify or interrogate the accuracy of the statements made in the documents or by individuals interviewed.

By virtue of the fact that this chapter focuses on the universities and universities of technology, it will focus on the Bachelor of Agriculture, the Bachelor of Science in Agriculture, and the Bachelor of Agriculture Honours (and similar qualifications). Where a university's qualification was found to be relevant to the study, but outside this general list, such qualifications were included in the study.

Unlike the colleges, which are more individually unique, universities all have the same overall structure. They are headed by a Vice-Chancellor. The structure in which

Agricultural Extension is offered is usually found within a school or department within a faculty. What is of particular interest to this study is that, with the exception of Stellenbosch University, former agricultural faculties have been incorporated into larger science faculties. Some are called Science and Agriculture, others Natural and Agricultural Sciences or some similar configuration. In the case of the University of Limpopo, agriculture is included with science and health. In the case of the University of Venda, agriculture is included with health and rural development.

A number of the respondents from these institutions commented that agriculture has seen a general decline in student numbers and that this was a major contributing factor to the once independent faculties of agriculture being incorporated into larger faculties. The location of extension in the faculty varies considerably with each university. This is discussed in each individual profile. Where such information was made available or searchable, the profiles will also present a brief overview of student numbers, staffing and facilities.

The primary focus of the university profiles will be to describe the AET offerings as they relate to Agricultural Extension. These profiles are not meant to be exhaustive, but rather to present a setting and context in which Agricultural Extension is offered to help create a sense of the overall positioning of Agricultural Extension in AET in general in South Africa's universities.

8.2.1. University of Fort Hare (Fort Hare)

Background

The University of Fort Hare (Fort Hare) is located in the Eastern Cape Province. As noted above, it has three campuses: Alice (the main campus), Bisho and East London. The Faculty of Science and Agriculture is located on the Alice Campus just outside the town of Alice about 120 km west of East London. It is a rural setting along the Thyume River. It is well positioned for agricultural training, education and research, particularly as regards the transformational agenda for South African agriculture. The area is replete with small-scale homestead farming on traditional and state land tenure systems.

Fort Hare is the oldest historically black university in Southern Africa. It was established in 1916. It was originally called the South African Native College. It was built in what is the Eastern Cape town now called Alice near the site of the military post of the Lieutenant-governor of the Eastern Cape Colony, Colonel John Hare, hence the name

Fort Hare. For 30 years it was under the control of missionaries. In 1946, the name was changed to the present Forth Hare and it was placed under the management of Rhodes University. In 1959, the apartheid government severed Fort Hare from Rhodes and established it as an independent 'black' university intended to serve the Eastern Cape homelands. Originally based only in Alice, recent reordering of tertiary institutions led Fort Hare to have campuses in Alice, Bisho and East London. Approximately 8600 students attend the university. Of these approximately 1400 students (14%) are in the Faculty of Science and Agriculture.

Agricultural Extension at Fort Hare

Fort Hare has five faculties of which one is Science and Agriculture which is located at the Alice Campus. The faculty was established in 1967. The Agricultural and Rural Development Research Institute (ARDRI) was created in 1977. Its aim was to research the needs of people and communities in rural South Africa. ARDRI is both a research and outreach unit.

The faculty has two schools: Science and Technology; and Agriculture and Agribusiness. The Agricultural Extension programme is located in the latter school. Agricultural Extension is part of the Agricultural Economics and Extension programme within the school.

The Agricultural Extension programmes are offered by the Agricultural Economics and Extension Department in the School of Agriculture and Agribusiness in the Faculty of Science and Agriculture which is headed by an Executive Dean. The Agricultural Economics and Extension Department have 5 full-time and 1 part-time lecturing staff.

AET Offerings

Fort Hare Faculty offers the following range of qualifications:

Diplomas and Bachelors degrees

- Part-time Diploma in Agricultural Extension and Rural Development
- Bachelor of Agriculture
- Bachelor of Science in Agriculture

Honours degrees

- Bachelor of Agriculture Honours
- Bachelor of Science in Agriculture Honours

Masters degrees and PhDs

- Master of Agriculture
- Master of Science in Agriculture
- Master of Sustainable Agriculture
- Doctor of Philosophy in Agriculture
- Doctor of Science in Agriculture

For the purpose of this study, Fort Hare's Bachelor of Agriculture and Bachelor of Agriculture Honours and Bachelor of Science in Agriculture were selected as the qualification to study.

Bachelor of Agriculture (B Agric)/Bachelor of Agriculture Honours (B Agric Hons)

The Fort Hare B Agric and B Agric Hons offer two main streams of study: Agriculture Economics and Agricultural Extension. The Agricultural Economics specialisation has one Agricultural Extension module in its curriculum; hence the focus is on the Agricultural Extension specialisation. The extension is grounded in communications and education approaches to Agricultural Extension. They address rural sociology, cultural anthropology, adult education, group dynamics and leadership, rural development programming and extension management. At the Honours level, research and evaluation in extension are introduced.

The qualifications are loosely structured around 128 credits per year. The B Agric is comprised of 400 and 420 credits depending on the area of specialisation. The B Agric Hons requires an additional 128 credits (bringing it to the equivalent of a four-year qualification totalling either 528 or 548 credits, again depending on the specialisation).

Bachelor of Science in Agriculture (B Sc Agric)

The Fort Hare B Sc Agric is listed as a NQF level 6 qualification offered with specialisations in Agricultural Economics, Crop Science, Soil Science, Animal Production, Livestock and Pasture Science, and Plant Production and Extension. The

degree is structured around 516 to 564 credits depending on the specialisation. Of the various specialisations, only one sub-stream of the Agricultural Economics specialisation (Economics sub-stream) and the Plant Production and Extension specialisation have extension content in their curricula.

Analysis of the Fort Hare Qualifications

B Agric (Extension)/B Agric Hons

Tables 8.2 and 8.3 present the PFE scores for the Fort Hare B Agric (Ext) and B Agric Hons. Of the 4200 NSH allocated to the Fort Hare B Agric (Ext), 520 NSH are devoted to Agricultural Extension. The PFE_{BAgric} score is 12. Of the 1280 NSH allocated to the B Agric Hons, 600 NSH are devoted to Agricultural Extension. The $PFE_{BAgricHons}$ score is 47. To compare this to a four year qualification, Table 8.4 has also been generated.

Table 8.2: PFE scores for the Fort Hare B Agric

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	128	128	PFE_1	0
2	8	148	156	PFE_2	5
3	44	92	136	PFE_3	32
Total	52	368	420	$PFE_{BAgricExt}$	12

Table 8.3: PFE Score for the Fort Hare B Agric Hons.

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
4	60	68	128	PFE_4	47
Total	60	68	128	$PFE_{BAgricHons}$	47

Table 8.4: PFE Score for the Fort Hare B Agric & B Agric Hons. combined

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	128	128	PFE_1	0
2	8	148	156	PFE_2	5
3	44	92	136	PFE_3	32
4	60	68	128	PFE_4	47
Total	112	436	548	$PFE_{BAgric\&Hons}$	20

Of the total of 5480 NSH allocated across the four years of study for a B Agric and B Agric Hons, 1120 NSH are devoted to Agricultural Extension. Thus the consolidated $PFE_{B\text{Agric}\&\text{Hons}}$ score is 20.

Fort Hare regards Agricultural Extension as a communication tool to bring about changes in agricultural production for the purpose of improving the socio-economic well-being of the human population and promoting rural development. From this stand point, Fort Hare's approach to extension is relatively traditional. It is worthy of note that the communication approach to extension in South Africa was established by Fort Hare through the efforts of Prof. Bembridge a one-time head of the extension programme at Fort Hare.

The B Agric Extension has four required extension modules and no elective extension modules. One worth 8 credits is offered in second year and three worth 16, 16 and 12 credits respectively are offered in third year. The B Agric Hons requires three extension modules each bearing 20credits and no elective extension modules.

The PFI scores for the Fort Hare B Agric (Ext), B Agric Hons, and the qualifications combined are as follows:

Presence Factor:	
<u>Individual Marker</u>	<u>Score</u>
PF11	0
PF12	29
PF13	56
PF14	59
$PFI_{B\text{Agr}}$	79
PFI_{Hons}	59
$PFIB_{\text{Ag Hons combined}}$	91

The detailed INSH scores for the Fort Hare B Agric (Ext) are recorded in Appendix 7. Table 8.5 shows the seven highest $INSHE_Q$ and $INSHQ_Q$ scores for the Fort Hare B Agric (Ext). Table 8.6 shows the seven highest $INSHE_Q$ and $INSHQ_Q$ scores for the Fort Hare B Agric Hons. Table 8.7 shows the seven highest $INSHE_Q$ and $INSHQ_Q$ scores for the Fort Hare B Agric (Ext) and the B Agric Hons combined to make it comparable to other four-year qualifications.

Table 8.5: Seven highest INSHE_Q and INSHQ_Q scores for the Fort Hare B Agric (Ext)

INSHE _Q Score	INSHQ _Q Score	Curricula marker
11	1.3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture
11	1.3	The theory of individual and collective learning & learning partnerships
9	0.9	The practice of the process of investigating (research), applying and sharing
7	0.8	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
7	0.6	The practice of problem solving
5	0.6	The theory of participatory technology development and innovation
5	0.6	The theory of the process of investigating (research), applying and sharing (IAS)

Table 8.6: Seven highest INSHE_Q and INSHQ_Q scores for the Fort Hare B Agric Hons

INSHE _Q Score	INSHQ _Q Score	Curricula marker
14	6.6	The theory of learning facilitation
11	5.0	The theory of individual and collective learning & learning partnerships
10	4.7	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
8	3.9	The theory of 'curriculum' development
7	3.1	The practice of problem solving
7	3.1	The theory of learning and learning styles
7	3.1	The practice of the process of investigating (research), applying and sharing

Table 8.7: Five highest INSHE_Q and INSHQ_Q scores for the Fort Hare B Agric (Ext) and B Agric Hons combined

INSHE _Q Score	INSHQ _Q Score	Curricula marker
11	2.2	The theory of individual and collective learning & learning partnerships
8	1.7	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
8	1.6	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture
7	1.5	The theory of learning facilitation
7	1.4	The practice of the process of investigating (research), applying and sharing

These tables indicate that more than adequate attention is given in the extension curricula and within the whole B Agric curriculum to problem-solving, working with information relevant to extension responsibilities and some of the aspect of learning. These tables further indicate that the B Agric Hons has a similar profile to the B Agric, but that it puts a primary focus on learning and on handling information relevant to extension. This is in keeping with the Agriflection concept developed as a part of this study (Chapter 2) and the emphasis it places on a learning approach to extension.

The INSHQ_Q scores are particularly high for the markers in the B Agric Hons, implying that they receive excessive attention. However, when the B Agric Hons is seen as part of a four-year qualification, then the markers moderate considerably to more appropriate levels against the overall curriculum. This is confirmed by the PFI scores which show that the majority of the markers are included in the overall curriculum. As noted below, there are three markers that are given no attention at all.

The curriculum markers not found in the Fort Hare B Agric (Ext) curriculum (i.e. INSHE_Q and INSHQ_Q scores were 0) across all three years collectively were:

- The theory of systems (systems thinking);
- The practice of Iterative Development Pathways;
- The theory of learning facilitation;
- The practice of individual and collective learning & learning partnerships;
- The theory of planning, action and reflection (Reflective learning);
- The practice of planning, action and reflection (Reflective learning); and
- Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use,

Taken on its own, the curriculum markers not found in the Fort Hare B Agric Hons curriculum (i.e. INSHE_Q and INSHQ_Q scores were 0) across the one year of study were:

- Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others
- The theory of participatory technology development and innovation
- The practice of participatory technology development and innovation
- The theory of sustainable agriculture
- The practice of sustainable agriculture

- The theory of Iterative Development Pathways
- The practice of Iterative Development Pathways
- The theory of Sustainable livelihoods
- The practice of Sustainable livelihoods
- The theory of development concepts
- The practice development concepts
- The theory of the process of investigating (research), applying and sharing (IAS)
- The practice of individual and collective learning & learning partnerships
- The practice of planning, action and reflection (Reflective learning)

However, the B Agric (Ext) is often combined with the B Agric Hons in the package of learning. When the INSHE_Q and INSHQ_Q scores of the two qualifications are merged, the curriculum markers not found are confined to the following three markers:

- The practice of Iterative Development Pathways
- The practice of individual and collective learning & learning partnerships
- The practice of planning, action and reflection (Reflective learning)

In sum, Agricultural Extension practitioners who have a Fort Hare B Agric and B Agric Hons are relatively well equipped to deliver on the agenda of current South African agricultural policy.

Bachelor of Science in Agriculture (B Sc Agric)

Table 8.8 shows the PFE scores for the Fort Hare B Sc Agric (Agricultural Economic/Economics). Of the 5160 NSH allocated to the Fort Hare B Sc Agric (Ag Econ/Econ), 80 NSH are allocated to extension learning. This gives the qualification a PFE_{BScAgricAEE} score of 2. The majority of the extension occurs in year four. However it is important to note that this qualification is listed at NQF level 6. Given this, year four modules are also regarded as NQF level 6 learning. There are no extension electives; therefore there is no potential PFE beyond those given in the table.

Table 8.9 shows the PFE scores for the Fort Hare B Sc Agric (Plant Production/Extension). Of the 5560 N SH allocated to the Fort Hare B Sc Agric (Plant Production/Extension), 520 NSH are allocated to extension learning. Thus the

PFE_{BScAgricPPE} score is 9. There are also no extension electives; therefore there is no potential PFE beyond those given in the table.

Table 8.8: PFE Scores for the Fort Hare B Sc Agric (Ag Econ/Econ)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	128	128	PFE ₁	0
2	0	128	128	PFE ₂	0
3	8	124	132	PFE ₃	6
4	0	128	128	PFE ₄	0
Total	8	508	516	PFE _{BScAgricAEE}	2

Table 8.9: PFE scores for the Fort Hare B Sc Agric (Plant Production/Extension)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	128	128	PFE ₁	0
2	0	148	148	PFE ₂	0
3	8	128	136	PFE ₃	6
4	44	96	144	PFE ₄	31
Total	52	504	556	PFE _{BScAgricPPE}	9

Given the higher PFE score, the analysis of the Fort Hare B Sc Agric focused on the Plant Production/Extension specialisation. The PFI scores for the Fort Hare B Sc Agric (Plant Production/Extension) were as follows:

Presence Factor:	
<u>Individual Marker</u>	<u>Score</u>
PFI1	0
PFI2	0
PFI3	29
PFI4	59
PFI _{BScAg}	82

The detailed INSH scores for the Fort Hare B Sc Agric (Plant Production/Extension) are recorded in Appendix 7. Table 8.10 shows the five highest INSH_{E_Q} and INSH_{Q_Q} scores for the qualification. The study found that the main focus of the extension curriculum of the Fort Hare B Sc Agric (Plant Production/Extension) is problem solving and learning with significant focus on handling information relevant to extension work.

Table 8.10: Five highest INSHE_Q and INSHQ_Q scores for the Fort Hare B Sc Agric (Plant Production/Extension)

INSHE _Q Score	INSHQ _Q Score	Curricula marker
11	1.0	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture
11	1.0	The theory of individual and collective learning & learning partnerships
9	0.9	The theory of learning facilitation
7	0.6	The practice of the process of investigating (research), applying and sharing
7	0.6	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.

The curriculum markers not found in the Fort Hare B Sc Agric (Plant Production/Extension) curriculum (i.e. INSHE_Q and INSHQ_Q scores were 0) across all four years collectively were:

- The practice of Iterative Development Pathways
- The practice of individual and collective learning & learning partnerships
- The theory of planning, action and reflection (Reflective learning)
- The practice of planning, action and reflection (Reflective learning)
- Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use

Further, the INSHQ_Q scores indicate that these learning areas in extension are adequately covered in the overall curriculum of the qualification. Attention needs to be given to those markers with lower INSHE_Q and INSHQ_Q scores, particularly the five with scores of 0.

8.2.2. University of the Free State (UFS)

Background

What is now the University of the Free State (UFS) was established in Bloemfontein in 1904 as the Grey College School. The institution grew and developed, and in 1950 the South African parliament elevated it to the status of a university and renamed it the University of the Orange Free State. At the time it had expanded from Arts and Sciences to include Education, Law and Social Sciences. Shortly thereafter it added Economics and Administrative Services (1954), and then Agriculture (1958) which later merged with the Science Faculty to become the Faculty of Natural and Agricultural Science.

The university grew substantially, especially during the 1960s, 1970s and 1980s. It added a faculty of Medicine in 1969 and of Theology in 1980. In 2001, the university changed its name to the present University of the Free State. In 2003, the QwaQwa campus of the former University of the North was added to UFS.

Agricultural Extension at UFS

Agricultural Extension is offered in the Faculty of Natural and Agricultural Science. The faculty is divided into a number of units which offer agricultural the programmes: the Centre for Sustainable Agriculture Management; the Department of Agricultural Economics; and the Department of Animal-, Wildlife- and Grassland Sciences. Agricultural Extension is included in all agricultural qualifications in that all the students take a full semester module in extension.

AET offerings

UFS offers the following agricultural qualifications.

Diplomas

- Diploma in Agriculture (Diploma) (a two-year programme)

Bachelors degrees

- Baccalaureus Agriculturae (B Agric)
- Baccalaureus Scientiae Agriculturae (BSc Agric)

Honours degrees

- Baccalaureus Scientiae Agriculturae Honores (BSc Agric Hons)
- Baccalaureus Agriculturae Honores (B Agric Hons)

Masters and PhD degrees

- Magister Scientiae Agriculturae (MSc Agric)
- Magister in Sustainable Agriculture (M Sus Agric)
- Magister Agriculturae (M Agric)
- Philosophiae Doctor (PhD)
- Doctor Scientiae (DSc)

The study examined the Bachelor of Agriculture (B Agric), the Bachelor of Agriculture Honours, and the Bachelor of Science in Agriculture.

B Agric/B Agric Hons

The UFS B Agric is a three-year degree listed as a NQF level 6 qualification. It is comprised of 128 credits per year, i.e. 384 credits for the degree. It is offered with seven specialisations: Irrigation Management, Animal Production Management, Mixed-farming Management, Crop Production Management, Horticultural Management, Agricultural Management, and Wildlife Management. All of the specialisations have one 16 credit modules on Agricultural Extension. The B Agric Hons is an additional year of study of 128 credits. The programme offers two specialisations: Agricultural Management and Wildlife Management. Neither programme has any extension content.

BSc Agric

The UFS BSc Agric is a four-year degree listed as a NQF level 6 qualification. It is also constructed on 128 credits per year; i.e. 512 credits for the qualification. The degree has 31 specialisation combinations derived primarily from Agricultural Economics, Agronomy, Agrometeorology, Animal Science, Food Science, Grassland Science, Irrigation field, Plant Breeding, Plant Pathology and Soil Science. Extension forms a part of the curriculum of two of the Agricultural Economics combinations. No extension electives appear to be offered for the other specialisations.

Analysis of UFS qualifications

B Agric/B Agric Hons

Table 8.11 gives the PFE scores for the FSU B Agric. Of the 3680 NSH allocated to the qualification, 160 NSH are allocated to extension learning. This gives the qualification a PFE_{BAgric} score of 4. As noted above, there are no Agricultural Extension modules associated with the FSU B Agric Hons; i.e. $PFE_{\text{BAgricHons}}$ is 0. Thus when the honours year is added to the B Agric, the combined PFE score is 3.

Table 8.11: PFE scores for the FSU B Agric

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	128	128	PFE ₁	0
2	16	112	128	PFE ₂	13
3	0	128	128	PFE ₃	0
Total	16	368	384	PFE _{BAgric}	4

Table 8.12 gives the PFE scores for the FSU B Sc Agric. The same extension module taken by the B Agric students is also taken by the B Sc Agric students. Of the 5120 NSH allocated to the qualification, 160 NSH are devoted to Agricultural Extension. Thus the PFE_{BScAgric} score is 3.

Table 8.12: The PFE scores for the FSU B Sc Agric.

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	128	128	PFE ₁	0
2	16	112	128	PFE ₂	13
3	0	128	128	PFE ₃	0
4	0	128	128	PFE ₄	0
Total	16	496	512	PFE _{BScAgric}	3

FSU did not participate in the survey, thus PFI and INSH scores were not determined. However, the module description refers to communication, applied learning theories, diffusion of innovations, group dynamics, programme planning, leadership development and management of extension organisations. From this it can be gleaned that the Agricultural Extension training in both the B Agric and the B Sc Agric are grounded in technology transfer. The curriculum marker addressing handling information relevant to extension responsibilities appears to present in the curriculum. However, beyond this one marker, it appears that few of the other markers would be included in the curriculum of either the B Agric or the B Sc Agric.

8.2.3. University of KwaZulu-Natal (UKZN)

Background

The University of KwaZulu-Natal (UKZN) came into being in January 2004 when the former University of Durban-Westville and the University of Natal were merged as a part of the transformation and rationalisation of universities in South Africa. Established in the 1960s Durban-Westville was originally a University College for Indians. In 1971 it was given university status. A new facility was built in Westville, a suburb of Durban (now eThekweni). In 1984 the university gained autonomy and opened its doors to all races.

The University of Natal was established in Pietermaritzburg in 1910 with the merger of the then Maritzburg College and the Durban Technical Institute. At the time it was a University College operating in association with the University of South Africa. Shortly after the First World War it established a campus in Durban. It became an independent university in 1949, known as the University of Natal.

In 1950, the University of Natal Medical School was established. It was known as a 'black faculty' in a 'white university'. In 2000, the school was renamed the Nelson R. Mandela Medical School. It is located in Durban.

In 2001, the Edgewood College of Education, at Pinetown near Durban, was incorporated into the University of Natal. This added a fourth campus to the University of Natal.

With the merger of the University of Durban-Westville and the University of Natal, the new University of KwaZulu-Natal was located on five campuses: Edgewood in Pinetown; Howard College and the Medical School in Durban; Pietermaritzburg; and Westville. UKZN has four colleges and eight faculties:

- Humanities incorporating: Educations; Humanities, Development and Social Sciences;
- Agriculture, Engineering and Science incorporating: Engineering; and Science and Agriculture
- Health Sciences incorporating : Health Science and the Medical School
- Law and Management Studies incorporating: Law; and Management Studies.

Agricultural Extension at UKZN

In 1946 the Faculty of Agriculture was established. It was, at the time, a part of the Department of Agriculture, which separated from the university in 1965. In 1991 the agricultural faculty merged with the science faculty to form the current Faculty of Science and Agriculture, which itself is part of the College of Agriculture, Science and Engineering – one of five colleges in the university. Agricultural related disciplines are housed on the Life Sciences campus south of the main Pietermaritzburg campus.

The Faculty of Science and Agriculture has ten schools. Four of the schools offer AET programmes – the School of Agricultural Science and Agribusiness, the School of Biochemistry, Genetics, Microbiology and Plant Pathology, the School of Biological and Conservation Sciences and the School of Environmental Sciences. Agricultural Extension is housed in the School of Environmental Sciences in a unit called the Centre for Environment, Agriculture and Development (CEAD). There are approximately 115 students in the agricultural undergraduate and honours programmes.

AET offerings

UKZN offers the following agricultural and related qualifications.

Bachelors degrees

- Bachelor of Agricultural Management
- Bachelor of Agriculture
- Bachelor of Science in Agriculture

Honours degrees/Postgraduate diplomas

- Bachelor of Agricultural Management Honours
- Bachelor of Agriculture Honours
- Post-Graduate Diploma in Rural Resource Management
- Post-Graduate Diploma in Food Security

Masters degrees and PhDs

- Master of Agricultural Management
- Master of Agriculture

- Master of Science in Agriculture
- Doctor of Philosophy in Agriculture
- Doctor of Science in Agriculture

The study examined the Bachelor of Agriculture (B Agric), the Bachelor of Agriculture Honours, and the Bachelor of Science in Agriculture.

B Agric/ B Agric Hons

The UKZN B Agric and B Agric Hons are offered by CEAD in the School of Environmental Sciences. The qualifications are designed to develop the capacity of practitioners such as Extension Officers and Community Development Facilitators who work in agricultural and rural development for the NGO and public service sectors and for agri-business and private sector companies involved with farmers and rural communities.

The B Agric is listed as a NQF level 6 qualification. It is a three-year qualification with 128 credits per year, totalling 384 credits. It has three specialisations: Agricultural/Rural Development (ARD); Natural Resource Management; and Small Enterprise Management. They are all structured similarly, but the study focused on the Agricultural/Rural Development stream. The B Agric Hons is listed as a NQF level 7 qualification. It is a one-year qualification comprised of 128 credits.

B Sc Agriculture

The B Sc Agriculture is offered in the School for Agricultural Science and Agribusiness. It is a four-year qualification listed at NQF level 7. Completion of a B Sc Agriculture articulates to the M Agriculture and MSc Agriculture. It offers 11 specialisations, some of which have sub-streams. The more agriculturally related specialisations include Agribusiness, Agricultural Economics, Agricultural Plant Sciences, Animal and Poultry Science, Forestry, Grassland Science and Soil Science.

The qualification is structured around 128 credits annually, totalling to 512 credits over the four years. All of the specialisations have a common first year which is comprised of maths and a selection of sciences. Agricultural courses only start in second year.

Analysis of the UKZN qualifications

B Agric/ B Agric Hons

Tables 8.13 and 8.14 present the PFE scores for the UKZN B Agric (ARD) and B Agric Hons. Of the 3840 NSH allocated to the UKZN B Agric (ARD), 1280 NSH are allocated to extension related learning; 32 credits at first and second years and 64 credits in third year. Thus the $PFE_{BAg(ARD)}$ score is 33. Of the 1280 NSH allocated to the B Agric Hons, 320 NSH are allocated to extension related learning. The PFE_{BAgHon} score is 25. There are no extension electives for either qualification; therefore there are no potential PFE scores. The PFE scores of 33 and 25 are, respectively, above and in keeping with the benchmark of 25 for curriculum training potential Agricultural Extension practitioners. Further it is consistent with the laddering approach to extension training, where extension is learned alongside technical qualification as opposed to being added onto a first degree.

Table 8.13: PFE scores for the UKZN B Agric (ARD)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	32	96	128	PFE_1	25
2	32	96	128	PFE_2	25
3	64	64	128	PFE_3	50
Total	128	256	384	$PFE_{BAg(ARD)}$	33

Table 8.14: PFE scores for the UKZN B Agric Hons

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
4	32	96	128	PFE_4	25
Total	32	96	128	PFE_{BAgHon}	25

The PFI scores for the UKZN B Agric (ARD) and B Agric Hons are:

Presence Factor:	
<u>Individual Marker</u>	<u>Score</u>
PFI1	65
PF12	38
PF13	76
PFI4	38
PFI_{BAg}	88
PFI_{Hons}	38
$PFI_{BAg Hons combined}$	91

The detailed INSHE scores for the UKZN qualifications are recorded in Appendix 8. Table 8.15 shows the six highest INSHE_Q and INSHQ_Q scores for the UKZN B Agric (ARD). Table 8.16 shows the five highest INSHE_Q and INSHQ_Q scores for the UKZN B Agric Hons. Table 8.17 shows the five highest INSHE_Q and INSHQ_Q scores for the UKZN B Agric and B Agric Hons combined.

The INSHE_Q and INSHQ_Q scores for these two qualifications indicate that the main focus of the B Agric (ARD) is on issues around learning and development concepts, with a significant emphasis on sustainable livelihoods. This reflects both in the extension curricula and the overall curricula. The extension curricula of the B Agric Hons appears to focus on the IAS concept (Chapter 2), concepts around learning, systems and systems thinking and, to a lesser extent, on participatory technology development and innovation. This is very much in keeping with the Agriflection concept developed as a part of this study (Chapter 2) and the emphasis it places on a learning approach to extension.

The INSHQ_Q scores for the B Agric (ARD) indicate that excessive attention is given in particular to learning and systems thinking. The UKZN information on this programme indicates that this is deliberate. The theory and practice of learning and theory and practice in systems thinking are the foundation of its extension training programme.

The INSHQ_Q scores are particularly high for the markers in the B Agric Hons, implying that they receive excessive attention. However, when the B Agric Hons is seen as part of a four-year qualification, then the markers moderate somewhat to more appropriate levels against the overall curriculum. This is confirmed by the PFI scores which show that the majority of the markers are included in the overall curriculum. As noted below, there are four markers that are given no attention at all.

Table 8.15: Six highest INSHE_Q and INSHQ_Q scores for the UKZN B Agric (ARD)

INSHE _Q Score	INSHQ _Q Score	Curricula marker
10	3.1	The practice of learning and learning styles
8	2.5	The theory of development concepts
7	2.1	The practice of problem solving
7	2.1	The practice of Sustainable livelihoods
6	1.7	The theory of learning facilitation
6	1.7	The practice of learning facilitation

Table 8.16: Five highest INSHE_Q and INSHQ_Q scores for the UKZN B Agric Hons

INSHE _Q Score	INSHQ _Q Score	Curricula marker
26	6.4	The practice of the process of investigating (research), applying and sharing
20	5.1	The practice of systems thinking
15	3.8	The theory of systems (systems thinking)
12	3.0	The practice of individual and collective learning & learning partnerships
6	1.4	The practice of participatory technology development and innovation

Table 8.17: Six highest INSHE_Q and INSHQ_Q scores for the UKZN B Agric (ARD) and B Agric Hons combined

INSHE _Q Score	INSHQ _Q Score	Curricula marker
8	2.4	The practice of learning and learning styles
8	2.3	The practice of systems thinking
7	1.9	The practice of problem solving
6	1.9	The theory of development concepts
6	1.8	The theory of systems (systems thinking)
6	1.8	The practice of the process of investigating (research), applying and sharing

In the curriculum of the B Agric (ARD) the following markers had INSHE_Q and INSHQ_Q scores of 0, i.e. they were not found in the curriculum:

- Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others
- The practice of participatory technology development and innovation
- The practice of sustainable agriculture
- The theory of ‘curriculum’ development
- The practice of ‘curriculum’ development

In the curriculum of the B Agric Hons 21 of the markers had INSHE_Q and INSHQ_Q scores of 0, i.e. they were not found in the curriculum.

When the B Agric (ARD) and B Agric Hons were combined, the following markers had INSHE_Q and INSHQ_Q scores of 0, i.e. they were not found in the curriculum:

- Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others
- The practice of sustainable agriculture

- The theory of ‘curriculum’ development including the following concepts
- The practice of ‘curriculum’ development as outlined above

What was noted, although largely outside the scope of this study, was that the B Agric (ARD) is particularly weak in agricultural training. Partly as a result of this research, UKZN has identified this as a significant shortcoming in the programme and is reviewing the B Agric and B Agric Hons curricula. It is also negotiating with Cedara College of Agriculture to deliver the B Agric in conjunction with the college on a franchise basis, similar to the arrangement between Stellenbosch University and CIAT discussed earlier.

Based on the foregoing, Agricultural Extension practitioners with a UKZN B Agric (ARD) should be in a reasonable position to deliver on the South African agricultural agenda. Doubts raised about the agricultural component, however, may mitigate the otherwise strength of this qualification. Further, Agricultural Extension practitioners with the UKZN B Agric Hons will not be well equipped to deliver on current South African agenda unless it is a follow on from a first degree with a similar scoring as the UKZN B Agric (ARD).

B Sc Agric

As discussed earlier, the UKZN B Sc Agric is a four-year qualification with eleven (11) specialisations offered. There are no required Agricultural Extension courses in any of the specialisations. Thus the minimum PFE scores are all 0. However, the Animal and Poultry Science specialisation allows 8 elective credits in first year for one of the extension modules. The Agribusiness and Soil Science specialisations have elective credits with extension options at second, third and fourth year. The Agricultural Economics specialisation has elective credits with extension options in fourth year. Thus potential PFE scores can be generated for these specialisations. Tables 8.18 and 8.19 show the potential PFE scores for these specialisations. The Agribusiness and Soil Science specialisations have a maximum Potential PFE score of 12 – if all the extension electives are chosen. The Agricultural Economics specialisation has a maximum potential PFE score of 6 – again if all the extension electives are chosen.

Table 8.18: Potential PFE scores for the UKZN B Sc Agric (Agribusiness or Soil Science)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	128	128	PFE ₁	0
2	32	96	128	PFE ₂	25
3	16	112	128	PFE ₃	13
4	16	128	144	PFE ₄	11
Total	64	464	528	PFE _{BScAg}	12

Table 8.19: Potential PFE scores for the UKZN B Sc Agric (Agricultural Economics)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	128	128	PFE ₁	0
2	0	128	128	PFE ₂	0
3	0	128	128	PFE ₃	0
4	32	112	144	PFE ₄	22
Total	32	496	528	PFE _{BScAg}	6

Given the 0 minimum PFE scores for the UKZN B Sc Agric, PFI and INSH scores were not determined. From this it is clear that Agricultural Extension practitioners with a UKZN B Sc Agric have not been suitable equipped to deliver on the current agricultural agenda in South Africa. Only the Agribusiness and Soil Science specialists would be somewhat equipped. However, experience of the researcher in the field indicates that such specialists rarely serve as Agricultural Extension practitioners.

8.2.4. University of Limpopo (ULIM)

Background

The University of Limpopo is located in the Limpopo province. It has two campuses: Turfloop, just outside Polokwane and MEDUNSA (Medical University of South Africa), northwest of Pretoria. Approximately 16500 students are registered at the university; 12000 at Turfloop and 4500 at MEDUNSA.

What is now the University of the Limpopo was originally the University College of the North which was established in 1959. The university college was a 'blacks only' institution, and, like other university colleges was governed through the University of South Africa. In 1969, it was granted full university status and began operating as such in

1970. At the time it had five faculties: Economics and Administration, Arts, Education, Maths and Natural Sciences, and Theology. In reference to the farm on which the original institution was established, the University of the North was known as Turfloop.

By 1990, the university had eight faculties: Management Sciences, Law, Education, Arts, Agriculture, Theology, Health, and Maths and Natural Sciences. Responding to the transformation of universities, in 2001, Turfloop rationalised its structures and reduced the faculties to three: Humanities, Management Sciences and Law, and Sciences, Health and Agriculture. It was no longer a 'blacks only' institution. In 2005, the University of the North merged with the Medical University of South Africa (MEDUNSA) which had been established in 1976 for the training of black medical practitioners. With the merger, it took on its current name University of Limpopo.

Extension at ULIM

The Faculty of Sciences, Health and Agriculture has five schools: the School of Agricultural and Environmental Sciences; the School of Health Sciences; the School of Computational and Mathematical Sciences; the School of Molecular and Life Sciences; and the School of Physical and Mineral Sciences. Extension is located in the School of Agricultural and Environmental Sciences. This school, reported to be the fastest growing school at Turfloop, offers the following programmes: Agricultural Economics; Agronomy; Horticulture; Animal Production; Pasture; Plant Protection; Soil Science; Aquaculture; and Geography. Among various other disciplines in the school is Agricultural Extension.

University documentation indicates that the extension programme was created specifically to improve the relevance of the agricultural curriculum to small scale farmers. The extension programme stays current through working with various agencies working in the field. Formal qualifications in extension are offered only at a Masters level. Extension courses are taught in the curriculum of the Bachelor of Science in Agriculture.

AET offerings

ULIM offers the following qualifications in agriculture.

Bachelors degrees

- Bachelor of Science in Agriculture (B Sc Agric)

Masters degrees and PhDs

- Master of Science in Agriculture
- Master of Agricultural Extension
- PhD in Agriculture
- Doctor of Science in Agriculture

Only the B Sc Agric was examined in this study.

B Sc Agric

ULIM offers a B Sc Agric with specialisations in Agricultural Economics, Animal Production, Plant Production (with sub-streams of Agronomy, Horticulture and Pasture Science), and Soil Science. It is a four-year degree listed at NQF level 7. Training is aimed at providing qualified to work bout in commercial agriculture and amongst the rural poor. The programme is designed to give a balance of theoretical, scientific and practical agriculture. Table 8.20 shows the credit allocations for the four main specialisations in the qualification.

Table 8.20: Credit allocation for the main specialisations in the ULIM B Sc Agric

Year	Credits per Specialisation			
	Agricultural Economics	Animal Production	Plant Production	Soil Science
1	121.5	135	135	120
2	126	124.5	132.5	124.5
3	129.5	122	128	130
4	120	126	102	114
Total	497	507.5	497.5	488.5

Analysis of the ULIM qualifications

The ULIM B Sc Agric Agricultural Economics and Animal Production specialisations have 24 credits of extension each. The Plant Production and Soil Science specialisations have 18 credits of extension each. Tables 8.21, 8.22, 8.23 and 8.24 set out the PFE scores for each of the specialisations.

Table 8.21: PFE scores for ULIM B Sc Agric (Ag Econ)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	122	122	PFE ₁	0
2	6	120	126	PFE ₂	5
3	18	112	130	PFE ₃	14
4		120	120	PFE ₄	0
Total	24	473.5	498	PFE _{BScAg(AE)}	5

Table 8.22: PFE scores for ULIM B Sc Agric (Animal Production)

Institution: Limpopo: B Sc Agric (Animal Production)					
Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	122	122	PFE ₁	0
2	6	120	126	PFE ₂	5
3	12	118	130	PFE ₃	9
4	6	114	120	PFE ₄	5

Table 8.23: PFE scores for ULIM B Sc Agric (Soil Science)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	122	122	PFE ₁	0
2	6	120	126	PFE ₂	5
3	12	118	130	PFE ₃	9
4	0	120	120	PFE ₄	0
Total	18	479.5	498	PFE _{BScAg(SS)}	4

The PFE tables for the ULIM show that between 4% and 5% of the NSH allocated to the four specialisations are allocated to Agricultural Extension. The PFE_Q scores are as follows:

$$PFE_{BScAg(AE)}: 5$$

$$PFE_{BScAg(AP)}: 5$$

$$PFE_{BScAg(PP)}: 4$$

$$PFE_{BScAg(SS)}: 4$$

ULIM did not participate in the study. Therefore no PFI scores or INSH were generated. However a review of university documents was made to assess the extension offerings. The curriculum includes three Agricultural Extension modules (credits in brackets):

- Introduction to Rural Sociology (6)
- Introduction to Agricultural Extension (12)
- Management and Leadership development (6)

The Rural Sociology module looks at family, community, social demography, and the concept of change – including group dynamics and decision-making. The Agricultural Extension module addresses the history and philosophy of extension, the organisation of extension, the role of extension in the development process, adult learning, and extension systems. The management and leadership module looks at human resource issues in extension, supervision and management of staff, reporting writing, office management and communication in administration. From these brief content descriptions it is not possible to determine possible inclusion of any of the 34 curriculum markers used in this study.

While it is beyond the scope of this study, it is interesting to note that the Masters level modules in Agricultural Extension cover a broader range of learning in extension. They compare extension systems looking for lessons and implications for South Africa. They extend the learning in group dynamics, change and introduce learning about farmer organisations, adoption of innovations and indigenous communication systems. They study farming systems research and extension with a view to understanding research-extension-farmer linkages, rapid rural appraisal and adaptive research. Finally, they look at agricultural policy and learn methods to analyse policy.

8.2.5. North West University (NWU)

Background

The North West University (NWU) is located in the North West Province. It is situated on three campuses; Mafikeng, Potchefstroom and the Vaal Triangle. It is the product of the merger of two older universities – the University of the North West (formerly the University of Bophuthatswana) and the Potchefstroom University for Higher Christian Education. The new University was launched in January 2004.

The Mafikeng Campus is the site of the former University of Bophuthatswana which had been established in 1980. Being part of the homeland of Bophuthatswana, it was not a ‘blacks only’ university per se – but the vast majority of its students were black. In 1994, the name was changed to the University of the North West. It had seven Faculties:

Agriculture, Commerce, Education, Humanities, Law, Science & Technology and Social Sciences.

What is now the Potchefstroom campus started as a theological school in 1869 in the rural town of Burgersdorp. It transferred to Potchefstroom in 1905 and, in 1919 “Het Potchefstroom Universiteitskollege voor Christelike Hooger Onderwijs” was established. In 1921 it became the Potchefstroom University College, having dropped its “for Christian Higher Education”. Like all other university colleges, it was associated with the University of South Africa. In 1933 it was restored to the name with “for Christian Higher Education” and in 1951 was granted independent university status. It was a ‘whites only’ university. In 1998, the legal framework of the university was changed, but allowed it to remain independent and Christian focused. It had eight faculties: Arts, Economic and Management Sciences, Education Sciences, Engineering, Health Sciences, Law, Natural Sciences and Theology. The Faculty of Natural Science, in which agriculture fell, was established in 1922.

The Vaal Triangle Campus was initially established as an extension of the Potchefstroom University. It was intended to be a multi-racial campus. Classes were held in short-term premises from 1963-1976 when more permanent facilities were acquired. While connected to Potchefstroom, it was relatively autonomous. It focussed on commerce, education and engineering. It was fully incorporated into the current NWU in January 2004.

NWU has eleven faculties: Agriculture, Science and Technology, Arts, Commerce and Administration, Economic and Management Sciences, Education Sciences, Engineering, Health Sciences, Human and Social Sciences, Natural Sciences and Theology.

Extension at NWU

The NWU School of Agricultural Sciences has three discipline groupings: Agricultural Economics and Extension, Animal Science and Crop Science. The school has 11 academic staff, of whom three are involved with Agricultural Economics and Extension. Four Agricultural Extension modules are offered in the undergraduate programme. They are offered as part of the required curriculum for most of the agricultural qualifications. The school also offers six extension modules at honours level.

AET offerings

All agricultural qualifications are offered in the School of Agricultural Sciences in the Faculty of Agriculture, Science and Technology. NWU offers the following qualifications in agriculture.

Diplomas

- Diploma in Animal Health
- Diploma in Agriculture (Animal Science; Crop Science)

Bachelors Degrees

- Bachelor of Science in Agriculture (Agric Economics; Animal Health; Animal Science; Crop Science)

Honours/Postgraduate Diplomas

- Bachelor of Science (Honours) (Agricultural Extension)
- Bachelor of Science (Honours) in Agriculture (Animal Health; Animal Science; Crop Science)
- Postgraduate Diploma in Agriculture
- Postgraduate Diploma in Agricultural Extension

Masters degrees/PhDs

- Master of Science in Agriculture
- Doctor of Philosophy (Agriculture)

This study examined the Bachelor of Science in Agriculture (B Sc Agric), the Bachelor of Science Honours in Agricultural Extension (B Sc Hon (Ext)) and the Postgraduate Diploma in Agricultural Extension (PGDip (Ext)).

B Sc Agric

The NWU B Sc Agric is a four-year degree. It is listed as an NQF level 6 qualification. It has four specialisations Agricultural Economics, Animal Health, Animal Science, and Crop Science. The purpose of these qualifications is to train agricultural economists and agricultural scientists. The Agricultural Economics specialisation is

focussed on agricultural development programmes with a view to creating competence in interpersonal relations and communication to contribute advancing agricultural business. Agricultural Extension is included in each of the specialisations.

The B Sc Agric qualifications are constructed using between 120 and 144 credits per year. Table 8.25 shows the allocation of credits in each specialisation of the B Sc Agric.

Table 8.24: Allocation of credits to specialisations of the NWU B Sc Agric

Year	Credit allocation per specialisation			
	Agricultural Economics	Animal Health	Animal Science	Crop Science
1	132	120	120	120
2	132	132	126	120
3	144	132	120	120
4	132	120	126	120
Total	540	504	492	480

PGDip (Extension)

The PGDip (Extension) is a one-year qualification. It is a professional qualification listed at NQF level 6. It appears to have been developed specifically to address extension training needs of Agricultural Extension practitioners currently employed in the public and NGO sectors. It focuses on general aspects of Agricultural Extension and rural development. The qualification is comprised of 7 modules of 18 credits each, totalling 126 modules. All the modules are directly related to Agricultural Extension. This qualification provides access to the B Sc Hons (Ext).

B Sc Hons (Ext)

The B Sc Hons (Ext) is a one-year qualification. promoted as also being specially designed for currently employed in the public and NGO sectors. It is also an access route to the Master of Agricultural Extension. It is listed at NQ level 7. It is comprised of eight modules of 18 credits each (i.e. 144 credits) all of which are directly related to Agricultural Extension. It focuses on extension and farm system analysis, programme planning and evaluation, communication, technology transfer, and human resource development. Students who have completed the PG Dip (Ext) or the B Sc Agric have access to this qualification.

Analysis of the NWU qualifications

Tables 8.26, 8.27, 8.28 and 8.29 give the PFE scores for the NWU B Sc Agric (all specialisations). As the tables show, Agricultural Extension is included in all of the specialisations. Of the 5400 NSH allocated to the B Sc Agric (Ag Econ), 480 NSH are devoted to extension, giving it a PFE score of 9.

Of the 5040 NSH allocated to the B Sc Agric (Animal Health), 120 NSH are devoted to extension, giving it a PFE score of 2. Of the 4920 NSH allocated to the B Sc Agric (Animal Science), 360 NSH are devoted to extension, giving it a PFE score of 7. Of the 4800 NSH allocated to the B Sc Agric (Crop Science), 120 NSH are devoted to extension, giving it a PFE score of 3.

Table 8.25: PFE scores for the NWU B Sc Agric (Agricultural Economics)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	132	132	PFE ₁	0
2	12	120	132	PFE ₂	9
3	24	120	144	PFE ₃	17
4	12	120	132	PFE ₄	9
Total	48	492	540	PFE _{BScAg(AE)}	9

Table 8.26: PFE scores for the NWU B Sc Agric (Animal Health)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	120	120	PFE ₁	0
2	0	132	132	PFE ₂	0
3	12	120	132	PFE ₃	9
4	0	120	120	PFE ₄	0
Total	12	492	504	PFE _{BScAg(AH)}	2

Table 8.27: PFE scores for the NWU B Sc Agric (Animal Science)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	120	120	PFE ₁	0
2	0	126	126	PFE ₂	0
3	12	108	120	PFE ₃	10
4	24	102	126	PFE ₄	19
Total	36	456	492	PFE _{BScAg(AS)}	7

Table 8.28: PFE scores for the NWU B Sc Agric (Crop Science)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	120	120	PFE ₁	0
2	0	120	120	PFE ₂	0
3	0	120	120	PFE ₃	0
4	12	108	120	PFE ₄	10
Total	12	468	480	PFE _{BScAg(CS)}	3

NWU did not complete scorecards. However, much could be learned from other documentation and NSH approximated. Four extension modules are offered in the B Sc Agric curriculum. The first module offered, a second year module, is Fundamental Concepts in Extension. The purpose of the module is to introduce students to the principles of Agricultural Extension. It addresses the following aspects:

- Philosophy and objectives of extension.
- The infrastructural needs of agricultural development.
- Basic sociological and psychological concepts in extension; cultural and social change; barriers to change.
- The diffusion and adoption of innovations; the role of communication in diffusion/adoption.
- The concept of programming planning and management in extension.
Extension teaching methods.

The curriculum has two third year modules: Extension for Development and Research in Extension. For each of these, specific learning outcomes have been established. In Extension for Development the learning outcomes include:

- Understanding of the role of extension in development.
- Applying adult learning principles in extension.
- Preparing an extension programme.
- Appropriately using different extension teaching methods.

Research in Extension focuses on building capacity to design, conduct and develop conclusions from research. It also trains students in the research steps and final writing.

The fourth year extension module is Rural Community Development. It focuses primarily on development theories, rural development projects and farmer support projects. It also addresses Agricultural Extension organisation and service provision.

Based on the proxy analysis, the PFI scores for the NWU B Sc Agric (Ag Econ) are as follows. Similar but lower scores apply to the other specialisations.

Presence Factor:	
<u>Individual Marker</u>	<u>Score</u>
PFI1	0
PFI2	0
PFI3	18
PFI4	9
PFI _{BScAg(Ag Econ)}	18

The extension curricula in the B Sc Agric programme is focused on development, learning and the ability to plan and implement development projects. The detailed INSHE scores for the NWU B Sc Agric qualifications are recorded in Appendix 9. Table 8.30 shows the six highest INSHE_Q and INSHQ_Q scores for the B Sc Agric (Ag Econ) as an example of the overall B Sc Agric programme.

Table 8.29: Six highest INSHE_Q and INSHQ_Q scores for the NWU B Sc Agric (Ag Econ)

INSHE _Q Score	INSHQ _Q Score	Curricula marker
12	2.1	The theory of development concepts
12	2.1	The practice development concepts
10	1.8	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
9	1.6	The theory of learning and learning styles
7	1.2	The practice of 'curriculum' development
3	0.6	The practice of learning and learning styles

The INSHE_Q scores indicate that most of these markers are given more than adequate attention in the extension curriculum of the qualification. The INSHQ_Q scores show that excessive attention may be given to these learning areas within the whole curriculum for the B Sc Agric (Ag Econ) to the exclusion of other areas of learning indicated by the 34 markers. This is borne out by the fact that the INSH scores for the balance of the markers are all 0. In sum, Agricultural Extension practitioners with a NWU B Sc Agric are not adequately equipped to deliver on the agenda of current South African agricultural policy.

PGDip (Extension)

Table 8.31 shows the PFE scores for the NWU PGDip (Ext). This qualification has a PFE score of 100 showing that it is fully dedicated to extension learning. This is consistent with the fact that the qualification is an add-on qualification to NQF level 6 qualifications.

Table 8.30: PFE scores for the NWU PGDip Agricultural Extension

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
4	126	0	126	PFE ₄	100
Total	126	0	126	PFE _{PGDip(Ext)}	100

In the absence of completed scorecards from NWU, an analysis of the seven modules associated with the PGDip was made using various documents. Students learn about community development theory and practice and how to help “rural development stakeholders” develop and implement rural development. They learn about leadership, supervision and how to assist farmers develop leadership capacity. They have broad exposure to extension, its evolution, factors that influence extension practice. They explore research-extension-farmer linkages and the changing paradigms in extension. Students study agricultural and rural development models in the context of South Africa’s development strategy. This is done with a view to being able to develop an agricultural development strategy.

Formal extension training focuses on communication with the ability to develop a communications strategy. They learn about the innovation development process. These are both done in the context of a diffusion-adoption and coupled with training in persuasion, motivation and attitude formation.

Based on the foregoing, there is little correlation between the 34 markers developed for this study and the curriculum for the NWU PGDip Agricultural Extension. The programme appears to be fairly traditional in its approach using both the communications and technology adoption approaches to Agricultural Extension. The one strong connection is in the contextualising of extension in rural and agricultural development as opposed to commercial agriculture. This is in keeping with the intentions of current South African agricultural policy. Agricultural Extension practitioners with the NWU PGDip in

Agricultural Extension are not adequately equipped to deliver on the agenda of current South African agricultural policy.

B Sc Hons (Ext)

Table 8.32 shows the PFE scores for the NWU B Sc Hons (Ext). This qualification has a PFE score of 75 showing that it is nearly fully dedicated to extension learning. The only part that is not directly related to extension is the research project and the module on human resource development. This is consistent with the fact that the qualification is an add-on qualification to NQF level 6 qualifications.

Table 8.31: PFE scores for the NWU B Sc Hons Agricultural Extension

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total	75	PFE ₄
4	108	36	144	75	PFE ₄
Total	108	36	144	75	PFE _{BScHons(Ext)}

The eight modules associated with this qualification were analysed. The areas of study are: Research methods and practical research in extension; Farm systems analysis; Programme planning and evaluation; Communication; and Human resource development. An important part of the learning appears to be centred in policy. Students study the policy formation process and learn to analyse policy.

Extension is contextualised in current agricultural policy. Learning covers land tenure, land reform, gender, and understanding the clientele of extension in South Africa. Participatory methodologies and engaging with indigenous knowledge systems and farmer experience are also part of the learning in this qualification.

The PFI score for the qualification is 29. The detailed INSHE scores for the NWU B Sc Hons (Ext) are recorded in Appendix 9. Table 8.33 shows the six highest INSHE_Q and INSHQ_Q scores for the qualification.

Table 8.32: Six highest INSHE_Q and INSHQ_Q scores for the NWU B Sc Hons (Ext)

INSHE _Q Score	INSHQ _Q Score	Curricula marker
18.6	16.3	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
1.4	1.3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture
1.4	1.3	The theory of development concepts
1.4	1.3	The practice development concepts
1.4	1.3	The theory of learning facilitation
1.4	1.3	The practice of learning facilitation
1.4	1.3	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction
1.4	1.3	Facilitate among farmers knowledge and skill regarding the critical use of information

Being a one-year qualification in which the extension curriculum is the majority of the overall curriculum, the INSHE_Q and INSHQ_Q scores will tend to be similar to one another. Clearly handling information relevant to extension responsibilities is the main focus of this programme. The balance of the highest scoring markers are addressed to some extent, but need attention. This indicates that the qualification needs much revision in terms of the knowledge and skill set needed according to current South African agricultural policy. Although the INSHE_Q score sits below the bench mark of 25, the programme may not be sufficiently diversified. This is supported by the fact that 26 of the curriculum markers have an INSHE_Q score of 0.

The very high INSHQ_Q scores for information in extension adequate attention is being given to development concepts, learning facilitation, and facilitation among farmers regarding stakeholder interaction and the critical use of information. However, the scores also indicate that excessive attention is being given to the handling information for extension.

In sum, Agricultural Extension practitioners with a NWU B Sc Hons Agricultural Extension are not adequately equipped to deliver on the agenda of current South African agricultural policy.

8.2.6. University of Pretoria (UP)

Background

The University of Pretoria (UP) is located in Gauteng Province. It is situated in the heart of Pretoria, the administrative capitol of South Africa. UP has its origins in 1903 when the Transvaal Technical Institute was established in Johannesburg. It was the first tertiary institution in the then Transvaal Province. In 1908 this institution became the Transvaal University College (TUC) which name led to its colloquial name of “Tukkies”. It was located in Pretoria. It had 32 students, four professors and three lecturers. Among the disciplines taught was agriculture.

It was originally a ‘whites only’ college using a variety of languages of instruction. In 1930 it was granted university status and became known as the University of Pretoria. In 1932 Afrikaans became the medium of instruction. Since then UP has grown from about 900 students to 50000 students.

Since 1995 UP has been more generally open to students of all races. Courses are now given in English and Afrikaans. It has nine faculties: Economic and Management Sciences; Education, Engineering, Built Environment and Information Technology; Health Sciences; Natural and Agricultural Sciences; Theology; and Veterinary Science

Extension at UP

The Faculty of Natural and Agricultural Sciences has four schools: Biological Sciences; Mathematical Sciences; Physical Sciences; and Agricultural and Food Sciences. Agricultural Extension is located in the latter school in the Department of Agricultural Economics, Extension and Rural Development. The Department has been one of the main role-players in extension in South Africa for many years.

In addition to the four schools, the faculty also has seven other units two of which are directly involved with Agricultural Extension. The faculty is the administrative home of the South African Society for Agricultural Extension which is the agency which leads the discipline in the country and which publishes the country’s only scientific journal on Agricultural Extension.

The faculty is also the administrative home of the Postgraduate School of Agriculture and Rural Development. The mission of this unit is to serve rural communities by facilitating agriculture and rural development which they pursue through scholarship, teaching, research and outreach. The unit’s programmes are aimed specifically at

integrated rural development and farmers from disadvantaged communities. Extension is one among a number of related professions catered to by the unit. The aim is to produce graduates who can operate effectively at management and subject specialisation levels, within the wide range of activities in the fields of agriculture and rural development.

The qualifications relevant to this study, discussed below, are offered through this unit.

AET offerings

During the period of research for this study, the agricultural offerings apparently underwent significant review. During the 2007 finalisation of the research, only the Bachelor of Science in Agriculture was being offered. Prior to this UP offered the Baccalaureus Institutionis Agrariae (B Inst Agrar); it was a four-year programme listed at NQF level 7. B Inst Agrar was suspended for new intake in 2005, 2006 and 2007. Similarly the one-year honours qualification, Baccalaureus Institutionis Agrariae Honores (B Inst Agrar Hons) and the Magister Institutionis Agrariae (M Inst Agrar) appear to have also been suspended during much of the research period. The 2008 UP Yearbook lists the B Inst Agrar Hons and the M Inst Agrar as being reinstated from 2008.

In addition to the B Sc Agric and the B Inst Agrar Hons, UP also offers an Advanced University Diploma in Extension and Rural Development (AUDip (ERD)), two masters qualifications in agriculture; Magister Scientiae Agriculturae (M Sc Agric), and Magister Institutionis Agrariae (M Inst Agrar). UP also offers a PhD and Doctor of Science in Agriculture (including a PhD Agrarian Extension).

The study examined the B Sc Agric, the B Inst Agrar Hons and the AUDip ERD.

B Sc Agric

The UP B Sc Agric is a four-year degree listed as a NQF level 7 qualification. It has the following specialisation options:

- Agricultural Economics: Agribusiness Management
- Animal Science
- Animal Science and Animal Genetics
- Animal Science: Pasture Science
- Food Science and Technology
- Genetics: Plant Breeding

- Plant Pathology
- Plant Production
- Soil Science

Each specialisation in the B Sc Agric is uniquely constructed. The credits allocated vary from 122 credits per year to 180 credits per year. Table 8.34 presents the credits loads of each of the specialisations.

Table 8.33: Credit loads for the UP B Sc Agric

Year	Credits by Specialisation				
	Agricultural Economics	Animal Science	Plant Pathology	Plant Production	Soil Science
1	122	148	148	148	148
2	146	180	144	156	156
3	156	154	150	154	138
4	164	174	168	159	170
Total	588	656	610	617	612

B Inst Agrar Hons

The B Inst Agrar Hons is a one-year qualification comprised of 160 credits. It is listed as a NQF level 7 qualification. The curriculum includes 100 credits of prescribed modules and 60 credits of electives from a prescribed list.

The qualification is intended for students in agriculture and/or rural development professions who already have a first degree (i.e. a relevant Bachelors degree). It is intended to be the foundation on the M Inst Agrar.

The qualification is designed to produce qualified professional extension/development agents. Among the capabilities gained through the qualification are designing, developing and implementing (including managing) extension/development programmes that are scientifically grounded, situation-specific and adapted to the relevant community. Participatory development aimed at maximum community participation and impact is high on the learning agenda of this qualification.

Among the learning areas in this qualification are the following:

- Different philosophies, concepts and approaches in extension and development;
- Organisation and management of extension and development;

- Principles of human behaviour with emphasis on decision-making and behaviour change;
- Theories involved in understanding and facilitating change;
- Theory and practical implementation of community development, group dynamics and leadership for the formulation and execution of development plans;
- Principles of communication; and
- Identifying and using the most appropriate communication methods

The B Inst Agrar Hons is offered with 14 specialisations of which one is Agricultural Extension. This study examined the extension specialisation.

AUDip (ERD)

The UP Advanced University Diploma in Extension and Rural Development (AUDip (ERD)) is a one-year qualification comprised of 120 credits. The curriculum is fully prescribed; there are no elective options.

It is very similar in purpose and nature to the B Inst Agrar Hons (Ext), but is listed as a NQF level 6 qualification. The range of learning is essentially the same as the B Inst Agrar Hons (Ext), but at a lower level. It is designed as a professional qualification and does not form a foundation for a masters. Entrants to the qualification will have non-academic qualifications (e.g. BTech or National Diploma) plus experience.

Analysis of the UP qualifications

B Sc Agric

From amongst all the B Sc Agric specialisations, only the Agricultural Economics specialisation has any extension training. In the third year, 20 credits in extension are required. Table 8.35 gives the PFE scores for this specialisation.

All 200 NSH are allocated to a single module on communication. The content of that module does not relate to any of the 34 markers used in this study. Hence the $INSHE_Q$ and $INSHQ_Q$ scores were all 0. The general point is made that Agricultural Extension practitioners with a UP B Sc Agric are not adequately equipped to deliver on the current South African agricultural agenda.

Table 8.34: PFE scores for the UP B Sc Agric (Agricultural Economics)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	0	122	122	PFE ₁	0
2	0	146	146	PFE ₂	0
3	20	136	156	PFE ₃	13
4	0	164	164	PFE ₄	0
Total	20	568	588	PFE _{BScAg(AE)}	3

B Inst Agrar Hons (Ext)

Table 8.36 shows the PFE scores for the B Inst Agrar (Ext). The minimum PFE score is 75 indicating that the qualification is nearly fully dedicated to extension learning. This is in keeping with the general approach taken by UP that extension be offered as a post-qualification qualification, rather than integrated into a qualification (pers. Comm. Düvel, Director South African Institute for Agricultural Extension, 2006).

Table 8.35: PFE scores for the UP B Inst Agar Hons (Ext)

Institution:	Pretoria: B Inst Agrar Hons (Extension)				
Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	80	20	100	PFE (Required Modules)	80
1	40-60	40-60	60	PFE (Elective Modules)	68-100
1	120	40	160	Minimum PFE _{BInstAgH(Ext)}	75
1	140	20	160	Potential PFE _{BInstAgH(Ext)}	88

The curriculum is comprised of five required modules of 20 credits each, giving 100 credits of required learning. Of these modules, four are related to Agricultural Extension learning. Hence the PFE for the required learning is 80. The balance of 60 credits is made up of electives of which 20 credits are not extension learning. Thus a student may construct his qualification with a minimum of 120 credits of extension learning (80 credits from required modules and 40 credits from elective modules) or a maximum of 140 credits of extension learning (80 credits from required modules and 60 credits from elective modules). Hence the Minimum PFE_{BInstAgH(Ext)} score is 75 and the Potential PFE_{BInstAgH(Ext)} score is 88.

As UP did not complete scorecards, PFI, INSHE_Q and INSHQ_Q scores were determined from public documentation available about the modules. Because of the

minimum and potential PFE scores, PFI, $INSHE_Q$ and $INSHQ_Q$ scores were determined for the required modules separately from the rest of the curriculum and then for the balance of the curriculum.

Based on the required modules only, the PFI score for this qualification is 24. This implies that within the prescribed extension learning, the majority of the curriculum markers developed for this study are not covered (i.e. the $INSHE_Q$ and $INSHQ_Q$ scores are 0). The detailed $INSHE$ scores for this qualification are recorded in Appendix 10. Table 8.37 shows the highest $INSHE_Q$ and $INSHQ_Q$ scores for the required modules for this qualification.

Table 8.36: Highest $INSHE_Q$ and $INSHQ_Q$ scores for the required modules in the UP B Inst Agar Hon (Ext)

$INSHE_Q$ Score	$INSHQ_Q$ Score	Curricula marker
15	7.3	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
9	4.6	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture
4	2.1	The theory of systems (systems thinking)
4	2.1	The theory of development concepts
3	1.3	The practice of problem solving
3	1.3	The theory of 'curriculum' development
3	1.3	The practice of 'curriculum'
2	1.0	The theory of Sustainable livelihoods

The $INSHE_Q$ scores indicate that the main focus of the required extension curriculum handling information relevant to extension responsibilities, followed somewhat distantly by the theory of problem solving in the South African agricultural context. The theory of systems (systems thinking), the theory of development concepts, the practice of problem solving, and the theory and practice of 'curriculum' development are all given adequate attention in the extension curriculum. Insufficient attention is given to sustainable livelihoods as a part of the extension curriculum. The $INSHQ_Q$ scores indicate that within the overall curriculum, appropriate attention is given to the practice of problem solving, the theory and practice of 'curriculum' and the theory of sustainable livelihoods.

This is essentially the foundation of extension learning for this qualification. Analysis of the elective modules indicates that elective choices will generally increase focus on

handling information relevant to extension responsibilities and the theory of development concepts, and less so to the theory of problem solving within the South African context.

Electives can potentially add the following markers to extension learning:

- Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction
- Facilitate among farmers knowledge and skill regarding the critical use of information
- It also adds the following markers to the curriculum:
- The theory of sustainable agriculture
- Facilitate among farmers knowledge and skill regarding the critical use of information

When the NSH in extension from this qualification are factored into the NSH for the first degree used to gain entry into the programme, combined PFE_Q scores (across five years) can be determined. Assuming the first degree is a UP B Sc Agric, the combined Minimum and Potential PFE scores are 16 and 19 respectively. This is a considerable improvement in terms of the PFE benchmark score of 25. Completing the B Inst Agrar Hons (Ext) after a first agricultural degree from Fort Hare, UKZN, NWU or Stellenbosch increases the PFE scores even more.

However, notwithstanding the substantial improvement in PFE scores when the B Inst Agrar Hons (Ext) is combined with a first degree in agriculture, the relevance of extension learning is in question. What this study found was that the extension curriculum of the B Inst Agrar Hons (Ext) is particularly focussed on handling information relevant to extension responsibilities. On this score, it may be insufficiently diversified. It is well grounded in development and links extension to problem solving in the South African context. However the modules clearly indicate that the general approach for extension is technology adoption which is essentially technology transfer. Learning and learning partnerships appear nowhere explicitly in the curriculum.

The qualification gives little or no attention to the majority of the 34 markers developed for this study. This indicates that graduates of this qualification will not be well equipped to address the imperatives of current agricultural policy in South Africa.

AUDip (ERD)

The PFE score for the AUDip (ERD) is 100. All of the modules in the curriculum are explicitly extension learning. As with the B Inst Agrar Hons (Ext), this qualification is intended as an add-on to a previous first agricultural degree. It is not, however, intended to create a foundation for entering a Masters. Rather it is more purely a professional qualification designed to give technically trained agriculturalists (agricultural scientists) training in Agricultural Extension.

A review of the curriculum for this qualification indicates that it is virtually identical in structure and content to the extension curriculum of the B Inst Agrar Hons (Ext). Given this, the INSHE_Q and INSHQ_Q scores will be similar and lead to the same general findings as pertain to the B Inst Agrar Hons (Ext). Successfully completing the AUDip (ERD) will substantially increase the PFE scores when combined with the first degree. However, the qualification gives little or no attention to the majority of the 34 markers developed for this study. This indicates that graduates of this qualification will not be well equipped to address the imperatives of current agricultural policy in South Africa.

8.2.7. Stellenbosch University (SU)

Background

Stellenbosch University (SU) is located in the Western Cape Province. It is situated in the rural town of Stellenbosch, South Africa's second oldest town, in the heart of South Africa's wine production area. It is about 50 km from Cape Town.

SU has its origins in the mid- to late 1800s when education was being formalised in the former Cape Colony. It was officially opened in a dedicated structure in 1881 offering theology, arts and maths. It was called the Stellenbosch Gymnasium. In 1887 it changed its name to the Victoria College of Stellenbosch. Teaching agriculture had been mooted in 1882 and was established in 1887. The Department of Agriculture was transferred to Elsenburg in 1898 and returned to Stellenbosch twenty years later when the University of Stellenbosch was formally established with a new Act.

SU has ten faculties: AgriSciences; Arts and Social Sciences; Economic and Management Sciences; Education; Engineering; Health Sciences; Law; Military Sciences; Science; and Theology. There are approximately 22000 students at SU.

Extension at Stellenbosch

The Faculty of AgriSciences has is comprised of eleven (11) departments: ; Agricultural Economics; Agronomy; Animal Sciences; Conservation Ecology and Entomology; Food Science; Forest and Wood Science; Genetics; Horticultural Science; Plant Pathology; Soil Science; and Viticulture and Oenology. Agricultural Extension does not feature as a discipline within any of these departments.

AET offerings

SU offers a wide range of agricultural specialisations in the following qualifications:

Bachelors degrees

- Bachelor of Agriculture (B Agric)
- Bachelor of Agriculture Administration (B Agric Admin)
- Bachelor of Science in Agriculture (B Sc Agric)
- Bachelor of Science in Conservation Ecology (B Sc Cons Ecol)
- Bachelor of Science in Food Science (B Sc Food Sci)
- Bachelor of Science in Forestry and Natural Resources (B Sc F&NR)

Honours and Postgraduate Diplomas

- Bachelor of Science in Agriculture Honours (B Sc Agric Hons)
- Bachelor of Agriculture Administration Honours (B Agric Admin Hons)

Masters and PhDs

- Master of Science in Agriculture (M Sc Agric)
- PhD in Agriculture
- Doctor of Science in Agriculture

The B Agric and the B Sc Agric were examined in this study.

Analysis of the Stellenbosch qualifications

B Agric

The Stellenbosch B Agric is structured around the SAQA/NQF system. Each module in the curricula has a credit load which relates to notional study hours. For each module the NQF level is established. The B Agric being a NQF level 6 qualification, it is comprised level 5 and 6 modules. The actual credit load varies with specialisation, but all of them fall into a range between 125 and 145 credits (1250 and 1450 NSH) in a given year of study.

All B Agric qualifications take a communications module in first year. Otherwise, there is no Agricultural Extension in the Stellenbosch B Agric except in the two Extension specialisations. Table 8.37 give PFE ratings for the qualification.

Table 8.37: PFE Ratings for the Stellenbosch B Agric

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	5	120	125	PFE ₁	4
2	25	110	135	PFE ₂	19
3	40	100	130	PFE ₃	31
Total	70	320	390	PFE _{BAGrE}	18

Of the 3900 NSH allotted to the Stellenbosch B Agric, 700 NSH are dedicated to extension training and education, giving it a PFE_{BAGrE} of 18. This is below the benchmark of 25. The PFI scores for the Stellenbosch B Agric are as follows:

Presence Factor:	
<u>Individual Marker</u>	<u>Score</u>
PFI ₁	47
PFI ₂	91
PFI ₃	94
PFI _Q	94

The detailed INSH scores for the Stellenbosch qualifications are recorded in Appendix 11. Table 8.39 shows the five highest INSHE_Q and INSHQ_Q scores for the Stellenbosch B Agric.

Table 8.38: Five highest INSHE_Q scores for the Stellenbosch B Agric

INSHE _Q Score	INSHQ _Q Score	Curricula marker
6	1.1	The theory of planning, action and reflection (Reflective learning)
5	1.0	Theory of participatory technology development and innovation
5	0.9	Facilitating among farmers: Creative and critical thinking for problem solving within systems
5	0.9	Theory of learning facilitation
5	0.9	Theory of learning and learning styles

The only curriculum markers not found in the Stellenbosch B Agric curriculum across all three years collectively were:

- The theory of ‘curriculum’ development including the following concepts
- The practice of ‘curriculum’ development as outlined above

The INSHE_Q and INSHQ_Q scores indicate that these highest scoring markers all adequately addressed within the extension curriculum. Similarly they are all given adequate attention in the overall curriculum of the qualification. The scores show that this qualification is reasonably grounded in learning (some of the learning markers are low). This is consistent with the learning concept for extension outlined in Chapter 2.

However, although the qualification generally scores well, the following markers fell into the low and none categories, and thus require attention.

- The theory of systems (systems thinking)
- The practice of systems thinking
- The theory of individual and collective learning & learning partnerships
- The practice of Iterative Development Pathways
- The practice of individual and collective learning & learning partnerships
- Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others
- The theory of Sustainable livelihoods
- Facilitating the acquisition by farmers knowledge and skills of farm organisation and management
- The theory of sustainable agriculture
- The practice of sustainable agriculture
- The practice of Sustainable livelihoods
- The theory of ‘curriculum’ development

- The practice of ‘curriculum’ development

In general, Agricultural Extension practitioners with a SU B Agric (Ext) are fairly well equipped to deliver on the issues and imperatives of current South African agricultural policy. They would be better equipped if the PFE score could be increased to the benchmark with the inclusion of addition NSH for the markers with low INSHE_Q and INSHEQ_Q scores.

B Sc Agric

The SU B Sc Agric is a four-year qualification. It is listed as a NQF level 6 qualification. SU offers a wide range of specialisations and sub-streams within specialisations. All of the B Sc Agric qualifications are similarly structured with between 120 and 144 credits per year. Table 8.40 gives examples of the credit allocation for a few of the basic B Sc Agric specialisation offered by SU.

Table 8.39: Credit allocations for selected SU B Sc Agric specialisations

YEAR	Ag Econ	Animal Science	Conservation Ecology	Crop Production	Forestry & NR Sciences	Viticulture
1	124	132	132	124	124	132
2	128	144	125	144	121	144
3	120	136	124	144	128	144
4	120	128	136	128	128	128
TOTAL	492	540	517	540	501	548

There are no extension modules in any of the SU B Sc Agric specialisations. Thus the PFE, INSHE_Q and INSHQ_Q scores are all 0. The implication is that Agricultural Extension practitioners with a SU B Sc Agric with any specialisation are not equipped to address the issues and imperatives of current South African agricultural policy.

8.2.8. Tshwane University of Technology (TUT)

Background

The main campus of Tshwane University of Technology (TUT) is located in Pretoria. It has campuses in Soshanguve, Ga-Rankuwa, Nelspruit, eMalahleni and Polokwane.

TUT was established in January 2004. It is the result of a merger of the former Technikon Northern Gauteng, Technikon North-West and Technikon Pretoria. TUT has seven faculties located as indicated below:

- Economics and Finance: Ga-Rankuwa, eMalahleni, Nelspruit and Polokwane
- Engineering and the Built Environment: Pretoria, Nelspruit and eMalahleni
- Humanities: Soshanguve and Polokwane
- Information and Communication Technology: Soshanguve, Nelspruit, eMalahleni and Polokwane
- Management Sciences: Pretoria Campus, Nelspruit, eMalahleni and Polokwane
- Science: Arcadia, Pretoria
- The Arts: Arts Campus, Pretoria

The Science faculty incorporates Natural Sciences, Health Sciences and Agriculture. It has twelve (12) departments of which three are directly associated with agriculture: Animal Sciences, Crop Science, and Horticulture.

AET offerings

TUT is phasing out three of its National Diplomas in Agriculture and replacing them with a new National Diploma. Thus, TUT offers the following agriculturally related qualifications.

Diplomas

Diplomas being phased out

- National Diploma in Agriculture: Crop Production (old version)
- National Diploma in Agriculture: Mixed Farming
- National Diploma in Agriculture: Rural Development and Extension (being phased out)

Diplomas currently with new intake

- National Diploma in Agriculture: Animal Production
- National Diploma in Agriculture: Crop Production
- National Diploma in Agriculture: Commercial Mixed Farming
- National Diploma in Agriculture: Development and Extension
- National Diploma in Horticulture

Bachelors degrees

- Baccalaureus Technologiae in Agriculture: Animal Production
- Baccalaureus Technologiae in Agriculture: Crop Production
- Baccalaureus Technologiae in Agriculture: Development and Extension
- Baccalaureus Technologiae in Agriculture: Agricultural Management
- Baccalaureus Technologiae in Horticulture

Masters and PhDs

- Magister Technologiae in Agriculture
- Magister Technologiae in Horticulture
- Doctor Technologiae in Agriculture
- Doctor Technologiae in Horticulture

This study examined the Diplomas in Agriculture and the Baccalaureus Technologiae in Agriculture. The credit allocation system at TUT is different from every other institution included in this study. For example, a module may be allocated anything from 0,07 credit to 1,000 credit. For a National Diploma the total credit requirement is 3,000. The Key Informant at TUT advised that to be able to compare like with like, the NSH conversion for TUT credits is 100 NSH per credit instead of the more common ten (10) NSH per credit. Further, in order to make the reading of table easier, in the tables that follow, the small credit numbers have been multiplied by 100.

National Diploma in Agriculture (Diploma Agric)

The National Diploma in Agriculture (Diploma Agric) is a three-year qualification listed as a NQF level 6 qualification. As noted above, TUT offers four agricultural diplomas. Each Diploma Agric is constructed along very similar lines; the only variation being the Animal Production specialisation. Table 8.41 gives the credit allocation for the Diploma Agric (except the Animal Production specialisation). Table 8.42 gives the credit allocation for the Diploma Agric: Animal Production. The credits have been inflated by a factor of 100.

Table 8.40: Credit allocation for the TUT National Diploma Agriculture: Crop Production, Commercial Mixed Farming and Development and Extension

Year	Credit allocation		
	Semester 1	Semester 2	Total
1	50	50	100
2	50	50	100
3	50	50	100
			300

Table 8.41: Credit allocation for the TUT National Diploma Agriculture: Animal Production

Year	Credit allocation		
	Semester 1	Semester 2	Total
1	37.5	37.5	75
2	62.5	62.5	125
3	50	50	100
			300

Baccalaureus Technologiae in Agriculture (B Tech Agric)

The Baccalaureus Technologiae in Agriculture (B Tech Agric) is a one-year qualification added onto a relevant three-year National Diploma in Agriculture. All of the TUT B Tech Agric qualifications are constructed on the basis of 0,500 per semester and 1,000 per year. For the purposes of this study this is equivalent to 100 credits.

Analysis of the TUT qualifications

Diploma Agric/B Tech

The Diploma and B Tech qualifications are companion qualifications. A Diploma in Crop Production articulates to a B Tech in Crop Production. Likewise, a Diploma in Development and Extension articulates to a B Tech in Development and Extension. Therefore, the analysis is presented in these articulated groupings.

There is no extension in the Diploma Agric: Animal Production. Therefore the PFE, INSHE_Q and INSHQ_Q scores are all 0. Tables are not presented for this qualification.

Diploma Agric: Crop Production/Commercial Mixed Farming/B Tech: Crop Production

Diploma

Table 8.43 gives the PFE scores for the Diploma Agric for the two specialisations of Crop Production and Commercial Mixed Farming. Of the 3000 NSH allocated to the Diploma Agric with specialisations in Crop Production and Commercial Mixed Farming, 100 NSH are allocated to extension. This gives the qualification a $PFE_{DipAg(CP/CMF)}$ score of 3. This qualification falls well below the PFE benchmark score of 25.

Table 8.42: PFE scores for the TUT Diploma Agric: Crop Production/Commercial Mixed Farming.

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	10	90	100	PFE_1	10
2	0	100	100	PFE_2	0
3	0	100	100	PFE_3	0
Total	10	290	300	$PFE_{DipAg(CP/CMF)}$	3

The PFI scores for these two Diplomas are as follows:

Presence Factor:	
<u>Individual Marker</u>	<u>Score</u>
PFI1	85
PFI2	0
PFI3	0
PFI_{Dip}	85

The detailed INSHE scores for the TUT qualifications are recorded in Appendix 12. The Diploma Agric: Animal Production was not analysed as it had a $PFE_{DipAg(AP)}$ score of 0. Table 8.44 shows the ten highest $INSHE_Q$ and $INSHQ_Q$ scores for the TUT Diploma Agric in Crop Production/Commercial Mixed Farming.

The $INSHE_Q$ scores indicate that the theory of sustainable agriculture and handling information relevant to extension is given more than adequate attention within the extension curricula. The balance of the high scoring markers is also given adequate attention in the extension curriculum.

The $INSHQ_Q$ scores show that insufficient attention is given to each of these markers within the overall curriculum. This is borne out by the low PFE score (3) for the

qualification. Further, the following markers had INSHE_Q and INSHQ_Q scores of 0 (i.e. they were not found in the curriculum of the Diploma):

- The practice of sustainable agriculture
- The practice of Iterative Development Pathways
- The practice of Sustainable livelihoods
- The theory of ‘curriculum’ development
- The practice of ‘curriculum’ development

Table 8.43: Ten highest INSHE_Q and INSHQ_Q scores for the TUT Diploma Agric: Crop Production/Commercial Mixed Farming

INSHE _Q Score	INSHQ _Q Score	Curricula marker
6	0.2	The theory of sustainable agriculture
6	0.2	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
5	0.2	The theory of the process of investigating (research), applying and sharing (IAS)
5	0.2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others
5	0.2	The theory of participatory technology development and innovation
5	0.2	The theory of systems (systems thinking)
5	0.2	The practice of systems thinking
5	0.2	The theory of Iterative Development Pathways
5	0.2	The theory of development concepts
5	0.2	The theory of learning and learning styles

In sum, Agricultural Extension practitioners with a TUT Diploma Agric: Crop Production/Commercial Mixed Farming are not adequately equipped to deliver on the agenda of current South African agricultural policy.

B Tech: Crop Production

Table 8.45 gives the PFE scores for the B Tech: Crop Production. Of the 1000 NSH allocated to the TUT B Tech: Crop Production, 250 NSH are allocated to extension. This give the qualification a PFE_{BTech(CP)} score of 25. This is in keeping with the benchmark.

Table 8.44: PFE scores for the B Tech: Crop Production.

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
4	25	75	100	PFE ₄	25
Total	25	75	100	PFE _{BTech(CP)}	25

The PFI score for this qualification is 97. Table 8.46 shows the highest INSHE_Q and INSHQ_Q scores for the TUT B Tech: Crop Production. The INSHE_Q scores shown above indicate all of the highest rated markers are given more than adequate attention in the extension curriculum of this qualification. Similarly, INSHQ_Q scores indicate that they also are given appropriate attention within the overall curriculum of the qualification. Only the following marker was not addressed in this curriculum was:

- The practice of ‘curriculum’ development.

Table 8.45: The six highest INSHE_Q and INSHQ_Q scores for the TUT B Tech: Crop Production

INSHE _Q Score	INSHQ _Q Score	Curricula marker
6	1.2	The theory of systems (systems thinking)
6	1.2	The theory of Sustainable livelihoods
6	1.2	The theory of ‘curriculum’ development
6	1.2	The theory of planning, action and reflection (Reflective learning)
6	1.2	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction
6	1.2	Facilitate among farmers knowledge and skill regarding the critical use of information

This is in keeping with the fact that the B Tech is an add-on qualification. In sum, Agricultural Extension practitioners with a TUT B Tech: Crop Production should be adequately equipped to deliver on the agenda of current South African agricultural policy. However the real efficacy is in the combination with the lower qualification.

When the Diploma and the B Tech are combined, the PFE_Q becomes 9, which is a significant improvement on the PFE score of the Diploma alone. The PFI score remains at 97. However the INSHE_Q and INSHQ_Q scores strengthen in terms of the Diploma and weaken in terms of the B Tech. Table 8.47 shows the nine INSHE_Q and INSHQ_Q scores for the combined Diploma and B Tech.

Table 8.46: The nine highest INSHE_Q and INSHQ_Q scores for the combined Diploma Agric: Crop Production/Mixed commercial Farming and B Tech: Crop Production.

INSHE _Q Score	INSHQ _Q Score	Curricula marker
6	0.5	The theory of systems (systems thinking)
5	0.5	The theory of Sustainable livelihoods
5	0.5	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
5	0.5	The theory of the process of investigating (research), applying and sharing (IAS)
5	0.4	The theory of development concepts
5	0.4	The theory of learning and learning styles
5	0.4	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction
5	0.4	Facilitate among farmers knowledge and skill regarding the critical use of information
5	0.4	The theory of planning, action and reflection (Reflective learning)

These scores show that the theory of systems is more than adequately covered in the extension curriculum of this qualification. They show that the other highest scoring markers are adequately covered in the extension curriculum. However, because the PFE score is still well below the benchmark, insufficient attention is given even to these highest scoring markers.

In brief, even with the combined qualification, Agricultural Extension practitioners with a TUT Diploma in Agriculture: Crop Production or Commercial Mixed Farming together with the B Tech: Crop Production will not be adequately equipped to deliver on the agenda of current South African agricultural policy.

Diploma Agric (Development and Extension)/B Tech: Development and Extension

Diploma

Table 8.48 gives the PFE scores for the TUT Diploma Agric: Development and Extension. Of the 3000 NSH allocated to the Diploma Agric: Development and Extension, 300 NSH are allocated to extension. This give this qualification a PFE_{DipAg(D&E)} score of 10. This qualification falls well below the PFE benchmark score of 25.

Table 8.47: PFE scores for the TUT Diploma Agric: Development and Extension

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	10	65	75	PFE ₁	13
2	20	105	125	PFE ₂	16
3	0	100	100	PFE ₃	0
Total	30	270	300	PFE _{DipAg(D&E)}	10

This is the only qualification in the study that recorded a PFI score of 100. The PFI scores for the qualification are as follows:

Presence Factor:	
<u>Individual Marker</u>	<u>Score</u>
PF11	85
PF12	100
PF13	0
PFI _{Dip}	100

Table 8.49 gives the INSHE_Q and INSHQ_Q scores for the TUT Diploma Agric: Development and Extension. Based on the INSHE_Q scores, these highest scoring markers are given adequate attention in the extension curricula of this qualification; the two highest being given more than adequate attention. The INSHQ_Q scores indicate that these markers are also given appropriate attention within the overall curriculum of the qualification. The balance of the markers with positive scores need greater attention.

Only the two following markers received a score of 0 (i.e. they were not found in the curriculum):

- The theory of 'curriculum' development
- The practice of 'curriculum' development

Table 8.48: The nine highest INSHE_Q and INSHQ_Q scores for the TUT Diploma Agric: Development and Extension

INSHE _Q Score	INSHQ _Q Score	Curricula marker
7	0.7	The theory of sustainable agriculture
6	0.6	The theory of development concepts
5	0.5	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
5	0.5	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture
5	0.5	The theory of participatory technology development and innovation
5	0.5	The theory of learning and learning styles
5	0.5	The theory of systems (systems thinking)

Even through the PFI score for this qualification is 100, the PFE score is very low. This limits the ability of the curriculum to allocate NSH to the lower scoring markers. Thus Agricultural Extension practitioners with a TUT Diploma Agric: Development and Extension are marginally equipped to deliver on the agenda of current South African policy.

B Tech

Table 8.50 gives the PFE score for the TUT B Tech Agric: Development and Extension. This qualification has the same PFE score as the B Tech Agric: Crop Production. Its score of 25 in line with the bench mark

Table 8.49: PFE score for the TUT B Tech Agric: Development and Extension.

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
4	25	75	100	PFE ₄	25
Total	25	75	100	PFE _{BTechAgric(D&E)}	25

The INSHE_Q and INSHQ_Q scores for the TUT B Tech Agric: Development and Extension are fairly evenly distributed. The highest INSHE_Q score is 6; this is attained by four of the markers. The next highest score is 6; this is attained by eight of the markers. Only five markers fall below 3. Table 8.51 gives the fourteen highest INSHE_Q and INSHQ_Q scores for the qualification. The INSHE_Q scores show that these markers are given more than adequate attention in the extension curricula of the qualification.

The INSHQ_Q scores indicate that excessive attention is given to these highest scoring markers relative to the overall curriculum. The highest is 2.8 and the lowest is 0.5. However, none of the markers fall into the low rating category.

In sum, Agricultural Extension practitioners with a TUT B Tech Agric: Development and Extension should be adequately equipped to deliver on the agenda of current South African agricultural policy.

Table 8.50: The 14 highest INSHE_Q and INSHQ_Q scores for the TUT B Tech Agric: Development and Extension

INSHE _Q Score	INSHQ _Q Score	Curricula marker
6	2.8	The theory of systems (systems thinking)
6	2.8	The theory of Sustainable livelihoods
6	2.8	The theory of learning facilitation
6	2.8	Facilitate among farmers knowledge and skill regarding the critical use of information
5	2.5	The theory of Iterative Development Pathways
5	2.5	The theory of development concepts
5	2.5	The theory of individual and collective learning & learning partnerships
5	2.5	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction
5	2.5	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture
5	2.5	The theory of learning and learning styles
5	2.5	The theory of 'curriculum' development
5	2.5	The theory of planning, action and reflection (Reflective learning)
5	2.5	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management
5	2.5	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda

Table 8.52: PFE scores for combined TUT qualifications Diploma Agric and B Tech Agric: Development and Extension. When the diploma and the B Tech are combined, the strength of extension in the B Tech strengthens the overall extension learning across the four years. This is reflected in the PFE score. However, the Diploma remains weak in terms of the bench mark.

Table 8.51: PFE scores for combined TUT qualifications Diploma Agric and B Tech Agric: Development and Extension

Credits			Presence Factor:	
Extension	Other	Total	Extension	
30	270	300	PFE _{Dip}	10
25	75	100	PFE _{BTech}	25
55	345	400	PFE _{Combined}	14

Combining the qualifications tends to lower the overall scores of the markers, indicating a need to give more attention to the lower scoring markers. This is to be expected because the Diploma carries so few NSH allocated to extension. The INSH scores for the combined qualifications are found in Appendix 12. Table 8.53 gives the eight highest INSHE_Q and INSHQ_Q scores for the combined qualifications. These scores and those of the lower scoring markers reinforce the conclusion that work needs to be done on the Diploma to ensure that Agricultural Extension practitioners with these qualifications can deliver on the agenda of current South African agricultural policy.

Table 8.52: The eight highest INSHE_Q and INSHQ_Q scores for the combined TUT Diploma and B Tech Agric: Development and Extension

INSHE _Q Score	INSHQ _Q Score	Curricula marker
5	1.1	The theory of development concepts
5	1.0	The theory of systems (systems thinking) including the following concepts
5	1.0	The theory of Sustainable livelihoods
5	1.0	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products
5	0.9	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)
5	0.9	Facilitate among farmers knowledge and skill regarding the critical use of information
5	0.9	The theory of learning facilitation including the following concepts:
5	0.9	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.

8.2.9. University of Zululand (UNIZUL)

Background

The University of Zululand (UNIZUL) is located in the KwaZulu-Natal Province. It is situated just outside Empangeni near Richards Bay in northern KwaZulu-Natal. It is a fairly rural area, but has adequate infrastructure to support academic standards at the higher education level. It is well positioned for agricultural training, education and research, particularly as regards the transformational agenda for South African agriculture. The area is a rich mix of commercial, semi-commercial, large-scale, small-scale and traditional farming on a variety of land tenure systems including freehold, long-term lease, permission-to-occupy, state land and informal settlement.

UNIZUL was originally known as Zululand University College and was a sub-unit of the University of South Africa (UNISA). While it was officially launched in 1961, the first intake of students arrived in 1960. It was created as part of the controversial Extension of University Education Act of 1959 the aim of which was ostensibly to take tertiary education to the then 'homelands'. UNIZUL was decried as a 'bush college' because of its being part of a greater strategy of apartheid to maintain the segregation of the races. Providing a university in the deep rural areas would help justify the prohibition of non-white students from attending university in the cities.

When the university opened its doors in 1960, it had 41 students of whom 36 were male. It offered courses in education and arts. In 1970, UNIZUL gained full university status, became independent of UNISA and was renamed the University of Zululand. In the post-apartheid transformation of higher education, UNIZUL remained intact as the only comprehensive institution of higher education in northern KwaZulu-Natal. UNIZUL has four faculties: Arts, Commerce and Law, Education and Science and Agriculture. The Science and Agriculture Faculty has twelve schools.

Agricultural Extension at UNIZUL

Agricultural Extension is part of two departments; Consumer Science and Agriculture. Both departments are part of the Faculty of Science and Agriculture. The main extension offering is in the Department of Consumer Science which has nine (9) academic staff. The Department of Agriculture has ten (10) academic staff. Exact student numbers were not available, but there are in excess of 10000 students at UNIZUL.

AET offerings

UNIZUL offers two main qualifications relevant to this study: Bachelor Consumer Science: Extension and Rural Development (B Consumer Science (ERD)); and Bachelor of Science in Agriculture with specialisations in agribusiness management, agronomy and animal science. The B Consumer Science is offered in the Department of Consumer Science and the B Sc Agric is offered in the Department of Agriculture.

The B Consumer Science is a four-year qualification. The aim of the qualification is to integrate knowledge and skills from consumer sciences and agriculture. It is anticipated that a graduate would work in such professions as extension and community/rural development in either the private or public sector. The qualification equips the learner to provide education, training and other extension services with special emphasis on resource management and food security (including food production, food processing and nutrition).

The B Sc Agric is also a four year qualification. The aim of the qualification is to train learners to take up work in the private or public sector as agricultural professionals including agricultural economists, agronomists and animal scientists. The course also seeks to build capacity among the learners to enable them to be self-employed in these same fields.

Analysis of the UNIZUL qualifications

B Consumer Science (ERD)

Table 8.54 presents the PFE scores for the UNIZUL B Consumer Science (ERD) and the B Sc Agric. Of the 5120 NSH allocated to the B Consumer Science (ERD) 640 NSH are devoted to extension, giving it a $PFE_{BConSci (ERD)}$ of 13. The B Consumer Science curricula has 32 required credits (320 NSH) of agricultural technical content in first year, 16 required credits (160 NSH) of agriculture in second year, 40 required credits (400 NSH) of agriculture in third year, and no required, but 16 elective credits (160 NSH) in fourth year. This implies that between 17% and 20% of the B Consumer Science (ERD) is grounded in agriculture. Using the PFE scoring system the minimum PFE_Q for agriculture in this qualification would be 17 and the potential PFE_Q for agriculture would be 20. This demonstrates that there is more agriculture in the qualification than there is extension. The balance of the learning is taken up with subjects such as entrepreneurship, consumer issues, food and nutrition, and clothing and textiles.

Table 8.53: PFE Scores for the UNIZUL B Consumer Science (ERD)

Year	Credits			Presence Factor: Extension	
	Extension	Other	Total		
1	8	120	128	PFE ₁	6
2	8	120	128	PFE ₂	6
3	16	112	128	PFE ₃	13
4	32	96	128	PFE ₄	25
Total	64	448	512	PFE _{BConSci (E&RD)}	13

The PFI scores for the B Consumer Science are:

Presence Factor: <u>Individual Marker</u>	<u>Score</u>
PFI ₁	9
PFI ₂	0
PFI ₃	35
PFI ₄	88
PFI _Q	88

In the B Consumer Science (ERD), the following curricula markers had a INSHE_Q score of 0, i.e. they were not found in the curricula:

- The practice of learning and learning styles
- The theory of ‘curriculum’ development
- The practice of ‘curriculum’ development
- The theory of the process of investigating (research), applying and sharing (IAS)

The detailed INSHE scores for the UNIZUL qualifications are recorded in Appendix 13. Table 8.55 shows the five highest INSHE_Q and INSHQ_Q scores for the UNIZUL B Consumer Science (Extension and Rural Development)

In terms of the INSHE_Q scores, the primary focus of the B Consumer Science (ERD) is training graduates to collect, analyse, organise and critically evaluate information relevant to extension responsibilities. The theory of participatory technology development and innovation and the practice of individual and collective learning & learning partnerships comprise other significant portions of the extension curriculum. The curriculum gives more than adequate attention to the theory of individual and collective

learning and learning partnerships and the theory of learning facilitation. The score of 36 indicates that this curriculum is probably insufficiently diversified.

Table 8.54: Five highest INSHE_Q scores for the UNIZUL for the B Consumer Science

INSHE _Q Scores	INSHQ _Q Score	Curricula Marker
36	6.5	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
14	2.4	The theory of participatory technology development and innovation
12	2.2	The practice of individual and collective learning & learning partnerships
7	1.3	The theory of individual and collective learning & learning partnerships
7	1.3	The theory of learning facilitation

In terms of the INSHQ_Q scores, it appears that excessive attention is given to the following markers

- Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
- The theory of participatory technology development and innovation
- The practice of individual and collective learning & learning partnerships

In sum, Agricultural Extension practitioners with a UNIZUL B Consumer Science (ERD) are not adequately equipped to deliver on the agenda of current South African agricultural policy.

B Sc Agric

Tables 8.55 presents the PFE scores for the UNIZUL B Consumer Science (ERD) and the B Sc Agric. Of the 5120 NSH allocated to the B Sc Agric 320 NSH are devoted to extension, giving it a PFE_{BScAgric} of 6. B Sc Agric students may also take an extension elective in fourth year. Thus, the minimum PFE_{BScAgric} is 6 and the potential PFE_{BScAgric} is 8. Clearly the students in agriculture receive significantly less training and education in extension than the students in consumer science. Further, the extension learning in the B Sc Agric is at second year (NQF level 5), whereas in the B Consumer Science extension is learned primarily in third and fourth years.

Table 8.55: PFE Scores for the UNIZUL B Sc Agric

Year	Credits			Presence Factor:	
	Extension	Other	Total	Extension	
1	0	128	128	PFE ₁	0
2	32	96	128	PFE ₂	25
3	0	128	128	PFE ₃	0
4	0	128	128	PFE ₄	0
Total	32	480	512	PFE _{BScAgric}	6

The PFI scores for the B Sc Agric are:

Presence Factor:	
<u>Individual Marker</u>	<u>Score</u>
PFI ₁	0
PFI ₂	41
PFI ₃	0
PFI ₄	0
PFI _Q	41

The detailed INSHE scores for the UNIZUL BSc Agric are recorded in Appendix 13. Table 8.57 gives the seven highest INSHE_Q and INSHQ_Q scores for the qualification. The INSHE_Q scores indicate that these seven markers are the primary focus of the extension curricula in the B Sc Agric. The INSHQ_Q scores indicate that these markers are given excessive attention within the overall curriculum of the qualification. Some 20 of the curricula markers had a INSHE_Q score of 0, i.e. they were not found in the curricula.

Table 8.56: Seven highest INSHE_Q and INSHQ_Q scores for the UNIZUL BSc Agric

INSHE _Q Score	INSHQ _Q Score	Curricula marker
15	2.7	The theory of individual and collective learning & learning partnerships
15	2.7	The theory of planning, action and reflection (Reflective learning)
13	2.3	The practice of individual and collective learning & learning partnerships
10	1.8	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture
10	1.8	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
10	1.8	The theory of learning facilitation
10	1.8	The practice of planning, action and reflection (Reflective learning)

In sum, Agricultural Extension practitioners with a UNIZUL B Sc Agric are not adequately equipped to deliver on the agenda of current South African agricultural policy.

8.3. Summary from universities and universities of technology

As noted in Chapter 6, all the relevant institutions were initially included in the study. However, not all institutions responded to the invitation. Therefore, the institutions included in the study was limited to those willing and able to participate or for which sufficient information could be gathered using secondary data. Willingness and ability to participate manifested itself at different stages of the research. Steps 3-7 each required either access information or to a key informant in the institution. If at any time the institution was unwilling or unable to provide sufficient primary data about their qualifications and curricula, then efforts were made to secure sufficient data through secondary data, such as curriculum handbooks in the public domain. Where no such secondary information could be obtained, the institution could not be included in the study.

It was noted that Hendrick (1999) had an 83% and a 34% non-response rate from universities of technology and colleges in a study done on Agricultural Management. Experience had also indicated that there is a general reluctance among ostensibly competing institutions to share too much information about programmes with sister institutions. Thus, while every effort was made to include relevant institutions, it was anticipated that not all would be willing or able to participate.

The curricula of seven universities and one university of technology in South Africa that offer agricultural qualifications were evaluated using the method developed in Chapters Five and Six. From this evaluation it was learned that in the main qualifications held by Agricultural Extension practitioners there is very little attention given to Agricultural Extension. Only the Tshwane University of Technology and the University of KwaZulu-Natal had any qualifications that reached the PFE benchmark score of 25.

The major concern is that the most commonly sought after qualification is the B Sc Agric. This study has shown that in most of the B Sc Agric qualifications there is little or no extension learning at all. In the main specialisations of animal and crop production which form the backbone of agricultural production, only Fort Hare and Zululand Universities have any substantial extension content. And these fall well below the benchmark.

8.4. Summary and conclusions from findings at institutions of higher education (colleges of agriculture, universities and universities of technology)

As noted in Chapters 5 and 6, the PFI, INSHE_Q and INSHQ_Q scores are indicators, not statistical measures. They are meant to help interrogate the extension education and training in the current curricula of institutions that offer higher education qualifications that are commonly held by Agricultural Extension practitioners. The aim is to identify strengths and weaknesses and particular gaps so that these institutions can begin to address them and align their offerings with the needs of the imperatives of South African Agriculture.

The main findings are two: First is that extension is rarely taught in any of the university degrees and generally given only scant attention in agricultural diplomas from the agricultural colleges – both qualifications being those most commonly held by those who serve as Agricultural Extension practitioners.

The second finding is a concern about the nature of Agricultural Extension education and training that is extant in the South African higher education system. The 34 markers developed for this study were designed around skills and knowledge needed to be equipped to deliver on the agenda of current South African agricultural policy. The study indicates that the current extension curricula used at South African universities generally does not equip Agricultural Extension practitioners for the imperatives of the day. Extension, contrary to current developments in the field, seems largely still in a technology transfer paradigm. While some of the learning markers are engaged, the learning paradigm developed through the Agriflection concept – the theoretical element of the TICE method – is rarely employed.

A detailed discussion of findings will be presented in Chapter 10. The initial conclusion of this part of the study is clear. Public Sector Agricultural Extension practitioners who hold a Diploma in Agriculture, a Bachelor of Agriculture, a Bachelor of Science in Agriculture and/or a Bachelor of Agriculture Honours are generally not well equipped to service the current needs of agriculture in South Africa.

While the status of Agricultural Extension practitioners currently employed in the Public Service is addressed briefly in the next section, the issue at stake here is the training and education of future Agricultural Extension practitioners. Currently employed practitioners can be re-trained. However, unless significant changes are made to the

extension curricula at higher education institutions, South Africa will continue to produce Agricultural Extension practitioners who are ill-equipped, ill-trained and ill-suited to the task at hand, and who will also require retraining.

References

CHE (Council on Higher Education), Undated. CHE Website. <http://www.che.ac.za/links/links.php?cat=21>. Accessed December 2007.

Hendrick, R.M., 1999. Guidelines for the Development of an Experiential Training Guide for the Agriculture Management Course at Technikon SA. Vista University, Pretoria

Chapter 9

Findings from Public Sector Agricultural Extension

9.1. Introduction

This Chapter will present findings from crosschecking research done within public sector Agricultural Extension. It discusses findings from a survey conducted among Agricultural Extension practitioners and from a review made of job descriptions of public sector Agricultural Extension positions. On their own the investigations were not meant to be conclusive. Rather, they were meant to provide additional insight into the world of Agricultural Extension education in South Africa – to either corroborate or contradict the findings from educational institutions.

9.2. Findings from Agricultural Extension practitioners

According to the South African National Department of Agriculture (DoA 2005), there are 1132 agricultural extension practitioners in the South African public service. As set out in Table 9.1, 85.5% of these practitioners hold an undergraduate qualification. Another 10.4% hold a four-year or fourth year (honours) qualification and 3.8% hold a Masters or PhD. Data were not available to disaggregate the four-year and fourth year qualifications.

Based on this information, 875 of these practitioners (77.3%) were actually currently in the field at the time of the study. Of these, 92.7% held undergraduate qualifications. This reinforces the decision to focus the study on undergraduate programmes as explained in Chapter 6.

Over 450 questionnaires distributed to South African public sector Agricultural Extension practitioners; 132 (approximately 29%) practitioners responded. This represents 11.7% of all practitioners as identified by the DoA. They ranged from agricultural technicians (the entry level position in Agricultural Extension) to Agricultural Extension managers.

As explained in Chapter 4, questionnaires were distributed at three events attended by public sector Agricultural Extension practitioners: the 40th Annual Conference of the South African Society for Agricultural Extension (SASAE) in May 2006; the 41st Annual

SASAE Conference in May 2007; a training programme conducted by the researcher for Agricultural Extension officials in November 2007. These events were chosen as they afforded relatively easy, random and unencumbered access to practitioners. No respondent completed more than one questionnaire, so there was no duplication of response. (See Appendix 3.)

The data collected was analysed using EXEL©. The primary purpose of this part of the study was to obtain an indication of the level and nature of Agricultural Extension training among current practitioners in terms of the 34 markers developed for this study.

Table 9.1: Numbers and qualifications of extension practitioners in public service in South Africa

	Total		Certificate or Diploma		Advance Diploma, B-Tech or B Degree		B Sc Agric, Hons		Masters, MSc, or PhD	
	n	%	n	%	N	%	n	%	n	%
Agricultural Technicians	20	1.8	16	2.1	2	1.0	2	1.7	0	0.0
Extension Workers	666	58.8	519	67.2	101	50.8	40	33.9	6	14.0
Extension Workers and Supervisors	189	16.7	135	17.5	38	19.1	11	9.3	5	11.6
Supervisors and Managers	128	11.3	61	7.9	26	13.1	18	15.3	23	53.5
Support services	97	8.6	23	3.0	24	12.1	42	35.6	8	18.6
Other	32	2.8	18	2.3	8	4.0	5	4.2	1	2.3
Total	1132	100.0	772	100.0	199	100.0	118	100.0	43	100.0
Percentages				68.2		17.6		10.4		3.8

Participants were asked to complete a single questionnaire that asked them to assess their perceived level of knowledge and skills related to each of the 34 markers. Their options were: None; Very little; Some; Adequate; More than adequate; and Proficient. As explained in Chapter 6, they were presented as a Likert scale (0-5). Simple frequency and distribution calculations were done to establish the perception of proficiency among current Agricultural Extension practitioners in terms of the 34 markers developed for this study. Additional details of the survey are included in Appendix 15. Analysis of these data provides some insight into the knowledge and skills of Agricultural Extension practitioners relative to the demands of current South African agricultural policy. Table

9.2 shows the curriculum markers scoring the highest percentages for which participants claimed “adequate”, “more than adequate” and “proficient” knowledge and skills. For the sake of brevity, this has been limited to those markers with a combined score of 75% or more. (See Appendix 14 for the ranking of all markers)

**Table 9.2: Curriculum markers which participants claimed “adequate”, “more than adequate” or “proficient” knowledge and skills
(Ranked from highest to lowest on the combined score; rounded to the nearest whole number)**

Marker	Percent			
	Adequate	More than adequate	Proficient	Combined
The theory of sustainable agriculture	32	48	12	92
Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	49	30	11	90
The practice of problem solving	38	42	9	89
Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	36	44	8	88
Facilitating among farmers: Creative and critical thinking for problem solving within systems	27	42	18	87
The practice of participatory technology development and innovation	42	38	5	85
The practice of sustainable agriculture	46	37	3	86
The theory of Sustainable livelihoods	44	31	10	85
The theory of learning facilitation:	44	31	10	85
The theory of planning, action and reflection (Reflective learning)	46	31	8	85
Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	36	36	11	83
Facilitate among farmers knowledge and skill regarding the critical use of information	40	37	7	84
The theory of problem solving in the context of dealing with issues facing developmental agriculture	28	48	8	84
The theory of participatory technology development and innovation:	36	36	11	83
The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	51	24	9	84
The practice development concepts	43	36	3	82
Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	42	32	9	83
The theory of development concepts	38	35	7	80

Marker	Percent			
	Adequate	More than adequate	Proficient	Combined
The practice of learning and learning styles as	47	27	5	79
The practice of learning facilitation as described above	42	31	6	79
The practice of planning, action and reflection (Reflective learning) as outlined above	42	31	5	78
Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	37	30	11	78
The practice of systems thinking	45	27	5	77
The practice of Sustainable livelihoods	42	27	7	76
The theory of individual and collective learning & learning partnerships	43	27	6	76
Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	41	30	5	76
The theory of systems (systems thinking)	40	27	8	75
The practice of individual and collective learning & learning partnerships	42	28	5	75
n = 132				

On the other end of the spectrum, Table 9.3 shows, in order of least prevalent, the curriculum markers for which respondents claimed “some”, “very little” or “no” knowledge and skills. Again for the sake of brevity, this has been limited to those markers with a combined score of 75% or more. (See Appendix 15 for the ranking of all markers)

Table 9.3: Curriculum markers for which respondents claimed “some”, “very little” or “no” knowledge and skills (Ranked from highest to lowest on the combined score)

Marker	Percent			
	None	Very Little	Some	Combined
The practice of ‘curriculum’ development	3.8	13.6	31.1	48.5
The practice of Iterative Development Pathways	3.8	10.6	31.8	46.2
The theory of the process of investigating (research), applying and sharing (IAS)	3.0	6.1	33.3	42.4
The theory of ‘curriculum’ development	3.0	11.4	27.3	41.7
The practice of the process of investigating (research),	3.0	7.6	28.0	38.6

Marker	Percent			
	None	Very Little	Some	Combined
applying and sharing				
The theory of Iterative Development Pathways	3.0	9.1	22.7	34.8
The theory of systems (systems thinking)	0.8	2.3	22.0	25.0
The practice of individual and collective learning & learning partnerships	2.3	4.5	18.2	25.0
n =132				

Together, Tables 9.2 and 9.3 frame the highest and lowest knowledge and skill sets regarding the 34 markers developed for this study. The results they represent give an indication of the preparedness of Agricultural Extension practitioners to deliver on the agenda of current South African agricultural policy. For 28 of the markers, 75% or more of the participants claimed adequacy or greater competence. For eight of the markers 25% to 48.5% little or no knowledge and skills.

When the data is tested for the mode for each marker, seven (7) markers emerge with a mode score of 4 (more than adequate):

- Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others
- The theory of problem solving in the context of dealing with issues facing developmental agriculture
- The practice of problem solving
- The theory of participatory technology development and innovation
- The theory of sustainable agriculture
- Facilitating among farmers: Creative and critical thinking for problem solving within systems
- Facilitating the acquisition by farmers knowledge and skills of farm organisation and management

From this list, it is evident that problem solving features prominently in the knowledge and skill set of the respondents.

One marker has a mode of 2 (some): The theory of the process of investigating (research), applying and sharing (IAS). The other 26 markers each had a mode of 3 (adequate). See Appendix 15 for the complete list of mode scores.

These findings are not consistent with the findings of the colleges and universities where the participants would have obtained their qualifications. They imply that the practitioners obtained these capabilities somewhere other than through their formal qualification. These findings are explored further in Tables 9.4, 9.5 and 9.6.

The 132 participants in the survey of Agricultural Extension practitioners were also asked to identify whether or not they had acquired knowledge and skill of a particular marker as a part of their qualification. Fifty-seven (57) participants (43.2%) chose to respond. These tables present their responses. Table 9.3 shows the curriculum markers identified 50% or more of the respondents as being learned as a part of their qualification. Table 9.4 shows the acquired curriculum markers identified by 50% or more of the respondents as not being learned as part of their qualification.

When the high scoring curriculum markers from Table 9.3 are juxtaposed to the findings on where knowledge and skills are acquired, the study shows (Table 9.5) that significant percentages of the respondents reported that they did not acquire these knowledge and skill sets as a part of their qualification. Some wrote on their questionnaires indicating that they had gained the knowledge and skills through training courses taken in association with their employment, i.e. in-service training. This is confirmed by the fact that only a very small percentage of South Africa's public sector Agricultural Extension practitioners have post-graduate qualifications. It is further confirmed by the fact that 68.2% of Agricultural Extension practitioners have a certificate or diploma. As demonstrated in Chapter 7, the curricula for diplomas (which are primarily offered at colleges of agriculture) are largely devoid of extension training in general and of the markers used in this study in particular.

Table 9.4: Acquired curriculum markers identified by 50% or more of the respondents as being learned as a part of their qualification

Curriculum marker	Part of Qualification %
Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	80.7
Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	61.4
The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture	61.4
The practice of problem solving	61.4
The theory of sustainable agriculture	57.9
The theory of development concepts	56.1
Facilitating among farmers: Creative and critical thinking for problem solving within systems	56.1
The theory of participatory technology development and innovation	54.4
The practice of systems thinking	54.4
Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	54.4
The practice of participatory technology development and innovation	52.6
The theory of systems (systems thinking) including	52.6
n = 57	

Table 9.5: Acquired curriculum markers identified by 50% or more of the respondents as not being learned as part of their qualification

Curriculum Marker	Not part of Qualification %
The practice of 'curriculum' development	68.4
The theory of 'curriculum' development	66.7
The practice of Iterative Development Pathways	64.9
The theory of the process of investigating (research), applying and sharing (IAS)	64.9
The practice of the process of investigating (research), applying and sharing	64.9
n = 57	

Table 9.6: Proficiency of skill and knowledge as a part of learning in a qualification

Curriculum Marker	Higher proficiency %	Part of Qualification %
The theory of sustainable agriculture	91.7	57.9
Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	89.4	80.7
The practice of problem solving	88.6	61.4
Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	87.9	61.4
Facilitating among farmers: Creative and critical thinking for problem solving within systems	87.9	56.1
The practice of participatory technology development and innovation	85.6	54.4
The practice of sustainable agriculture	85.6	49.1
The theory of Sustainable livelihoods	84.8	45.6
The theory of learning facilitation	84.8	49.1
The theory of planning, action and reflection (Reflective learning)	84.8	45.6
Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	84.1	54.4
Facilitate among farmers knowledge and skill regarding the critical use of information	84.1	54.4
The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture	83.3	61.4
The theory of participatory technology development and innovation	83.3	54.4
The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	83.3	49.1
The practice of development concepts	82.6	49.1
Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	82.6	43.9
The theory of development concepts	79.5	49.1
The practice of learning and learning styles	79.5	47.4
The practice of learning facilitation as described above	79.5	42.1
The practice of planning, action and reflection (Reflective learning)	78.0	49.1
Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	77.3	47.4
The practice of systems thinking	76.5	54.4
The practice of Sustainable livelihoods	75.8	49.1
The theory of individual and collective learning & learning partnerships	75.8	43.9

Curriculum Marker	Higher proficiency %	Part of Qualification %
Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	75.8	40.4
The theory of systems (systems thinking)	75.0	52.6
The practice of individual and collective learning & learning partnerships	75.0	42.1
n = 57		

It must be pointed out, however, that the findings from the colleges, universities and universities of technology had pointed to the likelihood of a higher percentage of the respondents reporting that they had not acquired these knowledge and skill sets as a part of their qualification. However, given that the sample was small and chosen only as a means of verification, the results are not wholly inconsistent with those findings.

It was expected, for example, that the vast majority of the respondents would indicate that they had learned to collect, analyse, organise and critically evaluate information relevant to extension responsibilities as a part of their formal qualifications. This marker appeared fairly consistently throughout most of the college and university curricula. Likewise, the earlier findings indicated that Agricultural Extension practitioners would have learned the theory of sustainable agriculture as a part of their qualifications. And finally, facilitating the acquisition by farmers knowledge and skills of farm organisation and management is found frequently in extension curricula of the qualifications evaluated in this study; therefore that 54.4% of the respondents reporting that they had acquired this learning as a part of their qualification was to be expected.

Being beyond the scope of this study, the results, however, are preliminary. They point to the potential value of further research into this facet of training and education in Agricultural Extension in South Africa.

Finally, as explained in Chapter 6, additional information about the respondents was captured in the questionnaire including employer, job title, information about their highest qualification, gender, home language and age. Of these the most pertinent was the information about each respondent's highest qualification which captured the name of the qualification, and when and where the qualification was obtained.

Originally it had been hoped that some cross referencing of responses could be made back to the various institutions where the respondents has received their qualifications. This turn out not to be a very viable exercise. First, only 57 respondents answered the question concerning whether or not the knowledge and skills was obtained as a part of their formal qualification making the sample very small. Second, the study made of curricula was based on current curricula and a substantial number of the respondents received their qualifications a number of years ago. Thus it would be impossible to correlate the perceived knowledge and skill set with the curriculum of a particular year of study as this information was not part of the study.

A perusal of the information about the respondents' qualifications, did offer a potential insight into the discrepancy between the findings from the study of curriculum and the perceptions of the respondents. The insight is based on the researcher's experience in South African Agricultural Extension. The vast majority of the respondents were black. Given the segregation of education (which effectively persists among the agricultural colleges (DoE 2007)) the majority of the respondents would have attended so-called black colleges. These colleges were influenced by the work of Bembridge (discussed briefly in Chapters 1 and 2) who, although operated in the communications approach, was very much concerned about the progress of the black farmer, not just about adoption of technology. While the researcher has no evidence to this effect other than the personal insights gained from training from Bembridge, that Bembridge's students (or those studying under curriculum influenced by him) would be exposed to concepts similar to those developed for this study, is entirely consistent with Bembridge's ethos and frame of reference.

9.3. Assessment of generic job descriptions

Two sets of job descriptions were analysed. As noted previously, the National Department of Agriculture and the nine Provincial Departments of Agriculture recently adopted provisional generic job descriptions to be used as the benchmark for developing specific job descriptions within the public sector Agricultural Extension service. The public sector is the primary employer of Agricultural Extension practitioners and thus the job descriptions examined provide reasonable insight into the thinking of the bulk of Agricultural Extension delivery in South Africa.

The first set of job descriptions analysed were those used as the basis for developing the second set analysed – the latter set being the more recent generic job descriptions. Together these gave a reasonable understanding of the work of public sectors Agricultural Extension practitioners.

As explained in Chapter 6, the job descriptions were analysed using the Content Analysis Method. The aim was to identify core competencies that would translate back to expected learning outcomes. In other words, the generic job descriptions were used to identify what the department expects their extension practitioners to know and what skills they expect them to have. This provided a basis for comparison with the learning markers used in the study. Again as discussed in Chapter 6, in addition to serving as a cross reference to the evaluation of extension curricula, it was anticipated that it would reveal in a very practical way the State's assumptions about and understanding of Agricultural Extension.

The following job descriptions were analysed:

Older job descriptions (on which the generic job descriptions were based):

- Extension Officer – Technician (lower level);
- Extension Officer – Technician (higher level);
- Extension Officer – Scientist (lower level)
- Extension Officer – Scientist (higher level)

Generic job descriptions

- Agricultural Advisor
- Senior Agricultural Advisor
- Specialist Agricultural Advisor

The older job descriptions can be divided into two main categories: technicians and scientists. Technicians were also known as Agricultural Development Officers. Their key performance areas included:

- Rendering general agricultural advice
- Providing technical support to government-funded projects
- Promoting sustainable production of agricultural projects

- Keeping up to date with (among other things) technological advances and best practices

Rendering agricultural advice included giving demonstrations of farming methods, organising and presenting farmers days, visiting farmers to assess impact, and sourcing technical inputs from specialists. In a similar vein, promoting sustainable agricultural production included gathering and analysing information to identify and prioritise problems, assessing needs and establishing structures and building capacity to address those needs, and to provide inputs for the implementation of best practices and technologies. In addition to these, advisor/technicians were to establish and enhance relationships with clients and stakeholders.

Both levels of the Technician/Development position required an appropriate national diploma (or equivalent). The lower position required no experience. The higher position required three years' experience. At the lower level, the assigned tasks were to be carried out under mentorship.

The Agricultural Advisor positions were also referred to as scientists. Their key performance areas included:

- Rendering scientific advice
- Providing technical support to organised agriculture and other agricultural stakeholders
- Providing technical support to government-funded projects
- Promoting sustainable production of agricultural projects
- Being involved in research projects
- Keeping up to date with (among other things) technological advances and best practices

Rendering scientific advice consisted of essentially the same activities as those included under the Agricultural Development positions. Providing technical support specifically included facilitating bridging the gap between commercial and emerging farmers. Providing technical support was also essentially the same as the Agricultural Development position with the addition of sourcing, interpreting and disseminating information. Likewise, promoting sustainable agricultural production followed the same pattern as the job description of the Agricultural Development positions.

Both levels of the Advisor/Scientist position required an appropriate four-year Bachelor of Science degree (or equivalent). The lower position required no experience.

The higher position required three years' experience. At the lower level, the assigned tasks were to be carried out under mentorship.

The newer generic Agricultural Advisor positions were said to be combinations of the Scientist and Technician positions. The key performance areas for the Agricultural and Senior Agricultural Advisor were:

- Rendering scientific and technical advice;
- Providing technical support for organised agriculture and other agricultural stakeholders;
- Providing technical support for government-funded projects;
- Promoting sustainable production of agricultural products;
- Being involved in research activities; and
- Keeping up to date with (among other things) technological advances and best practices.

The overall descriptions of each of these read very closely to those of the Development and Scientist positions. However, there are a number of additions. For the Agricultural Advisor position (lower position) the following were added:

- Support the establishment of cooperatives, farmers associations and interest groups; and
- Disseminate findings from research.

For the Senior Agricultural Advisor the additions were:

- Providing information concerning financial assistance;
- Promoting the establishment of cooperatives, farmers associations and interest groups; and
- Evaluating inputs on identification, development and implementation of appropriate extension programmes.

The Specialist Agricultural Advisor has the following key performance areas:

- Conducting adaptive research to optimise production and profits;
- Identifying, compiling and disseminating the latest scientific developments;
- Rendering specialist agricultural advice; and
- Keeping up to date with (among other things) technological advances and best practices.

The Agricultural and Senior Agricultural Advisor positions require an appropriate four-year degree or B Tech in Agricultural Extension. The lower position requires no previous experience. The higher position requires at least three years' experience. The job descriptions note that no specific extension qualification exists and that intervention with educational institutions must take place to address this.

The Specialist Agricultural Advisor position requires a Master of Science (MSc) in a specific subject area. It also requires at least six years of appropriate experience.

All of the positions require computer skills, knowledge of extension methods and communication/presentation skills. The Senior and Specialist Agricultural Advisor positions also require knowledge of project planning and management.

Analysis of the public sector Agricultural Extension positions

The analysis of the job descriptions indicates that the following twelve (12) markers are found in the public sector Agricultural Extension positions reviewed for this study:

- Collect, analyse, organise and critically evaluate information relevant to extension responsibilities;
- Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others;
- The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture;
- The practice problem solving;
- The theory of sustainable agriculture;
- The practice the theory of sustainable agriculture;
- The theory of 'curriculum' development;
- The practice 'curriculum' development;
- Facilitate acquisition by farmers: Farm organisation and management;
- Facilitate acquisition by farmers: Stakeholder interaction;
- Facilitate acquisition by farmers: Critical use of information; and
- Facilitate acquisition by farmers: Critical and responsible engagement with technology development and use.

The analysis highlights a number of important points. First, 22 of the markers are not found in the job descriptions. Second, the job descriptions are completely devoid of any of the learning content markers. Similarly, they are devoid of any explicit requirement of training in the theory and practice of development. The job descriptions appear to support the technology transfer approach to Agricultural Extension. They suggest a needs-based approach, instead of an assets-based approach. (See Chapter 2, Section 2.5) Finally, as noted earlier, the job descriptions anticipate that the current training available to potential Agricultural Extension practitioners does not have appropriate qualifications in place.

The job descriptions analysed further reinforce the initial challenge presented in the evaluation of curriculum; that the assumptions on which Agricultural Extension is built are not challenged. In the creation of the new generic job descriptions, the wording of the descriptions varies little. The new job descriptions show an increase in the technological and technical science aspects of Agricultural Extension, but do not address the fundamental human development aspects of Agricultural Extension.

Communication in the job descriptions is a good example of this point. Communication with farmers is extractive with regard to research and planning. Agricultural Extension practitioners are asked to determine needs and communicate them to the scientists. Problem-solving research is done in the absence of farmers. Results from research are interpreted by the Agricultural Extension practitioners and communicated to the farmers. Farmers appear to be involved in adaptive research to enable them to utilise the research results in practice. This string of communication places farmers as a non-participatory (passive) recipient of technology located or developed based on needs extracted from the farmers. Technology is not developed by or with the farmers.

This initial analysis of generic job descriptions for Agricultural Extension practitioners raises a serious question about the premise upon which the extension service is based. It is beyond the scope of this study to investigate this in any detail. However, as noted above, the indications are very clear that the approach to Agricultural Extension embedded in the job descriptions is more consistent with the communication and behaviour approaches that have been common in South Africa for many decades. These approaches fall into the long-outdated technology transfer approach to extension. Further investigation into this is warranted.¹⁸

¹⁸ After the research was completed, it was learned through the researcher's contact with provincial Departments of Agriculture that there was little consultation with extension specialists in the development

9.4. Summary of findings from the public sector

The intent of this chapter has been to provide a crosscheck of the findings presented in Chapters 7 and 8. It has presented two sets of findings. First are the findings of investigations into the knowledge and skills currently held by Agricultural Extension practitioners currently employed in the public sector measured against the 34 curriculum markers developed for this study. Second are the findings from an examination of job descriptions to be universally applied to Agricultural Extension in the public sector.

The results of both investigations indicate that many Agricultural Extension practitioners do not have knowledge and skills of many of the 34 markers; nor are they expected to do so. Most notably absent are the learning markers which represent the overall approach to Agricultural Extension learned by these practitioners. The two investigations generally support the findings from the educational institutions that Agricultural Extension in South Africa is not well-equipped to deliver on the agenda of current South African agricultural policy.

of the new job descriptions. They were developed almost independently by the Human Resource section of the National Department of Agriculture in consultation with the Human Resource sections of the provincial Departments of Agriculture (Lütge 2008).

References

DoA (South African National Department of Agriculture), 2005. Norms and standards for extension and Advisory services in agriculture. Directorate: Scientific Research and Development. Department of Agriculture, Pretoria.

DoA (South African National Department of Agriculture), 2007. Transforming South Africa's Colleges of Agriculture. Directorate: Education, Training and Extension Services, National Department of Agriculture, Pretoria.

Lütge, B., 2008. Personal communication, August 2008.

Chapter 10

Summary, Conclusions and Recommendations

10.1. Introduction

This Chapter is a summary of the research conducted among higher education institutions offering qualifications commonly held by Agricultural Extension practitioners in South Africa. The general framing of the research was Agricultural Extension education in the context of Agricultural Extension in South Africa. The research has attempted to address the following primary research questions:

- To what extent does current agricultural extension education in South Africa adequately reflect the current and changing educational and developmental imperatives?
- To what extent does it adequately equip extension officers and other agricultural development practitioners to deliver relevant support to farmers and farming communities?

The study also pursued a number of secondary research questions in three key areas.

Current agricultural policy

- To what extent does current Agricultural Extension education in South Africa reflect the principles enshrined in current agricultural policy?

Outcomes-based education

- How can Agricultural Extension education curricula meet the OBE framework as articulated in South African educational policy?
- To what extent does current Agricultural Extension education curricula provide graduates knowledge and skills to facilitate the acquisition of these skills by farmers and other clients of extension practitioners?

Sustainable livelihoods

- To what extent does current Agricultural Extension curricula in South Africa meet the principles of the Sustainable Livelihoods Approach?

10.2. The changing conceptualisation of Agricultural Extension

Agricultural Extension has long operated in a singular mode of technology transfer. The primary concern has been conveying to farmers the ‘latest’, if appropriate, technologies to improve production. In this mode, success has been measured in terms of the rate of adoption of technologies by farmers. As argued in Chapter 2, if the farmers adopted the technologies, the extension service was successful; if not, it failed.

As outline in Chapter 2, the nature of engagement and exchange between extensionists and farmers was largely characterised as a communications exercise based on a process of needs identification with farmers, followed by technology design and trials by specialists, and ultimately delivery to farmers. The extension practitioner’s role was to act as the communications link in the process. Where farmers resisted technology, strategies were developed to overcome resistance to lead to ultimate adoption of technology.

Recent research in Africa and elsewhere in the world indicates that extension needs be reconstructed on a different set operational objectives led by a different vision. (Röling 1990, 1991; Neuchâtel Group 1999; Moyo & Hagman 2000). The extension strategy herein presented is built around a vision which places the focus on the farmer (and other land users) in the context not of technology, but of creating prosperity.

The vision implies that the purpose of Agricultural Extension is to facilitate the establishment of self-reliant farmers who are contributing to widespread prosperity. The dual outcomes of self-reliant farmers and widespread prosperity are meant to be realised through a new set of ‘rules of engagement’. Prosperity is derived out of farmers working together, sharing information, and learning together. Self-reliant farmers are an outcome a learning partnership between farmers and extension practitioners.

To realise such a vision, it is essential that the mission of the extension service be recast to reflect the dynamics of the implications of the vision. Key elements of the mission which emerge are client-responsiveness and partnerships. The power to realise the vision rests in three critical aspects. First is the capacity of the extension service to

engage with its clients as genuine partners in a shared learning agenda. The second is the capacity of the extension service to engage with the many other agencies and organisation which supply goods and services to farmers and land users. The third is ensuring that engagements with farmers support sustainable development, that is, that production of food, fibre and fuel is socially just, economically sustainable and environmentally sustainable.

This vision and mission lay the foundation for a fundamental shift in the way Agricultural Extension is positioned, resourced, implemented, and evaluated. The strategic goals, principles and values presented in this strategy are built on this foundation. They, in turn, create the framework for constructing the operational plans of the extension service as well as for management and measurement of the service. All of this has bearing on how Agricultural Extension is taught and what is learned; how it is presented in curricula.

In South Africa, changes in agricultural policy likewise support fundamental changes in the approach to development. One such approach developed through this study is the Agriflection concept (Chapter 2). As explained in that chapter, the focus of Agriflection is the engagement of farmers, extension practitioners, and policy makers and other enablers as partners in learning. Learning is intended to take place both individually by each partner and collectively among partners. In this approach extension practitioners are more facilitators of learning than purveyors of technology. Being in the position of an intermediary, extension practitioners are required to facilitate a learning agenda in their engagements with farmers. The aim of the engagement and of the learning is to increase the sustainability of the livelihoods of the farmers .

The Agriflection concept gives rise to a number of knowledge and skill requirements not generally associated with Agricultural Extension in South Africa. The practice of reflection-based learning and development in the processes of planning, action and reflection and of investigating, applying and sharing are among the knowledge and skill sets that emerge from the concept. It also gives rise to the concepts of extension and learning finding their fulfilment in acts of service.

Further, South African agricultural policy has placed increased focus on smallholder farmers – the marginalised masses largely excluded from support. It has placed particular emphasis on poverty alleviation and rural wealth creation. It anticipates that extension practitioners will be able to work with farmers on a broader scale ranging from traditional

technology transfer to research and technology development, from systems thinking to rural development. It underscores a knowledge and skills base which covers a range agricultural technical disciplines, agricultural economics, learning theory, as well as sustainable livelihoods, sustainable agriculture, and concepts in iterative development (DoA 2005, 2001).

This fundamental shift in Agricultural Extension requires a concomitant change in Agricultural Extension education and curricula – particularly at the higher education level. Van Crower *et al* (1998) argue such issues as greater experiential learning, collaborative learning approaches, and participatory teaching and learning strategies will be increasingly important to successful Agricultural Extension. They further posit that training of extension practitioners should focus on systems and pay particular attention to reasoning skills, holistic thinking and problem-solving. Training should focus less on specific, single agricultural disciplines and more transdisciplinary in nature. In short extension practitioners should be trained to operate in a more multi-disciplinary, multi-dimensional mode more closely aligned to the rural communities they serve with the particular emphasis on the integration of technical, social and economic systems in farming (van Crower *et al* 1998).

The sentiments expressed above are echoed in South African educational policy. Outcomes-based education (OBE) places an emphasis on shared learning agendas between educator and learner. It has been suggested that, as Agricultural Extension is essentially an educational programme, it should be constructed on the principles of OBE. This being the case, it would require extension practitioners to understand and be able to practice participatory curriculum development in which farmers are engaged in determining and otherwise contributing to the learning agenda. It implies extension practitioners need to be trained in the theory and practice of learning (DoE Undated).

10.3. Evaluating Agricultural Extension curricula

The examination of Agricultural Extension curricula was informed by a new method developed specifically for this study. The method, called Theory-led Instructional Design Curriculum Evaluation and Development, involves six processes depicted in Figure 5.2 (Chapter 5).

Processes one and two are critical underpinning elements of this model. They form the “theory-led” aspect of the method. The principle behind theory-led or theory-driven evaluation is that establishing the theory behind the curriculum enables the evaluation to “understand and capture what a program really can do for a social problem” Chen and Rossi (1990:111). The theory thus developed – in this case Agriflection - became the foundation and touchstone for formulating questions and selecting methods for conducting the evaluation including data collection and analysis. It was in fact the interrogation of Agricultural Extension that led to the discovery of the need to create a theory-led evaluation model. Having challenged conventional thought on Agricultural Extension in South Africa and the assumptions on which it has been founded, the question was raised: what does this imply for Agricultural Extension?

Process three addresses this question. The aim of this process is to creatively extend the established theory into curricula and the workplace to identify processes, knowledge and skills that the theory would require. This is a critical step in the method as it must be approached with as little bias as possible (Baker 1969) but openly acknowledging whatever bias does exist (Townsend & Adams 2003). Processes four and five, consolidate the design process into learning outcomes and an evaluation framework which lead to the evaluation itself (process six).

In applying this model, the factors in Agricultural Extension proposed by the Agriflection concept, and further highlighted by current South African agricultural and educational policy, pointed to the need to investigate the extent to which current Agricultural Extension curricula can deliver on the agricultural and educational agendas. Consideration of these factors, particularly in the light of the recently published South African Agricultural Education and Training Strategy (DoA 2005), resulted in the development of 34 critical curriculum indicators grouped in three categories: meta markers which address cross-cutting factors in the learning agenda; learning content markers which are underpinning markers that address theory and practice in areas that impact on all other learning outcomes in the curricula; and process markers which are facets of the learning process which need to be included in the Agricultural Extension curricula. The identified markers comprise essential learning for extension practitioners in addition to the particular technical learning required. They create the framework for facilitated learning.

In addition to creating a framework for learning, the markers also created a basis for evaluating current Agricultural Extension offerings at key higher education institutions including universities, colleges of agriculture and universities of technology in South Africa. Specifically, the study involved six universities, four colleges of agriculture and one technikon. It looked at more than 50 modules included in the respective Agricultural Extension programmes. The broad learning from this interrogation is discussed in the sections that follow.

10.4. Current Agricultural Extension offerings and the changing agricultural and educational landscape

The central focus of this study was to determine to what extent current Agricultural Extension curricula prepares extension practitioners to deliver on the agricultural agenda as articulated in the prevailing policy. In brief, the research determined that there is a significant mismatch between extension education and training and the aims of agricultural policy. Further, it was learned that a significant percentage of the people hired in Agricultural Extension have little or no formal training in Agricultural Extension.

Six types of qualifications are found the South African public extension service: Two-year Higher Certificates leading to three-year Diplomas in Agriculture (Diploma); Three-year Bachelors of Agriculture (B Agric); Four-year Bachelors of Technology in Agriculture (B Tech Agric); Four-year Bachelors of Agricultural Science (BSc Agric); One-year Honours in Agriculture and/or Agricultural Extension; and One-year Postgraduate Diplomas in Agriculture and/or Agricultural Extension. These qualifications were evaluated in terms of the PFE and INSH scores outlined in Chapters 6, 7 and 8.

10.4.1. PFE scores

For each qualification a PFE score was generated. This score measures the presence of extension in a qualification effectively as a percentage of the total credits allocated to the qualification. A benchmark of 25 was established (see Chapter 7). Table 10.1 summarises the PFE scores for the three-year Diplomas. Table 10.2 summarises the PFE scores for three-year degrees. Table 10.3 summarises the PFE scores for the fourth-year (NQF level 7) add-on year. Table 10.4 summarises the PFE scores for the B Sc Agric.

Table 10.5 summarises the PFE scores for combined qualifications comprised of a first degree plus an add-on.

Table 10.1: PFE_Q scores for Diplomas in Agriculture

Institution	Extension	Other	Total	PFE _Q
CIAT	60	300	360	17
TUT	30	270	300	10
GLEN	69	906	975	7
OCSA	60	960	1020	6
FT COX	16	369	385	4
GROOTFONTEIN	12	348	360	3
CEDARA	10	475	485	2
LOWVELD*	0	360	0	0
POTCH	0	368	368	0

* credits estimated

Table 10.2: PFE_Q scores for B Agric

	Extension	Other	Total	PFE _Q
UKZN	128	256	384	33
Stellenbosch	70	320	390	18
ULIM	60	330	390	15
Fort Hare	52	368	420	12

Table 10.3: PFE_Q scores for fourth year qualifications

	Extension	Other	Total	PFE _Q
Pretoria	120	40	160	75
Fort Hare	60	68	128	47
TUT	25	75	100	25
UKZN	32	96	128	25

Table 10.4: PFE_Q scores for B Sc Agric

	Extension	Other	Total	PFE _Q
Fort Hare	52	504	556	9
Zululand	40	472	512	8
North West	36	456	492	7
Limpopo	24	474	498	5
Pretoria	20	568	588	3
Stellenbosch	0	540	540	0
UKZN*	0	528	528	0

* The UKZN B Sc Agric specialisation of Agribusiness has a potential PFE of 12.

Table 10.5: PFE_Q scores for combined first degree and relevant fourth year

	First Degree	Extension	Other	Total	Presence Factor: Extension Combined
UKZN	B Agric (3 Years)	160	352	512	31
North West	B Sc Agric (4 Years)	144	492	636	23
Ft Hare	B Agric (3 Years)	112	436	548	20
Pretoria	B Sc Agric (4 Years)	140	608	748	19
TUT	Diploma (Years)	55	345	400	14

While the Diploma and the BSc Agric. are the preferred qualifications for extension practitioners, in the majority of cases these qualifications have little or no extension in their curriculum. There is a richer grounding in extension in the Diploma and B Agric qualifications. Because of the limited response from Universities of technology, little can be concluded about the B Tech Ag in terms of extension. Honours qualifications and Postgraduate Diplomas vary greatly – some are exclusively dedicated to Agricultural Extension, some only partially so.

Except in the case of UKZN and to a lesser extent Fort Hare, to reach anything near the benchmark of 25, a student needs to complete five years of study. The North West B Sc Agric is a NQF level 6 qualification; after a fourth year of extension training, the PFE score is 23. The Pretoria B Sc Agric is a NQF level 7 qualification; a fifth year also at level 7 brings the PFE score to 19. At TUT, after four years of study, the Diploma/B Tech still scores only a 14; one would have to complete a Master of Technology to obtain the desired complement of extension learning.

Logic would argue that there is little incentive to study extension. An additional year of study would not add to the advancement up the NQF levels. This does not correlate well with the Government's stated need for additional and more qualified Agricultural Extension practitioners.

10.4.2. PFI and INSH scores

The results from the various PFI and INSH analyses (Chapter 8) show that a number of South African higher education institutions address a significant number of the 34

markers derived from agricultural and educational policy and extension theory. However, with the exception of the University of KwaZulu-Natal (UKZN) and the University of Zululand (UNIZUL), few of the programmes give sufficient attention to them. It stands to reason that UKZN would cover more of the markers as it is the institution which originated the markers through experimentation in curriculum. Even with this higher match, however, there remains a significant gap between the ‘ideal’ and current practice within UKZN’s Extension and Resource Management Programme which offers a 3-year B Agric. As noted by the Associate Professor whose agricultural modules in the UKZN B Agric programme were evaluated in this study, the learning covered in the module bears little relation to any of the 34 markers in the study.

Table 10.6 provides a graduated presence ‘rating’ of low, medium and high for each of the markers in each of the four types of qualifications. Also listed are ‘absent’, ‘rare’, ‘varied’. Absent indicates that the neither marker nor any relatively similar learning outcome was found. ‘Rare’ denotes that the marker or something similar to it rarely occurred in the qualification. ‘Varied’ implies that there was no pattern of occurrence. The rating is aggregated from the ratings for individual institutions discussed in Chapter 6. The aim of Table 10.6 is to paint a general picture of the extension curricular offerings at representative higher education institutions.

Table 10.7 provides an indication of the efficacy of the markers that appear at least ‘rarely’ in one or more of the qualifications studied. The two tables give a generalised view of the presence and depth of learning in the areas of extension identified by applying the TICE method.

Table 10.6: Overall presence rating of markers by qualification

Indicator		Agricultural Diploma	B Agric	B Tech Agric	BSc Agric
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	Varied	High	High	Rare
2	Effectively participate in the development of agricultural technology	Varied	Low	Low	Low
3	The theory of problem solving	High	High	High	High
4	The practice of problem solving	High	High	High	High
5	The theory of participatory technology development and innovation including	Low	Low	Low	Low
6	The practice of participatory technology development and innovation	Low	Low	Low	Low

Indicator		Agricultural Diploma	B Agric	B Tech Agric	BSc Agric
7	The theory of systems (systems thinking)	Medium	Medium	Medium	Medium
8	The practice of systems thinking as	Medium	Medium	Medium	Medium
9	The theory of sustainable agriculture	Low	Varied	Varied	Medium
10	The practice of sustainable agriculture	High	High	Varied	Varied
11	The theory of Iterative Development Pathways	Rare	Rare	Rare	Rare
12	The practice of Iterative Development Pathways	Rare	Rare	Rare	Rare
13	The theory of Sustainable livelihoods	Rare	Rare	Rare	Rare
14	The practice of Sustainable livelihoods	Rare	Rare	Rare	Rare
15	The theory of development concepts	Medium	Medium	Medium	Rare
16	The practice development concepts	Medium	Medium	Medium	Rare
17	The theory of learning and learning styles	Rare	Rare	Rare	Rare
18	The practice of learning and learning styles	Rare	Rare	Rare	Rare
19	The theory of learning facilitation	Rare	Rare	Rare	Rare
20	The practice of learning facilitation	Rare	Rare	Rare	Rare
21	The theory of curriculum development	Absent	Absent	Absent	Absent
22	The practice of curriculum development	Absent	Absent	Absent	Absent
23	The theory of the process of investigating (research), applying and sharing (IAS)	Absent	Absent	Absent	Absent
24	The practice of the process of investigating (research), applying and sharing	Absent	Absent	Absent	Absent
25	The theory of individual and collective learning & learning partnerships	Rare	Low	Low	Absent
26	The practice of individual and collective learning & learning partnerships	Rare	Low	Low	Absent
27	The theory of planning, action and reflection	Rare	Rare	Rare	Rare
28	The practice of planning, action and reflection	Medium	Medium	Medium	Medium
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	Rare	Medium	Medium	Rare
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	Medium	High	High	Rare
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	Absent	Rare	Rare	Absent
32	Facilitate among farmers knowledge and skill regarding the critical use of information	Absent	Rare	Rare	Absent

Indicator		Agricultural Diploma	B Agric	B Tech Agric	BSc Agric
33	Facilitate acquisition by farmers re engagement with technology development and use	Absent	Rare	Rare	Absent
34	Facilitate acquisition by farmers re participating as a partner in a learning agenda	Absent	Rare	Rare	Absent

Table 10.7: Overall efficacy rating of markers by qualification

Indicator		Agricultural Diploma	B Agric	B Tech Agric	BSc Agric
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	Varied	High	High	Rare
2	Effectively participate in the development of agricultural technology	Varied	Low	Low	Low
3	The theory of problem solving	High	High	High	High
4	The practice of problem solving	High	High	High	High
5	The theory of participatory technology development and innovation including	Low	Low	Low	Low
6	The practice of participatory technology development and innovation	Low	Low	Low	Low
7	The theory of systems (systems thinking)	Medium	Medium	Medium	Medium
8	The practice of systems thinking as	Medium	Medium	Medium	Medium
9	The theory of sustainable agriculture	Low	Varied	Varied	Medium
10	The practice of sustainable agriculture	High	High	Varied	Varied
11	The theory of Iterative Development Pathways	Low	Low	Low	Low
12	The practice of Iterative Development Pathways	Low	Low	Low	Low
13	The theory of Sustainable livelihoods	Low	Low	Low	Low
14	The practice of Sustainable livelihoods	Low	Low	Low	Low
15	The theory of development concepts	Medium	Medium	Medium	Low
16	The practice development concepts	Medium	Medium	Medium	Low
17	The theory of learning and learning styles	Low	Low	Low	Low
18	The practice of learning and learning styles	Low	Low	Low	Low
19	The theory of learning facilitation	Low	Low	Low	Low
20	The practice of learning facilitation	Low	Low	Low	Low
21	The theory of curriculum development	Low	Low	Low	Low
22	The practice of curriculum development	Low	Low	Low	Low
23	The theory of the process of investigating (research), applying and sharing (IAS)	Low	Low	Low	Low
24	The practice of the process of investigating (research), applying and sharing	Low	Low	Low	Low

Indicator		Agricultural Diploma	B Agric	B Tech Agric	BSc Agric
25	The theory of individual and collective learning & learning partnerships	Low	Low	Low	Low
26	The practice of individual and collective learning & learning partnerships	Low	Low	Low	Low
27	The theory of planning, action and reflection	Low	Low	Low	Low
28	The practice of planning, action and reflection	Medium	Medium	Medium	Medium
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	Low	Medium	Medium	Low
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	Medium	High	High	Low
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	Low	Low	Low	Low
32	Facilitate among farmers knowledge and skill regarding the critical use of information	Low	Low	Low	Low
33	Facilitate acquisition by farmers re engagement with technology development and use	Low	Low	Low	Low
34	Facilitate acquisition by farmers re participating as a partner in a learning agenda	Low	Low	Low	Low

10.4.3. General implications

Basic extension skills, problem solving and sustainable agriculture appear to be the most commonly covered markers. Of particular concern is that few of the qualifications cover any of the development related concepts, with the notable exception of development theory. Of even greater concern is that learning, learning theory and learning partnerships, which is the underpinning of the Agriflection model and which is supported in current extension literature, is rare or absent in most agricultural qualifications. Extension qualifications in South Africa appear to follow fairly traditional curricula including communication, negotiation/persuasion, behaviour change and technology transfer. This is borne out by the unit standards for Agricultural Extension submitted to and substantially approved by the Standards Generating Body for Agricultural Extension in South Africa (AgriSeta 2006).

The implications of these findings are simple. Without a greater degree of coverage of the identified markers, in particular the learning and development (including Sustainable Livelihoods) markers, Agricultural Extension cannot deliver on the agricultural development agenda sought by the South African Government. In terms of the primary research questions, this study indicates that current agricultural extension education in South Africa adequately does not strongly reflect South Africa's current and changing educational and developmental imperatives. Thus, the current curricula do not appear to adequately equip extension officers and other agricultural development practitioners to deliver relevant support to farmers and farming communities.

In terms of the secondary research questions, there is clear disconnection between current Agricultural Extension education and training and the intentions and principles enshrined in current South African agricultural policy. As sound as the policy may be, this study indicates that institutions producing Agricultural Extension practitioners – one of the key role player in delivering on the policy – with few exceptions, have not effectively translated the requirements policy into learning outcomes that will train practitioners to deliver on the desired outcomes of policy.

In terms of OBE, the study presented an example of how its principles could be integrated into Agricultural Extension curriculum. It did this by developing a model for Agricultural Extension and examining it to identify the learning outcomes that would be needed to implement it. This theme will be discussed in more detail in the Section 10.4.4.

The majority of the curricula reviewed focused on behaviour and communication, and little evidence was found of training in learning or facilitating learning or curriculum development (as applied to Agricultural Extension). Thus current Agricultural Extension curricula, again with few exceptions, does not appear to provide potential practitioners with knowledge and skills in facilitating learning among farmers. The one area of facilitation that scored high (in the B Agric and B Tech Agric) was “facilitating the acquisition by farmers knowledge and skills of farm organisation and management”

Finally, the low rating for Sustainable Livelihoods indicates that current Agricultural Extension curricula only marginally reflect the principles of Sustainable Livelihoods. This implies that Agricultural Extension practitioners are not adequately equipped in this area.

10.4.4. Implications from specific key markers

The markers used in this study were very detailed. They were so designed to be able to expose outcomes that might be hidden in broader outcome statements. However, upon application, it was clear that the markers were too detailed and in a sense overly prescriptive. As noted in Chapter 4, being prescriptive is both the intention and the criticism of Instructional Design approaches to evaluation. It is also one of the cited shortcomings of theory-led evaluations.

As was learned in the analysis stage of the study (Chapters 7 and 8) the multiplicity of markers also led to a multiplicity of scores for each curriculum. The danger was over reliance on apparent statistical accuracy in a dynamic setting. As implied by Hunkins and Hammill (1994), this tended toward the mechanical view of the world which fragments thought and action. Rather, the research indicated that it would be more useful to group the markers into learning areas and discuss the broader implications of the degree of their presence in Agricultural Extension curricula. The groupings are as follows and are addressed in the following sections:

- Technology, innovation and scientific enquiry
- Sustainable livelihoods and development concepts
- Learning
- Planning, action and reflection (Reflective learning)
- Sustainable agriculture, systems thinking, targeted facilitation

10.4.4.1. Technology, innovation and scientific enquiry

This grouping of markers incorporates Participatory Technology Development (PTD) and Investigation, Application and Sharing (IAS). Together they address technology and scientific enquiry. The PTD marker is essentially an indicator of attitudes around the place of technology in extension and farming. Its presence in a curriculum implies at least a basic understanding of and at least a partial commitment to the genuine engagement of farmers in the identification and development of technologies. Research, as discussed in earlier chapters, indicates that extension results in more sustainable progress when technology is developed in partnership with farmers. PTD is more sustainable than earlier technology transfer approaches where technology may be developed in response to farmer

needs and opportunities, but where it is developed for the farmer instead of with or even by farmers.

Similarly, IAS speaks to attitudes about scientific enquiry. As argued in Chapter 2, it is meant to be facilitated among farmers by extension practitioners. It implies that extension practitioners will have both the theory and the skill of IAS, as well as the ability to facilitate IAS among farmers. It is another of the underpinning markers that supports sustainability first in a manner similar to PTD, but more importantly in first developing the capacity of farmers to conduct basic independent research and then fostering an attitude and practice of sharing and service. It is in the sharing and service that the sustainability is unlocked.

The general absence of the theory and practice of PTD and anything similar to IAS (which is a new concept) implies that there is little shift in the thinking about the role of extension in technology as it is taught in South Africa. It would seem to support the notion expressed often in the handbooks of the higher education institutions that Agricultural Extension is essentially about technology transfer and is grounded in agricultural production technologies.

10.4.4.2. Sustainable livelihoods and development concepts

Research clearly indicated the important role Agricultural Extension can and should play in achieving wider development objectives. Farming is ultimately about livelihoods and if, as it is claimed in handbooks and course descriptions, farming is about sustainable economic growth of a farm, then it must, by definition, support the idea of iterative development. The general absence of the theory and practice of Iterative Development Pathways (IDP), and Sustainable Livelihoods (SL) underscores the likelihood that development will be event- and output-driven with short-term time horizons driving decisions. IDP and SL emphasise the slower, cumulative approach to development. Unless it is taught/learned, it will not likely be practiced in the field. Thus, while it is encouraging that extension is linked to development in curricula, it is of concern that the development approach appears to be of the less sustainable variety.

10.4.4.3. Learning

Learning is perhaps the single most important grouping of markers. It collects a wealth of understanding in the form of Kolb's learning theory, learning facilitation,

learning partnerships and curriculum development. It speaks to the heart of the relationship between the extension practitioner and the farmer. As argued in Chapter 2, it is the defining element and chief underpinning of sustainability. It is through learning how to learn and developing skills of facilitating an attitude and practice learning among farmers and other stakeholders in the steady movement towards lasting prosperity that ever-advancing prosperity can be realised.

Therefore, that the presence of learning as a theory and a practice is rare in Agricultural Extension curricula in South Africa implies again a preference for a more technology transfer approach to extension. It implies further that production and technology and not farmers and sustainable livelihoods are the focus of extension. These concepts and skills are largely absent in South African extension curricula.

10.4.4.4. Planning, action and reflection (Reflective learning)

Although reflective learning could be grouped with the other learning markers, it is kept separate because of the unique role it plays in underpinning development. It is also handled separately because it appears in varied forms as a practice in most of the extension curricula. This is encouraging in that it demonstrates at least a general acceptance of the importance of a learning framework even in the absence of a learning theory.

To an extent, this finding mitigates against the concerns raised above in the learning grouping. This can be used as a starting point to introduce more substantial learning theory as a means of entrenching and enhancing the practice that is already learned, and be expanding it to other areas of Agricultural Extension such as technology development and iterative development.

10.4.4.5. Other markers: sustainable agriculture, systems thinking, targeted facilitation

Most of the institutions included in the study at least touch on the issue of sustainable agriculture. Similarly, most of the institutions also address systems – not generally as formally as systems thinking theory and practice as suggested in the markers, but usually in the form of farm systems. While generic facilitation occurs in most extension curricula, the range of targeted facilitation presented in the 34 markers was generally rarely addressed from a facilitation skill point of learning.

10.5. Agricultural Extension education in the workplace

In addition to examining curricula, a brief investigation was made linking extension training to the workplace. A survey was conducted among extension practitioners in South Africa to determine to what extent they believed they had the knowledge or skills embodied in the 34 markers used in the study. Further, a brief analysis was made of key job descriptions for extension positions in the state service. Both of these investigations shed more light on the main question of the relevance of Agricultural Extension curricula to current agricultural policy.

10.5.1. Perceptions of extension practitioners

This part of the study was not intended to be exhaustive. Rather it was used as a means to cross check findings in the analysis of curricula. Few of the extension practitioners who responded to the survey believed they possessed the knowledge and skills represented by the 34 markers used in this study.

Given the fact that most of the respondents had qualifications from the institutions included in the study, it can be concluded that their formal higher education-level training in extension has been limited. It can further be concluded that their extension training has been along fairly traditional lines including communication, negotiation/persuasion, behaviour change and technology transfer.

PTD learning theory and practice and related learning outcomes essential to meet the new South African agricultural agenda are manifestly lacking. Technology transfer prevails as the primary mode of extension in terms of training and practice of current extension practitioners in South Africa. It is noted that participatory methodologies are included in the curricula, but as established by Worth (2002) these methodologies are more often used as a means to transfer technology and to change farmers' behaviour with a view to adopting a given technology.

This being the case, the extension practitioners currently employed in the South African public sector are ill equipped to deliver on the present South African agricultural agenda. While it may be argued that short-term gains will be realised with the transfer of technology to a minority of farmers, the larger mass of impoverished and resource-constrained smallholder farmers will likely not benefit from this approach. Scott (1985)

cited by Little (2005:2) noted that the Green Revolution in India in the 1960s “substantially marginalized” the “lowest stratum” in the “village economy”.

10.5.2. Implications of extension job descriptions

The generic job descriptions recently established by the National Department of Agriculture as the benchmark for all extension related posts in the country were examined using the indicators used in the study. The aim of the examination was to see to what extent the job descriptions match the learning essential for extension. The following summarises the findings from this examination:

- Technology, innovation and scientific enquiry
Extension practitioners are more conduits of information than they are generators of knowledge. They are asked to do adaptive research, but they do not appear to be asked to engage farmers in scientific enquiry or innovation.

- Sustainable livelihoods and development concepts
Not addressed in the job descriptions

- Learning
Not addressed in the job descriptions, but reference is made to building capacity of farmers through developing training materials and presenting courses.

- Planning, action and reflection (Reflective learning)
Not addressed in the job descriptions

- Sustainable agriculture, systems thinking, targeted facilitation
Extension practitioners are expected to support and promote sustained production.

10.5.3. Summary from the workplace

It would appear that while agricultural and educational policy lean in the direction of process and learning driven extension, those governing the public extension service maintain that the primary focus of extension remains on technology transfer. An example

of this was the Agricultural Extension training programme adopted by the KwaZulu-Natal Department of Agriculture – which programme is grounded in commodities, without any reference to extension training. Further evidence of this is the agricultural development strategy adopted by the KwaZulu-Natal Department of Agriculture for developing farmers along a ladder of succession, strongly linked to commodities, from so-called subsistence and food security farmers to international exporters.

It is submitted that both of the aforementioned programmes move extension further from the required learning approach. In addition, they focus extension on technology transfer within specific commodities, thereby channelling Agricultural Extension practitioners into narrower specialisation. Commodity specialisation is inappropriate in a setting such as South Africa wherein the most common profile of the bulk of farmers and producers needing state-provided extension are smallholder farmers with mixed and integrated farming practices.

10.6. Learning about the methodologies

This study was as much about learning about how to evaluate Agricultural Extension curricula as it was about the evaluation of specific curricula. Two methodological approaches were developed and employed in this study. One dealt with the overall approach to curriculum evaluation: the TICE curriculum evaluation method. The other was a set of methodologies used to collect and analyse data based on the TICE method.

10.6.1. Theory-led instructional design curriculum evaluation and design

As noted in Chapter 5, the TICE method was derived through a dual process of review of existing theory and of grounded theory. The review of existing theory gave rise to the value of the method being theory-led. This was consistent with the assertions made in Chapter 2 that Agricultural Extension in South Africa has gone largely unchallenged particularly in terms of the assumptions that underpin it. This study has demonstrated that evaluating curricula based on a theoretical framework for the discipline in question is valid. It helps the researcher stay on target and not be swayed by the biases which appear to be deeply entrenched in the Agricultural Extension fraternity. During the analysis stage, it helped keep the analysis focused on the transformation, not on the preferences within the discipline. It helped to overcome the natural resistance to change. The

increasing detail of data collection, driven by the analysis of data, was facilitated by this constant focus. It helped to ensure that the data were interpreted with consistency and it helped to derive the very tools of analysis of the data.

10.6.2. Learning from methods of data collection and analysis

One challenge presented by this study was to establish a method that would make it possible to collect and analyse data from these disparate systems of higher education. The answer was found in learning; more specifically in notional learning. A common thread, albeit perhaps tenuous, that ran through the higher education institutions included in this study was the concept of measuring learning in terms of the anticipated number of hours it took to learn a particular aspect of knowledge and/or skill – generally embedded in credit bearing modules attached to a particular qualification. Notional study hours, based on the ratio of one credit = 10 notional study hours became the equalising standard. The result was to derive two types of factors to measure the extent to which Agricultural Extension curricula addressed the 34 extension curricula markers developed for the study – Presence Factors and Efficacy Factors.

Presence Factors were designed to give two simple indications. First was the amount of Agricultural Extension training found in qualifications commonly held by South African Agricultural Extension practitioners. The second was the presence of the 34 markers in those qualifications. Efficacy Factors are more complex. They permitted a detailed analysis of curricula within a single module, within a particular year or level of study, and across an entire qualification. Together, these factors established the possibility for determining the minimum and potential efficacy of a curriculum.

These methods were developed and adopted to collect and analyse data to support the TICE method employed to evaluate Agricultural Extension curricula in South Africa. In keeping with the nature of this study, these methods were applied in a reflective and reiterative manner. Applying them in this way contributed to learning about the relevance and practicality of the Theory-led Instructional Design Curriculum Evaluation and Design method discussed above. In addition, applying them in this way shed light on the value, both practical and otherwise, of the methods themselves.

A number of positive results were realised from following an evolutionary approach to the method. Partnerships in conducting the research and in implementing learning from it were formed. Further, participating in refining the methods used also generated greater

cooperation as well as keener interest in both the collective and institutional results of the study as well as in adopting the process for future evaluation of curricula against a pre-determined structure of markers. Finally, such a cooperative and participative approach is entirely in keeping with the ethos of the learning approach in Agricultural Extension defined in the study.

10.6.2.1. Presence and efficacy factors

Initially it was thought to develop and calculate a range of analyses measuring minimum and potential efficacy. However, the initial development of the analyses, their denotation and their explanations resulted in establishing 13 analyses, seven for analysing efficacy based on modules and six for analysing efficacy based on the 34 markers. The result would be an impressive table of numbers that would most likely fall into that category of information that is “not worth knowing”, whereas in cases of action-based participatory research of which this study was a form, it is rather preferred “not measuring more accurately than what is needed because it is better to be approximately right than precisely wrong” (Tones 2001:29-30).

As the intention of the study was to develop a practical vehicle for evaluating Agricultural Extension curricula, it needed to be simple rather than too complex, ‘user-friendly’ rather than requiring technical experts. In the end, a workable system was formulated that allowed the evaluation to suggest (rather than precisely measure) efficacy. This would open the door to consulting and exploring the potential for strengthening the qualification. The areas of evaluation addressed markers individually and collectively.

An unexpected discovery using this method to establish efficacy was that a number of programmes are over-taught. Theoretically, the total number of notional study hours accounted for by curriculum markers in the analysis of an individual module would not exceed the notional study hours of that module determined by its credit weighting. Thus if a module carries 16 credits and correspondingly the notional study hours is 160, the number of notional study hours taken up by the curricula markers should not exceed 160 or 100%. And yet, there were a number of cases in which this happened. Upon enquiry it was learned that many institutions or at least the lecturers are driven by required content which must be covered no matter how long it takes.

This raised two useful points. One is that it is common among technical science lecturers to teach to a prescribed learning content which they are reluctant to forsake,

particularly to make space for human science learning of Agricultural Extension (Wallace 1997). One professor of horticulture commented when consulted about making space for human science learning in his B Sc Agric. programme explained that he would be grossly remiss if he graduated a student without covering all the content in the current programme. When challenged on the changing state of agriculture and the clearly articulated need for scientists to have human science knowledge and skill, he remained fixed that there could be no space made in the programme. TICE could help dislodge such recalcitrant thinking thereby possible overcoming reluctance to change and to make space for human science learning.

The other is that TICE, together with the presence and efficacy factors, could expose over-teaching and over reliance on a content-led instead of a learning-led approach to curriculum development and delivery. This could open the way to rethinking credit loads and notional study loads placed upon learners. In addition to fostering learning-led approach, it could also encourage a student-centred approach.

Overall the study suggests that TICE and its attending presence and efficacy analyses can be applied in any educational setting. The markers can easily be changed to accommodate substantial changes in either developmental or educational policy. This then puts in the hands of educational and training institutions a powerful tool for rapid, effective assessment of the ability of a particular curriculum to deliver on a particular agenda, thereby enabling the relevant institution to identify and implement changes as and when required.

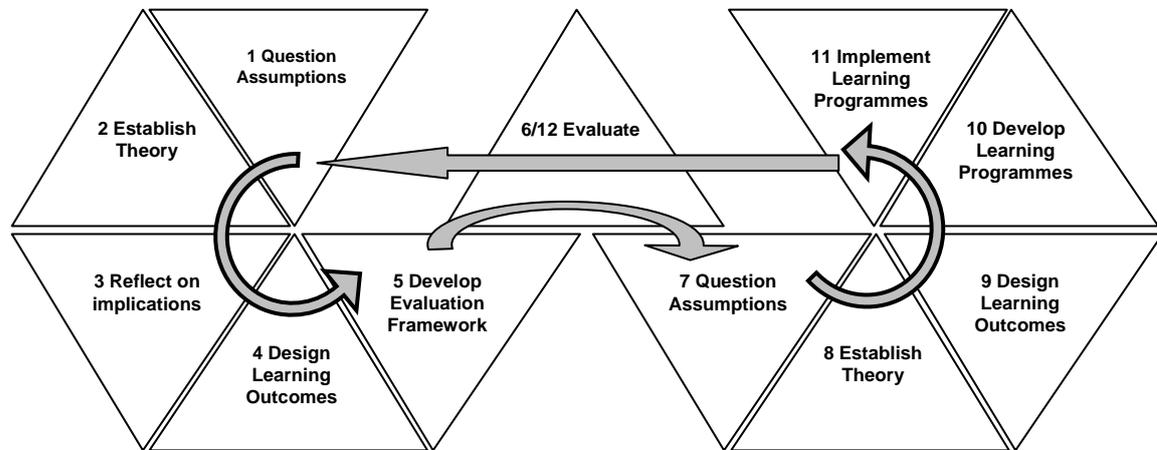
10.6.3. Expanded TICE

Chapter 6 established the TICE method for the evaluation of Agricultural Extension curricula. As discussed earlier, it falls into the general category of Instructional Design methodologies. To be true to this approach to curriculum, it would be necessary to apply the design and testing aspects of the approach. The purpose of this study was to implement this as a means to measure the relevance of current Agricultural Extension curricula within South Africa's transforming agricultural context. It was not intended to take the process further.

Figure 10.1 shows the expanded TICE method, termed Theory-led Instructional Design Curriculum Evaluation and Design (TICED), which accommodates the cycle of design

and implementation. It retains the six original processes, but then adds five more processes to complete the method.

Figure 10.1: TICED method of curriculum evaluation and design



Process 7: Question assumptions

As with Process 1, once the evaluation has been completed (as was done in this study), the next process would be to re-question assumptions. To avoid the dangers raised by Townsend & Adams (2003) that theory can become fixed unless continuously challenged, the TICED requires a second questioning of assumptions.

Process 8: Establish theory

The aim of the second round of questioning would be to either re-affirm theory or to establish a new theory. The evaluation of curriculum done in the prior cycle should have produced rich input into the second round of interrogation and re-formation of theory.

Process 9: Design learning outcomes

Theory is translated into learning outcomes. This would be both theory and practice in a range of areas that would give practical substance to the theory. In keeping with instructional design, the learning outcomes would be clearly identified and measurable.

Process 10: Develop learning programmes

Learning outcomes need to be packaged into learning programmes. This would include activities, modes of instruction, development of materials and tools of assessment,

as well as the combining of learning outcomes in learnable units. In terms of the proposed model, educational institutions would be encouraged to be creative in developing approaches that are consistent with the learning framework emanating from the theory established and the overall learning objectives.

Process 11: Implement learning programmes

Once the evaluations and designs are done and the programmes have been developed, the programmes need to be implemented. It is important that the programmes be followed consistently and with integrity.

Process 12: Evaluation

Process 12 is a return to evaluation. The results of the programmes need to be assessed in terms of the intended outcomes. They should also be assessed in terms of the modes of learning and materials used. This round of evaluation completes the TICED cycle. It sets the curriculum evaluation and design process up for a renewed round of evaluation and development.

10.7. Conclusions

The foregoing summary of findings and initial conclusions can be consolidated into more theoretical conclusions regarding Agricultural Extension education generally as well as practical conclusions for South Africa in particular. This section will attempt to present such a consolidation of learning from this study.

The results of the study clearly indicate a conspicuous gap between current curricular offerings and the training needed by Agricultural Extension practitioners to be able to deliver on the objectives of agricultural policy and programmes adopted by South Africa. Current curricula train Agricultural Extension practitioners as purveyors of information, as persuaders, and promoters of technologies with limited training in facilitation, development and, most importantly, the fundamentals of learning,

10.7.1. Extension's mismatch

As is clearly articulated above, current Agricultural Extension curricula has not and will not train extension practitioners who can deliver on the current agricultural agenda in South Africa. Training programmes continue to emphasise technology, technology transfer and behaviour change for the purpose of technology adoption by farmers. This is further borne out by the technology based training of extension practitioners and their significant lack of extension training – especially learning-based extension. And this is ultimately borne out by the agreed generic job descriptions for extension practitioners, where, again, the emphasis is placed on technology and technology transfer.

As noted in 10.3. above, technology transfer based extension is not sustainable and will not reach those targeted in South African agricultural policy. South African extension must change, and the change must be extensive, pervasive and radical. Agricultural development cannot be separated from the wellbeing of farming families (Swaminathan 2000). Suri (2006:1525) warns that India's green revolution adversely affected rural life. He implies that things were not thought through carefully enough. The sole focus on technology transfer in the rush to stave off massive food shortages was short-sighted. Cooperation among farmers – the socio-cultural safety net – largely disappeared. He explained: "With the increased use of machinery for agricultural operations, cultivation of single crops under the pressure of the markets, (coupled with the increase in the number of small holdings), the earlier practices of farmers cooperating with each other in agricultural operations began to die out. Such cooperation was now neither needed nor feasible. Agriculture became a cashbased (sic) individual enterprise requiring high investments in modern inputs and wage labour. Now, a farmer has to draw more and more credit to plough it into the land. As a result, the demand for credit had increased by several times when compared to the earlier period. Lack of remunerative prices in such a situation would cause immense trouble to farmers. If, in addition, the crop fails – due to either natural or man-made factors – the farmer's economy is doomed" (Suri 2006).

Regarding India's technology-based Green Revolution, Scott (1985) cited by Little (2005) concluded that the gap between the large-scale and small-scale farmers grew to an extreme, even to the point that small-scale farmers could not even find employment as farm labour on the larger farms. Scott further noted that income distribution became more inequitable with the added problem that actual incomes did not improve or were lower than

years after the Green Revolution. Little (2005) contends that agricultural development, and by implication Agricultural Extension, cannot be separated from wider social issues.

Swaminathan (2000) – the acknowledged ‘father of the Green Revolution’ – conceded that some 30 years on it was finally realised that while technology transfer did address the immediate problem of hunger and poverty, it left a larger more intractable problem in its wake. Technology was put into the hands of so-called ‘progressive’ farmers with larger land sizes. With this they consolidated power through land and production, effectively further disenfranchising the smaller-scale, poorer farmers. Swaminathan (2000) makes the point on a worldwide scale that after more than 50 years of technological development in agriculture, hunger not only persists, but is increasing. A broader answer is required.

While Agricultural Extension is but one of the many possible conduits for addressing poverty, hunger and the like, it must play its role responsibly and with wisdom and understanding of the long-term affects of its actions. It is in this vein that the revamping of Agricultural Extension and the educational curricula that frames and shapes it is proposed. The Agriflection model and its learning framework herein proposed is an initial offering in this direction.

10.7.2. A broader curriculum

This study, while looking particularly at curricular issues within the specified field of Agricultural Extension, exposed the need for more broadly based education and training within the whole agricultural education domain.

10.7.2.1. Broadening Agricultural Extension curricula

First, in addition to adapting Agricultural Extension curricula to match more purposefully the developmental, educational and agricultural priorities of South Africa, Agricultural Extension practitioners need exposure to broad ranges of disciplines. The Agricultural Extension Carousel of Learning shown in Figure 10.2 graphically depicts an example of such an expanded learning programme. Table 10.8 sets out the details of the non-extension elements of the learning carousel. They outline eight (8) related areas of learning (grouped into three broad fields) which extension practitioners would need to cover, and two (2) overarching learning areas that create the application context for the eight other areas of study. These ten (10) areas of learning provide what can be called the technical component of an extension qualification. They would be learned in an

overarching context of extension as outlined by the 34 markers (grouped into five key learning areas) addressed in this study.

For agricultural production-related learning functional knowledge is recommended. Agricultural Extension practitioners do not need to be specialists, but they must have sufficient grounding in the areas listed to be able to provide coherent support to farmers. Under economics and management, the need is for practical skills in determining basic profitability, using marketing and organising a farm's resources. Regarding social and environmental sustainability, Agricultural Extension practitioners need to be able to assess basic viability. Essentially it is more about contexts than it is about pure technical knowledge. It is about knowing how to learn or otherwise acquire and work with and apply technical knowledge within the unique context of the farmer.

Finally, the entire carousel of content is supported by the fundamentals of the explicitly extension content as refined in this study. (See Section 10.5.2).

It should be borne in mind that the study did not explicitly research a broadened curriculum for agricultural extension. Thus it cannot provide sufficient credible references to substantiate it. Therefore, the concept of the carousel is presented as a proposal to evoke further thought, research and debate.

Figure 10.2: The Agricultural Extension Carousel of Learning

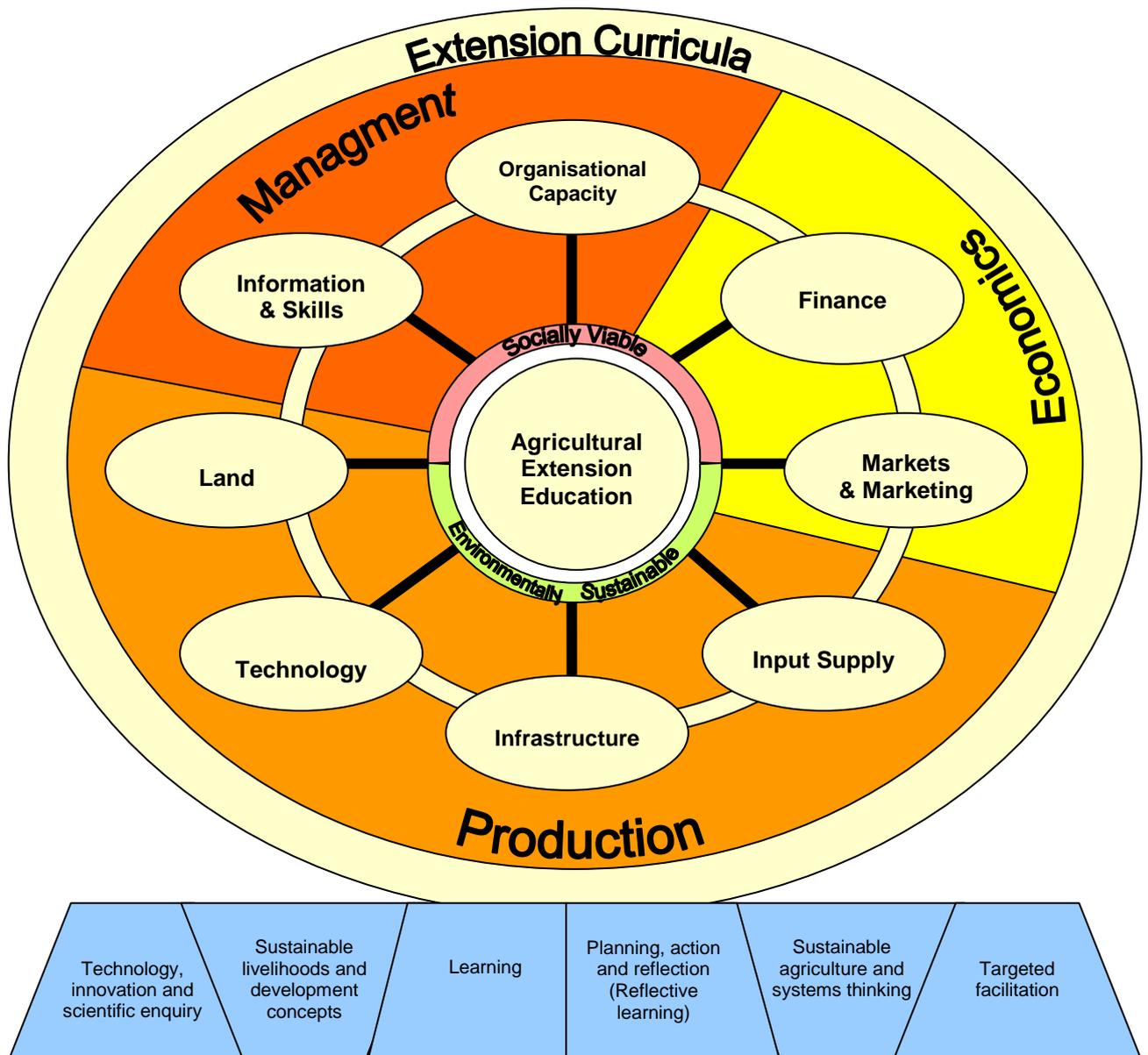


Table 10.8: Details of the Extension Carousel of Learning (non-Extension elements)

Learning Area	Brief explanation
Production	Functional knowledge recommended
<ul style="list-style-type: none"> • Land 	<ul style="list-style-type: none"> • Soil-plant and soil-animal relationships (e.g. productivity) • Land in society, economics and law (including land reform)
<ul style="list-style-type: none"> • Input Supply 	<ul style="list-style-type: none"> • Evaluation of input options
<ul style="list-style-type: none"> • Technology 	<ul style="list-style-type: none"> • Evaluation of technical options; Technology development
<ul style="list-style-type: none"> • Infrastructure 	<ul style="list-style-type: none"> • Basic infrastructural requirements; evaluation of infrastructure options
Economics	Practical skills
<ul style="list-style-type: none"> • Finance 	<ul style="list-style-type: none"> • Profitability, Gross margins, Enterprise budgeting
<ul style="list-style-type: none"> • Markets & Marketing 	<ul style="list-style-type: none"> • Fundamentals of marketing, evaluation of marketing options
Management	Practical skills
<ul style="list-style-type: none"> • Information & Skills 	<ul style="list-style-type: none"> • Locating, assessing, generating information; Skills assessment;
<ul style="list-style-type: none"> • Organisational Capacity 	<ul style="list-style-type: none"> • Basic farm management (understanding the key element of farm management including diagnosis, planning, organising, implementing and monitoring)
Social Viability	<ul style="list-style-type: none"> • Assess agricultural activities in terms of social viability/acceptability (including cultural heritage, labour law, other social and cultural regulations)
Environmental Sustainability	<ul style="list-style-type: none"> • Assess agricultural activities in terms of environmental viability/acceptability (including natural resource management, conservation, environmental law)

10.7.3. The marginalisation of Agricultural Extension in agricultural qualifications

The study examined agricultural qualifications at colleges, universities of technology and universities. The intent was to assay the relevance of Agricultural Extension training to the new South Africa, agriculturally and educationally. In addition to discovering the mismatch and curricular adjustments required Agricultural Extension training programmes, it was also discovered that there is a significant marginalisation of Agricultural Extension from the more technical training and education. In the majority of cases the Agricultural Diplomas, the B-Tech's and the BSc's Agriculture, Agricultural Extension did not feature at all. In a few cases it featured as an elective. In still fewer cases it featured as a required area of learning – usually within a particular stream. And

the extension that was present was largely the traditional training that, as has already been discussed, does not meet the needs of present requirements.

The impact of this finding is that the South African agricultural education system is producing agricultural scientists who will not be trained to work among the marginalised masses. They will not have the skills to communicate with or to engage farmers in innovation and the development of technologies. This, by default, will perpetuate and reinforce the top-down approach of technology transfer, which as has previously been established is counter-productive to sustainable development among the very people whose livelihoods are so vulnerable to technology choices. It increases rather than decreases dependency. It dis-empowers rather than empowers. The solution is to ensure that appropriate Agricultural Extension education and training be required study in the curricula of all agricultural qualifications in the higher education system.

10.7.4. Additional learning

As noted above, the study ultimately unearthed issues beyond the initial research question. These conclusions arose out of reflection on the findings of the study and on the processes followed in the study and the responses to them. This section will address each of the following points.

- The primacy of learning in the context of sharing and service
- Extension is not a tool of technology
- Higher education educators are not comfortable with learning outcomes
- The applicability of the Agriflection concept to developing Agricultural Extension curricula
- The assumption that agricultural development is about production

10.7.4.1. The primacy of learning in the context of sharing and service

The programmes reviewed in this study were found to be linked technically, but not philosophically. While programmes appear to have been developed as a coherent set of learning outcomes, the coherency was not held within an obvious or articulated learning framework. This is inconsistent with the underpinnings of OBE and current thinking in Agricultural Extension both of which highlight the need for curricula to place a primacy on learning, and learning within the context of sharing and service. In one sense, this can

be translated into the conscious infusing of the practice of learning into the acquisition of technical sciences.

Such an infusion will mitigate against the creation of what can be called “priests of knowledge”, technical specialists who create around themselves a mystique borne of their having knowledge which their ‘clients’ do not. Such an elevated status lends itself to power imbalances in favour of the ‘priest’ to whom the ‘parishioners’ are required to turn for ‘truth’ and ‘salvation’. This again perpetuates dependency and dis-empowerment.

10.7.4.2. Extension is not a tool of technology

The study confirmed both in its examination of extension practice and curricula that the dominant sentiment in South Africa is that Agricultural Extension is viewed, learned and practiced as a tool of technology. To some, extension cannot exist outside of agricultural production. Such positioning of extension is contrary to current international trends and tends to reduce sustainability. Rather, extension should be seen, learned and practiced as the interface between the technical (primarily agricultural) sciences and human science. It is the science and skill of engaging farmers and others in the process of scientific discovery. When applied in this way, there is no dissonance between the two traditionally opposed frames of reference. Rather technical and human sciences are conjoined as a single tool wielded in the pursuit of the advancement of development. Agricultural development in the end is essentially a human development exercise which draws upon human learning talents and draws in where needed technical support relevant to the needs of the farmer.

To effect such a fundamental shift in thinking in South Africa will require three lines of action. First, those currently in the service of agricultural development (e.g. Agricultural Extension practitioners, agricultural researchers and agricultural specialists) should undergo intensive short-term training in the fundamental elements of extension. Second, in parallel to the first, extension strategies within Provincial Departments of Agriculture will need to be examined and adjusted to accommodate aspects of human development and farmer learning. Similarly, monitoring and evaluation programmes, as well as performance management systems will need to be examined and adjusted. Third, directly in line with the aims of this study, higher education institutions offering agriculture will need to a) create space for Agricultural Extension in their various

qualifications and b) ensure that the modules included reflect a learning approach to Agricultural Extension along the lines outlined in this chapter.

10.7.4.3. The assumption that agricultural development is about production

Another discovery made in this study is the assumption that agricultural development is about production and economics. While it is beyond the scope of this study *per se*, there is ample evidence in literature (most notably in discussions around the human development paradigm) that in reality development (including agricultural development) is about the development of the human being and the capacity to learn and to take a greater command of the processes that influence one's life. The ideas and recommendations presented in this chapter are consistent with this understanding. However, to effect such a fundamental shift in development planning, implementation, monitoring and evaluation would require extensive rethinking of assumptions in all fields of development. This chapter cannot go beyond the general recommendation that, if there is genuine interest in true sustainability, such a rethink be expedited as a priority.

10.8. Summary of conclusions

Current extension curricula are not overly compatible with South Africa's educational and agricultural priorities. Extension remains technology focussed and production driven. There is a particular mismatch in the area of outcomes based learning and translating that into learning agendas in the form of curricula for farmers. Colleges, in general, focus on practical technology, e.g. how to grow plants, while universities and universities of technology focus on more theoretical aspects of technology, e.g. how plants grow. With either approach, the key focus is on the technology, and the key extension practice regarding technology is technology transfer and related practices of communication and behaviour change. There are few notable exceptions where post graduate options which specifically introduce participatory technology development.

In short, with rare exceptions, the overall curricula for Agricultural Extension in South Africa falls well short of the learning required by extension practitioners to deliver on the agricultural imperatives outlined in policy. Extension training remains technology

centred. It needs to embrace the concept that Agricultural Extension practitioners need training to work at the interface between the human and technical sciences.

While this study suggests some serious re-thinking in Agricultural Extension, the real challenge is in obtaining a hearing with higher education institutions. South African Agricultural Extension curricula have, as far as can be detected via a review of curriculum and the kind of research published in South African journals, has remained largely unchanged and unaffected in its fundamentals over the last few decades. It is still very technology driven, aimed at adoption of technology and less so on farmer learning. To make inroads in this arena will be very challenging.

But there is a wider field of challenge. Wallace (1997:34-35) argued that it is difficult “to convince seasoned educationists from basic and applied disciplines of the need to allocate sufficient time for experiential and learner-centred activities, as well as inter-disciplinary innovations such as outreach and real-life problem solving”. In order for Agricultural Extension curricula to be made relevant to South Africa’s current context, Agricultural Extension itself must change. This would be the first step in the proposed TICED method of curriculum evaluation and design. This study did such an interrogation of Agricultural Extension and from that interrogation proposed the Agriflection concept for extension. It is a learning-based concept aimed at supporting farmers and farming communities in making steady progress towards prosperity based on an ever-increasing sustainability of their livelihoods. This is accomplished through Agricultural Extension practitioners taking on the dual role of learner and facilitator of learning. It demands of all stakeholders in the mix to engage in genuine learning as equal partners.

This study has shown that unless such an approach to Agricultural Extension is formally adopted and used as the basis for reconstituting Agricultural Extension curriculum South Africa’s higher education institutions responsible for producing the resources employed as Agricultural Extension practitioners, will continue to produce practitioners who cannot deliver on the agenda of current South African agricultural policy. The result will be a continued focus on technology transfer which, as has been amply demonstrated, does little to advance the well-being and prosperity of the marginalised majority, but rather tends to reinforce the entrenched and widening gap between the rich and the poor.

10.9. Consolidation of Recommendations

The results of this study point to a number of recommendations. If implemented, these recommendations could significantly improve the ability of public sector Agricultural Extension practitioners and Agricultural Extension services to deliver on the transformational agenda so urgently required to bring prosperity to the marginalised masses.

10.9.1. Extent of Extension in AET

This study has shown that there is far too little Agricultural Extension training and education in the agricultural qualifications used to recruit Agricultural Extension practitioners. A national standard should be set that complies with tested international standards; i.e. a PFE score of 25. This will ensure that every person trained in agriculture, at whatever level, will have at least basic training in Agricultural Extension which will a) help them to contextualise their learning in the context of sharing knowledge and skill; and b) give them knowledge and skills to engage farmers and other relevant parties with their expertise.

10.9.2. The Concept of Agricultural Extension

This study has proposed a learning-based framework for Agricultural Extension. The Agriflection concept and the consequential derivatives of its implementation, is aligned with the essential underpinning aims and objectives of sustainable agriculture, development and livelihoods – all of which are entrenched aspects of South Africa's current agricultural policy. South African Agricultural Extension policy should be reassessed in the light of the Agriflection concept. Efforts should be made to transform the service from one which is dominated by communication and behavioural change approaches aimed at technology transfer to one which is driven by a learning agenda in which farmers, Agricultural Extension practitioners and the State are all committed to learning from and with one another. Implementing a learning-based approach to Agricultural Extension can provide a solid foundation for sustainably achieving the aims and objectives of widespread rural prosperity.

10.9.3. Agricultural Extension curriculum

This study has shown that Agricultural Extension education is on a treadmill of complacency with the *status quo*. Agricultural Extension curricula are still largely built around communication and behaviour change approaches which alone cannot achieve the desired outcomes for agriculture in South Africa. It is recommended that a set of national norms and standards be established for Agricultural Extension curricula. The norms and standards should ensure that, at every level of Agricultural Extension training and every institution, students of Agricultural Extension are being trained and educated with knowledge and skills that will contribute to the transformation of agriculture in South Africa and toward sustainable wealth creation in its rural communities. To realise this, the norms and standards should entrench the following aspects:

- Technology, innovation and scientific enquiry: where the focus is on developing capacity among Agricultural Extension practitioners to develop capacity among farmers to develop and otherwise engage with technology innovatively.
- Sustainable livelihoods and development concepts: where the focus is on developing the capacity among Agricultural Extension practitioners to assist farmers relate their agricultural activities to their livelihood systems and to wider development opportunities in such a way that farmers become contributors to the increasing sustainability of their own and others' livelihoods.
- Learning: where the focus is on understanding how learning occurs and developing the capacity among Agricultural Extension practitioners to command their own learning processes; and that the purpose of learning is sharing knowledge.
- Planning, action and reflection (Reflective learning): where the focus is on channelling the capacity to learn into action aimed at iterative advancement of prosperity.
- Sustainable agriculture and systems thinking: where the focus is on understanding the holistic nature of farming enterprises and to develop the capacity among

Agricultural Extension practitioners to analyse farming and agricultural livelihoods in the context of systems with a view to strengthening the systems to enhance sustainability; and to foster this capacity among farmers.

- Targeted facilitation: where the focus is on developing capacity among Agricultural Extension practitioners to be conscious that their primary concern is to build capacity among farmers and other land users to engage consciously and deliberately with their own livelihoods, with technology, policy and other factors that influence their livelihoods; that the aim of the Agricultural Extension practitioner is to facilitate learning and increased capacity among his clients.

10.9.4. Broader curriculum for Agricultural Extension

This study has reinforced the understanding that agriculture is more than merely issues of production and marketing. It involves a wide range of activities and demands a wide range of knowledge and skills. Contrary to the trend of management in South African public sector Agricultural Extension services, what is needed among Agricultural Extension practitioner is more general knowledge and not commodity-based specialisation. It is recommended that Agricultural Extension curriculum be broadened to ensure that it incorporates all of the facets included in the ‘Agricultural Extension Carousel of Learning’ proposed by this study.

10.10. Outcomes of the study

The study aimed to achieve a number of outcomes. These are reviewed below.

- Provide both the relevant Departments of Agriculture and tertiary institutions offering training in the field of Agricultural Extension with an objective analysis of the compatibility of curricula with educational and agricultural priorities.

Chapters 7, 8 and 9 of this study and summary reports emanating from them were presented to the National Department of Agriculture and to the commissions working implementing the Agricultural Education and Training (AET) strategy. The information has been fed into the work being done on agricultural colleges, the positioning of agriculture in tertiary institutions, and the barriers to access to agricultural education.

- Present a curriculum development framework which will allow tertiary institutions to maintain educational and developmental structural integrity while allowing course content to adapt to changing priorities.

The study submits TICED as a way to evaluate and develop curricula that retains essential structure while remaining responsive to changes. A key element of this is the requirement that the assumptions underlying the theory(ies) on which Agricultural Extension curricula are based. The implication of this is that even the Agriflection model must be interrogated over time to ensure that it does not emerge as inflexible doctrine.

- Create a curriculum model which uses Sustainable Livelihoods and a learning agenda (driven by the principles of OBE) as the context in which relevant content (both science and process) in Agricultural Extension is learned.

The study did not finalise a curriculum model. It did make progress toward the development of the model – this being in the form of the revised markers and in the proposed Agricultural Extension Carousel of Learning. It was found that to finalise a curriculum model would require further research into the proposed carousel and into the mix of technical and extension learning in the curriculum. This is captured under recommendations for further study.

The carousel and markers have influenced the development of several new qualifications in Agricultural Extension recently approved by SAQA. They have also been used as the framework for a new Bachelor of Agriculture (Agricultural Extension) (B Agric (AE)) at the University of KwaZulu-Natal (UKZN). This new qualification is being recommended as the ‘model’ for extension curriculum in the National Department of Agriculture’s commission on agricultural curricula.

- Propose a new concept for extension applying the principles of Sustainable Livelihoods.

In the spirit of the TICE and later TICED methods developed for this study, Agricultural Extension was interrogated. Agriflection was proposed as a model for

Agricultural Extension. It is not submitted as the ultimate model, but to hold the space of a learning approach to broaden the range of thinking and practice in South African Agricultural Extension. The model and the general framework it represents have been adopted by the National Department of Agriculture's commission on agricultural curricula as a 'touchstone' model, together with the carousel and the UKZN B Agric (AE) for Agricultural Extension curricula review and development.

TICED has yet to be presented either as a published article or to the National Department of Agriculture or other universities.

In addition to the abovementioned outputs and as noted in Chapter 1, earlier versions of Chapters 2, 3 and 4 have been published in the peer-reviewed Journal of Agricultural Education and Extension. An earlier version of Chapter 10 was presented at the 41st Annual Conference of the South African Society for Agricultural Extension and published in the proceedings of the conference.

10.11. Recommendations for further study

This study raised a number of questions which are ripe for research. As mentioned in Chapter 4, there would value in understanding the interplay between the more purely extension elements and technical elements of extension curriculum. How much technical agriculture should be in an extension curriculum? Thus additional research is recommended to determine the ratio or mix of the learning framework and the technical learning. As also noted in Chapter 4, based on the work done in this study, it is anticipated that this ratio will be dynamic and will reflect the actual work required by the extension practitioners and the profile of the farmers with whom they engage.

On a related theme, the "Agricultural Extension Carousel of Learning" proposed in Section 10.7.2.1 needs further debate and interrogation. In addition to the ratio of technical content, the range of technical content needed to be a proficient extension practitioner should be studied and clarified.

Connected to researching more on the carousel is conducting more research to finalise a curriculum model that could be implemented by tertiary institutions offering training and education in Agricultural Extension.

The results of the survey conducted among public service extension practitioners were inconclusive. The claims, for example, of the practitioners to have acquired competence in a number of the markers used in this study could not be substantiated by the review of extension curricula at the institutions from which they were likely to have obtained their training and qualifications. Thus it is recommended that more, empirical research be done in this area.

As noted in Chapter 9, it is suggested that more thorough investigation into the job descriptions of public sector Agricultural Extension practitioners be conducted. The aim of such research would be to establish a clearer link between agricultural policy and recruitment policy. In such an investigation, the extension philosophy used to inform the work of an extension practitioner should be exposed and interrogated so that they do not limit extension action to a single approach.

Parallel with such research would be a clear investigation into the planning, budgeting, implementation and monitoring and evaluation processes systems used to govern Agricultural Extension in practice. Further, a careful study of the systems of performance management, assessment and remuneration of Agricultural Extension practitioners should also be made.

It was often mentioned by respondents in this study that there remains a declining interest in agriculture as a field of study. Unearthing the cause of this and ameliorating this would be invaluable to the cause of agricultural development in South Africa. Failure to do so would imperil any efforts, such as those in this study, to realign or otherwise reinvigorate agricultural education.

One of the issues raised at the Colleges of Agriculture during their interviews and which has been observed by the researcher at universities is the ability to attract and retain “black” South Africans as educators in the field. This clearly limits the ability to deliver on a range of transformational policy in agriculture. It is, apparently, linked not only to agriculture, but to the study of maths and science at secondary school level. There is apparently a dearth of qualified teachers of agricultural science. Research into the educational capacity at high school level to teach agriculture and agricultural science and to foster interest in agriculture as a profession is also recommended.

One of the limitations of operating within a policy paradigm as this study has done, is that policy is often based on untested or unresearched assumptions. While the study has attempted to interrogate the assumptions around Agricultural Extension and has

acknowledged arguments about OBE, it has not questioned the assumptions of South Africa's policy for agricultural transformation. For the purpose of this study, it has taken the policy as given (i.e. *ceteris paribus*). Thus the study recommends research be conducted to interrogate the assumptions underpinning agricultural policy. Such research should address assumptions around at least the following: land reform, macro agricultural economics, rural economic development, agrarian reform, and globalisation. Further interrogation into OBE is also recommended.

10.12. Weaknesses and limitations of the study

This study has a number of weaknesses and limitations which are briefly summarised in this section.

10.12.1. Weaknesses

a) Notional study hours

The evaluation method devised for this research in part rests on the using the framework of notional study hours. As discussed in Chapter 6, notional study hours are, by definition theoretical. It is not a completely reliable system for comparison. While there is general policy agreement to the idea, and institutions overtly state to use notional study hours, logic suggests that this is less than true in practice. For example, SAQA uses 120 credits as its base while UKZN uses 128 credits as its base. The former has a general pattern of awarding credits in units of 5 and 10, whereas UKZN awards credits in units of 8 and 16. One is hard pressed to find any evidence that demonstrates in practice that learners on a SAQA based system are engaged 80 hour less per year than UKZN learners.

b) Low response rates from institutions

The findings of the study would have been greatly strengthened if there had been a higher response rate from the institutions invited to participate. This is particularly true of the Universities of Technology in general (of which only one responded) and of the University of Pretoria in particular which has a very high profile in Agricultural Extension in South Africa.

c) Low sample from practitioners; perceptions not crosschecked

The study would have benefitted from more extensive research among the current extension practitioners. Time and funds limited this possibility. Such research may have identified additional sources of training which may have explained the disconnection between what the researcher expected and what the practitioners claimed in terms of proficiency around the markers developed for this study. Although the study forthrightly states that the practitioner element of the study was a simple validation process,

d) Leap of faith

This study is predicated on a link between the failure in extension in South Africa and tertiary training of current extension practitioners. That extension has failed to have any significant impact among the economically disenfranchised in agriculture in South Africa is a matter of record acknowledged by the State. However, there are many factors that have contributed to the continuing poverty among this sector of the population – Agricultural Extension being but one of them. The researcher is confident through his own engagement with South African Agricultural Extension and observation of the system over nearly three decades that one of the factors contributing to extensions failure is the training extension practitioners' received with their formal qualifications. However, this link is not proven empirically.

10.12.2. Limitations

a) Excluded post graduate qualifications

By design the study did not include an interrogation of post graduate qualifications. It was limited to Diplomas, Bachelors of Agriculture, Bachelor of Technology and to relevant Honours qualifications. Masters and PhD qualifications were excluded. The reason for this was argued in Chapter 6 which, in brief, indicates that only a very small percentage of the current extension practitioners in South Africa possess a higher level qualification.

b) Factors contributing to continuing poverty.

This study was about Agricultural Extension. While one context was the poverty of farmers, the study did not investigate the other factors contributing to poverty.

c) The relationship between current qualifications of practitioners with curriculum.

Time and practicality limited the possibility of interrogating the relationship between current qualifications of practitioners with curriculum offered at that time. Given the range of years of completion among the participants in the study, it would have been difficult, if not impossible, to obtain a response from each institution about the curriculum for a particular year.

References

- AgriSETA, 2006. Unit Standards for Agricultural Extension. Working papers. Personal files.
- Baker, R.L., 1969. Curriculum Evaluation. *Review of Educational Research*, (39) 3, 339-358.
- Chen, H.T. and Rossi, P.H., 1980. The multi-goal, theory-driven approach to evaluation: a model linking basic and applied social science. *Social Forces*, 59 (1), 106-122.
- DoA (South African National Department of Agriculture), 2001. The Strategic Plan for South African Agriculture. Department of Agriculture. Pretoria
- DoA (South African National Department of Agriculture), 2005. National Education and Training Strategy for Agriculture and Rural Development in South Africa (AET Strategy). Department of Agriculture, Pretoria.
- DoE (South African National Department of Education), Undated. Curriculum 2005: Lifelong learning for the 21st Century: A User's Guide. Department of Education, Pretoria. <http://www.polity.org.za/govdocs/misc/curr2005.html>. Accessed 3 July 2001.
- Hunkins, F.P. and Hammill, P.A., 1994. Beyond Tyler and Taba: reconceptualizing the curriculum process. *Peabody Journal of Education*, 69 (3), 4-18.
- Little, D. 2005. Institutions, Inequality and Well-being: Distributive Determinants of Rural Development. Paper delivered at the International Conference & Workshop on Ethics and Development at Michigan State University, April 8 - 15, 2005.
- Machethe, C.L. (2004). Agriculture and poverty in South Africa: can Agriculture reduce poverty? Paper presented at the Overcoming Underdevelopment Conference held in Pretoria, 28-29 October 2004.
- Moyo, E. and Hagman, J., 2000. Facilitating competence development to put learning process approaches into practice in rural extension. In: Human resources in agricultural and rural development. 1999. FAO, Rome. www.fao.org/DOCREP/003/X7925M/X7925M14.htm. Accessed February 2002.
- Neuchâtel Group, 1999. Common framework on Agricultural Extension. Paris, Neuchâtel Group. www.odi.org.uk/rpeg/cf_en.pdf. Accessed January 2002.
- Röling, N., 1990. The agricultural research-technology transfer interface: a knowledge systems perspective. In: Kaimowitz, D. (Ed.), 1990. *Making the link: Agricultural research and technology transfer in developing countries*. Westview Press, Boulder

Röling, N., 1991. The development of the concept of agricultural knowledge information systems: implications for extension. In: Rivera, W.M. and D.J. Gustafson (Eds.), 1991. *Agricultural Extension: Worldwide institutional evolution and forces for change*. Elsevier, Amsterdam.

Scott, J.C., 1985. *Weapons of the Weak: Everyday Forms of Peasant Resistance*. Yale University Press, New Haven.

Suri, K.C., 2006. Political Economy of Agrarian Distress. *Economic and Political Weekly*. April 22, 2006, 1523-1529.

Swaminathan, M.S., 2000 Community-led approaches to ending food insecurity and poverty. Swaminathan Research Foundation, Chennai.

Tones, A.S., 2001. The potential of participatory rural appraisal (PRA) approaches and methods for Agricultural Extension and development in the 21st century. *Journal of International Agriculture and Extension Education*, 8 (1), 24-37.

Townsend, D., and Adams, P., 2003. Program evaluation models and practices: a review of research literature. *AISI Online Clearinghouse*. http://education.gov.ab.ca/k_12/special/aisi/pdfs/UofLEvalModels_2003.pdf . Accessed October 2007.

van Crowder, L., Lindley, W.I., Brueing, T.H., and Doron, N., 1998. Agricultural Education for Sustainable Rural Development: Challenges for Developing Countries in the 21st Century. *Journal of Agricultural Education and Extension*. 5 (2), 71-84.

Wallace, I., 1997. Agricultural education at the crossroads: present dilemmas and possible options for the future in Sub-Saharan Africa. *International Journal of Educational Development*, 17 (1), 27-39.

Worth, S.H., 2002. Sustainable extension: nor transformation but renewal. *Proceedings of the 18th Annual Conference of Association for International Agricultural Education and Extension*. May 2002. Durban, South Africa. pp 473-480.

Appendix 1: Curriculum Markers

1. Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.
2. Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others
3. The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products
4. The practice of problem solving.
5. The theory of participatory technology development and innovation
6. The practice of participatory technology development and innovation
7. The theory of systems (systems thinking)
8. The practice of systems thinking
9. The theory of sustainable agriculture
10. The practice of sustainable agriculture
11. The theory of Iterative Development Pathways
12. The practice of Iterative Development Pathways
13. The theory of Sustainable livelihoods
14. The practice of Sustainable livelihoods
15. The theory of development concepts
16. The practice development concepts
17. The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)
18. The practice of learning and learning styles
19. The theory of learning facilitation
20. The practice of learning facilitation
21. The theory of curriculum development
22. The practice of curriculum development
23. The theory of the process of investigating (research), applying and sharing (IAS)
24. The practice of the process of investigating (research), applying and sharing
25. The theory of individual and collective learning & learning partnerships
26. The practice of individual and collective learning & learning partnerships
27. The theory of planning, action and reflection (Reflective learning)
28. The practice of planning, action and reflection (Reflective learning)
29. Facilitating among farmers: Creative and critical thinking for problem solving within systems
30. Facilitating the acquisition by farmers knowledge and skills of farm organisation and management
31. Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction
32. Facilitate among farmers knowledge and skill regarding the critical use of information
33. Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use
34. Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?

Appendix 2: Institutional Scorecard

Extension Education at Tertiary Institutions in South Africa
Research being conducted by Steve Worth

Name of Tertiary Institution:				
Qualification:				
Name of Module:				
Module Code or Number:				
Credits:		Notional Study Hours (NHS):		
Is this a required module for the qualification?		Required or elective:		
What percentage of the notional study hours of this module is dedicated to the following learning outcomes?			Percent of NSH	Actual NSH
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.			
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others			
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products			
4	The practice of problem solving as outlined above			
5	The theory of participatory technology development and innovation including the following concepts: <ul style="list-style-type: none"> Participatory approach to technology development and innovation as a fundamental underpinning to sustainable progress. Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 			
6	The practice of participatory technology development and innovation as outlined above			
7	The theory of systems (systems thinking) including the following concepts <ul style="list-style-type: none"> Successful farm management requires successful systems management. To act otherwise negatively impacts on sustainability. Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 			

8	The practice of systems thinking as outlined above		
9	The theory of sustainable agriculture?		
10	The practice of sustainable agriculture?		
11	The theory of Iterative Development Pathways including the following concepts <ul style="list-style-type: none"> • Development is iterative, experiential, linked to action and continuous. • Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. • Development is simultaneously a concept, process and an outcome. 		
12	The practice of Iterative Development Pathways as outlined above		
13	The theory of Sustainable livelihoods		
14	The practice of Sustainable livelihoods		
15	The theory of development concepts		
16	The practice development concepts		
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)		
18	The practice of learning and learning styles as outlined above?		
19	The theory of learning facilitation including the following concepts: <ul style="list-style-type: none"> • Learning facilitation describes the relationship between practitioners and farmers. • Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. • Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 		
20	The practice of learning facilitation as described above?		
21	The theory of 'curriculum' development including the following concepts <ul style="list-style-type: none"> • Practitioners should participate in the development of curricula. • Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. • The methods and skills required to develop curricula 		
22	The practice of 'curriculum' development as outlined above		
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts <ul style="list-style-type: none"> • IAS describes to the learning process to be used in extension engagements. • IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. • The importance of sharing knowledge gained through the process of investigation and application. 		
24	The practice of the process of investigating (research), applying and sharing as outlined above		
25	The theory of individual and collective learning & learning partnerships including the following concepts <ul style="list-style-type: none"> • Each participant in the learning process is responsible for his or her own learning – individually and collectively. 		

	<ul style="list-style-type: none"> • Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. • The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. • The student is an equal partner in the learning process. 		
26	The practice of individual and collective learning & learning partnerships as outlined above		
27	<p>The theory of planning, action and reflection (Reflective learning) including the following concepts:</p> <ul style="list-style-type: none"> • Learning should be reflective/reflexive. • Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. • The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. • Learning is iterative, experiential, linked to action and, above all, continuous. 		
28	The practice of planning, action and reflection (Reflective learning) as outlined above		
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems		
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management		
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction		
32	Facilitate among farmers knowledge and skill regarding the critical use of information		
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?		
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?		

Appendix 3: Agricultural Extension Practitioners Questionnaire

Employer: _____

Job Title: _____

Highest Qualification: _____

Obtained where: _____ Obtained when: _____

Gender: _____ Home language: _____ Age: _____

- Kindly answer the following questions using the scoring system shown below.
- For each question, indicate whether or not you acquired this knowledge or skill as a part of obtaining your qualification(s).

0= None • 1= Very little • 2= Some • 3= adequate • 4= more than adequate • 5= proficient

Question: To what extent do you have the following knowledge or skills?	Score	Learned as part of your qualification?	
		Yes	No
1. How well are you able to collect, analyse, organise and critically evaluate information relevant to extension responsibilities?	0 1 2 3 4 5		
2. How well are you able to effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others?	0 1 2 3 4 5		
3. How well do you understand the theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products?	0 1 2 3 4 5		
4. How well are you able to practice problem solving as outlined above?	0 1 2 3 4 5		
5. Theory of participatory technology development and innovation How well do you understand the following concepts? <ul style="list-style-type: none"> ▪ Participatory approach to technology development and innovation as a fundamental underpinning to sustainable progress. ▪ Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. ▪ Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 	0 1 2 3 4 5		

Question: To what extent do you have the following knowledge or skills?	Score	Learned as part of your qualification?	
6. How well are you able to practice participatory technology development and innovation as outlined above?	0 1 2 3 4 5		
7. Theory of systems (systems thinking) How well do you understand the following concepts: <ul style="list-style-type: none"> ▪ Successful farm management requires successful systems management. ▪ To act otherwise negatively impacts on sustainability. ▪ Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. ▪ Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 	0 1 2 3 4 5		
8. How well are you able to practice systems thinking as outlined above?	0 1 2 3 4 5		
9. How well do you understand the theory of sustainable agriculture?	0 1 2 3 4 5		
10. How well are you able to practice the theory of sustainable agriculture?	0 1 2 3 4 5		
11. Theory of Iterative Development Pathways How well do you understand the following concepts? <ul style="list-style-type: none"> ▪ Development is iterative, experiential, linked to action and continuous. ▪ Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. ▪ Development is simultaneously a concept, process and an outcome. 	0 1 2 3 4 5		
12. How well are you able to put into practice Iterative Development Pathways as outlined above?	0 1 2 3 4 5		
13. How well do you understand the theory of Sustainable livelihoods?	0 1 2 3 4 5		
14. How well are you able to practice the theory of Sustainable livelihoods?	0 1 2 3 4 5		
15. How well do you understand the theory of development concepts?	0 1 2 3 4 5		
16. How well are you able to practice the theory of development concepts?	0 1 2 3 4 5		
17. How well do you understand the theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)?	0 1 2 3 4 5		
18. How well are you able to practice the theory of learning and learning styles as outlined above?	0 1 2 3 4 5		

Question: To what extent do you have the following knowledge or skills?	Score	Learned as part of your qualification?	
19. How well do you understand the theory of learning facilitation in the following context? <ul style="list-style-type: none"> ▪ Learning facilitation describes the relationship between practitioners and farmers. ▪ Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. ▪ Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 	0 1 2 3 4 5		
20. How well are you able to practice learning facilitation as described above?	0 1 2 3 4 5		
21. Theory of 'curriculum' development How well do you understand the following concepts? <ul style="list-style-type: none"> ▪ Practitioners should participate in the development of curricula. ▪ Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. ▪ The methods and skills required to develop curricula 	0 1 2 3 4 5		
22. How well are you able to practice 'curriculum' development as outlined above?	0 1 2 3 4 5		
23. Theory of the process of investigating (research), applying and sharing (IAS). How well do you understand the following concepts? <ul style="list-style-type: none"> ▪ IAS describes to the learning process to be used in extension engagements. ▪ IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. ▪ The importance of sharing knowledge gained through the process of investigation and application. 	0 1 2 3 4 5		
24. How well are you able to practice the process of investigating (research), applying and sharing as outlined above?	0 1 2 3 4 5		

Question: To what extent do you have the following knowledge or skills?	Score	Learned as part of your qualification?	
25. Theory of individual and collective learning & learning partnerships How well do you understand the following concepts? <ul style="list-style-type: none"> ▪ Each participant in the learning process is responsible for his or her own learning – individually and collectively. ▪ Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. ▪ The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. ▪ The student is an equal partner in the learning process. 	0 1 2 3 4 5		
26. How well are you able to practice individual and collective learning & learning partnerships as outlined above?	0 1 2 3 4 5		
27. Theory of planning, action and reflection (Reflective learning) How well do you understand the following concepts? <ul style="list-style-type: none"> ▪ Learning should be reflective/reflexive. ▪ Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. ▪ The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. ▪ Learning is iterative, experiential, linked to action and, above all, continuous. 	0 1 2 3 4 5		
28. How well are you able to practice of planning, action and reflection (Reflective learning) as outlined above?	0 1 2 3 4 5		
29. How well are you able to facilitate among farmers: Creative and critical thinking for problem solving within systems?	0 1 2 3 4 5		
30. How well are you able to facilitate acquisition by farmers: Farm organisation and management?	0 1 2 3 4 5		
31. How well are you able to facilitate acquisition by farmers: Stakeholder interaction?	0 1 2 3 4 5		
32. How well are you able to facilitate acquisition by farmers: Critical use of information?	0 1 2 3 4 5		
33. How well are you able to facilitate acquisition by farmers: Critical and responsible engagement with technology development and use?	0 1 2 3 4 5		
34. How well are you able to facilitate acquisition by farmers: Participating as a partner in learning agenda?	0 1 2 3 4 5		

Appendix 4: New Higher Education Qualifications Framework*

HEQF Level	Qualification	Total Credits	Credit Structure and Levels	Approx. Years
10	D Thesis	360		2
9	M Thesis	180		1
9	M Coursework & Dissertation	180		1
8	PG Diploma	120		1
8	B Hons	120	30 credits min research	1
8	4+ year B degree	480	96 min @ level 8	4
7			120 credits min @ level 7	
6			(168)	
5			96 credits max & level 5	
7	3 year B degree	360	120 credits min @ level 7	3
6			(144)	
5			96 credits max & level 5	
7	Advanced Diploma	120	120 credits @ level 7	1
7	Diploma	360	60 credits min @ level 7	3
6			(180)	
5			120 credits max & level 5	
6	Advanced Certificate	120	120 credits @ level 6	1
5	Higher Certificate	120	120 credits @ level 5	1

* adapted from Prof Jan Botha, Lynda Murry and Prof John Cooke - UKZN

Appendix 5: PFE Scores for all institutions

EXTENSION IN AGRICULTURAL QUALIFICATIONS PFE SCORES

2-Year Higher Certificates in Agriculture

Institution: Cape Institute					
Year	Credits			PFE	
	Extension	Other	Total		
1	0	120	120	0	PFE1
2	0	120	120	0	PFE2
TOTAL	0	240	240	0	PFEQ

Institution: Cedara					
Year	Credits			PFE	
	Extension	Other	Total		
1	10	165	175	6	PFE1
2	0	145	145	0	PFE2
TOTAL	10	310	320	3	PFEQ

Institution: Fort Cox					
Year	Credits			PFE	
	Extension	Other	Total		
1	0	145	145	0	PFE1
2	16	104	120	13	PFE2
TOTAL	16	249	265	6	PFEQ

Institution: Glen: Higher Certificate					
Year	Credits			PFE	
	Extension	Other	Total		
1	4.6	32.6	37.2	12	PFE1
2	2.3	28	30.3	8	PFE2
TOTAL	6.9	60.6	67.5	10	PFEQ

Institution:	Grootfontein				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	120	120	0	PFE1
2	0	120	120	0	PFE2
TOTAL	0	240	240	0	PFEQ

Institution:	Lowveld				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	0	0	NWU	PFE1
2	0	0	0	NWU	PFE2
TOTAL	0	0	0	NWU	PFEQ

Institution:	OSCA				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	355	355	0	PFE1
2	0	305	305	0	PFE2
TOTAL	0	660	660	0	PFEQ

**EXTENSION IN AGRICULTURAL QUALIFICATIONS
PFE SCORES**

3-Year Diplomas

Institution:	Cape Institute: Diploma in Extension				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	120	120	0	PFE1
2	0	120	120	0	PFE2
3	60	60	120	50	PFE3
Total	60	300	360	17	PFEQ

Institution:	Cedara: Diploma in Agriculture				
Year	Credits			PFE	
	Extension	Other	Total		
1	10	165	175	6	PFE1
2	0	145	145	0	PFE2
3	0	165	165	0	PFE3
Total	10	475	485	2	PFEQ

Institution:	Fort Cox: Diploma in Agriculture				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	145	145	0	PFE1
2	16	104	120	13	PFE2
3	0	120	120	0	PFE3
Total	16	369	385	4	PFEQ

Institution:	Glen: Diploma in Agriculture				
Year	Credits			PFE	
	Extension	Other	Total		
1	4.6	32.6	37.2	12	PFE(1)
2	2.3	28	30.3	8	PFE(2)
3	0	30	30	0	PFE(3)
Total	6.9	90.6	97.5	7	PFE(Q)

Institution:		Grootfontein: Diploma in Agriculture			
Year	Credits			PFE	
	Extension	Other	Total		
1	0	120	120	0	PFE1
2	0	120	120	0	PFE2
3	12	108	120	10	PFE3
Total	12	348	360	3	PFEQ

Institution:		Lowveld: Diploma in Extension			
Year	Credits			PFE	
	Extension	Other	Total		
1	0	0		NWU	PFE1
2	0	0		NWU	PFE2
3		0		NWU	PFE3
Total	0	0	0	NWU	PFEQ

Institution:		OSCA: Diploma in Agriculture			
Year	Credits			PFE	
	Extension	Other	Total		
1	0	355	355	0	PFE1
2	0	305	305	0	PFE2
3	60	300	360	17	PFE3
Total	60	960	1020	6	PFEQ

Institution:		Potchefstroom: Diploma in Agriculture			
Year	Credits			PFE	
	Extension	Other	Total		
1	0	120	120	0	PFE1
2	0	120	120	0	PFE2
3	0	128	128	0	PFE3
Total	0	368	368	0	PFEQ

Institution:		TUT: Diploma in Agriculture Crop/Mixed			
Year	Credits			PFE	
	Extension	Other	Total		
1	10	90	100	10	PFE1
2	0	100	100	0	PFE2
3	0	100	100	0	PFE3
Total	10	290	300	3	PFEQ

Institution:	TUT: Diploma in Agriculture Animal Prod				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	75	75	0	PFE1
2	0	125	125	0	PFE2
3	0	100	100	0	PFE3
Total	0	300	300	0	PFEQ

Institution:	TUT: Diploma in Agriculture Devel & Ext				
Year	Credits			PFE	
	Extension	Other	Total		
1	10	65	75	13	PFE1
2	20	105	125	16	PFE2
3	0	100	100	0	PFE3
Total	30	270	300	10	PFEQ

SUMMARY FOR DIPLOMAS					
	Extension	Other	Total	PFE	
CIAT	60	300	360	17	
CEDARA	10	475	485	2	
FT COX	16	369	385	4	
GLEN	69	906	975	7	
GROOTFONTEIN	12	348	360	3	
LOWVELD	0	360	0	0	
OCSA	60	960	1020	6	
POTCH	0	368	368	0	
TUT	30	270	300	10	

**EXTENSION IN AGRICULTURAL QUALIFICATIONS
PFE SCORES**

3-Year Degrees

Institution:	Fort Hare: B Agric (Extension)				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	128	128	0	PFE1
2	8	148	156	5	PFE2
3	44	92	136	32	PFE3
Total	52	368	420	12	PFEQ

Institution:	Free State: B Agric				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	128	128	0	PFE1
2	16	112	128	13	PFE2
3	0	128	128	0	PFE3
Total	16	368	384	4	PFEQ

Institution:	KwaZulu-Natal: B Agric				
Year	Credits			PFE	
	Extension	Other	Total		
1	32	96	128	25	PFE1
2	32	96	128	25	PFE2
3	64	64	128	50	PFE3
Total	128	256	384	33	PFEQ

Institution:	Stellenbosch: B Agric				
Year	Credits			PFE	
	Extension	Other	Total		
1	5	120	125	4	PFE1
2	25	110	135	19	PFE2
3	40	90	130	31	PFE3
Total	70	320	390	18	PFEQ

SUMMARY FOR B AGRIC				
	Extension	Other	Total	PFE
Fort Hare	52	368	420	12
UKZN	128	256	384	33
Stellenbosch	70	320	390	18

**EXTENSION IN AGRICULTURAL QUALIFICATIONS
PFE SCORES**

1-Year Honours Degrees/Post-Grad Diplomas

Institution: Fort Hare: B Ag Hons					
Year	Credits			PFE	
	Extension	Other	Total		
		0			
		0			
		0			
4	60	68	128	47	PFE4
Total	60	68	128	47	PFEQ

Institution: UKZN: B Ag Hons					
Year	Credits			PFE	
	Extension	Other	Total		
		0			
		0			
		0			
4	32	96	128	25	PFE4
Total	32	96	128	25	PFEQ

Institution: NWU: PG Dip Ag Extension					
Year	Credits			PFE	
	Extension	Other	Total		
		0			
		0			
		0			
4	126	0	126	100	PFE4
Total	126	0	126	100	PFEQ

Institution: NWU: BSc Hons (Ag Extension)					
Year	Credits			PFE	
	Extension	Other	Total		
		0			
		0			
		0			
4	108	36	144	75	PFE4
Total	108	36	144	75	PFEQ

Institution: Pretoria: B Inst Agrar Hons (Extension)					
Year	Credits			PFE	
	Extension	Other	Total		
1	40	20	60	67	Min Elect
1	60	0	60	100	Max Elect
1	80	20	100	80	Required
1	120	40	160	75	Min PFEQ
Total	140	20	160	88	Pot PFEQ

Institution: TUT B Tech: Crop Production					
Year	Credits			PFE	
	Extension	Other	Total		
		0		NWU	
		0		NWU	
		0			
4	25	75	100	25	PFE4
Total	25	75	100	25	PFEQ

Institution: TUT B Tech: Development & Extension					
Year	Credits			PFE	
	Extension	Other	Total		
		0			
		0			
		0			
4	25	75	100	25	PFE4
Total	25	75	100	25	PFEQ

Summary for 4th year				
	Extension	Other	Total	PFE
Fort Hare	60	68	128	47
UKZN	32	96	128	25
Pretoria	120	40	160	75
TUT	25	75	100	25

**EXTENSION IN AGRICULTURAL QUALIFICATIONS
PFE SCORES**

4-year degrees

Institution:	Fort Hare: B Sc Agric Ag Econ/Econ				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	128	128	0	PFE1
2	0	128	128	0	PFE2
3	8	124	132	6	PFE3
4	0	128	128	0	PFE4
Total	8	508	516	2	PFEQ

Institution:	Fort Hare: B Sc Agric Plant Prod & Ext				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	128	128	0	PFE1
2	0	148	148	0	PFE2
3	8	128	136	6	PFE3
4	44	100	144	31	PFE4
Total	52	504	556	9	PFEQ

Institution:	UKZN: BScAgric (Agribusiness or Soil Sci)				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	128	128	0	PFE1
2	0	128	128	0	PFE2
3	0	128	128	0	PFE3
4	0	144	144	0	PFE4
Total	0	528	528	0	PFEQ

Potential: based on electives

Institution:	UKZN: BScAgric (Agribusiness or Soil Sci)				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	128	128	0	PFE1
2	32	96	128	25	PFE2
3	16	112	128	13	PFE3
4	16	128	144	11	PFE4
Total	64	464	528	12	PFEQ

Institution: UKZN: BScAgric (Ag Econ)					
Year	Credits			PFE	
	Extension	Other	Total		
1	0	128	128	0	PFE1
2	0	128	128	0	PFE2
3	0	128	128	0	PFE3
4	32	112	144	22	PFE4
Total	32	496	528	6	PFEQ

Institution: Limopo: B Sc Agric (Ag Econ)					
Year	Credits			PFE	
	Extension	Other	Total		
1	0	122	122	0	PFE1
2	6	120	126	5	PFE2
3	18	112	130	14	PFE3
4	0	120	120	0	PFE4
Total	24	473.5	498	5	PFEQ

Institution: Limopo: B Sc Agric (Animal Production)					
Year	Credits			PFE	
	Extension	Other	Total		
1	0	122	122	0	PFE1
2	6	120	126	5	PFE2
3	12	118	130	9	PFE3
4	6	114	120	5	PFE4
Total	24	473.5	498	5	PFEQ

Institution: Limopo: B Sc Agric (Plant Production)					
Year	Credits			PFE	
	Extension	Other	Total		
1		122	122	0	PFE1
2	6	120	126	5	PFE2
3	12	118	130	9	PFE3
4		120	120	0	PFE4
Total	18	479.5	498	4	PFEQ

Institution:	Limopo: B Sc Agric (Soil Science)				
Year	Credits			PFE	
	Extension	Other	Total		
1		122	122	0	PFE1
2	6	120	126	5	PFE2
3	12	118	130	9	PFE3
4		120	120	0	PFE4
Total	18	479.5	498	4	PFEQ

Institution:	Zululand: B Sc Agriculture				
Year	Credits			PFE	
	Extension	Other	Total		
1	0	128	128	0	PFE1
2	32	96	128	25	PFE2
3	0	128	128	0	PFE3
4	8	120	128	6	PFE4
Total	40	472	512	8	PFEQ
4	8	Elective			

Institution:	Zululand B Consumer Science (Extension and Rural Development)				
Year	Credits			PFE	
	Extension	Other	Total		
1	8	120	128	6.3	PFE1
2	8	120	128	6.3	PFE2
3	16	112	128	12.5	PFE3
4	32	96	128	25.0	PFE4
Total	64	448	512	12.5	PFEQ

Institution:	Zululand B Consumer Science (Extension and Rural Development)					PFE	PFE Ag
Year	Credits						
	Extension	Agric	Other	Total	PFE		
1	0	32	96	128	0	PFE1	25
2	8	16	104	128	6	PFE2	13
3	24	40	64	128	19	PFE3	31
4	32	0	96	128	25	PFE4	0
Total	64	88	360	512	13	PFEQ	17

Institution: NWU: B Sc Agric (Ag Econ)					
Year	Credits			PFE	
	Extension	Other	Total		
1	0	132	132	0	PFE1
2	12	120	132	9	PFE2
3	24	120	144	17	PFE3
4	12	120	132	9	PFE4
Total	48	492	540	9	PFEQ

Institution: NWU: B Sc Agric (Animal Health)					
Year	Credits			PFE	
	Extension	Other	Total		
1	0	120	120	0	PFE1
2	0	132	132	0	PFE2
3	12	120	132	9	PFE3
4	0	120	120	0	PFE4
Total	12	492	504	2	PFEQ

Institution: NWU: B Sc Agric (Animal Sci)					
Year	Credits			PFE	
	Extension	Other	Total		
1	0	120	120	0	PFE1
2	0	126	126	0	PFE2
3	12	108	120	10	PFE3
4	24	102	126	19	PFE4
Total	36	456	492	7	PFEQ

Institution: NWU: B Sc Agric (Crop Science)					
Year	Credits			PFE	
	Extension	Other	Total		
1	0	120	120	0	PFE1
2	0	120	120	0	PFE2
3	0	120	120	0	PFE3
4	12	108	120	10	PFE4
Total	12	468	480	3	PFEQ

Institution: Pretoria: B Sc Agric (Ag Econ)					
Year	Credits			PFE	
	Extension	Other	Total		
1	0	122	122	0	PFE1
2	0	146	146	0	PFE2
3	20	136	156	13	PFE3
4	0	164	164	0	PFE4
Total	20	568	588	3	PFEQ

Institution: Pretoria: B Sc Agric					
Year	Credits			PFE	
	Extension	Other	Total		
1	0	122	122	0	PFE1
2	0	146	146	0	PFE2
3	0	156	156	0	PFE3
4	0	164	164	0	PFE4
Total	0	588	588	0	PFEQ

Institution: Free State: B Sc Agric					
Year	Credits			PFE	
	Extension	Other	Total		
1	0	128	128	0	PFE1
2	16	112	128	13	PFE2
3	0	128	128	0	PFE3
4	0	128	128	0	PFE4
Total	16	496	512	3	PFEQ

Summary for B Sc Agric					
	Extension	Other	Total	PFE	
Fort Hare	52	504	556	9	
UKZN	0	528	528	0	
Limpopo	24	473.5	497.5	5	
North West	36	456	492	7	
Pretoria	20	568	588	3	
Stellenbosch	0			0	
Zululand	40	472	512	8	

Combined qualifications
add B Inst Agrar Hons Ext

Pretoria: B Sc Agric + B Inst Agrar Hons Ext				
Credits			PFE	
Extension	Other	Total		
120	40	160	75	Min PFEHons
120	628	748	16	Min PFEQ

140	20	160	88	Pot PFEHons
140	608	748	19	Pot PFEQ

TUT: Dip Ag + B Tech Ag: Devel & Ext				
Credits			PFE	
Extension	Other	Total		
30	270	300	10	PFE(Dip)
25	75	100	25	PFE(Btech)
55	345	400	14	

UKZN: B Agric + Hons				
Credits			PFE	
Extension	Other	Total		
128	256	384	33	PFE(B Ag)
32	96	128	25	PFE(B Ag Hons)
160	352	512	31	PFE(Combined)

Ft Hare: B Agric + Hons				
Credits			PFE	
Extension	Other	Total		
52	368	420	12	PFE(B Ag)
60	68	128	47	PFE(B Ag Hons)
112	436	548	20	PFE(Combined)

NWU: B Sc Agric + B Sc Hons				
Credits			PFE	
Extension	Other	Total		
36	456	492	7	PFE(B Ag)
108	36	144	75	PFE(B Ag Hons)
144	492	636	23	PFE(Combined)

FSU: B Agric + B Agric Hons				
Credits			PFE	
Extension	Other	Total		
16	368	384	4	PFE(B Ag)
0	128	128	0	PFE(B Ag Hons)
16	496	512	3	PFE(Combined)

	Summary			
	Extension	Other	Total	PFECombined
Pretoria	140	608	748	19
Ft Hare	112	436	548	20
UKZN	160	352	512	31
TUT	55	345	400	14

Appendix 6: CIAT INSH Scores

CIAT EFFICACY FACTORS DIPLOMA IN EXTENSION

	Curriculum Marker	INSH1	INSHE1	INSH2	INSHE2	INSH3	INSHE3	INSHQ	INSHE(Q)	INSHQ(Q)
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	0	0	0	0.0	8	1	8	1	0.2
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0	0	0	0.0	5	1	5	1	0.1
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	0	0	0	0.0	25	4	25	4	0.7
4	The practice of problem solving as outlined above	0	0	0	0.0	25	4	25	4	0.7
5	The theory of participatory technology development and innovation including the following concepts:	0	0	0	0.0	20	3	20	3	0.6
	<ul style="list-style-type: none"> Participatory approach to technology development and innovation as a fundamental underpinning to sustainable progress. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 	0	0	0	0.0	0	0	0	0	0.0

	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 	0	0	0	0.0	0	0	0	0	0.0
6	The practice of participatory technology development and innovation as outlined above	0	0	0	0.0	14	2	14	2	0.4
7	The theory of systems (systems thinking) including the following concepts	0	0	0	0.0	10	2	10	2	0.3
	<ul style="list-style-type: none"> Successful farm management requires successful systems management. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> To act otherwise negatively impacts on sustainability. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 	0	0	0	0.0	0	0	0	0	0.0
8	The practice of systems thinking as outlined above	0	0	0	0.0	14	2	14	2	0.4
9	The theory of sustainable agriculture?	0	0	0	0.0	2	0	2	0	0.1
10	The practice of sustainable agriculture?	0	0	0	0.0	2	0	2	0	0.1
11	The theory of Iterative Development Pathways including the following concepts	0	0	0	0.0	25	4	25	4	0.7
	<ul style="list-style-type: none"> Development is iterative, experiential, linked to action and continuous. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 	0	0	0	0.0	0	0	0	0	0.0

	<ul style="list-style-type: none"> Development is simultaneously a concept, process and an outcome. 	0	0	0	0.0	0	0	0	0	0.0
12	The practice of Iterative Development Pathways as outlined above	0	0	0	0.0	11	2	11	2	0.3
13	The theory of Sustainable livelihoods	0	0	0	0.0	2	0	2	0	0.1
14	The practice of Sustainable livelihoods	0	0	0	0.0	2	0	2	0	0.1
15	The theory of development concepts	0	0	0	0.0	5	1	5	1	0.1
16	The practice development concepts	0	0	0	0.0	5	1	5	1	0.1
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	0	0	0	0.0	7	1	7	1	0.2
18	The practice of learning and learning styles as outlined above?	0	0	0	0.0	7	1	7	1	0.2
19	The theory of learning facilitation including the following concepts:	0	0	0	0.0	16	3	16	3	0.4
	<ul style="list-style-type: none"> Learning facilitation describes the relationship between practitioners and farmers. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 	0	0	0	0.0	0	0	0	0	0.0
20	The practice of learning facilitation as described above?	0	0	0	0.0	6	1	6	1	0.2
21	The theory of 'curriculum' development including the following concepts	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> Practitioners should participate in the development of curricula. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 	0	0	0	0.0	0	0	0	0	0.0

	<ul style="list-style-type: none"> The methods and skills required to develop curricula 	0	0	0	0.0	0	0	0	0	0.0
22	The practice of 'curriculum' development as outlined above	0	0	0	0.0	0	0	0	0	0.0
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts	0	0	0	0.0	16	3	16	3	0.4
	<ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of investigation and application. 	0	0	0	0.0	0	0	0	0	0.0
24	The practice of the process of investigating (research), applying and sharing as outlined above	0	0	0	0.0	14	2	14	2	0.4
25	The theory of individual and collective learning & learning partnerships including the following concepts	0	0	0	0.0	8	1	8	1	0.2
	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. 	0	0	0	0.0	0	0	0	0	0.0

	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 	0	0	0	0.0	0	0	0	0	0.0
26	The practice of individual and collective learning & learning partnerships as outlined above	0	0	0	0.0	7	1	7	1	0.2
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	0	0	0	0.0	33	6	33	6	0.9
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 	0	0	0	0.0	0	0	0	0	0.0
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action and, above all, continuous. 	0	0	0	0.0	0	0	0	0	0.0
28	The practice of planning, action and reflection (Reflective learning) as outlined above	0	0	0	0.0	23	4	23	4	0.6
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	0	0	0	0.0	20	3	20	3	0.6
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	0	0	0.0	2	0	2	0	0.1
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	0	0	0	0.0	11	2	11	2	0.3
32	Facilitate among farmers knowledge and skill regarding the critical use of information	0	0	0	0.0	19	3	19	3	0.5
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	0	0	0	0.0	17	3	17	3	0.5

34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	0	0	0	0.0	14	2	14	2	0.4
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<u>PFI</u>	<u>SCORE</u>
PF11	0
PF12	0
PF13	94
PFIQ	94

Appendix 7: Glen INSH Scores

GLEN EFFICACY FACTORS Higher Certificate and Diploma

		INSH1	INSHE1	INSH2	INSHE2	INSH3	INSHE3	INSHQ	INSHE(Q)	INSHQ(Q)
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	0.23	1	4.6	20.0	0	0	4.83	11	0.5
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0.46	2	1.15	5.0	0	0	1.61	4	0.2
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	1.15	5	1.15	5.0	0	0	2.3	5	0.2
4	The practice of problem solving as outlined above	0	0	0	0.0	0	0	0	0	0.0
5	The theory of participatory technology development and innovation including the following concepts:	0.23	1	1.15	5.0	0	0	1.38	3	0.1
	<ul style="list-style-type: none"> Participatory approach to technology development and innovation as a fundamental underpinning to sustainable 	0	0	0	0.0	0	0			

	progress.									
	<ul style="list-style-type: none"> Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 	0	0	0	0.0	0	0			
6	The practice of participatory technology development and innovation as outlined above	0.23	1	0	0.0	0	0	0.23	1	0.0
7	The theory of systems (systems thinking) including the following concepts	6.9	30	1.15	5.0	0	0	8.05	18	0.8
	<ul style="list-style-type: none"> Successful farm management requires successful systems management. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> To act otherwise negatively impacts on sustainability. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. 	0	0	0	0.0	0	0			

	<ul style="list-style-type: none"> Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 	0	0	0	0.0	0	0			
8	The practice of systems thinking as outlined above	0	0	0	0.0	0	0	0	0	0.0
9	The theory of sustainable agriculture?	1.38	6	1.15	5.0	0	0	2.53	6	0.3
10	The practice of sustainable agriculture?	0	0	0	0.0	0	0	0	0	0.0
11	The theory of Iterative Development Pathways including the following concepts	5.75	0	1.15	5.0	0	0	6.9	15	0.7
	<ul style="list-style-type: none"> Development is iterative, experiential, linked to action and continuous. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> Development is simultaneously a concept, process and an outcome. 	0	0	0	0.0	0	0			
12	The practice of Iterative Development Pathways as outlined above	0	0	0	0.0	0	0	0	0	0.0
13	The theory of Sustainable livelihoods	0.23	1	0	0.0	0	0	0.23	1	0.0
14	The practice of Sustainable livelihoods	0	0	0	0.0	0	0	0	0	0.0
15	The theory of development concepts	5.75	25	0	0.0	0	0	5.75	13	0.6
16	The practice development	0	0	0.46	2.0	0	0	0.46	1	0.0

	concepts									
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	0	0	0.46	2.0	0	0	0.46	1	0.0
18	The practice of learning and learning styles as outlined above?	0	0	0	0.0	0	0	0	0	0.0
19	The theory of learning facilitation including the following concepts:	1.15	5	0.69	3.0	0	0	1.84	4	0.2
	• Learning facilitation describes the relationship between practitioners and farmers.	0	0	0	0.0	0	0			
	• Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner.	0	0	0	0.0	0	0			
	• Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer	0	0	0	0.0	0	0			
20	The practice of learning facilitation as described above?	0	0	0.46	2.0	0	0	0.46	1	0.0
21	The theory of 'curriculum' development including the following concepts	5.06	22	1.15	5.0	0	0	6.21	14	0.6
	• Practitioners should participate in the development of curricula.	0	0	0	0.0	0	0			
	• Setting outcomes, content and processes involved in the execution of general and specific engagement with	0	0	0	0.0	0	0			

	farmers.									
	<ul style="list-style-type: none"> The methods and skills required to develop curricula 	0	0	0	0.0	0	0			
22	The practice of 'curriculum' development as outlined above	5.06	22	1.15	5.0	0	0	6.21	14	0.6
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts	1.15	0	0.46	2.0	0	0	1.61	4	0.2
	<ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of investigation and application. 	0	0	0	0.0	0	0			
24	The practice of the process of investigating (research), applying and sharing as outlined above	0.46	0	0.46	2.0	0	0	0.92	2	0.1
25	The theory of individual and collective learning & learning partnerships including the following concepts	0.69	3	0	0.0	0	0	0.69	2	0.1

	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 	0	0	0	0.0	0	0			
26	The practice of individual and collective learning & learning partnerships as outlined above	0.23	0	0	0.0	0	0	0.23	1	0.0
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	1.61	7	0.46	2.0	0	0	2.07	5	0.2
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 	0	0	0	0.0	0	0			
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action 	0	0	0	0.0	0	0			

	and, above all, continuous.									
28	The practice of planning, action and reflection (Reflective learning) as outlined above	0	0	0	0.0	0	0	0	0	0.0
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	0	0	1.15	5.0	0	0	1.15	3	0.1
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	0	0	0.0	0	0	0	0	0.0
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	0.92	4	0	0.0	0	0	0.92	2	0.1
32	Facilitate among farmers knowledge and skill regarding the critical use of information	1.61	7	0	0.0	0	0	1.61	4	0.2
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	0	0	0.46	2.0	0	0	0.46	1	0.0
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	0	0	1.15	5.0	0	0	1.15	3	0.1

<u>PFI</u>	<u>Score</u>
PF11	47
PF12	56
PF13	0
PFIQ	76

Appendix 8: Fort Hare PFE Scores

FORT HARE EFFICACY FACTORS B AGRIC (EXT) AND HONS

								B Agric		Hons			ALL 4 YEARS		
		INSH 1	INSHE 1	INSH 2	INSHE 2	INSH 3	INSHE 3	INSHE Q	INSHQ Q	INSH 4	INSHE 4	INSHQ Q	INSH Q	INSHE Q	INSHQ Q
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	0	0.0	0	0.0	34	8	7	0.8	60	10	4.7	94	8	1.7
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0	0.0	0	0.0	8	2	2	0.2	0	0	0.0	8	1	0.1
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food	0	0.0	12	15.0	44	10	11	1.3	30	5	2.3	86	8	1.6

	security to international issues of global competitiveness of agricultural products															
4	The practice of problem solving as outlined above	0	0.0	0	0.0	24	5	5	0.6	40	7	3.1	64	6	1.2	
5	The theory of participatory technology development and innovation including the following concepts:	0	0.0	0	0.0	24	5	5	0.6	0	0	0.0	24	2	0.4	
	<ul style="list-style-type: none"> Participatory approach to technology development and innovation as a fundamental underpinning to sustainable progress. 															
	<ul style="list-style-type: none"> Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 															

	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 														
6	The practice of participatory technology development and innovation as outlined above	0	0.0	0	0.0	8	2	2	0.2	0	0	0.0	8	1	0.1
7	The theory of systems (systems thinking) including the following concepts	0	0.0	0	0.0	0	0	0	0.0	20	3	1.6	20	2	0.4
	<ul style="list-style-type: none"> Successful farm management requires successful systems management. 														
	<ul style="list-style-type: none"> To act otherwise negatively impacts on 														

	sustainability.														
	<ul style="list-style-type: none"> • Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. 														
	<ul style="list-style-type: none"> • Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 														
8	The practice of systems thinking as outlined above	0	0.0	0	0.0	8	2	2	0.2	10	2	0.8	18	2	0.3
9	The theory of sustainable agriculture?	0	0.0	8	10.0	0	0	2	0.2	0	0	0.0	8	1	0.1
10	The practice of sustainable agriculture?	0	0.0	0	0.0	16	4	3	0.4	0	0	0.0	16	1	0.3
11	The theory of Iterative Development Pathways including the following concepts	0	0.0	0	0.0	16	4	3	0.4	0	0	0.0	16	1	0.3

	• Development is iterative, experiential, linked to action and continuous.														
	• Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action.														
	• Development is simultaneously a concept, process and an outcome.														
12	The practice of Iterative Development Pathways as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0	0	0	0.0
13	The theory of Sustainable livelihoods	0	0.0	16	20.0	0	0	3	0.4	0	0	0.0	16	1	0.3
14	The practice of Sustainable livelihoods	0	0.0	8	10.0	0	0	2	0.2	0	0	0.0	8	1	0.1
15	The theory of development concepts	0	0.0	8	10.0	0	0	2	0.2	0	0	0.0	8	1	0.1
16	The practice development concepts	0	0.0	8	10.0	0	0	2	0.2	0	0	0.0	8	1	0.1

17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	0	0.0	0	0.0	12	3	2	0.3	40	7	3.1	52	5	0.9
18	The practice of learning and learning styles as outlined above?	0	0.0	0	0.0	12	3	2	0.3	30	5	2.3	42	4	0.8
19	The theory of learning facilitation including the following concepts:	0	0.0	0	0.0	0	0	0	0.0	84	14	6.6	84	8	1.5
	• Learning facilitation describes the relationship between practitioners and farmers.														
	• Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner.														

	<ul style="list-style-type: none"> Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 															
20	The practice of learning facilitation as described above?	0	0.0	0	0.0	22	5	4	0.5	22	4	1.7	44	4	0.8	
21	The theory of 'curriculum' development including the following concepts	0	0.0	0	0.0	16	4	3	0.4	50	8	3.9	66	6	1.2	
	<ul style="list-style-type: none"> Practitioners should participate in the development of curricula. 															
	<ul style="list-style-type: none"> Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 															
	<ul style="list-style-type: none"> The methods and skills required to develop curricula 															

22	The practice of 'curriculum' development as outlined above	0	0.0	0	0.0	8	2	2	0.2	20	3	1.6	28	3	0.5
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts	0	0.0	0	0.0	24	5	5	0.6	0	0	0.0	24	2	0.4
	<ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 														
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 														
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of 														

	investigation and application.														
24	The practice of the process of investigating (research), applying and sharing as outlined above	0	0.0	0	0.0	36	8	7	0.9	40	7	3.1	76	7	1.4
25	The theory of individual and collective learning & learning partnerships including the following concepts	0	0.0	0	0.0	56	13	11	1.3	64	11	5.0	120	11	2.2
	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 														
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 														
	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; 														

	less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge.															
	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 															
26	The practice of individual and collective learning & learning partnerships as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0	0	0	0.0	
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	0	0.0	0	0.0	0	0	0	0.0	20	3	1.6	20	2	0.4	
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 															
	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 															

	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 														
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action and, above all, continuous. 														
28	The practice of planning, action and reflection (Reflective learning) as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0	0	0	0.0
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	0	0.0	4	5.0	16	4	4	0.5	10	2	0.8	30	3	0.5
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	0.0	4	5.0	0	0	1	0.1	10	2	0.8	14	1	0.3
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder	0	0.0	4	5.0	0	0	1	0.1	10	2	0.8	14	1	0.3

	interaction														
32	Facilitate among farmers knowledge and skill regarding the critical use of information	0	0.0	8	10.0	0	0	2	0.2	20	3	1.6	28	3	0.5
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	0	0.0	0	0.0	0	0	0	0.0	10	2	0.8	10	1	0.2
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	0	0.0	0	0.0	16	4	3	0.4	10	2	0.8	26	2	0.5

PFI

PF11
 PF12
 PF13
 PF14
 PFIB Ag
 PFIHons
 PFIB Ag Hons combined

SCORE

0
 29
 56
 59
 79
 59
 91

**FORT HARE EFFICACY FACTORS
B SC AGRIC PLANT PRODUCTION &
EXTENSION**

										B SC AGRIC		
		INSH1	INSHE 1	INSH2	INSHE 2	INSH3	INSHE 3	INSH4	INSHE 4	INSHQ	INSHE Q	INSHQ Q
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	0	0.0	0	0.0	0	0	34	8	34	7	0.6
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0	0.0	0	0.0	0	0	8	2	8	2	0.1
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	0	0.0	0	0.0	12	15	44	10	56	11	1.0
4	The practice of problem solving as outlined above	0	0.0	0	0.0	0	0	24	5	24	5	0.4
5	The theory of participatory technology development and innovation including the following concepts:	0	0.0	0	0.0	0	0	24	5	24	5	0.4
	<ul style="list-style-type: none"> Participatory approach to technology development and innovation as a fundamental underpinning to sustainable progress. 											
	<ul style="list-style-type: none"> Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 											

	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 											
6	The practice of participatory technology development and innovation as outlined above	0	0.0	0	0.0	0	0	8	2	8	2	0.1
7	The theory of systems (systems thinking) including the following concepts <ul style="list-style-type: none"> Successful farm management requires successful systems management. To act otherwise negatively impacts on sustainability. Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 	0	0.0	0	0.0	0	0	0	0	0	0	0.0
8	The practice of systems thinking as outlined above	0	0.0	0	0.0	0	0	8	2	8	2	0.1
9	The theory of sustainable agriculture?	0	0.0	0	0.0	8	10	0	0	8	2	0.1
10	The practice of sustainable agriculture?	0	0.0	0	0.0	0	0	16	4	16	3	0.3
11	The theory of Iterative Development Pathways including the following concepts <ul style="list-style-type: none"> Development is iterative, experiential, linked to action and continuous. Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 	0	0.0	0	0.0	0	0	16	4	16	3	0.3

	<ul style="list-style-type: none"> Development is simultaneously a concept, process and an outcome. 											
12	The practice of Iterative Development Pathways as outlined above	0	0.0	0	0.0	0	0	0	0	0	0	0.0
13	The theory of Sustainable livelihoods	0	0.0	0	0.0	16	20	0	0	16	3	0.3
14	The practice of Sustainable livelihoods	0	0.0	0	0.0	8	10	0	0	8	2	0.1
15	The theory of development concepts	0	0.0	0	0.0	8	10	0	0	8	2	0.1
16	The practice development concepts	0	0.0	0	0.0	8	10	0	0	8	2	0.1
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	0	0.0	0	0.0	0	0	12	3	12	2	0.2
18	The practice of learning and learning styles as outlined above?	0	0.0	0	0.0	0	0	12	3	12	2	0.2
19	The theory of learning facilitation including the following concepts: <ul style="list-style-type: none"> Learning facilitation describes the relationship between practitioners and farmers. Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 	0	0.0	0	0.0	0	0	48	11	48	9	0.9
20	The practice of learning facilitation as described above?	0	0.0	0	0.0	0	0	22	5	22	4	0.4
21	The theory of 'curriculum' development including the following concepts <ul style="list-style-type: none"> Practitioners should participate in the development of curricula. Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 	0	0.0	0	0.0	0	0	16	4	16	3	0.3
	<ul style="list-style-type: none"> Practitioners should participate in the development of curricula. 											
	<ul style="list-style-type: none"> Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 											

	<ul style="list-style-type: none"> The methods and skills required to develop curricula 											
22	The practice of 'curriculum' development as outlined above	0	0.0	0	0.0	0	0	8	2	8	2	0.1
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts	0	0.0	0	0.0	0	0	24	5	24	5	0.4
	<ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 											
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 											
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of investigation and application. 											
24	The practice of the process of investigating (research), applying and sharing as outlined above	0	0.0	0	0.0	0	0	36	8	36	7	0.6
25	The theory of individual and collective learning & learning partnerships including the following concepts	0	0.0	0	0.0	0	0	56	13	56	11	1.0
	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 											
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 											
	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. 											

	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 											
26	The practice of individual and collective learning & learning partnerships as outlined above	0	0.0	0	0.0	0	0	0	0	0	0	0.0
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	0	0.0	0	0.0	0	0	0	0	0	0	0.0
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 											
	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 											
	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 											
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action and, above all, continuous. 											
28	The practice of planning, action and reflection (Reflective learning) as outlined above	0	0.0	0	0.0	0	0	0	0	0	0	0.0
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	0	0.0	0	0.0	4	5	16	4	20	4	0.4
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	0.0	0	0.0	4	5	0	0	4	1	0.1
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	0	0.0	0	0.0	4	5	0	0	4	1	0.1
32	Facilitate among farmers knowledge and skill regarding the critical use of information	0	0.0	0	0.0	8	10	0	0	8	2	0.1
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	0	0.0	0	0.0	0	0	0	0	0	0	0.0

34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	0	0.0	0	0.0	0	0	16	4	16	3	0.3
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<u>PFI</u>	<u>SCORE</u>
PF11	0
PF12	0
PF13	29
PF14	59
PFIBScAg	82

Appendix 9: UKZN PFE Scores

UKZN EFFICACY FACTORS B AGRIC (EXT) AND HONS

		INSH 1	INSH E1	INSH 2	INSH E2	INSH 3	INSH E3	B Agric		Hons			ALL 4 YEARS		
								INSHE Q	INSHQ Q	INSH 4	INSH E4	INSHQ Q	INSH Q	INSHE Q	INSHQ Q
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	4	1.3	8	2.5	32	5	3	1.0	0	0	0.0	44	3	0.8
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	4	1.3	0	0.0	0	0	0	0.1	0	0	0.0	4	0	0.1
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	16	5.0	16	5.0	24	4	4	1.3	16	5	1.3	72	5	1.3
4	The practice of problem solving as outlined above	16	5.0	16	5.0	56	9	7	2.1	16	5	1.3	104	7	1.9
5	The theory of participatory technology development and innovation including the following concepts:	1	0.3	64	20.0	0	0	5	1.5	0	0	0.0	65	4	1.2
	<ul style="list-style-type: none"> Participatory approach to technology development and innovation as a 														

	fundamental underpinning to sustainable progress.														
	<ul style="list-style-type: none"> Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 														
	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 														
6	The practice of participatory technology development and innovation as outlined above	0	0.0	0	0.0	0	0	0	0.0	18	6	1.4	18	1	0.3
7	The theory of systems (systems thinking) including the following concepts	20	6.3	16	5.0	16	3	4	1.2	48	15	3.8	100	6	1.8
	<ul style="list-style-type: none"> Successful farm management requires successful systems management. 														
	<ul style="list-style-type: none"> To act otherwise negatively impacts on sustainability. 														
	<ul style="list-style-type: none"> Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. 														

	<ul style="list-style-type: none"> Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 														
8	The practice of systems thinking as outlined above	12	3.8	0	0.0	48	8	5	1.4	65	20	5.1	125	8	2.3
9	The theory of sustainable agriculture?	8	2.5	16	5.0	0	0	2	0.6	0	0	0.0	24	2	0.4
10	The practice of sustainable agriculture?	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0	0	0	0.0
11	The theory of Iterative Development Pathways including the following concepts	28	8.8	4	1.3	16	3	4	1.1	0	0	0.0	48	3	0.9
	<ul style="list-style-type: none"> Development is iterative, experiential, linked to action and continuous. 														
	<ul style="list-style-type: none"> Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 														
	<ul style="list-style-type: none"> Development is simultaneously a concept, process and an outcome. 														
12	The practice of Iterative Development Pathways as outlined above	8	2.5	0	0.0	16	3	2	0.6	0	0	0.0	24	2	0.4
13	The theory of Sustainable livelihoods	28	8.8	3	1.0	0	0	2	0.7	0	0	0.0	31	2	0.6
14	The practice of Sustainable livelihoods	8	2.5	0	0.0	80	13	7	2.1	0	0	0.0	88	6	1.6
15	The theory of development concepts	67	21.0	12	3.8	24	4	8	2.5	0	0	0.0	103	6	1.9

16	The practice development concepts	4	1.3	0	0.0	56	9	5	1.4	1	0	0.1	61	4	1.1
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	4	1.3	32	10.0	16	3	4	1.2	16	5	1.3	68	4	1.2
18	The practice of learning and learning styles as outlined above?	4	1.3	48	15.0	80	13	10	3.1	0	0	0.0	132	8	2.4
19	The theory of learning facilitation including the following concepts:	0	0.0	64	20.0	8	1	6	1.7	5	2	0.4	77	5	1.4
	• Learning facilitation describes the relationship between practitioners and farmers.														
	• Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner.														
	• Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer														
20	The practice of learning facilitation as described above?	0	0.0	64	20.0	8	1	6	1.7	3	1	0.2	75	5	1.4
21	The theory of 'curriculum' development including the following concepts	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0	0	0	0.0
	• Practitioners should participate in the development of curricula.														

	<ul style="list-style-type: none"> Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 														
	<ul style="list-style-type: none"> The methods and skills required to develop curricula 														
22	The practice of 'curriculum' development as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0	0	0	0.0
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts	0	0.0	0	0.0	8	1	1	0.2	0	0	0.0	8	1	0.1
	<ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 														
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 														
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of investigation and application. 														
24	The practice of the process of investigating (research), applying and sharing as outlined above	0	0.0	0	0.0	16	3	1	0.4	82	26	6.4	98	6	1.8

25	The theory of individual and collective learning & learning partnerships including the following concepts	0	0.0	0	0.0	8	1	1	0.2	0	0	0.0	8	1	0.1
	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 														
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 														
	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. 														
	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 														
26	The practice of individual and collective learning & learning partnerships as outlined above	12	3.8	0	0.0	24	4	3	0.9	38	12	3.0	74	5	1.4
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	4	1.3	0	0.0	16	3	2	0.5	8	3	0.6	28	2	0.5
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 														

	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 														
	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 														
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action and, above all, continuous. 														
28	The practice of planning, action and reflection (Reflective learning) as outlined above	20	6.3	0	0.0	16	3	3	0.9	8	3	0.6	44	3	0.8
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	2	0.5	0	0.0	4.8	1	1	0.2	0	0	0.0	6	0	0.1
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	8	2.5	0	0.0	4.8	1	1	0.3	0	0	0.0	13	1	0.2
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	0	0.0	0	0.0	4.8	1	0	0.1	0	0	0.0	5	0	0.1
32	Facilitate among farmers knowledge and skill regarding the critical use of information	2	0.5	0	0.0	4.8	1	1	0.2	0	0	0.0	6	0	0.1
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	0	0.0	0	0.0	4.8	1	0	0.1	0	0	0.0	5	0	0.1

34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	0	0.0	0	0.0	4.8	1	0	0.1	0	0	0.0	5	0	0.1
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<u>PFI</u>	<u>SCORE</u>
PFI1	65
PF12	38
PF13	76
PFI4	38
PFIB Ag	88
PFIHons	38
PFIB Ag Hons combined	91

Appendix 10: NWU PFE Scores

NWU EFFICACY FACTORS

Bachelor of Science in Agriculture

Agricultural Economic

		INSH1	INSHE 1	INSH2	INSHE 2	INSH3	INSHE 3	INSH4	INSHE 4	INSHQ	INSHE Q	INSHQ Q
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	0	0.0	0	0.0	24	10	12	10.0	36	10	1.8
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
4	The practice of problem solving as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
5	The theory of participatory technology development and innovation including the following concepts: <ul style="list-style-type: none"> Participatory approach to technology development and innovation as a fundamental underpinning to sustainable progress. 	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
	<ul style="list-style-type: none"> Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 											

	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 											
6	The practice of participatory technology development and innovation as outlined above											
7	The theory of systems (systems thinking) including the following concepts											
	<ul style="list-style-type: none"> Successful farm management requires successful systems management. 											
	<ul style="list-style-type: none"> To act otherwise negatively impacts on sustainability. 											
	<ul style="list-style-type: none"> Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. 											
	<ul style="list-style-type: none"> Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 											
8	The practice of systems thinking as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
9	The theory of sustainable agriculture?	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
10	The practice of sustainable agriculture?	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
11	The theory of Iterative Development Pathways including the following concepts	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
	<ul style="list-style-type: none"> Development is iterative, experiential, linked to action and continuous. 											
	<ul style="list-style-type: none"> Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 											

	<ul style="list-style-type: none"> Development is simultaneously a concept, process and an outcome. 											
12	The practice of Iterative Development Pathways as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
13	The theory of Sustainable livelihoods	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
14	The practice of Sustainable livelihoods	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
15	The theory of development concepts	0	0.0	0	0.0	6	3	36	11.7	42	12	2.1
16	The practice development concepts	0	0.0	0	0.0	6	3	36	11.7	42	12	2.1
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	0	0.0	19	16.0	12	5	0	8.7	31	9	1.6
18	The practice of learning and learning styles as outlined above?	0	0.0	0	0.0	12	5	0	3.3	12	3	0.6
19	The theory of learning facilitation including the following concepts:	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
	<ul style="list-style-type: none"> Learning facilitation describes the relationship between practitioners and farmers. 											
	<ul style="list-style-type: none"> Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. 											
	<ul style="list-style-type: none"> Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 											
20	The practice of learning facilitation as described above?	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
21	The theory of 'curriculum' development including the following concepts	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
	<ul style="list-style-type: none"> Practitioners should participate in the development of curricula. 											
	<ul style="list-style-type: none"> Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 											

	<ul style="list-style-type: none"> The methods and skills required to develop curricula 											
22	The practice of 'curriculum' development as outlined above	0	0.0	0	0.0	24	10	0	6.7	24	7	1.2
23	<p>The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts</p> <ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 											
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of investigation and application. 											
24	The practice of the process of investigating (research), applying and sharing as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
25	The theory of individual and collective learning & learning partnerships including the following concepts	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 											
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 											
	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. 											

	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 											
26	The practice of individual and collective learning & learning partnerships as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 											
	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 											
	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 											
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action and, above all, continuous. 											
28	The practice of planning, action and reflection (Reflective learning) as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
32	Facilitate among farmers knowledge and skill regarding the critical use of information	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0

34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
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<u>PFI</u>	<u>SCORE</u>
PFI1	0
PF12	0
PF13	18
PFI4	9
PFIQ	18

NWU EFFICACY FACTORS
B Sc Hons Extension

		INSH4	INSHEQ	INSHQQ
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	234	18.6	16.3
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0	0.0	0.0
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	18	1.4	1.3
4	The practice of problem solving as outlined above	0	0.0	0.0
5	The theory of participatory technology development and innovation including the following concepts:	0	0.0	0.0
	<ul style="list-style-type: none"> • Participatory approach to technology development and innovation as a fundamental underpinning to sustainable progress. 			
	<ul style="list-style-type: none"> • Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 			

	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 				
6	The practice of participatory technology development and innovation as outlined above		0	0.0	0.0
7	The theory of systems (systems thinking) including the following concepts		0	0.0	0.0
	<ul style="list-style-type: none"> Successful farm management requires successful systems management. 				
	<ul style="list-style-type: none"> To act otherwise negatively impacts on sustainability. 				
	<ul style="list-style-type: none"> Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. 				
	<ul style="list-style-type: none"> Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 				
8	The practice of systems thinking as outlined above		0	0.0	0.0
9	The theory of sustainable agriculture?		0	0.0	0.0
10	The practice of sustainable agriculture?		0	0.0	0.0
11	The theory of Iterative Development Pathways including the following concepts		0	0.0	0.0
	<ul style="list-style-type: none"> Development is iterative, experiential, linked to action and continuous. 				

	<ul style="list-style-type: none"> Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 			
	<ul style="list-style-type: none"> Development is simultaneously a concept, process and an outcome. 			
12	The practice of Iterative Development Pathways as outlined above	0	0.0	0.0
13	The theory of Sustainable livelihoods	0	0.0	0.0
14	The practice of Sustainable livelihoods	0	0.0	0.0
15	The theory of development concepts	18	1.4	1.3
16	The practice development concepts	18	1.4	1.3
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	0	0.0	0.0
18	The practice of learning and learning styles as outlined above?	0	0.0	0.0
19	The theory of learning facilitation including the following concepts:	18	1.4	1.3
	<ul style="list-style-type: none"> Learning facilitation describes the relationship between practitioners and farmers. 			
	<ul style="list-style-type: none"> Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. 			
	<ul style="list-style-type: none"> Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 			
20	The practice of learning facilitation as described above?	18	1.4	1.3

21	The theory of 'curriculum' development including the following concepts		0	0.0	0.0
	<ul style="list-style-type: none"> Practitioners should participate in the development of curricula. 				
	<ul style="list-style-type: none"> Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 				
	<ul style="list-style-type: none"> The methods and skills required to develop curricula 				
22	The practice of 'curriculum' development as outlined above		0	0.0	0.0
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts		0	0.0	0.0
	<ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 				
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 				
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of investigation and application. 				
24	The practice of the process of investigating (research), applying and sharing as outlined above		0	0.0	0.0
25	The theory of individual and collective learning & learning partnerships including the following concepts		9	0.7	0.6

	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 			
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 			
	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. 			
	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 			
26	The practice of individual and collective learning & learning partnerships as outlined above	9	0.7	0.6
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	0	0.0	0.0
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 			
	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 			
	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 			
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action and, above all, continuous. 			
28	The practice of planning, action and reflection (Reflective learning) as outlined above	0	0.0	0.0
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	0	0.0	0.0
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	0.0	0.0

31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction		18	1.4	1.3
32	Facilitate among farmers knowledge and skill regarding the critical use of information		18	1.4	1.3
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?		0	0.0	0.0
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?		0	0.0	0.0

<u>PFI</u>	<u>Score</u>
PF11	
PF12	
PF13	
PF14	
PFIQ	29

Appendix 11: UP PFE Scores

UP EFFICACY FACTORS B INST AGAR HONS (EXTENSION) Required Modules

		INSH4	INSHEQ	INSHEQQ
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	117	15	7.3
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0	0	0.0
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	73	9	4.6
4	The practice of problem solving as outlined above	20	3	1.3
5	The theory of participatory technology development and innovation including the following concepts:	0	0	0.0
	<ul style="list-style-type: none"> Participatory approach to technology development and innovation as a fundamental underpinning to sustainable progress. 			
	<ul style="list-style-type: none"> Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 			

	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 			
6	The practice of participatory technology development and innovation as outlined above	0	0	0.0
7	The theory of systems (systems thinking) including the following concepts	33	4	2.1
	<ul style="list-style-type: none"> Successful farm management requires successful systems management. 			
	<ul style="list-style-type: none"> To act otherwise negatively impacts on sustainability. 			
	<ul style="list-style-type: none"> Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. 			
	<ul style="list-style-type: none"> Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 			
8	The practice of systems thinking as outlined above	0	0	0.0
9	The theory of sustainable agriculture?	0	0	0.0
10	The practice of sustainable agriculture?	0	0	0.0
11	The theory of Iterative Development Pathways including the following concepts	0	0	0.0
	<ul style="list-style-type: none"> Development is iterative, experiential, linked to action and continuous. 			

	<ul style="list-style-type: none"> Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 			
	<ul style="list-style-type: none"> Development is simultaneously a concept, process and an outcome. 			
12	The practice of Iterative Development Pathways as outlined above	0	0	0.0
13	The theory of Sustainable livelihoods	17	2	1.0
14	The practice of Sustainable livelihoods	0	0	0.0
15	The theory of development concepts	33	4	2.1
16	The practice development concepts	0	0	0.0
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	0	0	0.0
18	The practice of learning and learning styles as outlined above?	0	0	0.0
19	The theory of learning facilitation including the following concepts:	0	0	0.0
	<ul style="list-style-type: none"> Learning facilitation describes the relationship between practitioners and farmers. 			
	<ul style="list-style-type: none"> Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. 			
	<ul style="list-style-type: none"> Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 			
20	The practice of learning facilitation as described above?	0	0	0.0

21	The theory of 'curriculum' development including the following concepts		20	3	1.3
	<ul style="list-style-type: none"> Practitioners should participate in the development of curricula. 				
	<ul style="list-style-type: none"> Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 				
	<ul style="list-style-type: none"> The methods and skills required to develop curricula 				
22	The practice of 'curriculum' development as outlined above		20	3	1.3
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts		0	0	0.0
	<ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 				
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 				
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of investigation and application. 				
24	The practice of the process of investigating (research), applying and sharing as outlined above		0	0	0.0
25	The theory of individual and collective learning & learning partnerships including the following concepts		0	0	0.0

	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 			
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 			
	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. 			
	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 			
26	The practice of individual and collective learning & learning partnerships as outlined above	0	0	0.0
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	0	0	0.0
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 			
	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 			
	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 			
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action and, above all, continuous. 			
28	The practice of planning, action and reflection (Reflective learning) as outlined above	0	0	0.0
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	0	0	0.0
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	0	0.0

31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction		0	0	0.0
32	Facilitate among farmers knowledge and skill regarding the critical use of information		0	0	0.0
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?		0	0	0.0
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?		0	0	0.0

<u>PFI</u>	<u>Score</u>
PF11	
PF12	
PF13	
PF14	
PFIQ	24

Appendix 12: Stellenbosch PFE Scores

STELLENBOSCH/CIAT EFFICACY FACTORS B AGRIC

		INSH1	INSHE 1	INSH2	INSHE 2	INSH3	INSHE 3	INSH4	INSHE 4	INSHQ	INSHE Q	INSHQ Q
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	1	2.0	13	5.2	8	2			22	3	0.6
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0	0.0	1	0.4	5	1			6	1	0.2
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	0	0.0	2	0.8	25	6			27	4	0.7
4	The practice of problem solving as outlined above	0	0.0	5	2.0	25	6			30	4	0.8
5	The theory of participatory technology development and innovation including the following concepts:	2	4.0	15	6.0	20	5			37	5	1.0
	<ul style="list-style-type: none"> Participatory approach to technology development and innovation as a fundamental underpinning to sustainable progress. 											
	<ul style="list-style-type: none"> Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 											

	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 											
6	The practice of participatory technology development and innovation as outlined above	2	4.0	11	4.4	14	4			27	4	0.7
7	The theory of systems (systems thinking) including the following concepts	0	0.0	5	2.0	10	3			15	2	0.4
	<ul style="list-style-type: none"> Successful farm management requires successful systems management. 											
	<ul style="list-style-type: none"> To act otherwise negatively impacts on sustainability. 											
	<ul style="list-style-type: none"> Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. 											
	<ul style="list-style-type: none"> Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 											
8	The practice of systems thinking as outlined above	0	0.0	0	0.0	14	4			14	2	0.4
9	The theory of sustainable agriculture?	0	0.0	1	0.4	2	1			3	0	0.1
10	The practice of sustainable agriculture?	0	0.0	1	0.4	2	1			3	0	0.1
11	The theory of Iterative Development Pathways including the following concepts	1	2.0	3	1.2	25	6			29	4	0.7
	<ul style="list-style-type: none"> Development is iterative, experiential, linked to action and continuous. 											
	<ul style="list-style-type: none"> Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed 											

	planning and action.											
	<ul style="list-style-type: none"> Development is simultaneously a concept, process and an outcome. 											
12	The practice of Iterative Development Pathways as outlined above	0	0.0	2	0.8	11	3			13	2	0.3
13	The theory of Sustainable livelihoods	0	0.0	4	1.6	2	1			6	1	0.2
14	The practice of Sustainable livelihoods	0	0.0	1	0.4	2	1			3	0	0.1
15	The theory of development concepts	0	0.0	20	8.0	5	1			25	4	0.6
16	The practice development concepts	0	0.0	20	8.0	5	1			25	4	0.6
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	2	4.0	25	10.0	7	2			34	5	0.9
18	The practice of learning and learning styles as outlined above?	2	4.0	13	5.2	7	2			22	3	0.6
19	The theory of learning facilitation including the following concepts:	5	10.0	14	5.6	16	4			35	5	0.9
	<ul style="list-style-type: none"> Learning facilitation describes the relationship between practitioners and farmers. 											
	<ul style="list-style-type: none"> Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. 											
	<ul style="list-style-type: none"> Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 											
20	The practice of learning facilitation as described above?	5	10.0	9	3.6	6	2			20	3	0.5
21	The theory of 'curriculum' development including the following concepts	0	0.0	0	0.0	0	0			0	0	0.0
	<ul style="list-style-type: none"> Practitioners should participate in the development of curricula. 											

	<ul style="list-style-type: none"> Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 											
	<ul style="list-style-type: none"> The methods and skills required to develop curricula 											
22	The practice of 'curriculum' development as outlined above	0	0.0	0	0.0	0	0			0	0	0.0
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts	2	4.0	10	4.0	16	4			28	4	0.7
	<ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 											
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 											
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of investigation and application. 											
24	The practice of the process of investigating (research), applying and sharing as outlined above	2	4.0	7	2.8	14	4			23	3	0.6
25	The theory of individual and collective learning & learning partnerships including the following concepts	0	0.0	6	2.4	8	2			14	2	0.4
	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 											
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 											

	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. 											
	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 											
26	The practice of individual and collective learning & learning partnerships as outlined above	0	0.0	6	2.4	7	2			13	2	0.3
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	4	8.0	4	1.6	33	8			41	6	1.1
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 											
	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 											
	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 											
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action and, above all, continuous. 											
28	The practice of planning, action and reflection (Reflective learning) as outlined above	2	4.0	4	1.6	23	6			29	4	0.7
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	1	2.0	14	5.6	20	5			35	5	0.9
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	0.0	4	1.6	2	1			6	1	0.2
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	1	2.0	7	2.8	11	3			19	3	0.5
32	Facilitate among farmers knowledge and skill regarding the critical use of	3	6.0	10	4.0	19	5			32	5	0.8

	information											
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	0	0.0	8	3.2	17	4			25	4	0.6
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	2	4.0	4	1.6	14	4			20	3	0.5

<u>PFI</u>	<u>SCORE</u>
PF11	47
PF12	91
PF13	94
PFIQ	94

Appendix 13: TUT PFE Scores

TUT EFFICACY FACTORS DIPLOMA & B TECH CROP PRODUCTION AND COMMERCIAL MIXED FARMING

								DIPLOMA			B TECH			ALL 4 YEARS		
		INSH 1	INSH E1	INSH 2	INSH E2	INSH 3	INSH E3	INSHE Q	INSHQ Q	INSH 4	INSH E4	INSHQ Q	INSH Q	INSHE Q	INSHQ Q	
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	6	6.0	0	0.0	0	0	6	0.2	13	5	1.3	19	5	0.5	
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	5	5.0	0	0.0	0	0	5	0.2	8	3	0.8	13	4	0.3	
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	4	4.0	0	0.0	0	0	4	0.1	10	4	1.0	14	4	0.4	
4	The practice of problem solving as outlined above	3	3.0	0	0.0	0	0	3	0.1	8	3	0.8	11	3	0.3	
5	The theory of participatory technology development and innovation including the following concepts:	5	5.0	0	0.0	0	0	5	0.2	8	3	0.8	13	4	0.3	
	<ul style="list-style-type: none"> Participatory approach to technology development and innovation as a 															

	fundamental underpinning to sustainable progress.														
	<ul style="list-style-type: none"> Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 														
	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 														
6	The practice of participatory technology development and innovation as outlined above	3	3.0	0	0.0	0	0	3	0.1	3	1	0.3	6	2	0.1
7	The theory of systems (systems thinking) including the following concepts	5	5.0	0	0.0	0	0	5	0.2	15	6	1.5	20	6	0.5
	<ul style="list-style-type: none"> Successful farm management requires successful systems management. 														
	<ul style="list-style-type: none"> To act otherwise negatively impacts on sustainability. 														
	<ul style="list-style-type: none"> Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. 														

	<ul style="list-style-type: none"> Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 														
8	The practice of systems thinking as outlined above	5	5.0	0	0.0	0	0	5	0.2	5	2	0.5	10	3	0.3
9	The theory of sustainable agriculture?	10	10.0	0	0.0	0	0	10	0.3	5	2	0.5	15	4	0.4
10	The practice of sustainable agriculture?	0	0.0	0	0.0	0	0	0	0.0	3	1	0.3	3	1	0.1
11	The theory of Iterative Development Pathways including the following concepts	5	5.0	0	0.0	0	0	5	0.2	10	4	1.0	15	4	0.4
	<ul style="list-style-type: none"> Development is iterative, experiential, linked to action and continuous. 														
	<ul style="list-style-type: none"> Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 														
	<ul style="list-style-type: none"> Development is simultaneously a concept, process and an outcome. 														
12	The practice of Iterative Development Pathways as outlined above	0	0.0	0	0.0	0	0	0	0.0	3	1	0.3	3	1	0.1
13	The theory of Sustainable livelihoods	4	4.0	0	0.0	0	0	4	0.1	15	6	1.5	19	5	0.5
14	The practice of Sustainable livelihoods	0	0.0	0	0.0	0	0	0	0.0	5	2	0.5	5	1	0.1
15	The theory of development concepts	5	5.0	0	0.0	0	0	5	0.2	13	5	1.3	18	5	0.4

16	The practice development concepts	1	1.0	0	0.0	0	0	1	0.0	3	1	0.3	4	1	0.1
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	5	5.0	0	0.0	0	0	5	0.2	13	5	1.3	18	5	0.4
18	The practice of learning and learning styles as outlined above?	2	2.0	0	0.0	0	0	2	0.1	5	2	0.5	7	2	0.2
19	The theory of learning facilitation including the following concepts:	2	2.0	0	0.0	0	0	2	0.1	13	5	1.3	15	4	0.4
	<ul style="list-style-type: none"> Learning facilitation describes the relationship between practitioners and farmers. 														
	<ul style="list-style-type: none"> Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. 														
	<ul style="list-style-type: none"> Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 														
20	The practice of learning facilitation as described above?	1	1.0	0	0.0	0	0	1	0.0	5	2	0.5	6	2	0.2
21	The theory of 'curriculum' development including the following concepts	0	0.0	0	0.0	0	0	0	0.0	15	6	1.5	15	4	0.4
	<ul style="list-style-type: none"> Practitioners should participate in the development of curricula. 														

	<ul style="list-style-type: none"> Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 														
	<ul style="list-style-type: none"> The methods and skills required to develop curricula 														
22	The practice of 'curriculum' development as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0	0	0	0.0
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts	6	6.0	0	0.0	0	0	6	0.2	13	5	1.3	19	5	0.5
	<ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 														
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 														
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of investigation and application. 														
24	The practice of the process of investigating (research), applying and sharing as outlined above	2	2.0	0	0.0	0	0	2	0.1	13	5	1.3	15	4	0.4

25	The theory of individual and collective learning & learning partnerships including the following concepts	2	2.0	0	0.0	0	0	2	0.1	13	5	1.3	15	4	0.4
	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 														
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 														
	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. 														
	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 														
26	The practice of individual and collective learning & learning partnerships as outlined above	1	1.0	0	0.0	0	0	1	0.0	5	2	0.5	6	2	0.2
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	1	1.0	0	0.0	0	0	1	0.0	15	6	1.5	16	5	0.4
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 														

	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 														
	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 														
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action and, above all, continuous. 														
28	The practice of planning, action and reflection (Reflective learning) as outlined above	1	1.0	0	0.0	0	0	1	0.0	3	1	0.3	4	1	0.1
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	3	3.0	0	0.0	0	0	3	0.1	10	4	1.0	13	4	0.3
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	2	2.0	0	0.0	0	0	2	0.1	10	4	1.0	12	3	0.3
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	2	2.0	0	0.0	0	0	2	0.1	15	6	1.5	17	5	0.4
32	Facilitate among farmers knowledge and skill regarding the critical use of information	2	2.0	0	0.0	0	0	2	0.1	15	6	1.5	17	5	0.4
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	4	4.0	0	0.0	0	0	4	0.1	8	3	0.8	12	3	0.3

34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	2	2.0	0	0.0	0	0	2	0.1	13	5	1.3	15	4	0.4
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<u>PFI</u>	<u>SCORE</u>
PF11	85
PF12	0
PF13	0
PF14	97
PFIB Ag	85
PFIHons	97
PFIB Ag Hons combined	97

**TUT EFFICACY FACTORS
DIPLOMA & B TECH DEVELOPMENT
AND EXTENSION**

								DIPLOMA			B TECH			ALL 4 YEARS		
		INSH 1	INSH E1	INSH 2	INSH E2	INSH 3	INSH E3	INSHE Q	INSHQ Q	INSH 4	INSH E4	INSHQ Q	INSH Q	INSHE Q	INSHQ Q	
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	6	6.0	10	5.0	0	0	5	0.5	20	4	2.0	36	5	0.9	
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	5	5.0	6	3.0	0	0	4	0.4	13	3	1.3	24	3	0.6	
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	4	4.0	12	6.0	0	0	5	0.5	23	5	2.3	39	5	1.0	
4	The practice of problem solving as outlined above	3	3.0	2	1.0	0	0	2	0.2	13	3	1.3	18	2	0.4	
5	The theory of participatory technology development and innovation including the following concepts:	5	5.0	11	5.5	0	0	5	0.5	13	3	1.3	29	4	0.7	
	<ul style="list-style-type: none"> Participatory approach to technology development and innovation as a fundamental underpinning to sustainable progress. 															

	<ul style="list-style-type: none"> Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 														
	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 														
6	The practice of participatory technology development and innovation as outlined above	3	3.0	7	3.5	0	0	3	0.3	5	1	0.5	15	2	0.4
7	The theory of systems (systems thinking) including the following concepts	5	5.0	9	4.5	0	0	5	0.5	28	6	2.8	42	5	1.0
	<ul style="list-style-type: none"> Successful farm management requires successful systems management. 														
	<ul style="list-style-type: none"> To act otherwise negatively impacts on sustainability. 														
	<ul style="list-style-type: none"> Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. 														

	<ul style="list-style-type: none"> Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 														
8	The practice of systems thinking as outlined above	5	5.0	2	1.0	0	0	2	0.2	10	2	1.0	17	2	0.4
9	The theory of sustainable agriculture?	10	10.0	11	5.5	0	0	7	0.7	13	3	1.3	34	4	0.8
10	The practice of sustainable agriculture?	0	0.0	2	1.0	0	0	1	0.1	13	3	1.3	15	2	0.4
11	The theory of Iterative Development Pathways including the following concepts	5	5.0	4	2.0	0	0	3	0.3	25	5	2.5	34	4	0.9
	<ul style="list-style-type: none"> Development is iterative, experiential, linked to action and continuous. 														
	<ul style="list-style-type: none"> Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 														
	<ul style="list-style-type: none"> Development is simultaneously a concept, process and an outcome. 														
12	The practice of Iterative Development Pathways as outlined above	0	0.0	8	4.0	0	0	3	0.3	8	2	0.8	16	2	0.4
13	The theory of Sustainable livelihoods	4	4.0	8	4.0	0	0	4	0.4	28	6	2.8	40	5	1.0
14	The practice of Sustainable livelihoods	0	0.0	2	1.0	0	0	1	0.1	15	3	1.5	17	2	0.4
15	The theory of development concepts	5	5.0	12	6.0	0	0	6	0.6	25	5	2.5	42	5	1.1

16	The practice development concepts	1	1.0	2	1.0	0	0	1	0.1	13	3	1.3	16	2	0.4
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	5	5.0	10	5.0	0	0	5	0.5	23	5	2.3	38	5	0.9
18	The practice of learning and learning styles as outlined above?	2	2.0	3	1.5	0	0	2	0.2	13	3	1.3	18	2	0.4
19	The theory of learning facilitation including the following concepts:	2	2.0	7	3.5	0	0	3	0.3	28	6	2.8	37	5	0.9
	<ul style="list-style-type: none"> Learning facilitation describes the relationship between practitioners and farmers. 														
	<ul style="list-style-type: none"> Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. 														
	<ul style="list-style-type: none"> Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 														
20	The practice of learning facilitation as described above?	1	1.0	2	1.0	0	0	1	0.1	13	3	1.3	16	2	0.4
21	The theory of 'curriculum' development including the following concepts	0	0.0	1	0.5	0	0	0	0.0	23	5	2.3	24	3	0.6
	<ul style="list-style-type: none"> Practitioners should participate in the development of curricula. 														

	<ul style="list-style-type: none"> Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 														
	<ul style="list-style-type: none"> The methods and skills required to develop curricula 														
22	The practice of 'curriculum' development as outlined above	0	0.0	1	0.5	0	0	0	0.0	10	2	1.0	11	1	0.3
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts	6	6.0	7	3.5	0	0	4	0.4	20	4	2.0	33	4	0.8
	<ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 														
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 														
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of investigation and application. 														
24	The practice of the process of investigating (research), applying and sharing as outlined above	2	2.0	2	1.0	0	0	1	0.1	15	3	1.5	19	2	0.5

25	The theory of individual and collective learning & learning partnerships including the following concepts	2	2.0	7	3.5	0	0	3	0.3	25	5	2.5	34	4	0.9
	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 														
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 														
	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. 														
	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 														
26	The practice of individual and collective learning & learning partnerships as outlined above	1	1.0	2	1.0	0	0	1	0.1	13	3	1.3	16	2	0.4
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	1	1.0	12	6.0	0	0	4	0.4	23	5	2.3	36	4	0.9
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 														

	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 														
	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 														
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action and, above all, continuous. 														
28	The practice of planning, action and reflection (Reflective learning) as outlined above	1	1.0	2	1.0	0	0	1	0.1	10	2	1.0	13	2	0.3
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	3	3.0	7	3.5	0	0	3	0.3	15	3	1.5	25	3	0.6
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	2	2.0	8	4.0	0	0	3	0.3	23	5	2.3	33	4	0.8
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	2	2.0	6	3.0	0	0	3	0.3	25	5	2.5	33	4	0.8
32	Facilitate among farmers knowledge and skill regarding the critical use of information	2	2.0	8	4.0	0	0	3	0.3	28	6	2.8	38	5	0.9
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	4	4.0	6	3.0	0	0	3	0.3	15	3	1.5	25	3	0.6

34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	2	2.0	8	4.0	0	0	3	0.3	23	5	2.3	33	4	0.8
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<u>PFI</u>	<u>SCORE</u>
PF11	85
PF12	100
PF13	0
PF14	100
PFIB Ag	100
PFIHons	100
PFIB Ag Hons combined	100

Appendix 14: UNIZUL PFE Scores

ZULULAND EFFICACY FACTORS B CONSUMER SCIENCE (EXTENSION & RURAL DEVELOPMENT)

		INSH1	INSHE 1	INSH2	INSHE 2	INSH3	INSHE 3	INSH4	INSHE 4	INSHQ	INSHE Q	INSHQ Q
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	0	0.0	8	10.0	8	5	99	36.1	115	36	6.5
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0	0.0	0	0.0	0	0	3	1.1	3	1	0.2
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	0	0.0	8	10.0	8	5	4	6.4	20	6	1.1
4	The practice of problem solving as outlined above	0	0.0	4	5.0	4	3	7	4.8	15	5	0.9
5	The theory of participatory technology development and innovation including the following concepts:	0	0.0	8	10.0	8	5	27	13.6	43	14	2.4
	<ul style="list-style-type: none"> Participatory approach to technology development and innovation as a fundamental underpinning to sustainable progress. 											
	<ul style="list-style-type: none"> Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 											

	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 											
6	The practice of participatory technology development and innovation as outlined above											
7	The theory of systems (systems thinking) including the following concepts											
	<ul style="list-style-type: none"> Successful farm management requires successful systems management. 											
	<ul style="list-style-type: none"> To act otherwise negatively impacts on sustainability. 											
	<ul style="list-style-type: none"> Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. 											
	<ul style="list-style-type: none"> Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 											
8	The practice of systems thinking as outlined above	0	0.0	4	5.0	4	3	7	4.8	15	5	0.9
9	The theory of sustainable agriculture?	10	12.5	4	5.0	4	3	3	6.7	21	7	1.2
10	The practice of sustainable agriculture?	0	0.0	4	5.0	4	3	6	4.5	14	4	0.8
11	The theory of Iterative Development Pathways including the following concepts	0	0.0	0	0.0	0	0	3	1.1	3	1	0.2
	<ul style="list-style-type: none"> Development is iterative, experiential, linked to action and continuous. Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 											

	<ul style="list-style-type: none"> Development is simultaneously a concept, process and an outcome. 											
12	The practice of Iterative Development Pathways as outlined above	0	0.0	0	0.0	0	0	2	0.7	2	1	0.1
13	The theory of Sustainable livelihoods	10	12.5	0	0.0	0	0	3	4.2	13	4	0.8
14	The practice of Sustainable livelihoods	0	0.0	0	0.0	0	0	3	1.1	3	1	0.2
15	The theory of development concepts	0	0.0	0	0.0	0	0	19	6.1	19	6	1.1
16	The practice development concepts	0	0.0	0	0.0	0	0	19	6.1	19	6	1.1
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	0	0.0	0	0.0	0	0	18	5.7	18	6	1.0
18	The practice of learning and learning styles as outlined above?	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
19	The theory of learning facilitation including the following concepts: <ul style="list-style-type: none"> Learning facilitation describes the relationship between practitioners and farmers. Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 	0	0.0	8	10.0	8	5	6	7.0	22	7	1.3
20	The practice of learning facilitation as described above?	0	0.0	4	5.0	4	3	6	4.4	14	4	0.8
21	The theory of 'curriculum' development including the following concepts <ul style="list-style-type: none"> Practitioners should participate in the development of curricula. Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
	<ul style="list-style-type: none"> Practitioners should participate in the development of curricula. 											
	<ul style="list-style-type: none"> Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 											

	<ul style="list-style-type: none"> The methods and skills required to develop curricula 											
22	The practice of 'curriculum' development as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
	<ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 											
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 											
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of investigation and application. 											
24	The practice of the process of investigating (research), applying and sharing as outlined above	0	0.0	0	0.0	0	0	2	0.7	2	1	0.1
25	The theory of individual and collective learning & learning partnerships including the following concepts	0	0.0	8	10.0	8	5	6	7.0	22	7	1.3
	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 											
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 											
	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. 											

	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 											
26	The practice of individual and collective learning & learning partnerships as outlined above	0	0.0	12	15.0	12	8	14	12.0	38	12	2.2
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	0	0.0	0	0.0	0	0	2	0.7	2	1	0.1
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 											
	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 											
	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 											
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action and, above all, continuous. 											
28	The practice of planning, action and reflection (Reflective learning) as outlined above	0	0.0	0	0.0	0	0	2	0.7	2	1	0.1
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	0	0.0	0	0.0	0	0	2	0.7	2	1	0.1
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	0.0	0	0.0	0	0	2	0.7	2	1	0.1
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	0	0.0	0	0.0	0	0	2	0.7	2	1	0.1
32	Facilitate among farmers knowledge and skill regarding the critical use of information	0	0.0	0	0.0	0	0	2	0.7	2	1	0.1
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	0	0.0	0	0.0	0	0	2	0.7	2	1	0.1

34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	0	0.0	0	0.0	0	0	2	0.7	2	1	0.1
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<u>PFI</u>	<u>SCORE</u>
PF11	9
PF12	0
PF13	35
PF14	88
PFIQ	88

ZULULAND EFFICACY FACTORS
BSc AGRIC

		INSH1	INSHE 1	INSH2	INSHE 2	INSH3	INSHE 3	INSH4	INSHE 4	INSHQ	INSHE Q	INSHQ Q
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	0	0.0	16	10.0	0	0	0	10.0	16	10	1.8
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	0	0.0	16	10.0	0	0	0	10.0	16	10	1.8
4	The practice of problem solving as outlined above	0	0.0	8	5.0	0	0	0	5.0	8	5	0.9
5	The theory of participatory technology development and innovation including the following concepts:	0	0.0	8	5.0	0	0	0	5.0	8	5	0.9
	<ul style="list-style-type: none"> Participatory approach to technology development and innovation as a fundamental underpinning to sustainable progress. 											
	<ul style="list-style-type: none"> Technology adoption on its own is promotes conformity, technology innovation promotes experimentation, exploration and creativity. 											

	<ul style="list-style-type: none"> Rather than teaching the capacity to persuade farmers to adopt a particular technology the aim is to develop in those supporting farmers the skill of engaging farmers, producers and small-scale value-adders in technology development 											
6	The practice of participatory technology development and innovation as outlined above											
7	The theory of systems (systems thinking) including the following concepts											
	<ul style="list-style-type: none"> Successful farm management requires successful systems management. 											
	<ul style="list-style-type: none"> To act otherwise negatively impacts on sustainability. 											
	<ul style="list-style-type: none"> Agriculture as an entity, whether at the level of the homestead or at the aggregate level, is an integrated part of the overall economy. 											
	<ul style="list-style-type: none"> Beyond the farm, continuous learning demands that people understand that life itself is a collection of systems that interact and impact on one another. 											
8	The practice of systems thinking as outlined above	0	0.0	4	2.5	0	0	0	2.5	4	3	0.5
9	The theory of sustainable agriculture?	0	0.0	4	2.5	0	0	0	2.5	4	3	0.5
10	The practice of sustainable agriculture?	0	0.0	4	2.5	0	0	0	2.5	4	3	0.5
11	The theory of Iterative Development Pathways including the following concepts	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
	<ul style="list-style-type: none"> Development is iterative, experiential, linked to action and continuous. 											
	<ul style="list-style-type: none"> Development is understood to be a learning process, following a three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 											

	<ul style="list-style-type: none"> Development is simultaneously a concept, process and an outcome. 											
12	The practice of Iterative Development Pathways as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
13	The theory of Sustainable livelihoods	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
14	The practice of Sustainable livelihoods	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
15	The theory of development concepts	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
16	The practice development concepts	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
18	The practice of learning and learning styles as outlined above?	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
19	The theory of learning facilitation including the following concepts:	0	0.0	16	10.0	0	0	0	10.0	16	10	1.8
	<ul style="list-style-type: none"> Learning facilitation describes the relationship between practitioners and farmers. 											
	<ul style="list-style-type: none"> Learning facilitation describes the attitude and the nature of the exchange of knowledge and understanding between the farmer and the extension practitioner. 											
	<ul style="list-style-type: none"> Learning facilitation represents a set of specific skills and attitudes that will foster learning and the owning of learning in the farmer 											
20	The practice of learning facilitation as described above?	0	0.0	12	7.5	0	0	0	7.5	12	8	1.4
21	The theory of 'curriculum' development including the following concepts	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
	<ul style="list-style-type: none"> Practitioners should participate in the development of curricula. 											
	<ul style="list-style-type: none"> Setting outcomes, content and processes involved in the execution of general and specific engagement with farmers. 											

	<ul style="list-style-type: none"> The methods and skills required to develop curricula 											
22	The practice of 'curriculum' development as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
23	The theory of the process of investigating (research), applying and sharing (IAS) including the following concepts	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
	<ul style="list-style-type: none"> IAS describes to the learning process to be used in extension engagements. 											
	<ul style="list-style-type: none"> IAS describes a cyclical process which is meant to be applied by practitioners in their own learning processes (including research), by practitioners in facilitating learning among farmers and in engagements with other stakeholders. 											
	<ul style="list-style-type: none"> The importance of sharing knowledge gained through the process of investigation and application. 											
24	The practice of the process of investigating (research), applying and sharing as outlined above	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
25	The theory of individual and collective learning & learning partnerships including the following concepts	0	0.0	24	15.0	0	0	0	15.0	24	15	2.7
	<ul style="list-style-type: none"> Each participant in the learning process is responsible for his or her own learning – individually and collectively. 											
	<ul style="list-style-type: none"> Learning is intended, and must be so constructed, to be a partnership among all participants in the learning process. 											
	<ul style="list-style-type: none"> The teacher/lecturer is less an instructor and more a facilitator; less the font of knowledge and more the guide to acquisition, development, use and sharing of knowledge. 											

	<ul style="list-style-type: none"> The student is an equal partner in the learning process. 											
26	The practice of individual and collective learning & learning partnerships as outlined above	0	0.0	20	12.5	0	0	0	12.5	20	13	2.3
27	The theory of planning, action and reflection (Reflective learning) including the following concepts:	0	0.0	24	15.0	0	0	0	15.0	24	15	2.7
	<ul style="list-style-type: none"> Learning should be reflective/reflexive. 											
	<ul style="list-style-type: none"> Participants in the learning process should develop and apply the skill and practice of reflecting on the outcomes and results of actions. 											
	<ul style="list-style-type: none"> The three-stage format of planning, then acting and then reflecting, leading to renewed planning and action. 											
	<ul style="list-style-type: none"> Learning is iterative, experiential, linked to action and, above all, continuous. 											
28	The practice of planning, action and reflection (Reflective learning) as outlined above	0	0.0	16	10.0	0	0	0	10.0	16	10	1.8
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
32	Facilitate among farmers knowledge and skill regarding the critical use of information	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0

34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	0	0.0	0	0.0	0	0	0	0.0	0	0	0.0
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PFI	SCORE
PFI1	0
PF12	41
PF13	0
PFI4	0
PFIQ	41

Appendix 15: Survey of Agricultural Extension practitioners

Extension Practitioners' Responses None, Very little, Some

Marker	Percent			
	None	Very little	Some	Combined
The practice of 'curriculum' development	3.8	13.6	31.1	48.5
The practice of Iterative Development Pathways	3.8	10.6	31.8	46.2
The theory of the process of investigating (research), applying and sharing (IAS)	3.0	6.1	33.3	42.4
The theory of 'curriculum' development	3.0	11.4	27.3	41.7
The practice of the process of investigating (research), applying and sharing	3.0	7.6	28.0	38.6
The theory of Iterative Development Pathways	3.0	9.1	22.7	34.8
The theory of systems (systems thinking)	0.8	2.3	22.0	25.0
The practice of individual and collective learning & learning partnerships	2.3	4.5	18.2	25.0
The practice of Sustainable livelihoods	0.8	2.3	21.2	24.2
The theory of individual and collective learning & learning partnerships	2.3	3.8	18.2	24.2
Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	2.3	3.0	18.9	24.2
The practice of systems thinking	0.8	3.0	19.7	23.5
Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	1.5	2.3	18.9	22.7
The practice of planning, action and reflection (Reflective learning)	2.3	3.0	16.7	22.0
The theory of development concepts	1.5	1.5	17.4	20.5
The practice of learning and learning styles	1.5	4.5	14.4	20.5
The practice of learning facilitation	0.8	4.5	15.2	20.5
The practice development concepts	0.8	3.0	13.6	17.4
Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	1.5	1.5	14.4	17.4
The theory of problem solving in the context of dealing with issues facing developmental agriculture	0.0	1.5	15.2	16.7
The theory of participatory technology development and innovation	0.0	2.3	14.4	16.7
The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	1.5	3.8	11.4	16.7
Facilitate among farmers knowledge and skill regarding the critical use of information	2.3	3.0	10.6	15.9
Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	2.3	1.5	12.1	15.9
The theory of Sustainable livelihoods	0.8	2.3	12.1	15.2
The theory of learning facilitation	0.8	4.5	9.8	15.2
The theory of planning, action and reflection (Reflective learning)	2.3	3.8	9.1	15.2
The practice of sustainable agriculture	1.5	3.8	9.1	14.4

Marker	Percent			
	None	Very little	Some	Combined
The practice of participatory technology development and innovation	0.0	3.0	11.4	14.4
Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0.0	0.8	11.4	12.1
Facilitating among farmers: Creative and critical thinking for problem solving within systems	2.3	1.5	8.3	12.1
The practice of problem solving	0.0	2.3	9.1	11.4
Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	0.0	0.8	9.8	10.6
The theory of sustainable agriculture	0.0	1.5	6.8	8.3

**Extension Practitioners' Responses:
Adequate, more than adequate, proficient**

Marker	Percent			
	Adequate	More than adequate	Proficient	Combined
The theory of sustainable agriculture	31.8	47.7	12.1	91.7
Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	48.5	30.3	10.6	89.4
The practice of problem solving	37.9	41.7	9.1	88.6
Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	35.6	43.9	8.3	87.9
Facilitating among farmers: Creative and critical thinking for problem solving within systems	27.3	42.4	18.2	87.9
The practice of participatory technology development and innovation	42.4	37.9	5.3	85.6
The practice of sustainable agriculture	45.5	37.1	3.0	85.6
The theory of Sustainable livelihoods	43.9	31.1	9.8	84.8
The theory of learning facilitation:	43.9	31.1	9.8	84.8
The theory of planning, action and reflection (Reflective learning):	46.2	31.1	7.6	84.8
Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	36.4	36.4	11.4	84.1
Facilitate among farmers knowledge and skill regarding the critical use of information	40.2	37.1	6.8	84.1
The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	28.0	47.7	7.6	83.3
The theory of participatory technology development and innovation:	36.4	36.4	10.6	83.3
The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	50.8	23.5	9.1	83.3

Marker	Percent			
	Adequate	More than adequate	Proficient	Combined
The practice development concepts	43.2	36.4	3.0	82.6
Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	41.7	31.8	9.1	82.6
The theory of development concepts	37.9	34.8	6.8	79.5
The practice of learning and learning styles	47.0	27.3	5.3	79.5
The practice of learning facilitation as described above	42.4	31.1	6.1	79.5
The practice of planning, action and reflection (Reflective learning)	41.7	31.1	5.3	78.0
Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	37.1	29.5	10.6	77.3
The practice of systems thinking	44.7	27.3	4.5	76.5
The practice of Sustainable livelihoods	41.7	27.3	6.8	75.8
The theory of individual and collective learning & learning partnerships	43.2	26.5	6.1	75.8
Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	40.9	30.3	4.5	75.8
The theory of systems (systems thinking)	40.2	26.5	8.3	75.0
The practice of individual and collective learning & learning partnerships	41.7	28.0	5.3	75.0
The theory of Iterative Development Pathways	42.4	18.2	4.5	65.2
The practice of the process of investigating (research), applying and sharing	32.6	22.0	6.8	61.4
The theory of 'curriculum' development	36.4	16.7	5.3	58.3
The theory of the process of investigating (research), applying and sharing (IAS)	28.8	23.5	5.3	57.6
The practice of Iterative Development Pathways	38.6	13.6	1.5	53.8
The practice of 'curriculum' development	33.3	15.9	2.3	51.5

Mode Scores for individual markers

	Marker	Mode
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	4
3	The theory of problem solving in the context of dealing with issues facing developmental agriculture	4
4	The practice of problem solving	4
5	The theory of participatory technology development and innovation	4
9	The theory of sustainable agriculture	4
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	4
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	4
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	3
6	The practice of participatory technology development and innovation	3
7	The theory of systems (systems thinking)	3
8	The practice of systems thinking	3
10	The practice of sustainable agriculture	3
11	The theory of Iterative Development Pathways	3
12	The practice of Iterative Development Pathways	3
13	The theory of Sustainable livelihoods	3
14	The practice of Sustainable livelihoods	3
15	The theory of development concepts	3
16	The practice development concepts	3
17	The theory of learning and learning styles	3
18	The practice of learning and learning styles	3
19	The theory of learning facilitation	3
20	The practice of learning facilitation as described above	3
21	The theory of 'curriculum' development	3
22	The practice of 'curriculum' development	3
24	The practice of the process of investigating (research), applying and sharing	3
25	The theory of individual and collective learning & learning partnerships	3
26	The practice of individual and collective learning & learning partnerships	3
27	The theory of planning, action and reflection (Reflective learning)	3
28	The practice of planning, action and reflection (Reflective learning)	3
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	3
32	Facilitate among farmers knowledge and skill regarding the critical use of information	3
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	3
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	3
23	The theory of the process of investigating (research), applying and sharing (IAS)	2

**Extension Practitioners' Responses:
Details**

	Respondent	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Marker	Rating														
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	3	3	3	3	3	4	4	3	4	5	4	3	3	4	1
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	2	4	3	2	3	3	4	3	4	4	4	3	4	4	3
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	4	2	3	2	1	4	4	4	4	4	3	3	4	4	2
4	The practice of problem solving	3	3	3	2	1	4	4	4	4	5	3	2	3	3	3
5	The theory of participatory technology development and innovation:	2	4	2	2	1	4	5	4	2	5	3	4	4	4	4
6	The practice of participatory technology development and innovation	2	3	3	2	1	4	5	4	3	4	4	3	4	4	4
7	The theory of systems (systems thinking)	3	3	3	3	1	3	4	3	4	4	4	2	3	3	2
8	The practice of systems thinking	3	5	2	3	0	4	4	3	4	4	2	2	3	4	3
9	The theory of sustainable agriculture	3	4	3	3	1	4	5	4	5	4	4	4	4	2	2
10	The practice of sustainable agriculture	3	4	3	3	1	4	5	4	4	4	0	0	2	3	2
11	The theory of Iterative Development Pathways	3	4	2	0	0	3	5	3	4	4	2	4	3	3	0
12	The practice of Iterative Development Pathways	3	4	2	0	0	3	4	2	0	3	3	3	3	4	2
13	The theory of Sustainable livelihoods	4	5	3	3	1	4	4	4	0	4	4	3	4	2	2
14	The practice of Sustainable livelihoods	3	4	3	3	1	3	4	4	0	4	4	2	3	4	3
15	The theory of development concepts	2	4	2	2	1	3	4	4	0	4	4	3	3	2	3
16	The practice development concepts	2	3	2	2	1	3	4	4	0	4	4	2	3	3	3
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	3	3	3	1	0	3	5	3	0	4	3	2	2	4	3
18	The practice of learning and learning styles	3	3	3	1	0	3	4	3	0	4	3	2	2	4	4
19	The theory of learning facilitation:	2	4	3	1	1	4	4	4	4	4	3	3	2		4
20	The practice of learning facilitation as described above	2	3	3	1	1	4	4	4	0	4	4	3	2	4	4
21	The theory of 'curriculum' development	2	2	2	0	1	4	4	4	4	3	2	2	1	3	4

	Respondent	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Marker	Rating														
22	The practice of 'curriculum' development	1	2	2	0	0	4	4	2	0	3	2	1	1	4	2
23	The theory of the process of investigating (research), applying and sharing (IAS)	2	2	2	0	0	4	4	1	3	4	4	0	2	3	1
24	The practice of the process of investigating (research), applying and sharing	2	2	3	0	0	4	4	0	3	4	4	1	2	3	2
25	The theory of individual and collective learning & learning partnerships	3	4	2	2	0	4	4	4	3	5	3	3	3	3	3
26	The practice of individual and collective learning & learning partnerships	2	4	2	2	0	3	4	3	3	4	4	2	2	3	3
27	The theory of planning, action and reflection (Reflective learning):	3	3	2	2	1	4	4	4	0	4	4	3	3	4	3
28	The practice of planning, action and reflection (Reflective learning)	3	3	3	1	0	4	5	3	4	4	4	3	3	3	4
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	4	4	3	2	1	4	5	4	4	5	4	3	4	4	4
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	2	4	3	3	1	4	5	4	3	5	4	3	4	4	2
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	2	4	3	3	1	3	5	3	3	5	4	3	4	3	2
32	Facilitate among farmers knowledge and skill regarding the critical use of information	1	3	3	3	1	4	5	3	4	5	4	3	3	4	3
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	1	3	3	2	2	4	5	3	0	5	4	3	4	4	2
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	1	3	3	2	3	4	5	3	4	5	4	3	4	4	3

	Respondent	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	Marker	Rating														
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	4	3	5	3	4	3	3	2	3	4	2	4	5	5	4
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	4	4	5	4	4	4	3	4	2	3	4	4	5	4	3
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	3	3	5	2	3	4	2	2	4	3	2	3	4	4	4
4	The practice of problem solving	3	2	4	3	3	4	2	3	4	3	2	3	4	4	3
5	The theory of participatory technology development and innovation:	4	4	5	4	4	3	3	3	4	4	3	4	5	5	3
6	The practice of participatory technology development and innovation	5	4	5	4	4	4	3	3	3	4	2	4	3	3	3
7	The theory of systems (systems thinking)	4	2	5	3	4	4	3	4	4	3	2	3	5	4	2
8	The practice of systems thinking	4	3	5	3	3	4	3	4	3	3	3	3	5	4	2
9	The theory of sustainable agriculture	4	3	5	3	4	4	3	4	4	3	4	4	5	4	4
10	The practice of sustainable agriculture	3	4	3	3	3	3	3	3	3	3	3	3	5	4	3
11	The theory of Iterative Development Pathways	4	1	3	3	4	3	3	3	4	4	4	3	4	2	1
12	The practice of Iterative Development Pathways	5	1	4	2	3	3	2	3	3	3	3	2	3	2	1
13	The theory of Sustainable livelihoods	4	3	5	4	4	3	3	3	3	3	4	3	3	4	3
14	The practice of Sustainable livelihoods	4	3	4	4	3	3	3	4	2	3	4	3	5	4	3
15	The theory of development concepts	0	2	4	4	4	3	3	4	4	4	3	3	5	4	3
16	The practice development concepts	3	1	4	4	3	3	3	4	3	3	3	2	3	4	4
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	5	4	5	3	3	3	3	3	3	4	3	2	3	5	2
18	The practice of learning and learning styles	5	4	5	3	3	2	3	3	3	3	3	4	2	5	2
19	The theory of learning facilitation:	4	4	3	3	4	3	3	4	3	4	3	3	4	4	2
20	The practice of learning facilitation as described above	3	3	3	3	4	3	3	4	2	3	3	3	4	4	2
21	The theory of 'curriculum' development	44	3	5	2	3	5	3	3	3	3	3	3	4	3	1
22	The practice of 'curriculum' development	3	3	5	2	3	4	3	3	2	3	3	3	3	3	1

	Respondent	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	Marker	Rating														
23	The theory of the process of investigating (research), applying and sharing (IAS)	4	2	5	3	3	2	3	3	4	3	4	2	2	4	1
24	The practice of the process of investigating (research), applying and sharing	3	4	5	3	3	2	3	3	3	3	3	3	2	4	1
25	The theory of individual and collective learning & learning partnerships	4	2	5	2	4	3	3	4	4	3	4	3	4	4	1
26	The practice of individual and collective learning & learning partnerships	3	2	5	2	4	3	3	4	4	3	3	3	4	3	1
27	The theory of planning, action and reflection (Reflective learning):	3	4	5	3	4	3	3	5	4	4	4	3	3	4	2
28	The practice of planning, action and reflection (Reflective learning)	3	3	5	3	4	2	3	3	3	3	4	2	2	4	3
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	5	4	5	2	3	4	4	4	4	4	2	4	5	5	3
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	3	3	5	2	3	4	3	3	3	4	4	3	5	4	3
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	4	2	5	3	3	4	3	3	3	3	3	3	5	4	3
32	Facilitate among farmers knowledge and skill regarding the critical use of information	0	4	5	3	4	4	4	4	3	4	3	3	5	4	2
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	3	3	5	4	4	3	3	4	3	3	3	3	5	4	1
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	3	3	5	4	3	3	3	4	3	4	3	3	5	4	1

	Respondent	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
	Marker	Rating														
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	2	4	5	3	4	4	4	4	3	3	3	3	3	3	4
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	3	4	4	4	3	2	4	3	3	3	3	4	3	4	3
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	3	4	4	3	4	4	4	3	3	4	3	2	2	2	4
4	The practice of problem solving	3	5	4	3	5	3	5	4	3	4	3	4	3	2	4
5	The theory of participatory technology development and innovation:	4	5	3	5	3	3	4	3	4	2	2	4	2	3	4
6	The practice of participatory technology development and innovation	3	5	3	3	3	2	3	3	4	2	2	3	2	3	4
7	The theory of systems (systems thinking)	3	3	4	3	3	5	5	5	4	4	2	3	2	3	4
8	The practice of systems thinking	3	3	3	3	3	3	4	3	3	4	2	3	2	3	4
9	The theory of sustainable agriculture	4	4	4	4	4	4	3	5	4	4	3	4	3	4	4
10	The practice of sustainable agriculture	3	4	4	3	4	4	4	3	3	4	3	4	3	4	3
11	The theory of Iterative Development Pathways	2	5	4	4	4	3	3	4	4	3	2	2	2	1	4
12	The practice of Iterative Development Pathways	2	4	4	4	3	2	3	3	3	3	2	3	2	1	4
13	The theory of Sustainable livelihoods	3	4	3	4	5	4	4	4	4	4	2	4	3	2	4
14	The practice of Sustainable livelihoods	3	4	3	4	4	4	4	3	2	3	2	2	2	2	4
15	The theory of development concepts	3	4	4	3	4	4	4	4	4	4	2	3	3	3	3
16	The practice development concepts	3	4	4	4	4	4	3	4	2	4	3	3	2	3	3
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	3	3	3	4	5	5	4	3	4	4	2	2	3	3	3
18	The practice of learning and learning styles	3	3	3	3	5	4	4	3	3	4	2	2	3	3	4
19	The theory of learning facilitation:	3	5	2	3	5	5	4	3	3	3	3	3	3	3	4
20	The practice of learning facilitation as described above	3	5	2	3	5	4	3	3	2	4	3	3	3	3	4
21	The theory of 'curriculum' development	2	4	3	4	3	5	4	3	0	2	2	2	1	3	4
22	The practice of 'curriculum' development	2	4	3	3	3	4	4	3	0	3	2	1	1	3	4

	Respondent	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
	Marker	Rating														
23	The theory of the process of investigating (research), applying and sharing (IAS)	3	5	2	3	4	3	3	2	1	2	2	4	1	3	2
24	The practice of the process of investigating (research), applying and sharing	2	5	2	4	4	2	4	1	1	3	2	3	1	3	2
25	The theory of individual and collective learning & learning partnerships	3	5	3	4	0	4	4	4	3	3	2	3	1		3
26	The practice of individual and collective learning & learning partnerships	3	5	3	4	0	3	4	4	3	3	3	2	2		2
27	The theory of planning, action and reflection (Reflective learning):	3	5	4	5	0	5	3	3	3	3	3	4	2		3
28	The practice of planning, action and reflection (Reflective learning)	3	5	4	3	0	3	3	2	2	3	3	3	2		4
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	4	5	2	5	0	5	4	4	2	4	4	3	3		4
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	3	4	2	4	0	5	4	4	3	4	4	3	3		4
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	3	4	2	4	0	5	4	3	3	3	3	4	3		4
32	Facilitate among farmers knowledge and skill regarding the critical use of information	3	4	3	4	0	5	3	3	3	2	2	3	3		4
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	3	4	3	4	0	3	4	3	3	4	2	4	2		4
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	3	5	2	4	0	5	4	3	3	4	2	3	2		4

	Respondent	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
	Marker	Rating														
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	3	3	3	3	4	4	2	2	4	3	3	4	3	3	3
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	3	3	3	4	5	4	4	4	4	3	4	3	5	2	3
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	3	2	2	4	4	4	4	2	3	4	4	3	4	3	2
4	The practice of problem solving	3	2	2	3	3	4	3	2	3	5	3	4	4	3	2
5	The theory of participatory technology development and innovation:	4	3	4	2	4	3	2	4	1	3	3	4	5	4	3
6	The practice of participatory technology development and innovation	3	3	3	3	4	4	4	4	1	4	3	4	4	3	3
7	The theory of systems (systems thinking)	4	3	3	4	3	4	1	3	2	0	4	4	5	3	3
8	The practice of systems thinking	3	2	2	3	3	3	4	3	1	1	3	4	4	3	3
9	The theory of sustainable agriculture	4	3	3	3	3	4	4	4	2	2	5	4	2	3	3
10	The practice of sustainable agriculture	4	2	3	2	3	4	4	3	1	2	3	4	2	3	3
11	The theory of Iterative Development Pathways	2	2	2	2	3	3	3	0	2	3	5	4	3	2	3
12	The practice of Iterative Development Pathways	2	2	2	2	3	3	2	0	0	2	4	4	2	1	3
13	The theory of Sustainable livelihoods	4	3	3	3	3	4	2	1	3	3	5	3	4	2	3
14	The practice of Sustainable livelihoods	3	3	3	3	3	4	2	1	3	3	4	3	4	3	3
15	The theory of development concepts	4	2	3	4	3	4	3	3	2	2	4	4	5	3	3
16	The practice development concepts	4	3	2	4	3	3	4	2	1	2	4	3	5	4	3
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	3	2	3	3	4	4	2	2	4	3	3	4	4	3	3
18	The practice of learning and learning styles	3	2	2	3	4	3	3	2	3	2	3	4	4	3	3
19	The theory of learning facilitation:	3	3	2	3	3	4	5	2	1	4	3	4	5	4	4
20	The practice of learning facilitation as described above	3	2	2	3	3	4	4	2	1	3	3	4	5	4	3
21	The theory of 'curriculum' development	4	2	1	3	3	4	5	3	3	3	3	3	5	1	2
22	The practice of 'curriculum' development	3	2	1	2	3	3	2	2	2	2	4	3	4	1	2

	Respondent	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
	Marker	Rating														
23	The theory of the process of investigating (research), applying and sharing (IAS)	3	2	2	3	2	4	2	2	2	3	3	4	4	3	4
24	The practice of the process of investigating (research), applying and sharing	2	2	1	4	2	3	5	2	2	4	2	3	5	3	3
25	The theory of individual and collective learning & learning partnerships	3	3	2	4	3	4	2	2	3	2	3	4	5	4	3
26	The practice of individual and collective learning & learning partnerships	3	3	1	4	3	3	3	2	3	1	3	4	5	4	2
27	The theory of planning, action and reflection (Reflective learning):	3	3	3	4	3	4	4	2	2	4	4	4	5	4	3
28	The practice of planning, action and reflection (Reflective learning)	4	2	3	2	2	3	4	2	3	4	4	3	4	4	2
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	3	3	3	4	3	4	0	3	3	5	5	4	5	3	3
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	4	3	3	4	3	4	2	3	2	2	4	4	5	3	2
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	4	3	2	4	3	4	2	3	3	2	5	4	3	3	3
32	Facilitate among farmers knowledge and skill regarding the critical use of information	3	2	3	4	3	4	2	3	3	3	4	4	4	3	3
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	4	2	3	4	3	4	4	2	2	2	2	3	4	3	2
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	4	2	3	4	4	4	1	3	3	3	3	4	4	3	2

	Respondent	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
	Marker	Rating														
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	3	4	3	2	3	4	5	4	4	4	4	3	4	3	2
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	3	4	2	2	2	4	5	3	4	3	5	4	4	4	3
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	3	4	4	3	3	3	4	4	3	4	4	5	3	2	2
4	The practice of problem solving	4	4	4	3	3	3	4	4	3	4	5	4	4	3	1
5	The theory of participatory technology development and innovation:	3	4	3	1	2	4	5	4	4	3	4	5	3	4	2
6	The practice of participatory technology development and innovation	4	4	4	1	4	3	4	4	4	3	4	3	3	4	2
7	The theory of systems (systems thinking)	3	3	3	2	3	4	4	4	4	4	5	3	4	3	2
8	The practice of systems thinking	3	3	3	2	2	3	4	4	4	3	4	4	4	3	2
9	The theory of sustainable agriculture	4	3	4	3	3	4	4	4	5	4	5	5	4	3	3
10	The practice of sustainable agriculture	3	3	4	2	4	3	3	3	4	3	1	4	4	3	1
11	The theory of Iterative Development Pathways	3	3	1	1	3	3	4	3	2	3	5	4	3	3	2
12	The practice of Iterative Development Pathways	3	3	1	1	3	3	4	2	2	3	4	2	2	3	2
13	The theory of Sustainable livelihoods	4	4	3	2	3	5	3	4	4	4	3	3	2	3	3
14	The practice of Sustainable livelihoods	4	5	3	2	4	4	3	4	4	3	2	3	2	3	3
15	The theory of development concepts	3	5	2	2	2	4	5	4	3	4	4	3	2	3	2
16	The practice development concepts	3	5	2	2	3	3	4	4	3	4	4	4	2	3	2
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	3	3	3	1	3	3	4	3	3	3	5	4	2	3	1
18	The practice of learning and learning styles	3	3	3	1	2	3	4	3	3	2	4	4	1	4	1
19	The theory of learning facilitation:	3	4	1	1	3	4	5	4	3	3	5	5	3	3	2
20	The practice of learning facilitation as described above	3	3	1	1	3	3	5	4	4	4	5	5	3	3	2
21	The theory of 'curriculum' development	2	2	2	1	3	3	3	2	0	3	1	5	3	3	2
22	The practice of 'curriculum' development	2	2	2	1	3	3	3	2	0	3	1	5	2	3	2

	Respondent	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
	Marker	Rating														
23	The theory of the process of investigating (research), applying and sharing (IAS)	2	2	3	0	3	4	4	3	5	3	4	4	3	2	2
24	The practice of the process of investigating (research), applying and sharing	2	4	3	1	3	3	3	3	4	4	2	4	3	2	0
25	The theory of individual and collective learning & learning partnerships	3	3	3	2	3	3	4	3	3	4	4	3	4	3	1
26	The practice of individual and collective learning & learning partnerships	3	3	3	2	3	3	4	3	4	4	4	4	4	3	1
27	The theory of planning, action and reflection (Reflective learning):	3	4	3	1	3	4	3	4	3	3	4	3	4	3	1
28	The practice of planning, action and reflection (Reflective learning)	3	4	3	1	3	4	4	4	4	3	3	4	4	4	3
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	3	4	4	3	3	4	5	3	5	4	3	5	4	4	3
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	3	4	4	2	3	3	5	3	4	3	5	5	4	3	2
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	3	4	4	1	3	3	4	3	3	3	5	4	4	3	2
32	Facilitate among farmers knowledge and skill regarding the critical use of information	3	4	4	1	3	3	4	3	3	4	4	4	4	4	3
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	3	4	3	1	3	3	3	3	4	3	4	4	4	3	2
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	3	4	4	2	3	3	5	3	3	4	4	5	4	3	2

	Respondent	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
	Marker	Rating														
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	3	5	3	3	4	4	2	4	4	3	4	5	4	3	3
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	2	4	2	4	4	2	3	4	4	4	4	5	4	3	3
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	3	4	3	4	4	4	3	5	4	4	4	5	3	4	4
4	The practice of problem solving	4	4	3	4	3	4	3	5	4	4	4	5	4	4	3
5	The theory of participatory technology development and innovation:	3	4	2	4	4	3	3	4	4	3	4	4	5	4	3
6	The practice of participatory technology development and innovation	3	4	2	4	4	3	3	5	3	3	3	4	5	4	3
7	The theory of systems (systems thinking)	2	5	2	4	2	4	2	5	3	3	2	4	3	3	2
8	The practice of systems thinking	3	5	2	4	2	3	2	5	3	3	2	4	3	3	2
9	The theory of sustainable agriculture	3	3	3	4	3	4	2	4	5	4	3	4	4	3	3
10	The practice of sustainable agriculture	4	3	3	4	3	3	3	4	4	4	3	4	4	3	3
11	The theory of Iterative Development Pathways	2	3	1	3	2	1	2	5	3	3	3	1	3	2	2
12	The practice of Iterative Development Pathways	2	3	1	3	2	1	2	5	4	3	3	1	3	2	2
13	The theory of Sustainable livelihoods	3	3	3	3	3	3	3	5	3	3	2	4	3	3	3
14	The practice of Sustainable livelihoods	3	3	3	3	2	2	3	5	3	2	2	4	3	3	2
15	The theory of development concepts	2	4	3	3	2	3	2	4	3	3	2	4	3	4	3
16	The practice development concepts	4	4	3	3	2	3	3	5	3	3	3	4	3	4	3
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	2	4	3	3	3	4	3	5	3	3	3	4	4	4	3
18	The practice of learning and learning styles	3	4	2	3	2	4	3	5	3	3	3	4	4	4	3
19	The theory of learning facilitation:	3	4	3	3	3	3	2	5	3	3	3	4	5	4	3
20	The practice of learning facilitation as described above	2	4	2	3	2	3	2	4	4	3	3	3	5	4	3
21	The theory of 'curriculum' development	2	2	3	2	1	2	2	4	3	3	3	2	4	2	2
22	The practice of 'curriculum' development	1	2	3	2	1	2	2	4	3	3	3	3	4	2	2

	Respondent	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
	Marker	Rating														
23	The theory of the process of investigating (research), applying and sharing (IAS)	2	2	2	2	4	2	2	4	3	3	3	5	3	2	2
24	The practice of the process of investigating (research), applying and sharing	2	2	2	2	4	2	3	5	3	3	3	5	3	2	2
25	The theory of individual and collective learning & learning partnerships	2	3	2	3	3	3	2	4	3	3	2	5	5	4	3
26	The practice of individual and collective learning & learning partnerships	3	3	2	3	3	3	2	4	3	3	2	5	5	4	3
27	The theory of planning, action and reflection (Reflective learning):	4	3	3	3	3	4	1	5	3	3	2	5	5	3	3
28	The practice of planning, action and reflection (Reflective learning)	3	3	3	3	2	3	1	5	3	4	2	5	5	3	2
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	3	4	3	3	4	5	2	5	3	4	2	5	5	3	2
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	3	3	2	3	4	4	1	4	3	4	2	5	5	3	3
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	2	3	3	4	4	4	2	5	3	4	2	5	4	3	2
32	Facilitate among farmers knowledge and skill regarding the critical use of information	2	3	3	4	4	3	2	4	3	4	2	4	4	3	3
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	2	3	2	4	4	3	3	4	3	4	2	4	4	3	2
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	3	4	2	4	4	4	2	5	3	4	2	4	5	3	3

	Respondent	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
	Marker	Rating														
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	5	3	3	2	4	3	2	3	3	3	3	3	4	4	2
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	5	3	4	4	3	4	4	4	4	3	2	3	4	4	3
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	5	3	4	4	4	2	4	4	4	4	3	4	4	2	4
4	The practice of problem solving	4	3	3	4	4	3	4	3	3	4	3	3	4	2	4
5	The theory of participatory technology development and innovation:	5	3	2	4	4	3	3	4	3	3	2	3	3	3	3
6	The practice of participatory technology development and innovation	5	3	2	4	3	2	2	3	3	4	4	4	3	3	3
7	The theory of systems (systems thinking)	5	3	3	3	4	2	2	3	4	3	3	3	3	2	3
8	The practice of systems thinking	4	3	3	3	4	2	4	4	3	3	4	4	3	2	3
9	The theory of sustainable agriculture	5	4	4	4	4	3	4	3	4	4	3	4	4	4	2
10	The practice of sustainable agriculture	4	4	3	3	4	3	4	4	5	4	4	4	3	4	2
11	The theory of Iterative Development Pathways	3	3	3	1	2	3	4	3	3	2	3	3	3	2	2
12	The practice of Iterative Development Pathways	3	3	2	1	2	3	3	3	3	1	4	3	2	2	3
13	The theory of Sustainable livelihoods	2	3	3	3	4	4	5	4	4	3	3	2	4	4	3
14	The practice of Sustainable livelihoods	2	3	3	2	4	3	4	4	3	2	2	2	2	4	3
15	The theory of development concepts	4	4	4	4	4	4	4	4	3	3	3	3	3	3	2
16	The practice development concepts	4	4	3	3	3	4	3	3	3	4	3	4	4	3	3
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	3	3	3	3	3	5	3	3	3	2	3	3	2	2	3
18	The practice of learning and learning styles	3	3	3	3	3	4	4	3	3	2	3	3	4	2	4
19	The theory of learning facilitation:	2	4	2	3	3	4	5	3	3	3	3	3	4	3	4
20	The practice of learning facilitation as described above	2	4	2	3	3	3	4	4	3	3	3	4	2	3	3
21	The theory of 'curriculum' development	3	3	2	2	1	3	3	3	2	3		4	1	1	3
22	The practice of 'curriculum' development	3	3	2	2	1	4	3	3	2	2	3	3	1	1	4

	Respondent	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
	Marker	Rating														
23	The theory of the process of investigating (research), applying and sharing (IAS)	4	4	3	2	2	4	3	3	2	3	2	4	2	3	2
24	The practice of the process of investigating (research), applying and sharing	5	4	3	2	2	4	3	3	2	3	3	4	4	4	2
25	The theory of individual and collective learning & learning partnerships	2	3	2	2	3	3	4	3	2	1	3	3	3	3	3
26	The practice of individual and collective learning & learning partnerships	3	3	2	2	3	4	4	3	2	1	3	3	4	3	2
27	The theory of planning, action and reflection (Reflective learning):	3	3	3	3	2	4	4	3	2	2	3	3	4	4	3
28	The practice of planning, action and reflection (Reflective learning)	3	4	3	2	2	3	4	3	2	4	3	3	4	4	4
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	3	4	4	4	3	4	5	3	3	4	4	3	4	4	3
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	2	3	4	3	3	4	5	4	2	3	3	4	3	4	3
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	2	3	2	2	3	3	4	4	2	3	3	4	4	4	3
32	Facilitate among farmers knowledge and skill regarding the critical use of information	3	4	2	2	3	3	4	4	3	4	4	3	4	3	3
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	3	4	2	3	2	3	2	4	2	4	3	3	3	3	3
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	2	3	2	2	3	3	2	4	2	3	3	3	2	2	3

	Respondent	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
	Marker	Rating														
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	2	3	3	3	3	3	5	3	3	4	3	3	3	4	3
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	3	3	3	4	3	4	4	4	2	4	4	3	3	3	3
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	3	4	2	4	4	3	4	3	4	3	3	3	4	4	3
4	The practice of problem solving	4	3	3	4	4	3	5	3	3	4	4	4	2	4	4
5	The theory of participatory technology development and innovation:	3	3	2	3	3	2	4	4	3	3	4	3	2	3	3
6	The practice of participatory technology development and innovation	3	4	3	4	3	2	4	4	2	3	4	4	3	3	3
7	The theory of systems (systems thinking)	2	4	3	3	2	2	4	3	2	3	3	3	2	2	3
8	The practice of systems thinking	2	3	4	3	3	3	4	3	2	3	3	4	2	2	3
9	The theory of sustainable agriculture	3	3	4	4	3	2	5	4	2	3	4	3	3	3	3
10	The practice of sustainable agriculture	4	3	3	3	3	2	4	4	2	3	4	4	3	3	3
11	The theory of Iterative Development Pathways	3	4	3	3	2	3	4	2	1	2	3	4	3	2	3
12	The practice of Iterative Development Pathways	2	2	4	3	2	3	4	2	1	2	3	3	2	2	3
13	The theory of Sustainable livelihoods	3	2	4	4	3	3	4	5	3	3	4	2	3	2	3
14	The practice of Sustainable livelihoods	2	2	3	4	3	2	4	5	2	3	4	4	3	2	3
15	The theory of development concepts	3	3	3	3	3	2	4	4	3	3	3	3	3	2	3
16	The practice development concepts	4	4	3	3	4	4	4	4	2	3	3	3	3	2	3
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	3	4	3	4	3	4	5	4	3	4	4	3	4	3	4
18	The practice of learning and learning styles	3	4	3	3	4	4	5	4	2	4	4	3	3	3	3

	Respondent	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
	Marker	Rating														
19	The theory of learning facilitation:	3	4	3	3	3	3	4	3	2	4	4	3	5	4	3
20	The practice of learning facilitation as described above	4	4	3	4	3	3	4	3	2	4	4	3	4	3	3
21	The theory of 'curriculum' development	2	3	1	3	2	4	3	1	2	3	4	4	2	3	3
22	The practice of 'curriculum' development	2	3	1	3	2	4	4	1	2	3	4	4	2	2	3
23	The theory of the process of investigating (research), applying and sharing (IAS)	2	2	4	2	2	4	4	2	3	4	3	4	1	3	3
24	The practice of the process of investigating (research), applying and sharing	2	2	3	2	2	4	4	2	3	4	3	4	1	3	4
25	The theory of individual and collective learning & learning partnerships	2	2	3	3	3	4	4	3	3	4	4	3	2	2	3
26	The practice of individual and collective learning & learning partnerships	2	3	3	4	3	4	4	3	3	4	4	3	2	2	4
27	The theory of planning, action and reflection (Reflective learning):	2	4	3	3	3	3	4	4	3	3	3	3	3	3	4
28	The practice of planning, action and reflection (Reflective learning)	2	4	3	3	3	3	4	4	3	3	3	4	2	2	3
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	2	4	4	4	4	4	4	3	4	5	4	4	4	4	3
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	3	3	4	4	4	4	4	3	3	5	4	4	3	3	3
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	2	3	4	4	4	3	4	3	3	4	3	4	3	4	4
32	Facilitate among farmers knowledge and skill regarding the critical use of information	2	3	4	3	4	2	4	3	3	4	4	4	4	3	4
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	3	2	3	3	3	2	4	3	3	4	4	3	3	3	3
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	2	3	3	3	3	4	4	5	3	4	4	4	2	3	3

	Respondent	121	122	123	124	125	126	127	128	129	130	131	132
	Marker	Rating											
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	5	5	3	4	4	2	5	3	3	5	3	3
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	5	3	2	3	5	3	4	4	2	5	1	3
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	5	4	4	5	4	2	5	5	1	5	3	4
4	The practice of problem solving	4	5	4	4	5	3	4	4	1	5	3	4
5	The theory of participatory technology development and innovation:	5	4	2	5	3	3	4	3	2	4	3	3
6	The practice of participatory technology development and innovation	4	3	4	4	3	3	4	3	2	3	1	3
7	The theory of systems (systems thinking)	4	2	3	4	4	2	5	3	1	3	2	2
8	The practice of systems thinking	5	2	1	4	4	2	4	3	1	4	2	2
9	The theory of sustainable agriculture	4	4	1	5	5	3	5	4	3	5	4	3
10	The practice of sustainable agriculture	3	4	2	4	3	3	4	4	3	5	1	2
11	The theory of Iterative Development Pathways	3	3	3	3	3	2	5	3	1	4	1	2
12	The practice of Iterative Development Pathways	3	3	3	3	2	2	4	3	1	4	1	2
13	The theory of Sustainable livelihoods	5	5	2	3	5	2	5	4	3	5	1	3
14	The practice of Sustainable livelihoods	5	5	5	3	3	3	5	4	3	5	1	2
15	The theory of development concepts	5	5	5	4	5	2	5	3	4	4	1	2
16	The practice development concepts	4	5	4	4	3	3	4	3	4	4	1	2
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	5	4	4	4	5	2	3	3	3	3	1	1
18	The practice of learning and learning styles	5	4	4	3	4	2	3	4	3	3	1	1
19	The theory of learning facilitation:	3	5	4	3	3	2	4	4	4	4	1	2
20	The practice of learning facilitation as described above	4	5	4	3	3	2	4	3	4	4	1	2
21	The theory of 'curriculum' development	5	4	4	2	4	3	3	2	2	3	1	2
22	The practice of 'curriculum' development	5	4	4	2	3	3	3	2	2	4	1	2

	Respondent	121	122	123	124	125	126	127	128	129	130	131	132
	Marker	Rating											
23	The theory of the process of investigating (research), applying and sharing (IAS)	5	3	4	4	3	2	5	2	3	5	1	1
24	The practice of the process of investigating (research), applying and sharing	5	3	4	4	4	2	3	3	3	5	1	1
25	The theory of individual and collective learning & learning partnerships	5	4	4	4	5	2	4	3	2	4	1	3
26	The practice of individual and collective learning & learning partnerships	5	4	4	4	5	2	4	3	4	4	1	3
27	The theory of planning, action and reflection (Reflective learning):	5	4	3	4	3	3	4	4	3	4	1	2
28	The practice of planning, action and reflection (Reflective learning)	5	4	4	3	2	3	4	4	4	4	1	2
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	4	4	2	3	5	3	4	5	3	5	1	2
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	4	4	0	4	4	3	4	5	4	5	2	2
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	4	5	2	3	4	3	4	5	4	5	2	3
32	Facilitate among farmers knowledge and skill regarding the critical use of information	5	4	1	3	3	2	5	5	4	5	3	2
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	5	4	1	4	3	3	4	4	2	5	2	2
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	5	4	2	4	2	3	4	5	2	5	2	2

**Extension Practitioners' Responses:
Part/Not Part of Qualification: Summary**

		Part of		Not part of	
		Qualification		Qualification	
		N	%	n	%
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	46	80.7%	11	19.3%
2	Effectively participate in the development of agricultural technology and share it...	35	61.4%	22	38.6%
3	The theory of problem solving in the context of dealing with issues facing developmental agriculture	35	61.4%	22	38.6%
4	The practice of problem solving	35	61.4%	22	38.6%
5	The theory of participatory technology development and innovation:	31	54.4%	26	45.6%
6	The practice of participatory technology development and innovation	30	52.6%	27	47.4%
7	The theory of systems (systems thinking)	30	52.6%	27	47.4%
8	The practice of systems thinking	31	54.4%	26	45.6%
9	The theory of sustainable agriculture	33	57.9%	24	42.1%
10	The practice of sustainable agriculture	28	49.1%	29	50.9%
11	The theory of Iterative Development Pathways	22	38.6%	35	61.4%
12	The practice of Iterative Development Pathways	20	35.1%	37	64.9%
13	The theory of Sustainable livelihoods	26	45.6%	31	54.4%
14	The practice of Sustainable livelihoods	28	49.1%	29	50.9%
15	The theory of development concepts	32	56.1%	25	43.9%
16	The practice development concepts	28	49.1%	29	50.9%
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	28	49.1%	29	50.9%
18	The practice of learning and learning styles	27	47.4%	30	52.6%
19	The theory of learning facilitation:	28	49.1%	29	50.9%
20	The practice of learning facilitation	24	42.1%	33	57.9%
21	The theory of 'curriculum' development	19	33.3%	38	66.7%
22	The practice of 'curriculum' development	18	31.6%	39	68.4%
23	The theory of the process of investigating (research), applying and sharing (IAS)	20	35.1%	37	64.9%
24	The practice of the process of investigating (research), applying and sharing	20	35.1%	37	64.9%

		Part of		Not part of	
		Qualification		Qualification	
		N	%	n	%
25	The theory of individual and collective learning & learning partnerships	25	43.9%	32	56.1%
26	The practice of individual and collective learning & learning partnerships	24	42.1%	33	57.9%
27	The theory of planning, action and reflection (Reflective learning)	26	45.6%	31	54.4%
28	The practice of planning, action and reflection (Reflective learning)	28	49.1%	29	50.9%
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	32	56.1%	25	43.9%
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	31	54.4%	26	45.6%
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	25	43.9%	32	56.1%
32	Facilitate among farmers knowledge and skill regarding the critical use of information	23	40.4%	34	59.6%
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	23	40.4%	34	59.6%
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	27	47.4%	30	52.6%

**Extension Practitioners' Responses:
Part/Not Part of Qualification: Details**

	Respondent	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Rating														
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	1	1	1	1	1	0	1	1	0	1	1	0	1	1	1
2	Effectively participate in the development of agricultural technology and share it...	0	1	1	1	1	0	1	1	1	0	1	1	1	1	1
3	The theory of problem solving in the context of dealing with issues facing developmental agriculture	1	1	1	0	1	0	1	1	1	1	1	0	0	1	1
4	The practice of problem solving	0	1	1	0	1	0	1	1	1	1	1	0	0	1	1
5	The theory of participatory technology development and innovation:	0	1	0	0	1	0	0	1	0	0	1	1	0	1	1
6	The practice of participatory technology development and innovation	0	0	0	0	1	0	0	1	0	0	1	1	0	1	1
7	The theory of systems (systems thinking)	0	0	0	0	1	0	1	1	0	0	1	0	0	1	1
8	The practice of systems thinking	0	0	0	0	1	0	1	1	0	0	1	0	0	1	1
9	The theory of sustainable agriculture	1	0	1	0	1	0	1	1	1	0	1	0	0	0	1
10	The practice of sustainable agriculture	1	1	1	0	1	0	1	1	0	0	1	0	0	0	1
11	The theory of Iterative Development Pathways	1	1	0	0	1	0	0	1	1	0	0	0	0	1	1
12	The practice of Iterative Development Pathways	1	1	0	0	1	0	0	1	1	0	0	0	0	0	1
13	The theory of Sustainable livelihoods	1	1	1	0	1	0	0	1	1	0	0	0	0	0	1
14	The practice of Sustainable livelihoods	1	1	1	0	1	0	0	1	1	0	0	0	0	0	1
15	The theory of development concepts	0	1	0	0	1	0	0	1	1	0	0	0	0	1	1
16	The practice development concepts	0	1	0	0	1	0	0	1	1	0	0	0	0	0	1
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	1	1	1	0	1	0	0	1	0	0	0	0	0	0	1
18	The practice of learning and learning styles	1	1	1	0	1	0	0	1	0	1	0	0	0	0	1
19	The theory of learning facilitation:	0	1	1	0	1	0	1	1	0	1	0	0	0	1	1
20	The practice of learning facilitation	0	1	1	0	1	0	1	1	0	1	0	0	0	1	1
21	The theory of 'curriculum' development	0	1	0	0	1	0	0	1	0	1	0	0	0	0	1
22	The practice of 'curriculum' development	0	1	0	0	1	0	0	1	0	1	0	0	0	0	1
23	The theory of the process of investigating (research), applying and sharing (IAS)	0	1	0	0	1	0	0	1	0	1	0	0	0	0	1
24	The practice of the process of investigating (research), applying and sharing	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1
25	The theory of individual and collective learning & learning partnerships	0	1	0	0	1	0	0	1	0	0	1	0	0	0	1

Respondent		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Rating														
26	The practice of individual and collective learning & learning partnerships	0	1	0	0	1	0	0	1	0	0	1	0	0	0	1
27	The theory of planning, action and reflection (Reflective learning)	1	1	0	0	1	0	0	1	0	0	1	0	0	1	1
28	The practice of planning, action and reflection (Reflective learning)	0	1	0	0	1	0	0	1	0	1	1	0	0	0	1
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	0	1	1	0	1	0	0	1	0	1	1	0	0	0	1
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	1	1	0	1	0	0	1	0	1	1	0	0	0	1
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	0	1	1	0	1	0	0	1	0	0	1	0	0	0	1
32	Facilitate among farmers knowledge and skill regarding the critical use of information	0	1	1	0	1	0	0	1	0	1	1	0	0	0	1
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use	0	1	1	0	1	0	0	1	0	1	1	0	0	0	1
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda	0	1	1	0	1	0	0	1	0	0	1	0	0	0	1

Respondent		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
		Rating														
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0	1	0	1	1	1	0	0	0	1	0	1	0	1	0
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global com-petitiveness of agricultural products	1	0	0	0	1	0	1	1	0	1	1	1	0	1	1
4	The practice of problem solving	1	0	0	0	1	1	1	1	1	1	1	1	0	1	1

	Respondent	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
		Rating														
5	The theory of participatory technology development and innovation:	1	0	0	1	1	1	1	0	0	1	0	1	0	1	1
6	The practice of participatory technology development and innovation	1	0	0	1	1	1	1	0	1	1	0	1	0	1	1
7	The theory of systems (systems thinking)	0	0	0	0	1	0	0	1	0	1	1	1	0	1	1
8	The practice of systems thinking	0	0	0	0	1	0	0	1	1	1	0	1	0	1	1
9	The theory of sustainable agriculture?	0	0	0	1	1	1	0	0	1	1	1	1	1	1	1
10	The practice of sustainable agriculture?	0	0	0	1	1	0	0	1	1	1	1	1	0	1	1
11	The theory of Iterative Development Pathways	1	0	0	0	1	0	0	1	1	1	0	1	0	0	0
12	The practice of Iterative Development Pathways	1	0	0	0	1	0	0	1	1	1	0	1	0	0	0
13	The theory of Sustainable livelihoods	0	0	0	0	1	1	0	0	1	1	1	1	1	0	1
14	The practice of Sustainable livelihoods	0	1	0	1	1	1	0	0	1	1	1	1	0	0	1
15	The theory of development concepts	1	1	1	1	1	0	0	1	1	1	1	1	1	0	1
16	The practice development concepts	0	1	1	0	1	1	0	1	1	1	1	1	0	0	0
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	1	1	1	0	1	0	0	0	0	1	1	1	0	1	0
18	The practice of learning and learning styles ?	1	1	1	0	1	0	0	0	1	1	1	1	0	1	0
19	The theory of learning facilitation:	1	1	0	0	1	1	0	0	0	1	1	1	0	0	1
20	The practice of learning facilitation as described above?	0	1	0	0	1	0	0	0	1	0	1	1	0	0	1
21	The theory of 'curriculum' development	0	0	0	0	1	0	0	1	1	1	1	1	0	0	0
22	The practice of 'curriculum' development	0	0	0	0	1	0	0	1	1	1	1	1	0	0	0
23	The theory of the process of investigating (research), applying and sharing (IAS)	0	1	0	0	1	0	0	0	1	1	0	1	0	0	0
24	The practice of the process of investigating (research), applying and sharing	0	1	0	0	1	0	0	0	1	1	0	1	0	1	0
25	The theory of individual and collective learning & learning partnerships	0	0	0	1	1	0	0	0	1	1	0	1	0	0	1
26	The practice of individual and collective learning & learning partnerships	0	0	0	1	1	0	0	0	1	1	0	1	0	0	1
27	The theory of planning, action and reflection (Reflective learning):	1	1	0	0	1	0	0	0	1	1	1	1	0	0	1
28	The practice of planning, action and reflection (Reflective learning)	0	1	0	1	1	1	0	0	1	1	1	1	0	0	1
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	1	1	0	1	1	1	0	0	1	1	1	1	1	1	1

	Respondent	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
		Rating														
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	1	0	1	1	1	0	0	1	1	1	1	0	0	1
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	0	1	0	1	1	1	0	0	1	1	1	1	0	0	1
32	Facilitate among farmers knowledge and skill regarding the critical use of information	0	1	0	1	1	0	0	0	1	1	1	1	0	0	0
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	0	1	0	1	1	0	0	0	1	1	0	1	0	0	1
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	1	1	0	1	1	0	0	0	0	1	1	1	0	0	1

	Respondent	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
		Rating														
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	1	0	1	1	0	1	1	1	1	1	0	0	1	1	1
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0	0	0	0	0	1	0	1	1	1	1	1	1	0	1
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global com-petitiveness of agricultural products	1	0	0	0	1	0	0	1	1	1	0	0	1	0	1
4	The practice of problem solving	0	0	0	0	0	0	1	1	1	0	0	0	1	1	1
5	The theory of participatory technology development and innovation:	0	0	0	1	0	1	0	1	1	1	1	0	1	1	1
6	The practice of participatory technology development and innovation	0	0	0	0	0	1	0	1	1	0	1	0	1	1	1
7	The theory of systems (systems thinking)	0	0	0	1	0	1	0	1	1	1	1	0	1	1	1
8	The practice of systems thinking	0	0	1	1	0	1	0	1	1	1	1	0	1	1	1
9	The theory of sustainable agriculture?	1	0	0	0	1	0	1	1	1	1	1	0	1	1	0
10	The practice of sustainable agriculture?	0	0	0	0	1	0	1	1	1	1	0	0	1	0	0
11	The theory of Iterative Development Pathways	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0
12	The practice of Iterative Development Pathways	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0

	Respondent	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
		Rating														
13	The theory of Sustainable livelihoods	0	0	0	0	0	1	0	1	1	1	0	0	1	1	1
14	The practice of Sustainable livelihoods	0	0	0	1	0	0	0	1	1	1	0	0	1	1	1
15	The theory of development concepts	0	0	0	1	0	0	1	1	1	1	1	0	1	1	1
16	The practice development concepts	1	0	0	0	0	0	1	1	1	1	0	0	1	1	1
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	1	1	0	0	0	0	0	1	1	1	0	0	1	1	1
18	The practice of learning and learning styles ?	0	1	0	0	0	0	0	1	1	1	0	0	0	1	1
19	The theory of learning facilitation:	0	1	0	0	0	1	0	1	1	1	0	0	0	1	1
20	The practice of learning facilitation as described above?	0	1	0	0	0	0	0	0	1	1	0	0	0	1	1
21	The theory of 'curriculum' development	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1
22	The practice of 'curriculum' development	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1
23	The theory of the process of investigating (research), applying and sharing (IAS)	0	1	0	0	0	0	0	0	1	1	0	0	1	1	1
24	The practice of the process of investigating (research), applying and sharing	0	1	0	0	0	0	0	0	1	1	0	0	0	1	1
25	The theory of individual and collective learning & learning partnerships	0	0	0	0	0	1	0	1	1	1	0	1	0	1	1
26	The practice of individual and collective learning & learning partnerships	0	0	0	0	0	1	0	0	1	1	0	1	0	1	1
27	The theory of planning, action and reflection (Reflective learning):	0	0	0	0	0	1	0	0	1	0	0	0	1	1	1
28	The practice of planning, action and reflection (Reflective learning)	0	0	0	0	1	0	0	0	1	1	0	0	1	1	1
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	0	0	0	0	1	0	1	0	1	0	0	0	1	0	1
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	0	0	1	0	1	1	0	1	1	1	0	1	0	1
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	0	0	0	1	0	0	0	0	1	0	1	0	1	0	1
32	Facilitate among farmers knowledge and skill regarding the critical use of information	0	0	0	1	0	0	0	0	1	0	1	0	1	0	1
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	0	0	0	1	0	0	0	0	1	1	1	0	1	1	1

	Respondent	Rating														Part of Qualification		Not part of Qualification	
		46	47	48	49	50	51	52	53	54	55	56	57	N	n	%	n	%	
1	Collect, analyse, organise and critically evaluate information relevant to extension responsibilities.	0	1	1	1	1	1	0	1	1	1	1	1	57	46	80.7%	11	19.3%	
2	Effectively participate in the development of agricultural technology and share it, showing responsibility towards the environment and the health of others	0	1	0	0	1	1	0	1	1	1	1	1	57	35	61.4%	22	38.6%	
3	The theory of problem solving in the context of dealing with short, medium and long-term issues facing developmental agriculture, ranging from micro issues of household food security to international issues of global competitiveness of agricultural products	0	1	1	1	1	0	0	1	1	1	1	0	57	35	61.4%	22	38.6%	
4	The practice of problem solving	0	1	1	1	1	0	0	1	1	1	1	0	57	35	61.4%	22	38.6%	
5	The theory of participatory technology development and innovation:	0	1	0	0	1	0	0	0	1	1	1	1	57	31	54.4%	26	45.6%	
6	The practice of participatory technology development and innovation	0	1	0	1	1	0	0	1	1	0	1	1	57	30	52.6%	27	47.4%	
7	The theory of systems (systems thinking)	0	1	1	1	1	0	0	0	1	1	1	1	57	30	52.6%	27	47.4%	
8	The practice of systems thinking	0	1	1	1	1	0	0	0	1	1	1	1	57	31	54.4%	26	45.6%	
9	The theory of sustainable agriculture?	0	1	1	1	1	0	0	0	1	0	1	0	57	33	57.9%	24	42.1%	
10	The practice of sustainable agriculture?	0	0	1	1	1	0	0	0	1	1	0	0	57	28	49.1%	29	50.9%	
11	The theory of Iterative Development Pathways	0	0	0	1	0	0	0	0	1	1	0	1	57	22	38.6%	35	61.4%	
12	The practice of Iterative Development Pathways	0	0	0	1	0	0	0	0	1	1	0	1	57	20	35.1%	37	64.9%	
13	The theory of Sustainable livelihoods	0	0	1	1	0	0	0	0	1	1	0	0	57	26	45.6%	31	54.4%	
14	The practice of Sustainable livelihoods	0	0	0	1	1	0	0	0	1	1	0	1	57	28	49.1%	29	50.9%	
15	The theory of development concepts	0	0	1	1	1	1	0	0	1	0	0	0	57	32	56.1%	25	43.9%	
16	The practice development concepts	0	0	1	1	1	1	0	0	1	1	0	0	57	28	49.1%	29	50.9%	
17	The theory of learning and learning styles (e.g. experiential learning, how people learn, Kolb)	0	0	1	1	0	1	0	0	1	1	1	0	57	28	49.1%	29	50.9%	
18	The practice of learning and learning styles ?	0	0	1	1	0	1	0	0	1	1	0	0	57	27	47.4%	30	52.6%	
19	The theory of learning facilitation:	0	0	0	1	1	1	0	0	1	0	1	0	57	28	49.1%	29	50.9%	
20	The practice of learning facilitation as described above?	0	0	0	1	1	1	0	0	1	0	1	0	57	24	42.1%	33	57.9%	

																Part of Qualification		Not part of Qualification	
	Respondent	46	47	48	49	50	51	52	53	54	55	56	57	N	n	%	n	%	
21	The theory of 'curriculum' development	0	0	0	1	1	0	0	0	1	1	0	0	57	19	33.3%	38	66.7%	
22	The practice of 'curriculum' development	0	0	0	1	1	0	0	0	1	1	0	0	57	18	31.6%	39	68.4%	
23	The theory of the process of investigating (research), applying and sharing (IAS)	0	1	0	1	0	0	0	0	1	1	0	0	57	20	35.1%	37	64.9%	
24	The practice of the process of investigating (research), applying and sharing	0	1	0	1	0	0	0	0	1	1	0	0	57	20	35.1%	37	64.9%	
25	The theory of individual and collective learning & learning partnerships	0	1	1	1	0	1	0	0	1	1	1	0	57	25	43.9%	32	56.1%	
26	The practice of individual and collective learning & learning partnerships	0	1	1	1	0	1	0	0	1	1	0	1	57	24	42.1%	33	57.9%	
27	The theory of planning, action and reflection (Reflective learning):	0	0	0	1	1	1	0	0	1	1	0	1	57	26	45.6%	31	54.4%	
28	The practice of planning, action and reflection (Reflective learning)	0	0	1	1	1	1	0	0	1	1	0	1	57	28	49.1%	29	50.9%	
29	Facilitating among farmers: Creative and critical thinking for problem solving within systems	0	0	1	1	1	1	0	0	1	1	1	1	57	32	56.1%	25	43.9%	
30	Facilitating the acquisition by farmers knowledge and skills of farm organisation and management	0	0	1	1	1	1	0	0	1	1	1	0	57	31	54.4%	26	45.6%	
31	Facilitate the acquisition by farmers the knowledge and skill of Stakeholder interaction	0	0	1	1	0	0	0	0	1	1	1	0	57	25	43.9%	32	56.1%	
32	Facilitate among farmers knowledge and skill regarding the critical use of information	0	0	0	1	0	0	0	0	1	1	1	0	57	23	40.4%	34	59.6%	
33	Facilitate acquisition by farmers of the ability/capacity for critical and responsible engagement with technology development and use?	0	0	0	1	1	0	0	0	1	1	1	0	57	23	40.4%	34	59.6%	
34	Facilitate acquisition by farmers of the ability/capacity to participate as a partner in a learning agenda?	0	0	1	1	1	0	0	0	1	1	1	0	57	27	47.4%	30	52.6%	