

UNIVERSITY OF KWAZULU-NATAL

THE ROLE OF AGRICULTURAL EXTENSION AND LANDCARE POLICY IN BUILDING FARMER CAPACITY TO MANAGE NATURAL RESOURCES: THE CASE OF LANDCARE PROGRAMMES IN KWAZULU-NATAL, SOUTH AFRICA

By

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Abstract

Agriculture is an important element of the South African (SA) economy. However, increasing pressure to produce food has exacerbated pressure on natural resources (NR). The deteriorating state of NR is caused by multiple factors that vary from farm to farm. SA LandCare was established specifically to address this. However, LandCare programmes are perceived to focus primarily on relief and rehabilitation of NR rather than addressing the underlying fundamental complex causes.

This study sought to explore the extent to which: LandCare attempts to mitigate core problems rather than symptoms; LandCare works to ensure long-term natural resource management (NRM) by farmers; and extension is contextualised in building farmer capacity to manage NR. This study also sought to provide a theoretical model depicting the positioning of extension within the LandCare programme to improve the sustainability of NRM while maintaining its goal of improving household food security.

Primary research comprised semi-structured interviews with 45 key respondents selected using purposive sampling. The respondents included 20 farmers, 20 provincial extension workers and five LandCare officials in the National Department of Agriculture (NDA). These three groups of respondents were selected deliberately as they could provide more accurate information to fulfil the study objectives and help answer the underlying research question.

This study had four central findings. First, the role of extension is not adequately contextualized in LandCare in terms of building farmer capacity to manage NR. Extension, in its NR-related work, is mainly involved in training farmers in specific technical skills and not in building learning and problem-solving capacity. This capacity would put farmers in the position of making informed decisions about the intended LandCare development and thereby make them more equal partners in the LandCare initiative.

Second, the way the role of extension in LandCare is carried out in practice undermines the significance of local knowledge and experience and effectively dismisses them as not being credible because they are not “scientific” – not informed by recognised scientific theories and methods. This is inconsistent with capacity building theory that posits that true capacity is built starting with what farmers know and have.

Third, farmers have limited opportunity to command structures and systems, and limited freedom to participate actively in all the LandCare processes, putting them on the passive receiving end of the programme. Further, LandCare implementation focuses less on empowering and building problem-solving capacity amongst farmer that is relevant to dealing with NR problems (during and post-project life) and more on enforcing change in farmers current practices to practices that are deemed to have less negative impact on NR. This runs a risk of making farmers constantly dependant on external support in addressing their NR challenges.

Fourth, while the physical rehabilitation work is generally successfully achieved, there is a disconnection between the LandCare policy and its implementation on the ground. LandCare practice focuses more on rehabilitation of NR and introducing more conservation-friendly farming systems to farmers and gives less attention to building farmer capacity to be self-reliant and resilient in solving their own problems and better manage their NR – which is the antithesis of both the capacity theory and the intention of LandCare programme.

Ultimately, the study proposes a framework for unifying the currently disparate processes to ensure that LandCare is simultaneously well administered, rehabilitates land and builds farmer capacity for sustainable NRM. Within the framework is a capacity-building ladder which helps maintain focus on the goal of sustainable NRM through the actions of the farmers on the land.

Preface

This study was conducted from July 2016 to August 2021 through the discipline of Agricultural Extension and Rural Resource Management in the School of Agricultural, Earth and Environmental Sciences at the University of KwaZulu-Natal, South Africa. The study included participants from National LandCare office, Provincial LandCare office, and extension officers from agriculture district offices in KwaZulu-Natal.

The study was conducted, written and compiled under the supervision of Prof Steve Worth, who is an associate professor in Agricultural Extension and Rural Resource Management at the University of KwaZulu-Natal. I hereby declare that this thesis presents the original research study and has not been submitted in any form to another institution for fulfilment of any degree award.



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17 August 2022

Date



Prof. Steven Worth (Supervisor)

17 August 2022

Date

Dedication

I dedicate this thesis to

ALMIGHTY GOD,

who has given me strength and wisdom to undergo this challenging work.

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My first unquantifiable appreciation goes to my ALMIGHTY GOD JEHOVA whom His GRACE and LOVE has strengthened me in pursuing this study.

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List of Abbreviation

NR	Natural Resources
NRM	Natural Resource Management
NDA	National Department of Agriculture
KZN	KwaZulu-Natal
ARC	Agricultural Research Council
NSCP	National Soil Conservation Programme
ACF	Australian Conservation Foundation
PDA	Provincial Department of Agriculture
NGO	Non-Government Organisation
CBNRM	Community-Based Natural Resource Management
TVET	Technical Vocational Education and Training
CARA	Conservation of Agriculture resources Act
TF	Technical Facilitator
LGU	Local Government Unit
NLP	National LandCare Programme
DAFF	Department of Agriculture, Forestry and Fisheries
NWA	National Water Act
DEFF	Department of Environment Forestry and Fisheries
EPWP	Extended Public Works Programme
CBA	Capacity Building Approach
DEA	Department of Environmental Affairs
DDA	District Department of Agriculture
SANBI	South African National Biodiversity Institute

Chapter 1: Introduction and Background

1.1. Background

Generally, the agricultural sector plays a significant role in the national economy, food security and the sustainability of small-scale farmers' livelihoods of many countries. An increasing demand on the agricultural sector, caused by "high rate of economic growth, growing population and per capita consumption", has exacerbated the already substantial pressure on natural resources (NR) such as water, vegetation and soils especially in the developing countries (USAID 2008: 1). As a result, a number of countries are experiencing a decline in the value of their NR which contributes to the detriment of agricultural production yields. This impacts heavily on rural households and farmers that are dependent on agriculture as a main source of food and income (World Bank 2001).

The Food and Agriculture Organisation (FAO) and Global Mechanism of the UNCCD (United Nations Convention to Combat Desertification) (2015) add that restoration of environmental ecosystems is key to solving global challenges such as food insecurity and desertification. Such measures should target smallholder farmers, coupled with the investment in improving adoption of best agricultural practices and strengthening farmers' entrepreneurial skills (FAO 2020).

The Covid 19 pandemic is another, more current, factor that has contributed on the substantial pressure on NR. The people who have lost jobs in urban areas due to Covid 19 have immigrated to rural areas (Thai PBS 2020) where NR become "a safety net providing fall-back livelihoods" (FAO 2020: 3). The need to recover from Covid 19 has created an opportunity for investment in restoring of NR, while providing short-term economic relief and strengthening well-being and resilience of people particularly residing in rural areas. However, there is a risk that the pandemic recovery plan may be influenced by decision-makers seeking short-term outcomes and thus ignoring sustainable measures resulting in long-term fiscal burden (Tollefson 2020).

According to the millennium development goals, environmental sustainability and food security are major goals which present as incompatible and mutually exclusive – suggesting

that food security cannot be achieved without harming the environment and vice-versa. While environmental sustainability seeks to ensure the conservation of NR and environment as a whole, food security, on the other hand, aims at halving the number of people living in poverty particularly suffering from hunger (United Nations 2005). To overcome this false dichotomy has demanded development approaches that are integrative and seek to simultaneously improve management of NR and agricultural food productivity. Thus, approaches such as the community-based natural resource management (CBNRM) came into existence.

In Australia, three fundamental environmental crises encouraged the birth of its LandCare initiative that adopted CBNRM approach. The first crisis was about poor management of water sources which resulted from long-term unsustainable extraction of water in the Murray-Garling system. This poor management of water was on-going and threatened to get to the point where there was not sufficient water for agriculture, human consumption and maintenance of the ecological balance of the river (Murray-Darling Basin Commission 1999). The second crisis was about the rapid clearing of trees and other natural bushy vegetation to create more grazing land for livestock. Scientific research conducted by Australian Conservation Trust that found that such clearing of indigenous vegetation would result in rising water tables, scalding, soil infertility, salinity of river water and loss of biodiversity (Prager & Vanclay 2010). The third crisis was when Snowy River (Australia) landholders, particularly farmers, were experiencing water shortage due to the diversion of the main river, 50 years earlier, by Snowy Mountains Hydro-Electricity Scheme. The decision to divert the river stream was made as a means to prevent farmers from over-using the water (by denying them full access) due to unsustainable use of water by farmers downstream through irrigation (Toyne & Farley 2000).

In South Africa, LandCare was adapted from the Australian grass-roots model in 1997 to combat issues such as soil erosion, overgrazing, wetland and water source destruction and bush encroachment that emerged since the adoption of industrialised agriculture that promoted NR-damaging farming practices. The mismanagement of NR has been traced specifically to the lack of the capacity of farmers (particularly larger-scale farmers) to apply adequate natural resource management (NRM) practices arising from inadequate information

about consequences of their land management practices, including the spinoff effect on other farmers utilizing the same resources (especially smallholder farmers) (Toyne & Farley 2000).

The South African LandCare programme was developed with an initial goal of optimising productivity and sustainability of NR to result in improved agriculture productivity, food security, job creation and a better quality of life for all (EDA 1999). The updated goal for LandCare, adopted in 2002, stresses the development and implementation of integrated NRM approaches which are efficient, sustainable, equitable and consistent with the principles of ecological sustainable development. The revised goal of LandCare was derived from the vision which sought to have a society that has adopted ecologically sustainable approaches through the use and management of NR and the environment while improving livelihoods (Department of Agriculture, land Reform and Rural Development 2002).

South African LandCare works in partnership with public/state extension in planning, designing, implementing and monitoring various LandCare projects. Extension officers work as provincial LandCare coordinators discharging duties including identifying potential projects, facilitating baseline studies of the affected communities to determine through conducting a situational analysis, developing business plans for funding applications, appointing services providers, and mobilizing stakeholders for implementation and on-site-monitoring of projects (Department of Environment, Forestry and Fisheries 2020).

Curtis *et al.* (2008) state that the sustainability of LandCare projects is dependent on capacity building amongst role-players, most importantly farmers since the main cause of NR crises come as result of their lack of capacity to apply appropriate NRM practices. South African LandCare on the ground suggested that more effort and expenditures are directed toward maintaining and rehabilitating NR and less toward building farmer capacity to be self-reliant in managing their NR. This misdirection would threaten the long-term sustainability of the very objectives and goals of the LandCare Programme. This study, therefore, investigated the role of extension in South African LandCare policy in building farmers capacity to be self-reliant and resilient in managing their NR.

1.2. Research questions

The main research question is: What role should Agricultural Extension play in building farmer capacity to manage NR in the context of the LandCare programme? To answer this question, the research explored the following questions:

1. What is agricultural extension in the context of capacity building in relation to agriculture and NR management?
2. What is the relationship between extension and the LandCare programme, with specific reference to South Africa?
3. How does the South African LandCare programme ensure the sustainability of its impact?
4. What changes in extension and South African LandCare programme are needed to ensure that farmer capacity to manage NR is effective?

1.3. Research objectives

This study investigated South Africa's LandCare programme to:

1. Determine the extent to which the South African LandCare programme attempts to mitigate core problems rather than symptoms;
2. Determine the extent to which it works to create and ensure long-term NRM by farmers without external support;
3. Determine the degree and depth to which extension is contextualised in building farmer capacity to manage NR; and
4. Generate recommendations to strengthen the capacity building element of LandCare in South Africa and contribute to the growing understanding of this in LandCare in South Africa and in other parts of the world.

1.4. Theoretical framework

This study embraces two theories: capacity building; and learning-based agricultural extension. These frameworks were adopted to clarify the research problem and to give structure for designing the research project and guiding data collection, analysis and interpretation.

1.4.1 Agricultural Extension

Literature suggests that extension is a relative term and that there is no universally accepted definition or approach for the concept. Definitions vary from one institution to another. Similarly, the various extension approaches are appropriate only when applied in their respective relevant situations (World Bank 2012; Rezaei-Moghaddam & Karami 2008). Furthermore, extension has evolved in theory and practice from being oriented toward extending tertiary scientific knowledge to out-of-school people with no access to knowledge sources (Chauhan 2007) to embracing learning as an approach and also as a theory of improving self-reliance and resilience of people thereby improving sustainability of rural development projects/programmes (Terblanché 2008).

Given the numerous roles that extension plays in rural development and agriculture, it is essential to understand that what is implemented by extension workers on the ground is mostly informed by the policies of a specific institution rendering extension services. This implies that the role of extension in South Africa, in both the public and private sectors, varies depending on the policies informing planning and implementation. However, the growing consensus emphasises that extension should be more oriented toward helping farmers help themselves (Terblanché 2008). This prioritises careful selection of approaches to adopt when working with farmers' complex and diverse agricultural and livelihood scenarios. Helping farmers help themselves can be achieved realistically only through building farmer capacity where learning and effecting behavioural change are core and fundamental in framing the role that extension adopts (Boon 2009).

Learning-based extension is consistent with how 'helping the farmer help themselves' can be achieved. It posits that the role of extension is concerned primarily with building capacity of the farmers, researchers and extension workers in working towards facilitating the desired change in the context of farmers' current position and future aspirations. Learning-based extension does not dismiss other approaches to extension, nor does it disqualify any extension role; rather it embraces them all. It suggests that extension should be about building capacity for self-directed learning and empowering farmers to be equal partners in development. Learning-based extension further emphasises that, fundamental to helping farmers help

themselves, extension should place three things in the centre of development: farmer learning, appropriate placement of technology; and the farmers themselves (Worth 2006).

1.4.2 Capacity building

Capacity building is a popular term in rural development as an initiative and as an approach to improve the livelihoods of the poor people in rural areas. Capacity building is applicable not only in rural development but applies more widely where it also implies provision of education and training beyond schooling to enable people to partake in specific activities unaided (Rola-Rubzen & Gubunanda 2003). Before understanding capacity building as a concept and approach it is essential to grasp the meaning of the term capacity.

1.4.2.1 Capacity

Generally, capacity is equated to capability. However, they do differ in definition. Capability is defined as one's ability to perform a certain task which is characterised as possessing knowledge and skills (Van Vuuren 2017). In rural development, capability is not a synonym for capacity; but it is an element of capacity. Capacity is then defined as one's ability, aptitude or competency to perform a particular task successfully and sustain the achievement over time. Capacity comprises attributes, assets, capabilities and relationships that enable one to be self-reliant in performing a task and resilience in the face of change (Walters 2007). Lavergne and Alba (2003) state succinctly that capacity is comprised of capabilities (knowledge, skills and competency); structures (effecting institution and organisation) and systems (policies and rules governing and guiding the development process).

Capacity building as a concept: The United Nations Economic Commission for Africa (UNECA) (2014: 5) defines capacity building as: “the process through which individuals, groups and organisations, and societies deploy, adapt, strengthen, and maintain the capabilities to define, plan and achieve their own development objectives on an inclusive, participatory, and sustainable basis”. Similarly, Stavros (1998) defines capacity building as a ‘process’ of strengthening people and their organisations to be able to effectively serve its people and consider impact of all stakeholders. Babu and Sengupta (2006) echo these definitions but add that capacity building should be centric to any development agenda and

should be focused on effecting the farmers' opportunity to take ownership of change initiative and embrace local capacity.

Capacity building as an approach: Capacity building as an approach is defined as an on-going process or journey (Bolger 2000), not an outcome or output of a project (Pack 2018). A capacity building approach (CBA) obliges the development intervention to go beyond the project world, that focuses on delivering output within a timeframe, to realising and focusing on how the project's outputs impact on sustainability (Eade 2010) at three levels within which the intervention operates – individually, organisationally and at a systems level (Bester 2015). CBA is 'continuous' as it focuses the development intervention to constantly cultivate capabilities of people involved to enhance their problem-solving abilities related to their livelihoods, health and their NR. The World Bank suggests that CBA is an on-going 'learning' process driven by local people, facilitated and supported by change agents, which seeks to promote local ownership and achieve local aspirations. CBA also emphasises a synergistic learning partnership between local people and agents of change as this forms a strategic effort toward effecting economic and social change (Otoo *et al.* 2009).

CBA does not provide a fixed procedure of building capacity; rather it provides a framework built on five principles that guide the design, implementation and evaluation of capacity development interventions (Bolger 2000):

- Inclusive participation and local ownership;
- Learning and synergistic partnership between key stakeholders;
- Embracing local capacities;
- Continuous learning and adaptation; and
- Focusing on sustainable development.

1.4.3 Building capacity of farmers

Building capacity of farmers embraces CB as a concept and as an approach. It is as an on-going process which can be seen as a ladder (van Vuuren 2017) of improving technical

knowledge, skills and attitude of individuals, organisations or communities (Photakoun 2010). Building farmer capacity prioritises improving the farmers' ability to learn continuously and be resilient in an ever-changing environment in order to achieve their objectives (Nettle *et al.* 2010). This can be achieved through improving farmers' access to structures and systems necessary for development to take place and effecting farmers' opportunity to command the structures and systems in place (Lammert *et al.* 2015; Nettle *et al.* 2010).

From the various definitions of the concept of capacity above abstracted from literature, this paper synthesises the definition of 'capacity' and refers to it as a set of elements that makes human systems function and be resilient. Capacity building comprises five elements: knowledge; skills; opportunity; structures; and systems. For capacity building to work, it should be guided by three sub-processes: effecting access to information sources; facilitation and empowerment; and engaging in participatory technological development and mentorship (van Vuuren 2017). Information access is critical so that farmers do not develop dependency from external stakeholders but can be self-reliant in directly accessing the information they need. Facilitation and empowerment are central as they ensure that the process is iterative – an essential key to sustained learning. Technological development reinforces the importance of engaging farmers in the process of developing new technologies suited for them for purpose of learning and owning the outcome (Coutts & Roberts 2003).

1.5 Methodology

This study employed a qualitative research approach which is defined as a type of social science research that deals with non-numeric data (Punch 2013) that helps to understand the social life we live in and provides justification of how and why a particular phenomenon functions a certain way in a particular case study (Polkinghorne 2005; Hancock *et al.* 2007).

This approach allows the study to be flexible in the use of research methods and facilitates exploring and investigating the deeper understanding of the nature of a phenomenon or problem (Syed 2012).

The primary research of this study investigated the perceptions of the individuals that participate in the LandCare programme in KwaZulu-Natal. Thus, this is a case study which, according to Creswell (2014), is defined as when the researcher is focused on exploring a small number of units, e.g. a programme, event, activity, process or people, intensively. With respect to this study, the researcher explored the South African LandCare programme focusing on participants' experience in the programme as opposed to description of the phenomena (Welman *et al.* 2005). The research design of this study was governed by the notion of fitness for purpose, where the purpose of the study informs the research design and selection of the methodology (Cohen *et al.* 2007).

This study sought to understand the role of extension and LandCare policy in building farmer capacity to manage their own NR. The study used a multidimensional approach in gathering data and analysis about the issue where the views and their relationship of three groups of participants were examined (Nieuwenhuis 2007): farmers; extension officers; and key informants (Enablers). The study draws upon participants' perceptions about the present and history of the programme in order to understand the complexity of the phenomena.

1.5.1 Research area and sampling

The study was conducted in KwaZulu-Natal, South Africa. The primary research comprised semi-structured interviews with 45 key informants selected using purposive sampling, and participant-observation. Key informants included 20 farmers, 20 provincial extension workers and five LandCare officials in the National Department of Agriculture (NDA)¹. These three groups of informants were selected deliberately as they could provide more accurate information to fulfil the study objectives and help answer the underlying research question (Etikan & Bala 2017).

¹ The official name of the Department changed during the course of this study. It was the Department of Agriculture, Forestry and Fisheries. It became the Department of Agriculture, Land Reform and Rural Development. For the purpose of this study the abbreviated term "National Department of Agriculture (NDA)" is used.

The researcher approached the NDA LandCare office and requested five key informants to participate in the study. These key informants identified another informant at the KZN provincial Department of Agriculture who, in turn, identified 20 extension workers and provided a list of farmers involved in the implementation of LandCare projects. Twenty (20) farmers were selected using snowball sampling through referrals given by extension workers and farmers themselves. In addition to the participants being part of the LandCare projects, the selection was based on their willingness to participate in the study (Taherdoost 2016).

1.5.2 Data gathering methods

1.5.2.1 Literature review

A literature review was used to critically explore a set of research publications, books, journals and documents relevant to study (Rajasekar *et al.* 2013). It was conducted with the aim of understanding the key themes in the research questions and to articulate the research gap that this study attempts to fill. The literature review was also conducted to develop a theoretical framework within which the research design would be formulated (Boote & Beile 2005) and the data analysed.

1.5.2.2 Document analysis

This research method was used to obtain deeper understanding of the phenomena. According to Merriam and Associates (2002), document analysis is regarded as a critical source of evidence. Its value lies in the fact that the existing documents frame the situation and hold factual data. In this particular study, the LandCare implementation policy and other supporting documents were reviewed to obtain information describing LandCare and its philosophy and role in building capacity of farmers to manage NR.

1.5.2.3 Interviews

This study employed semi-structured interviews. The interviews were guided by a number of open-ended questions that defined the main topic and also provided the platform for the researcher and the interviewee to have conversations about more specific themes in more detail. The interview guide was developed with the assistance of an academic at an

agricultural college involved in teaching NR management module, and was piloted with students attending the NR management module. In semi-structured interviews the researcher used cues, and probed to stimulate the conversation with the interviewee to obtain richer responses (Hancock *et al.* 2007). [See [Appendix 2; 3 & 4](#)].

The respondents for this research study were provided with informed consent which, in accordance with Manti and Licari (2018) is signed agreement which confirms the willingness of the respondent to partake in a research study voluntary post being informed of all aspects the research and their rights thereof. All the interviews were carried out for the duration of 30 to 45 minutes per respondents where the researcher was an interviewer accompanied by a trained note taker.

Interviews with key informant were held at their respective offices for the convenience of time and venue. The interviews with extension workers were held at the centric venue organised by a key informant at the provincial office for convenience of time since they were working in different local municipality. Farmers were visited and interviewed in their farms for their expediency in terms of time and cost of travelling.

1.5.2.4 Validity and trustworthiness

The study used different research methods for two reasons: to achieve triangulation to improve the credibility and reliability of the findings; and to enhance the validity and trustworthiness of the findings and conclusion. Further, to enhance the validity and trustworthiness of the study, three groups of participants were interviewed using similar design of themes and questions.

1.5.2.5 Data analysis

This study used NVIVO software programme to analyse the data. Data was analysed through thematic analysis which according to McNiff (2016) helps the researcher makes sense of the data gathered from research study respondents by identifying main points and themes for discussion, determining differences and similarities between responses, and integrating themes and responses into a research report.

Specifically for this study, a word cloud was used as the primary function to identify common themes and phrases across the responses as points for discussion. The questionnaire used to gather primary data was open-ended but guided in sense that it will evoke certain responses that are relevant to this study. The data that was entered in to NVIVO systems were direct individual respondents' responses to questions and were not subjected to researcher's interpretation. The data analysis parameters were determined by the way the questionnaires were structured which channelled the respondents to providing relevant data and input that will create a range of commonality. The questionnaire was informed and developed from the 3 theory papers (chapters 2, 3 & 4) which provided the framework and lenses for critiquing the primary data.

1.6 Rationale

Due to factors such as a drop in the national economy and increasing national food insecurity, rural farmers have put more effort into making their agricultural production more efficient for selling for profit and/or consumption. This phenomenon perpetuated increased demand and pressure on NR such as water, soil and vegetation resulting in these resources being prone to degradation. The LandCare programme was designed to mitigate degradation of NR while at the same time improving food security. This programme officially adopts an ecologically sustainable approach to management of South Africa's NR that will ensure that future generations will be able to use them to meet their food, livelihood and other needs.

The LandCare programme policy addresses rehabilitation of degraded NR and skills development for better management of NR by farmers. However, in reality, it appears that LandCare programmes are more focused on physically rehabilitating degraded NR and the skills they do provide are primarily related to technical land rehabilitation and not on NR management. This study sought to investigate the role of extension and LandCare policy in building farmers capacity to manage their NR while obtaining optimum yields in their production.

The study ultimately provides the LandCare programme, its officials and other stakeholders with a framework that will help strengthen the current practice of the programme toward

building farmer capacity to be self-reliant and resilient in managing their own NR – the fundamental essentiality of which is the primary assumption of this study. The study will also provide the programme with the recommendations that will help improve the implementation of LandCare programme in achieving desired outputs that are in line with goals and objectives.

1.7 Limitation of the study

This study investigates the role of extension and LandCare in building farmer capacity to manage their NR using a case study research method. The case study investigated is LandCare programme implemented in KwaZulu-Natal in three district municipalities: Mkhanyakude, UGu and Amajuba. This therefore implies that the results and conclusion of this study are limited to and cannot be generalised beyond LandCare projects implemented in the aforementioned district municipalities. Nevertheless, the study will contribute to the body of knowledge of building farmer capacity to be self-reliance and resilient in their operations, particularly the vulnerable smallholder farmers involved in the LandCare programme and in other farmer related initiatives.

1.8 Thesis Presentation

This thesis consists of eight chapters including this first introductory chapter.

Chapters 2 to 8 are presented as stand-alone papers in journal article format in preparation for submission for publication. There is, therefore, some unavoidable repetition of information and overlap of themes in some of the chapter in the thesis. Further, due to this format each chapter has its own reference list. The chapters are presented as follows:

Chapter 2: Role of Agricultural Extension in Building Farmer capacity

Chapter 3: Role of South African LandCare in Building Farmer Capacity to Manage Natural Resources

Chapter 4: Agricultural extension, LandCare and building farmer capacity: LandCare Capacity building Framework (Presented as incomplete manuscript to be later submitted for publication)

Chapter 5: Farmers' Perceptions on the Role of Extension and SA LandCare in Building Natural Resource Management Capacity amongst Farmers

Chapter 6: Extension Officers' Perception on the Role of Extension and SA LandCare in Building Natural Resource Management Capacity amongst Farmers

Chapter 7: Key Informants Perception on the Role of Extension and SA LandCare in Building Natural Resource Management Capacity amongst Farmers

Chapter 8: This chapter provides the overall discussion and conclusion based on the previous chapters and against research question and objectives

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Chapter 2: The Role of Agricultural Extension in Building Farmer Capacity

Abstract

Capacity building has become an increasingly popular concept in South Africa in the field of agricultural and rural development as an approach that acknowledges and embraces local farmer knowledge. The capacity building approach seeks to build local ownership of the development process and outcomes; and to strengthen farmers' resilience as way of improving sustainability of agricultural development programmes. The execution of many capacity building programmes brings to light that the role of agricultural extension in building farmer capacity remains unclear as extension is still centred primarily in imparting knowledge and transferring technologies to farmers. This leads to the argument of this paper, which seeks to articulate the role of agricultural extension in building farmer capacity by clarifying and analysing theoretical origin and characteristics of the concepts of 'agricultural extension' and 'capacity building'. Capacity building, as a concept, refers to increasing the power and ability of individuals, organisations and society to perform specific functions, participate in continuous learning, and develop resilience in their own operation. The capacity of a farmer is characterised by five elements: skills, knowledge, opportunity to take command, structures and systems (SKOSS). Capacity building, as an approach, posits that the process of building capacity should be 'learning-oriented' which will yield favourable change at all levels of capacity (individual, organisation and sectoral/systems). Learning in the context of the capacity building approach is described as an ongoing process of investigation, assimilation and sharing which occur not only among clients (e.g. farmers), but among all the relevant stakeholders (agents of change). Similarly, learning-based extension theory suggests that the role of agricultural extension is to develop farmers' aspirations and to build learning capacity among the farmers, researchers and extension workers while working towards facilitating the desired change that will improve farmers' livelihoods. This implies that the role of extension goes beyond imparting knowledge and skills to farmers to facilitating learning among all the stakeholders in the process thereby yielding favourable change in terms of skills, knowledge and access to and the opportunity to take command of and access to resources (structures and systems).

2.1 Introduction

The evolution of rural development approaches both globally and in South Africa has yielded development strategies that not only seek to provide technical support to farmers, but also seek to build the capacity of rural farmers in taking ownership of their development and becoming resilient in their farming operation. However, it is evident that many development organisations struggle to understand the role of agricultural extension in building farmer capacity. The role of extension is still perceived, primarily, as engaging with the farmers primarily for the purpose of imparting knowledge and skills.

This paper explores how agricultural extension can be positioned in capacity building to improve the sustainability of its impact. It first defines the concept of agricultural extension and outlines the overall role of extension in agriculture and rural development. It then defines ‘capacity’ and ‘capacity building’ as concepts and provides the theoretical background of capacity building as an approach. Finally, the paper presents and discusses a conceptual model embracing the two concepts which provide a framework to clarify the role of agricultural extension in building farmer capacity within the context of capacity building.

2.2 Agricultural Extension

2.2.1 What is Agricultural Extension?

The concept of agricultural extension is relative and has theory and practice which has evolved over time (Rezaei-Moghaddam & Karami 2008). Agricultural extension emerged as an out-of-school system that extended the university research output to farmers who would not otherwise have access to such knowledge (Chauhan 2007). Due to the critique of linear extension practices for their lack of focus to assist in building sustainable livelihoods for the rural farmer, the definition and description of extension as concept has evolved to include the element of advisory, facilitation and learning (Botha & Atkins 2005).

It is evident in the literature that the concept of extension is still defined in various ways by different organisations and institutions, depending on their line of work and their objectives for offering agricultural extension. Most of the definitions of agricultural extension fit in one or cuts across the core elements stated above. An example of a definition that cuts across the core elements of agricultural extension is given by Christoplos (2010) where extension is

defined as a system that enables access to information, knowledge and technologies amongst key stakeholders (farmers, extension and market); builds synergistic partnerships in research, education and agri-business; and builds the capacity of farmers to be innovative and develop their own technical and management skills and practices.

La Grange *et al.* (2010) defines agricultural extension as the facilitated exposure of farmers to information relevant to their livelihood and farming systems which places them in an informed position to decide on the appropriate changes to be implemented in their agricultural businesses. This definition takes into consideration that extension is not a unilateral channel for transferring knowledge and technology. Rather it emphasises the role of building farmer capacity through education and developing knowledge-rich partnerships with farmers.

For many, extension is embedded in the philosophy of ‘helping farmers to help themselves’, which prioritises behavioural change as the major role of extension. This suggests that the role of extension should include facilitating desired rural behavioural change which will bring about an appreciation of basic human values such as self-determination, individuality and self-reliance which are the core principles of community development (Terblanché 2008). Boon (2009) supplements this by suggesting that extension involves communication as a tool to assist with improving knowledge and skills and changing farmers’ attitudes to initiate the desired behavioural change. Agricultural extension has also been defined as a system that supports agricultural producers through facilitating their efforts in problem solving, in providing linkages to markets and the value chain, in building capacity and in advancing technologies to improve livelihoods of the farmers (Birner *et al.* 2009; Davis & Asenso-Okyere 2009).

From the critique of technology transfer being linear, arguments emerged that agricultural extension should embrace and engage in human and social development, to include organising producer groups, building capacity and rendering support to farmers in production and sustainable management of natural resources (Swanson 2008). Glendenning *et al.* (2010) synthesise the expanded role of extension – from technology-centred approaches to facilitation-centred approaches – with regard to information access and sharing which

prioritises extension services' engagement in facilitating farmers' access to reliable and relevant information sources to counteract the increasingly complex agricultural scenario.

The Food and Agriculture Organisation of the United Nations (FAO) states that the term extension can be used as an umbrella term to describe various activities focusing on the provision of knowledge and advisory services that are desired by agricultural producers and other actors in the agri-food systems and rural development (Christoplos 2010).

Despite widespread agreement that extension relates to change, it is clear that no single extension model is universally appropriate; a model is appropriate when it is relevant to the individual situation (World Bank 2012). This further suggests that there is no universal definition for the concept of agricultural extension. Definitions vary from one institution/organisation to another. Despite the lack of common definition or single appropriate model, discussion from literature does highlight that agricultural extension as it is defined and practiced is structured on *what* is it, *how* it is carried out and *why* it is carried out.

2.2.2 Role of agricultural extension

Agricultural extension (private and public) in most developing countries is put in place to play a significant role in enhancing the agricultural sector, especially on small-scale or emerging farming enterprises, making a significant contribution to national development goals. In most developing countries, agricultural extension policy suggests that agricultural extension should facilitate and contribute towards the achievement of three primary agricultural development goals: achieving national and household food security; improving rural livelihoods; and strengthening natural resource management. Derived from the primary agricultural development goals are the specific objectives of agricultural extension: technology transfer, human capital development, social capital development and sustainable natural resource management (Swanson 2008).

Christoplos (2010) states that the role of extension has expanded over time to include service such as the ones presented in Table 1.

Table 1: Role of extension presented against extension model/ approach categories

Technology transfer	Advisory	Facilitation	Learning
<ul style="list-style-type: none"> • Disseminating technologies and research information to farmers • Supporting government policy through creating awareness to farmers about new technologies and production methods • Providing nutrition and home science education to farmers 	<ul style="list-style-type: none"> • Providing training and advise to farmers about issues identified by farmers • Providing feedback systems between farmers and outside stakeholders • Providing legal and fiscal advice to farmers 	<ul style="list-style-type: none"> • Adapting technologies and practices to suit the situation of the farmer • Building entrepreneurship skills among smallholder farmers • Forming farmer learning groups to clarify and express own demands • Facilitating conflict resolution amongst farmers about natural resources 	<ul style="list-style-type: none"> • Facilitating synergistic partnerships between farmers and market actors for learning • Facilitating farmers access to knowledge sources such as training and educational institutions of agriculture • Facilitating equal partnerships between farmers, extension and the public sector • Supporting institutional development through learning • Impacting on the development of relevant policies • Building capacity to access non-government services and support

[Adapted from Christoplos (2010)]

Table 1 presents the roles of extension as outlined by Christoplos. Some of the roles of extension cut across the varied approaches of extension. However, for the case of this paper they were categorized based on where they likely fall under. Information presented in the table highlights again that no one approach is more appropriate than another; the same being true for the various roles. But they all become appropriate in given relevant situations. It is essential to note that extension roles are not limited to the one presented in the table, but the table categorises the ones outline by Christoplos.

Learning-based extension views extension from a different perspective. It does not dismiss other approaches to extension, nor does it question the many activities in which extension might engage such as those identified by Christoplos. Rather it posits that the role of

agricultural extension is concerned primarily with building learning capacity among farmers, researchers and extension practitioners in working towards facilitating the desired change in the context of the farmers' aspirations. Learning-based extension thus stresses a synergistic partnership among farmers, researchers, policy makers (termed 'enablers') and extension. It places farmers in the centre of development together with farmer learning and in the identification of the appropriate placement of technology (Worth 2006). Learning based extension argues that while linear, advisory and facilitation approaches to extension are genuine and relevant in some circumstances. Extension must first and foremost be about building the capacity for self-directed learning as it is the only means by which the farmer can become an equal partner in the extension conversation.

2.3. Building Farmer Capacity

2.3.1. What is capacity?

Capacity is generally defined as an ability, aptitude or competency to perform a certain task successfully (UNESCO 2011) and to sustain the achievement over the long term (Whittle *et al.* 2012). Chaskin (1999) states that 'capacity' signifies the concept of containing (holding and storing) and the idea of ability (of mind, action). Capacity can be described as a set of elements that makes a human system function, survive and self-renew (Otoo *et al.* 2009). In the context of a rural community, capacity is comprised of attributes, assets, capabilities and interactions that can be used to improve and maintain the well-being of a community as well as to counteract problems as they arise (Walters 2007). In the field of education, capacity is defined as ability to make desired changes, which is further characterised by four specific capacities: human; organisational; structural; and material. Human capacity refers to knowledge, skills and the willingness to implement desired change. Organisational capacity refers to one's ability to interact, collaborate and communicate with other people for learning. Structural capacity includes elements such as policies, procedures and practices be followed or amended in implementing change. Material capacity is monetary resources, materials and equipment which needs to be acquired in order for change to be implemented (Lammert *et al.* 2015). Similarly, Alba and Lavergne (2003) define capacity as being comprised of three things that have to be in place: 'condition' (individual's knowledge, skills and competence to

perform a particular task); ‘structures’ (effecting institutions and organisation) and ‘systems’ (policies providing framework to guiding development process).

In capacity building, capacity has three levels: individual, organisational and institutional Walters (2007). Individual capacity is defined as one’s ability to apply knowledge and skills acquired through training and learning interventions to improve their outcomes (de Rosa and Belman 2012; Walters 2007). Organisational capacity refers to a group’s ability to utilize resources, systems and processes in place to manage available resources and skills (including leadership, communication, negotiation, consensus building and conflict resolution) to achieve missions and visions (IFAD 2015; Rocchigiani & Herbel 2013). Institutional capacity is an ability of an institution to support organisations and individuals in achieving their outcomes (USAID 2010).

van Vuuren (2017) draws a distinction between capacity and capability and describes capability as one’s ability, skills and knowledge. Whilst, in contrast, capacity refers to one’s ability to carry out stated activities to achieve goals. This implies that having capability does not guarantee that one will be able to carry out responsibilities successfully in order to meet objectives. This denotes that it is essential that development institutions focus on building farmer capacity as a measure to ensure sustainable development rather than building capabilities.

2.3.2. Capacity building

Capacity building has become a popular term in recent years, especially amongst development institutions, as an initiative to improve the livelihoods of the poor in rural areas that are generally characterised as resource poor and reliant on their own labour as their primary source of income (Rola-Rubzen & Gubunanda 2003). The concept of capacity building emerged years ago in the rural development sector, and the meaning, models, methods and tools have evolved over time (Whittle *et al.* 2012). Literature depicts that the understanding of capacity building varies significantly between institutions and fields, even to this day, in terms of the nature of the term and the approaches employed.

2.3.4. Capacity building as a concept

The United Nations Economic Commission for Africa (UNECA) (2014: 5) defines capacity building as: “the process through which individuals, groups and organisations, and societies deploy, adapt, strengthen, and maintain the capabilities to define, plan and achieve their own development objectives on an inclusive, participatory, and sustainable basis”.

Stavros (1998) earlier noted similarly that capacity building can be defined as the process of extending boundaries by strengthening the organisation and its people to be able to effectively serve its people and consider the impact of all stakeholders. Babu and Sengupta (2006:2) echo these definitions, but add that capacity building implies taking ownership of change initiatives and should be “an integral component of development agendas. More specifically, they argue that “development plans and goals cannot be achieved without adequate local capacity” and that lack of local capacity persists to the detriment of development efforts.

2.3.5. Capacity Building Approach

Capacity building as an approach is described as an ongoing process that aims towards the reduction of poverty (Bolger 2000). FAO states that the capacity building approach is a process or a journey and not an outcome of an intervention (Pack 2018) which largely contributes to economic growth, poverty alleviation and national development (Babu and Sengupta 2006). This implies that the capacity building approach views the intervention in a larger perspective through what it can bring in the long run to a wider segment of society.

Capacity building cannot be referred to as a single approach or prescription (Bolger 2000) but rather a framework that consist of various approaches, strategies, and methodologies which aim at enhancing performance at different social levels. This implies that capacity building provides a framework within which development organisations/ agencies can develop effective and efficient capacity building interventions (Bolger 2000). Capacity building is rooted in specific principles and orientations that guide the design and implementation of capacity interventions (Bolger 2000:2):

- “Inclusive participation and local ownership;

- strengthening the capacity of partners in cooperation to assume responsibility for their own development;
- building from what the farmers already have;
- ongoing learning and adaptation;
- long term investments to gauge sustainable development;
- integration and collected effort in all levels to address complex problems.”

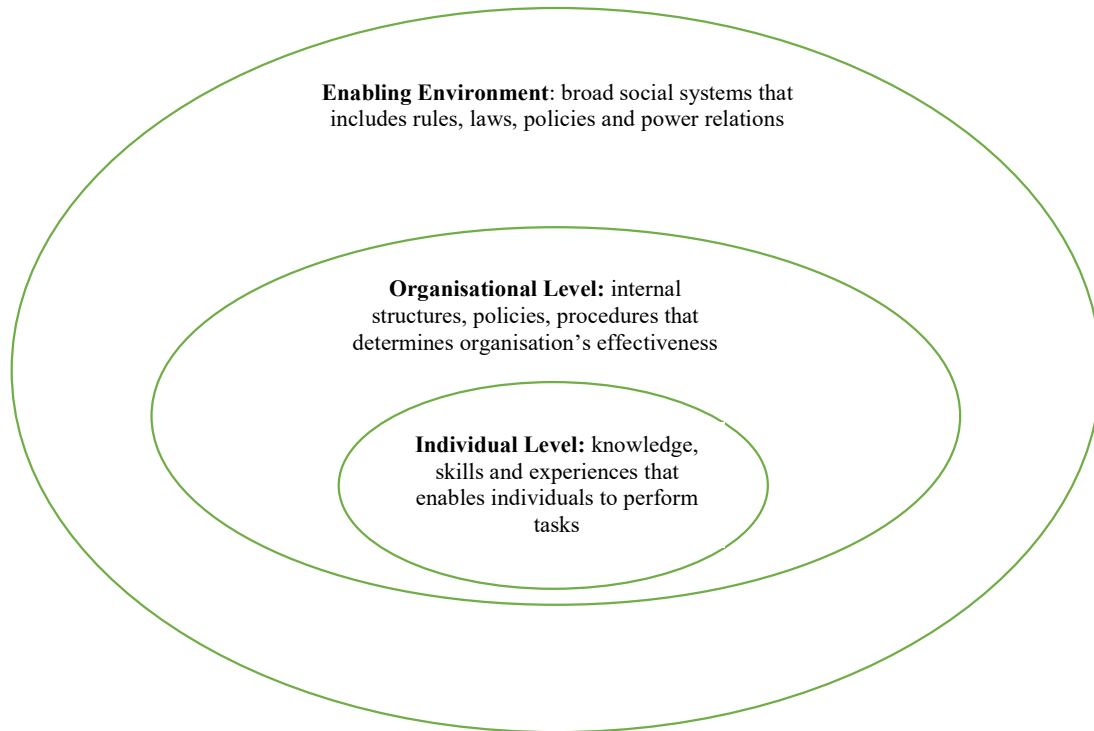
Pack (2018) defines capacity building as an approach that is applied to enhance organisational vision and improve impact which takes into consideration the integration of good governance and market access. This approach is continuous in that it constantly nurtures abilities of involved parties to solve problems related to health, livelihoods and natural resource management. Furthermore, capacity building is an approach that ensures that the capacity building interventions are designed and implemented appropriately to ensure that the impact is sustainable. Sustainability of the capacity building interventions can be improved when the design is built with a clear vision, a broad-based commitment and active participation of stakeholders at all levels (Nuffuc 2016).

The World Bank states that it is important that a distinction be drawn between capacity for development and capacity building. Capacity for development refers to the systems and structures in place such as availability of resources and effective and efficient systems from which societies deploy the respective resources sustainably in-order to achieve their development goals. On the other hand, capacity building is defined as an ongoing learning process that is driven by local people whilst facilitated and promoted by leaders, coalitions and other agents of change to enforce institutional change to enhance local ownership for effectiveness and efficiency in the efforts towards achieving objectives (Otoo *et al.* 2009).

“A capacity-building approach therefore means getting out of Project World, focusing less on the supporting scores of projects and more on realising tangible interventions within the context of social and other kinds of change – local, national, regional, and global. Rather than viewing support of each organisation or initiated activity in a fragmented or insular fashion, it is necessary to look intelligently at the entire web of social relations within which these organisations and their activities are embedded” (Eade 2010:206). This, in practice, implies that capacity building goes beyond focusing on delivering outputs within the certain

timeframe to realising how the delivered outputs impact on social capital and other kinds of change at different level or spheres the intervention operates within.

Similar to Walters (2007), there is a growing consensus that capacity resides at three interrelated levels and that capacity issues need to be looked at from a systems perspective: individual level, organisational level and enabling environment (see Figure 1: Levels of



capacity in systems context)

Figure 1: Levels of capacity in systems context
(adapted from Bester 2015 & Matachi 2006)

Individual Level: This is referred to as the first layer/sphere of capacity, where individuals within an organisation or society require knowledge, skills and experiences in order to meet their development goals. Individual capacity, then, in this sense is defined as one's ability to learn skills and attain knowledge and the ability to use them towards achieving their respective objectives. This further suggests that building individual capacity becomes mainly demand-driven and centred on learning and active participation (Freeman 2010). According to Babu and Sengupta (2006), literature shows that prior capacity building interventions were

more focused on this level of capacity building without paying attention to the other two levels. Building capacity on this level entails assessing individual skills and knowledge against 'job' requirements in order to identify capacity gaps. The gaps are then addressed through training, formal education, learning by doing and experience, mentorships, networking, communities of practice and via multimedia platforms (USAID 2015).

Organisational level: Building organisational capacity, broadly, refers to the strengthening of internal relational components of the organisation in order to improve efficiency and effectiveness in the use of resources towards achieving missions and sustainability over time (Stavros 1998). Building organisational capacity goes beyond the individual level or project. Instead, it focuses on various institutions and building coherent strategies in order to address a certain issue at a larger scale. Building organisational capacity involves taking into account the scale, exit strategy and strategies for sustaining desired impact (Whittle *et al.* 2012). USAID (2015) adds that capacity development at this level focuses on strengthening capacities such as leadership, organisational ability to engage, ability to produce and maintain desired results/outcomes, manage change, adapt and self-renew.

Enabling environment: In the context of systems thinking, this is the highest level at which capacity can be analysed and developed. This level is also referred to as an enabling environment since it is where organisations operate. Capacity building at systems level refers to functions and structures that support programmes and capacity development intervention (PEPFAR 2012) such as socio-political factors, the government, the economic/technological and physical environment (Babu and Sengupta 2006). Building capacity at this level includes improving the external environment within which the individual and organisation operates including supporting structures, systems and processes, as well as regulating policy and legislations that needs to be adhered to. Capacity at this level is effectively developed when a synergistic approach to learning across all the systems' components is applied (PEPFAR 2012; USAID 2015).

2.3.6. Building farmer capacity

Building farmer capacity can be defined as both improving technical knowledge, skills and attitudes of individuals, organisations or communities (Photakoun 2010) and improving one's

ability to learn and adapt in an ever-changing environment in order to achieve objectives (Nettle *et al.* 2010). Building capacity of a farmer also takes into consideration facilitating and improving access to resources (financial, physical structures and systems) for development to take place (Lammert *et al.* 2015; Nettle *et al.* 2010).

Literature argues that improved knowledge, skills, systems and structures alone does not assure that an individual or group will acquire ability to learn and adapt to changes. As result, an element of ‘processes’ (opportunity) was added in the definition (Nettle *et al.* 2010). ‘Processes’ in the context of capacity building refers to the opportunity that people have to utilise acquired capabilities and freedom of commanding structures and systems in place (Lammert *et al.* 2015).

As a ‘purpose’, building farmer capacity is defined as an on-going process that can be seen as a ladder for the core purpose of ensuring information access, facilitation and empowerment, technological development and mentorship. In the context of sustainable agricultural development, capacity building is carried out by extension with which engagement/ participation of individuals, groups and communities becomes central to intervention to enable farmers to address and deal with their day-to-day problems and seize opportunities open to them (van Vuuren 2017).

From the various definitions of the concept of capacity above abstracted from literature, this paper synthesises the definition of ‘capacity’ and refers to it as a set of elements that enables human systems to function on their own and to develop resilience. Figure 2 shows the five elements (ladder steps) of capacity that need to be in place for human systems to function, survive and self-renew: knowledge, skills, opportunity, structures and systems.

This conceptualisation implies that knowledge and skills to perform a certain task do not equate to true capacity, rather it means that one has capability – potential capacity. Thus, one may be capable of doing something, but not have the capacity to it. In addition to acquiring knowledge and skills, it is therefore essential to have relevant structures and systems which will enable one to apply acquired knowledge and skills. However, the existence of structures and systems, does not automatically imply that knowledge and skills can be put to use. This

makes the element of ‘command opportunity’ equally significant. The element of command opportunity draws attention to the reality that the existence of structures and systems does not always guarantees permission or freedom to use them. Thus, in pursuing capacity building, it is essential to identify and address factors that prevent the farmer from having the opportunity to apply knowledge and skills to manage (command) or use the structures and systems.

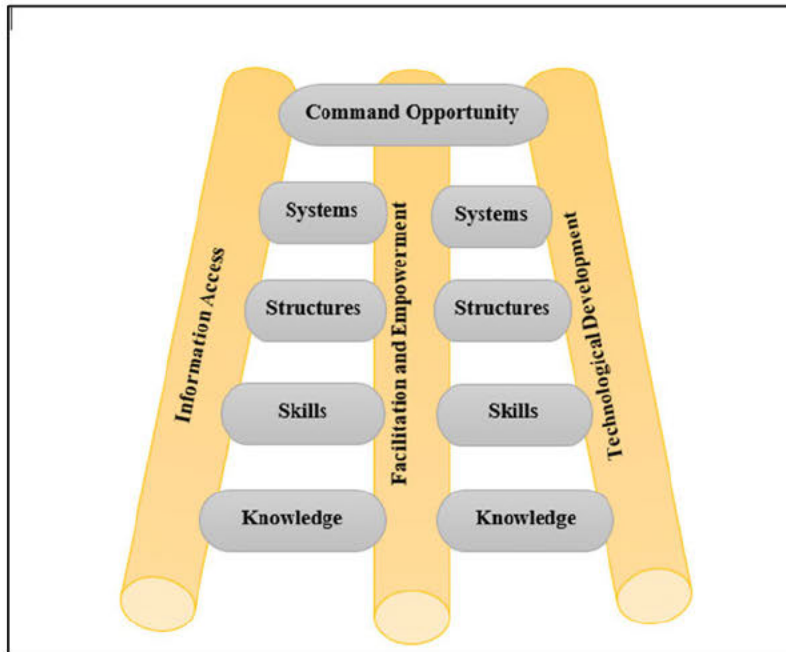


Figure 2: Farmer capacity building ladder
(Adapted from Coutts & Roberts 2003)

As depicted in Figure 2, for the capacity building process to work, it should be guided by three sub-processes: information access (left leg), facilitation and empowerment (central leg) and participatory technology development (right leg). Information access is critical so that farmers do not develop dependency from external stakeholders but can be self-reliant in directly accessing the information they need. The facilitation and empowerment leg is central in the sense that it ensures that the process is iterative – an essential key to sustained learning. Technological development reinforces the importance of engaging farmers in the process of developing new technologies suited for them for the purpose of learning and owning the outcome of the project (Coutts and Roberts 2003).

2.4. Role of agricultural extension in building farmer capacity

Literature depicts that the role of extension has expanded from solely transferring agricultural technologies to the farmer to building farmer capacity for self-directed learning and the ability to obtain access to information sources and various resources relevant to their farming systems. On the other hand, capacity building theory posits five elements that are key to building the capacity of an individual or group: knowledge, skills, systems structures and command opportunity. True capacity is built through strengthening these elements guided by three main processes: effecting information access, facilitation for empowerment, and participatory development of local technology. Capacity building is presented in the form of a ladder to demonstrate that it is an on-going and incremental process that one engages in, which implies that the further one climbs the ladder, the more capacity one acquires.

The role of extension in building farmer capacity is then to help farmers strengthen the five key elements of capacity through facilitating and coordinating the three main three processes of building capacity. In other words, the role of extension is to help the farmer climb the capacity ladder. This does not necessarily imply pulling or pushing farmers up the ladder but means strengthening farmers' capability and enabling opportunity for farmers to climb the ladder on their own and unaided. The key process to building capacity is 'facilitation for empowerment' as it encourages farmers to actively participate in their development and own the outcomes of their decision and actions.

Successful capacity building can then be measured using three fundamental outcome-indicators: strengthened capability; self-reliance; and resilience. Capability, as defined earlier, includes the farmer's knowledge and skills to perform a particular task. Self-reliance gauges farmer ability to perform set of activities successfully unaided or with the least external assistance; climbing the ladder without being pushed or pulled. Resilience measures sense of owning the development process and persistence - where resilience is defined by the farmer's courage and ability to cope and recover from setbacks or unfavourable results. Resilience in the capacity ladder denotes climbing the ladder again after falling or failing to climb.

2.5. Conclusion

There is a plethora of definitions of agricultural extension, and they are often divergent in views depending on the context and the organisation defining it. It is further understood that the role of agricultural extension varies from one organisation/ institution to another. Among the long list of tasks in which extension engages, building farmer capacity is pivotal as it is key to improving sustainability of any development projects/programme, and, more importantly, emerges as the primary and fundamental purpose of extension.

The definition of extension has evolved from being a system of extending research findings to people who are not able to access such information to a system of empowering and capacitating farmers to be equal partners in their development. In practice, extension in many developing countries does not seem to have shifted from the paradigm of extending scientific knowledge and technology adoption. It is surmised that this reluctance to change is due lack of understanding the theory and practice of building capacity which is key to achieving sustainable development.

Capacity building is a common concept in rural development which is described as the process of enhancing the capability of one and ensuring them the opportunity to utilize knowledge and skills. Capacity building as an approach posits that the process is on-going and is principled by continuous learning, adaptation, participation, and is locally driven. Capacity building exhibits five elements: structures, systems, knowledge, skills and opportunity to take command. Collectively these elements reflect true capacity which is characterised by a farmer' self-reliance in managing structures and systems relevant to their operation (local ownership), their resilience from vulnerabilities, and the ability of the farmer to continuously advance (which is an attribute of continuous learning).

There are three fundamental processes that build capacity: information access; facilitation for empowerment; and engagement in participatory technology development. The role of extension in building farmer capacity becomes one of facilitating these three processes – equipping a farmer to climb the ladder of capacity with minimal aid and with persistence. This is consistent with learning-based extension that identifies self-reliance, resilience, and continuous learning and advancement as fundamental indicators of true/successful capacity building. Focusing on the elements of building capacity in the framework suggested in this

paper and building them into extension programmes will significantly improve the sustainability of farmer development projects and programmes.

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Chapter 3: The Role of South African LandCare in Building Farmer Capacity to Manage Natural Resources

Abstract

Purpose: This paper explores the role of South African LandCare policy in building capacity of farmers to manage their environment and engage in sensible use of natural resources (NR) within their reach. The exploration is done in the context of the perception that LandCare in South Africa engages primarily in rescuing farmers that are experiencing environmental crises, in particular land deterioration, and does not deal with the fundamental causes of these crises.

Methodology: Literature was reviewed to clarify the concept of LandCare (from its origin) and explore the role LandCare could play in addressing the core cause of environmental crises and building capacity of the farmers to manage their environment.

Findings: LandCare was developed under the principles of community-based natural resource management (CBNRM) and sustainable development. This evinced two things: LandCare seeks to restore and rehabilitate degraded (NR); and to establish a balance between sustainable optimum production and sustainable use and management of NR. LandCare should empower local people to be self-reliant in managing their NR sustainably while achieving optimum and sustainable gains from their production. In achieving this goal LandCare suggests a framework that emphasises building synergistic partnerships among key actors (farmers, technical facilitators and local government) with the purpose of mutual learning and the aim of building capacity of farmers to manage their NR.

Practical implications: The LandCare framework and its aims highlight that the key to building farmer capacity lies in fostering equal partnerships between and among key actors for learning and support. Drawing on this, LandCare coordinators and facilitators would then direct their energies in promoting joint learning for the purpose of empowering local people (farmers) to make wise decisions about managing their natural resources.

Theoretical implication: LandCare falls into the family of development initiatives rather than operational action. Thus, as true development is not centred on providing relief and rescue but on empowering people to be self-reliant in dealing with issues that affects them, LandCare must also pursue the same aims and its success be measured in terms of how well it strengthens human capacity and social capital.

Value: Aligning LandCare within the framework of development theory-, aligns it also with theories of sustainable agriculture enabling them to work cohesively toward realising both effective natural resource management (NRM) and sustainable agricultural production in the greater context of building farmer capacity to make coherent decisions.

3.1. Introduction

There is generally great pressure for small-scale farmers to increase their production on their limited land size and resources in order to meet their livelihood outcomes. Much effort has been expended by various development organisations to help farmers develop and/or adopt technologies to improve production. However, less attention has been directed toward gauging and addressing side-effects of such practices on the environment. This creates a tug-of-war between increasing production and ensuring sustainability of NR. To achieve both simultaneously it requires a sound framework and integrative approaches.

The theoretical premise for this study is that small-scale farmer must have capacities in at least two fields to be self-reliant and sustainable as they work to improve their livelihoods: capacity to manage the farm enterprise; and capacity to manage the sustainability of the (natural) environment. Effectively, the greater the capacity to manage the farm's sustainability context results in greater sustainability and longevity of the farm enterprise thereby greater sustainability of the livelihoods (Worth 2014; Graef *et al.* 2015; van Noordwijk 2017; Paillet *et al.* 2015). The key to building these capacities lies in developing human and social capital which will result in enhanced skills, knowledge, attitude and behaviour on individuals and also create awareness amongst farmers (Robins 2008; Mitchell *et al.* 2014).

This paper explores the role the South African LandCare programme has in establishing equilibrium between increasing agricultural production and ensuring the sustainability of NR through building farmer capacity. It defines LandCare and explains the different levels of the programme. The paper provides an international and national perspective of how the concept of LandCare came about and describes approaches communities have used in NRM and LandCare programme (international and national). It presents and discusses the traditional conceptual framework for LandCare and a modified framework that, while retaining the principles of LandCare, focuses on the role of LandCare in building farmer capacity in managing NR.

3.2. What is LandCare

3.2.1. Defining LandCare

LandCare is a community-based approach to address problems related to managing and restoring NR, and improving sustainability of agricultural activities derived from those resources (LandCare New South Wales 2011). Similarly, LandCare Australia (2016) defines LandCare as a national network that is comprised of thousands of local community groups that are driven by the ethic of caring for the country's natural resources. Further, Mercado and Sanchez (2020) refer to LandCare as set of appropriate land management practices and ethics that describe the sensible utilisation of NR. This implies that LandCare can be view in two ways: as a development approach; and as a community-led movement. It is a development approach in that sense that it is used to address existing problems related to both poor condition of NR and low agricultural production levels. It is a movement because it is implemented and driven by the local people with the fundamental goal of raising awareness, influencing farm and management practices and meeting environmental objectives across the landscape (AFLRG 2010).

In Australia, LandCare embraces both cultural and social elements in promoting sustainable use of natural resources which includes caring for land and peer-reinforcement of good stewardship. In practice, LandCare can be defined as a programme that seeks to build balance between the values of environment and production to improve community benefits from

natural resources and to improve and maintain the state of the natural resources base and ecosystems (Youl *et al.* 2006).

Whether a theory or a practice, common to all these definitions is the objective of LandCare to establish a balance between the values of the environment and production to generate sustainable benefits to society while maintaining a good state of NR.

3.3.2 Levels of LandCare

National LandCare Programme (NLP) is commonly narrowly defined as government-led initiative that encourages partnership between government and community in alleviating and preventing land degradation. An NLP determines the approach of engagement, enables resource availability and provides policies, laws and legislation to guide the implementation of alleviating and preventing land degradation, and promoting sustainable management of natural resources (Cary & Webb 2000).

Community LandCare refers to the execution of the NLP strategic plan to tackle land degradation and sustainable management of natural resources. Community LandCare is comprised of the administrative structures and processes required to serve, support and direct the operation of a given community LandCare group and guides execution of the programme (Cary & Webb 2000).

LandCare movement refers to a group of people, not necessarily involved in a community LandCare programme, who are concerned about and acting on the issue of land degradation and sustainability of natural resources (Cary & Webb 2000; Garrity 2000). The LandCare movement and its actions are founded on the stewardship, volunteerism and actioning the philosophy of LandCare (LandCare New South Wales 2011). The movement is characterised by less cohesive collections of individuals, groups and organisations that subscribe to the broad LandCare ethics (Cary & Webb 2000), and which develop their own agendas and tackle issues related to sustainability of natural resources. The ownership and momentum of the individual programme rest with the community (Garrity 2000).

3.4 History and background of LandCare

3.4.1 International history of LandCare

Most literature claims that the concept of LandCare originated in Australia in 1986 and introduced into other countries thereafter (Catacutan *et al.* 2009; DAFF 2007; Youl *et al.* 2006; Toyne & Farley 2000). However, it appears similar interventions emerged independently in many other countries, such as Germany, around the same time (Prager & Vanclay 2010). Whether or not the concept originated in Australia, it is confirmed that Australia coined the term 'LandCare' (Prager & Vanclay 2010). It is also evident that the notion of caring for land and other natural resources commenced well before the creation of term 'LandCare' in Australia. The term LandCare emerged specifically when Joan Kirner, the then Minister of Conservation, Forests and Lands, developed a state-wide, holistic land protection programme to service locally based community groups which came to be known as LandCare. It was created by design to appeal to a wide range of people and to integrate the issues of agricultural production and land degradation (Campbell 1994; Youl *et al.* 2006).

The Australian ethos of LandCare emerges as of result of three environmental problems that affected most landscapes of Australia. The first was poor water source management, which resulted from long-term unsustainable extraction of water from the Murray-Darling system. This poor management of water was on-going and threaten to get to point where there was not sufficient water for agriculture, human consumption and maintenance of the ecological balance of the river (Murray-Darling Basin Commission 1999). Salinity of Basin rivers and essential wetlands was critical at the time and had threatened to affect more than two million hectares of land within 50 years if this poor management persist (Walker *et al.* 1999). In an attempt to rectify this, the New South Wales Government planned to reduce water entitlement to control the extraction of water until the water reached sustainable level. This plan has created conflicts between the Government and cotton farmers, who protested, claiming the plan would ruin their business (Prager & Vanclay 2010).

The second problem, occurring about the same time as the first, was rapid tree clearing in Queensland. This was brought into attention by Australian Conservation Trust which released figures showing that Australia ranked fifth among the worst land clearing nations in the world. To address this, the Queensland Government has passed legislation to control clearing

of trees and significant vegetation on the freehold land. The legislation compensated livestock farmers for not clearing indigenous vegetation to create grazing lands (Prager & Vanclay 2010). This legislation was premised on scientific research that found that such clearing of indigenous vegetation would result in rising water tables, scalding, soil infertility, salinity of river water and loss of biodiversity. Implementing this legislation created conflict between Farmers (especially grazers) and the Government (conservation) as legislation did not take into account most of the farmers' needs. Farmers challenged the legislation demanding their right to do as they please on their lands. To farmers, clearing trees and other native vegetation, increased the productivity of pastures (Prager & Vanclay 2010).

Third issue, landholders, particularly farmers, in Snowy River (Australia) were experiencing water shortage due to the diversion of the main rivers 50 years earlier by the Snowy Mountains Hydro-Electricity Scheme (SMHES). Landholders and political supporters launched a campaign to restore water to the river feeding their land. Environmentalists demanded that 28% of water should be returned by the SMHES to bring the river back to life. The Commonwealth and New South Wales Government disagreed due to the claimed impact of unsustainable water usage on irrigators further downriver. Returning 28% of the water to the river would be considered only if the farmers downstream agreed to sustainable use of water in their agricultural practices (Toyne & Farley 2000).

It was after these three major environmental issues that the Australian government realised the nature of the dispute over water use: The environmental problems increased the threat on the environment and long-term economic viability of the country. The three issues illustrated the disconnection between management and policy in responding to natural resource issues in Australia (Toyne & Farley 2000).

In 1986, Joan Kirner, the Minister for Conservation, Forests and Lands, took a particular interest in land degradation issues and instructed her department to establish a broad community programme to address land degradation issues. The instruction included the requirement that the programme should actively involve the community in both planning and implementation. The programme was registered in Victoria as 'LandCare' and received support from the Victorian Farmers' Federation. The LandCare programme was then

launched and ten community LandCare groups were formed by the end of 1986 (Campbell 1994; Cary & Webb 2000).

The initial phase of LandCare was funded by the National Soil Conservation Programme (NSCP) which had been established previously following the adoption of National Conservation Strategy in 1983. LandCare was successful in tackling major issues related to land degradation in number of communities in Victoria. However, budget constraints limited LandCare's functionality and scale of impact (Cary & Webb 2000).

In realising that land degradation was a national problem and that the funding was insufficient, the Australian Conservation Foundation (ACF) and National Farmers' Federation jointly development a proposal for the National Land Management Programme to seek funding expand LandCare groups on a larger scale. The proposal received political support, and in 1989, the Australian Government adopted LandCare at the national level; declaring the 1990s as 'The Decade of LandCare' (Cary & Webb 2000 and Commonwealth of Australia 2015). Building partnerships between the government and the communities to work toward addressing the environmental degradation remained the aim of LandCare.

The first half of the Decade of LandCare aimed at establishing and expanding coordinated community LandCare groups to address land degradation and facilitating peer reinforcement of good stewardship to landowners for integration of sustainable practices into the management of their land (Commonwealth of Australia 2015). The number of LandCare groups grew substantially as did the success in addressing targeted issues. The LandCare programme was one of the first Natural Resource Management (NRM) programmes which not only addressed conservation and production simultaneously but also devolved governance and management of resources to local communities. Dr Peter Ampt of the University of Sydney Faculty of Agriculture and Environment noted that Australia's LandCare was also one of the first environmental management programmes where activities were not dictated or influenced by government and politics (Commonwealth of Australia 2015).

In 1992, just two years into the "decade", due to the success of the programme in terms of expansion of groups and impact, the National LandCare Programme (NLP) was established replacing a range of existing programmes that did not have an integrative approach to NRM.

The NLP was funded through the Natural Resource Management (Financial Assistance) Act to consolidated previous funding programmes and build partnership agreements between the commonwealth, states and territories in alignment with the LandCare goals and priorities (Cary & Webb 2000; Commonwealth of Australia 2015). The main outcomes of the NLP were the conservation and enhancement of communities' natural resources to the extent that the ecological processes were maintained, and ensuring that today's practices do not compromise the quality of resources for future generations (Cary & Webb 2000).

Drawing on the successes of its LandCare programme, the Australian government launched networking initiatives internationally to promote LandCare approaches to sustainable landscapes. From these networking initiatives countries such as South Africa, the Philippines, New Zealand, Kenya, Uganda, the United States, Canada, Iceland, Great Britain, Fiji, Jamaica and Sri Lanka adopted the concepts and approaches of LandCare (Youl *et al.* 2006).

3.4.2 LandCare in South Africa

South Africa's LandCare programme was established in 1997. It was inspired and built on the Australian grass-root LandCare model (Aliber 2002). LandCare was adopted to combat issues arising from industrialised agriculture which promoted farming practices that led to damage such as soil erosion, overgrazing, wetland and watercourse destruction and bush encroachment (Ward 2 Forum Team 2016). This mismanagement of natural resources has been further traced to the lack of knowledge about and capacity of smallholder farmers to apply NRM practices and was compounded by inadequate information on the consequences of their land management practices and the spin off effect on other farmers utilizing the same resources (Mulder & Brent 2006; Ward 2 Forum Team 2016).

The LandCare programme was developed with an initial goal of optimising productivity and sustainability of natural resources with the aim of improving agriculture productivity, food security, and job creation in the broader goal of ensuring better quality of life for all (EDA, 1999). Ward 2 Forum Team (2016) adds that the goal of LandCare stresses the development and implementation of integrated NRM approaches which are efficient, sustainable, equitable and consistent with the principles of ecological sustainable development. The LandCare goals were derived from the vision which seeks to have a society that has adopted ecologically

sustainable approaches and manages natural resources and environment while improving livelihoods (Ward 2 Forum Team 2016). The programme is comprised of five main elements, the outcomes of which collectively would contribute to achieving the overall goal of LandCare: major conservation works; community and staff capacity building; awareness; policy and legislation; and research and monitoring. Among these, the first two elements involve direct interaction with low-income households and account for 60% of the total LandCare budget (Aliber 2002).

The National Department of Agriculture (NDA)² carries the overall responsibility for the programme with Provincial Departments of Agriculture (PDA) serving as programme co-ordinators. PDAs are responsible for executing and managing conservation works and community building directly or in collaboration with other relevant stakeholders (e.g. private sector consultants and NGOs) (Metcalf 2004). NGOs focus on providing technical expertise and offering community-level training. PDAs also encourage interest and action and promote building local ownership of the LandCare programme through increasing local participation in assessing local challenges, determining priorities and in undertaking specific actions roles (Aliber 2002). PDAs are also responsible for forming LandCare committees at regional level to promote interaction between NDA staff, large- and small-scale farmers and community leaders (Aliber 2002; Ward 2 Forum Team 2016).

3.5 Approaches to LandCare/NRM

3.5.1 Approaches to LandCare in Australia

Australian LandCare adopts a grass-roots approach that is commonly used in community development initiatives which puts the client in the centre of the development. In this way, interventions are developed based on issues that affect and take into consideration knowledge and ideas of local people (e.g. farmers). The success of this approach is conditioned on the

² Formally: the Department of Agriculture, Forestry and Fisheries

strong partnership and social capital between and among farmers, communities and the government (Mercado & Sanchez 2020).

LandCare uses a triadic approach driven by a convergence of farmers, local government and technical facilitators to facilitate rapid and cost-effective dissemination of information and adoption of NRM technologies. This approach is grounded in generating and sharing knowledge and locally-driven organisation and adaptation of sustainable and profitable agriculture that preserves and maintains NR (Mercado & Sanchez 2020) (See Figure 3: Triadic LandCare Framework (Catacutan & Mercado 2001).

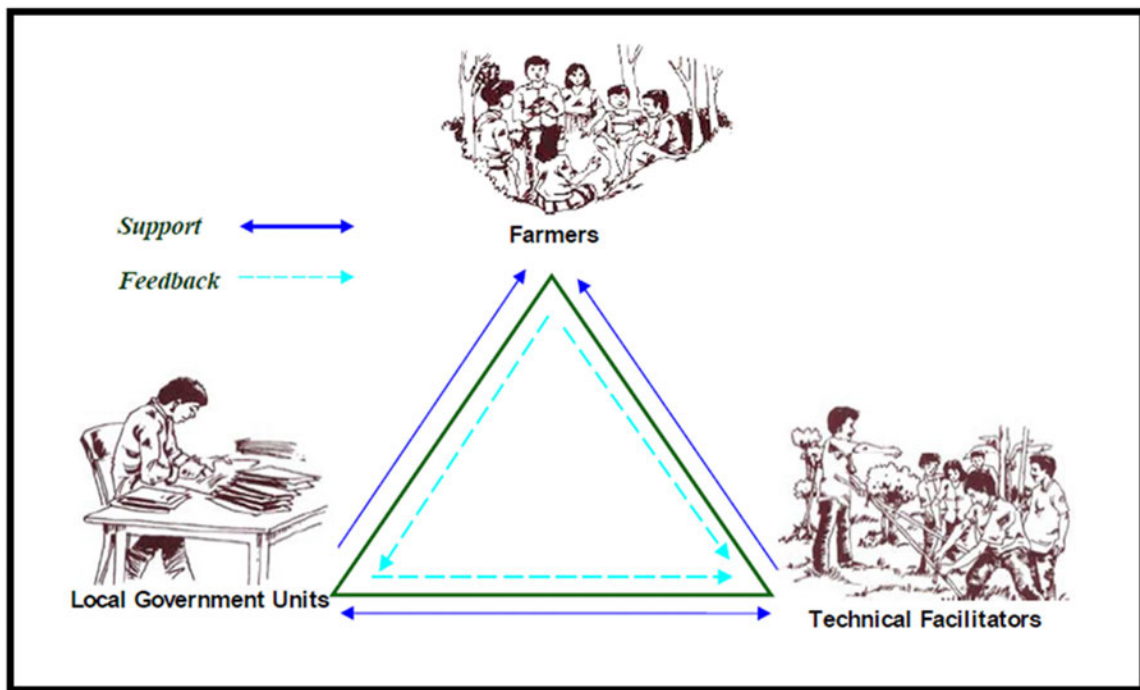


Figure 3: Triadic LandCare Framework (Catacutan & Mercado 2001)

The triadic approach comprises three interrelated and interdependent elements: appropriate placement technologies, community institution development; and partnership building.

Appropriate placement of technology refers to the dissemination, adoption and adaptation of new technology relevant to sustainable agriculture and conservation to and by the farmers. For areas like Australia's upland environments that are prone to environmental risks such as soil degradation, appropriate technologies for include those that can be easily adapted by resource-poor farmers to their biophysical and socio-economical contexts. If they are to be

adopted, technologies must also be culturally acceptable and compatible with farmers' sense of value for money. Further, technologies must be feasible; that they can be established and maintained with available resources and capacity (Franzel *et al.* 2002). Farmer education, cross-farm visits, farmer-to-farmer learning are used to ensure appropriate placement and use of technologies (Mercado & Sanchez 2020).

Building community capacity in LandCare is mainly for enhancing leadership and farmer participation in conservation farming and agroforestry dissemination and adoption. This is facilitated through forming community LandCare groups which constitute a vehicle for learning, information dissemination and scaling up conservation practices. This approach puts the farmers in the driver's seat of extension and learning according to their desired direction. LandCare groups are enabled to be self-governing, including officers who facilitate the learning process, which includes addressing and solving of issues relevant to conservation that affects the farmers. The LandCare officers also provide leadership in different LandCare activities which enable farmers to confidently plan and implement activities, and enhance leadership skills and participation in an effort towards sustainable agriculture and natural resource management (Mercado & Sanchez 2020).

This element enables LandCare to be decentralised to the level of the farmers and encourages farmer participation in discussions about farming issues affecting them and promoting partnerships to generate and share ideas and knowledge. Active participation of farmers in LandCare groups also promote enhancement of knowledge, awareness, skills and appreciation thus building human and social capital in the process (Mercado & Sanchez 2020).

Partnership building emerged after it was realised that LandCare actively involves technical facilitators and farmers in the planning and implementing phases and the local government as funders of the programme. Partnership building responded to fill a communication gap which developed between the farmers and local governments leading to failure in meeting LandCare outcomes. In particular, failure was perceived to be a result from local government not being aware of the grass-root problems. Partnership building pulls the local government into a synergistic learning partnership with technical facilitators and LandCare farmer groups. This partnership is referred to as 'triadic' – a 'triangle in balance' – in which success can be

achieved only when each party performs its role in balance with the other two. This triadic partnership has created systems for convergence of ideas, shared decision-making and mobilization of private and public resources to achieve the desired impact and create more benefit to the community (Mercado & Sanchez 2020).

2.5.2 Southern Africa

Long before colonisation, Natural Resource Management in Southern African was practiced by the Khoisan and Bantu. Laws were put in places to control access to and promote sustainable use of natural resources. The key focus was raising awareness about the significance of preserving environment, and shaping attitudes and behaviours regarding resource use and management for social rather than ecological purposes. The system “fostered a sense of identify and collective responsibility towards the natural environment”. This ‘traditional’ NRM system was sufficient and effective at the time since natural resources were mainly for subsistence (Thakadu 2014: np).

During the colonial era, colonists expropriated land, alienated residents from it and used natural resources on an extraction basis to make money. They also brought diseases that devastated wildlife and human populations as a result. In a relatively short space of time the landscape was permanently altered for the worse. Declining wildlife was perceived as caused by the indigenous population and initial ‘conservation’ laws sought to curb poaching as well as exploitive hunting by indigenous people and preserve it for European aristocracy. Laws ostensibly advanced conservation, but forced people of their land to make way for ‘protected areas’. While designated areas were protected and conservation outwardly achieved there, the areas onto which removed populations were relocated became rife with environmental degradation due to “compressing people onto land that [could] no longer support them” (DeGeorges & Reilly 2009: 745).

Effectively, the colonial approach to NRM approach was put in place to limit rural people from accessing/using natural resources, control the harvest of NR by foreigners, and preserve and protect endangered species, the environment and specific sites. It became the framework for conventional NRM which ostensibly involved some local participation but effectively

decisions were made by “experts” and power was held by centralised NRM agencies and staff (Thakadu 2014).

Eventually, however, the post-colonial governments realised that conventional NRM was failing to prevent drastic declines in faunal and floral resources. The new post-colonial thinking gave rise to Community-based Natural Resource Management (CBNRM). It was developed on the conviction that the goal of NRM could only be achieved through genuine joint effort between local people and the state, with firm commitment of local people (DeGeorges & Reilly 2009; Thakadu 2014; Roe *et al.* 2009)

The CBNRM approach was developed with the view of improving the sustainability of natural resources together with the community in a decentralised manner. Implementing CBNRM became a tool for returning resource control to local people, and promoting sustainable land use, biodiversity conservation, rural development and co-management between rural communities and state conservation agencies (Thakadu 2014; Roe *et al.* 2009). In CBNRM, local communities are managers of the natural resources. They participate in NRM through collective representative bodies which enable them to be decision-makers and beneficiaries of the intervention (Wasonga 2010). Due to shortfalls including limited resources, lack of platform for benefit sharing, and effective strategies to capacitate local people to manage natural resources, CBNRM has undergone various transformations to adapt from these shortfalls and remained relevant as an approach of addressing community-related NR crisis (Thakadu 2014).

Thus did the concept and practice of NRM evolve from being top-down to more participatory; encompassing and aligning with the evolution of sustainable development theory (Bocchino & Burroughs 2013). Additionally, it evolved from a centralised to a decentralised approach where those reliant on the NR were again key decision-makers in managing their natural resources.

3.5.3 South Africa

In the South African context, the theory or framework behind LandCare is taken from the Australian grass-roots model. As stated earlier, South African LandCare comprises five elements. Each element employs different methods and tools to achieve outcomes and goals.

The elements are: major conservation works; community and staff capacity building; awareness; policy and legislation; research and monitoring. These approaches are discrete in practice but are jointly implemented depending on the situation of the community or site.

Major conservation works targets communities and areas with degraded natural resources in critical need for rehabilitation. In most cases this element targets erosion of land and protection of water sources. The aim is not only rehabilitation or building structures to improve the state of the resource but it also aims to create short-term jobs for the local community. Public extension identifies areas with major concerns about sustainable resource use. Executing this element involves a number of stakeholders with different competencies: NPA, PDA, Regional and local LandCare groups, and Technology centres (e.g. Universities and NGO's). The NDA and PDA coordinate implementation while the other stakeholders provide technical, practical and other support (LandCare South Africa 1999).

Capacity building focuses on providing education and support to LandCare stakeholders to promote participation in resource management and management of LandCare activities and to empower local people to make sound decision about their NR. Stakeholders include communities, government, donors and institutions involved or participating in the implementation of the LandCare programme. Extension officers, resource conservation officers and other relevant NGOs in the field are responsible for building farmer capacity, including motivating the community, and designing and facilitating the LandCare educational programme. To achieve the aim of building farmer capacity, extension services and extension training facilities have been restructured to include primary-level conservation and production advisory services (LandCare South Africa 1999).

An integral part of building farmer capacity is training other stakeholders practically involved with LandCare programmes at the grass-root level. These stakeholders include LandCare coordinators, farmer support groups training and helping farmers organise their participation; NGOs and community-based organisations working with local government on community organisation and participation, and any other relevant local public, private and traditional institutions (LandCare South Africa 1999).

Awareness informs South Africans who are dependent on NR about the consequences of unsustainable use of natural resource in agriculture (LandCare South Africa 1999) and the impact that it has on the livelihoods of the farmers, and on social and economic spheres locally and nationally. Awareness specifically reaches out to farmers who are engaging with unsustainable land use practices and informs people about the policies and institutions supporting farmers, especially those who are already suffering from the consequences of poor use and management of resources for agriculture. This aspect of the programme is implemented by the NDA in collaboration with Department of Education and Department of Environmental Affairs and Tourism (LandCare South Africa 1999).

Policy and Legislation focuses on formulating policies to govern the overall LandCare that are relevant and responsive to current NR issues and dealing with incentives and disincentives on NRM. NDA in collaboration with Department of Land Affairs carries the responsibility of implementing this programme approach (LandCare South Africa 1999). The Envisaged activities include:

- Review of Act No. 43 of 1983 (Conservation of Agricultural Resources Act, Act No. 43 of 1983)
- Comparative review of international and national experience of incentives and disincentives of sustainable use of resources (fiscal and financial incentives)

Research and Evaluation entails prioritising research that focuses on developing and disseminating simple, cost-effective responses to natural resource degradation and agricultural challenges. Evaluation focuses on designing and implementing on-going monitoring and evaluation systems to monitor and assess the outcomes and impact of the LandCare programme; providing a basis for further planning and research align activities to outcomes and impact. Evaluation systems measure and evaluate the economic efficiency and the benefit of the LandCare programme (LandCare South Africa 1999).

3.6 LandCare Conceptual Model

The triadic LandCare framework (**Error! Reference source not found.**) mentioned earlier exists to facilitate a holistic approach that addresses complexities, diversities and risks associated with achieving simultaneously sustainable agricultural development and natural resources management. It suggests that the key to achieving sustainable agriculture development and NRM depends on the existence of a synergy partnership, represented by the support and feedback arrows, and the maturity of the social capital between farmers, local government units and technical facilitators (Catacutan & Mercado 2001; Mercado & Sanchez 2020).

This framework emphasises that making LandCare successful requires substantial investment in social capital – an attribute of convergence of interest and common goals among the key actors. Quality participation is another essential factor that significantly affects the success of LandCare because it accelerates building trust and commitment among key actors which in turns ease farmer group formation and sustainability (Catacutan & Mercado 2001).

LandCare puts facilitation as the central approach of the system to build farmers' social capital, thus improving their involvement and participation in the programme. Facilitation focuses mainly on empowering farmer groups and the institutions working with them in identifying and responding to changes that ultimately affect farmers' livelihoods. Facilitation is consistent with the fact that LandCare is a programme rather than a project with specified targets and timeframes. This makes it more concerned with process, outputs and outcomes. This reinforces creating a learning environment that enables all key actors to understand the why's and how's of the development process (Catacutan & Mercado 2001).

The one-way support arrows in **Error! Reference source not found.** depict that technical facilitators (TF) and Local Government Units (LGU) provide support to farmers. LGU provide political, policy and financial support to farmers. TF support farmers by transferring appropriate technologies and information to farmers, facilitating formation of LandCare groups, providing education, and brokering networking between farmers and other stakeholders. LGU also provide leadership support to TF in facilitating formation of LandCare groups and in developing and facilitating capacity building programmes. (Mercado

et al. 2014 Catacutan & Mercado 2001). The researcher did not find the type of support provided by TF to LGU in all literature reviewed.

The one-way feedback arrows illustrate the 'request' and 'feedback' relationship existing between the triad; they represent the flow of information on the basis of request. LGU and TF request information from the farmers about their situation. This forms the basis and context for developing programmes and providing of appropriate support. The diagram further shows that TF also receive information on request from LGU about assistance available to LandCare groups. Such requests help TF in planning and allocating appropriate support based on the needs of the farmers (Catacutan & Mercado 2001).

3.7 LandCare/NRM and farmer capacity

The LandCare triadic framework emphasises two actions: building support and feedback partnerships between key role-players and improving social capital as a modus enabling a learning environment. These form key outputs geared to building capacity particularly of the farmer to improve agricultural production while sustaining NR for future generations. This framework employs facilitation as an approach of establishing learning and support partnership between farmers and among all key role-players and facilitating group dynamics amongst farmers and other role-players for the purpose of building social capital-platform for continuous learning.

As discussed, **Error! Reference source not found.** illustrates the current triadic framework. Ostensibly, it is based on equal partnerships between farmers, technical facilitators and local government manifested by support and feedback processes. However, it is evident that the arrangement does not reflect synergistic partnerships between farmer and other role players. Viewed from the perspective collaborative learning theory and learning-based extension theory, the current triadic arrangement renders the farmers powerless and inferior in the learning process. The narrative describing the triad diagram and showing its practical implementation is not coherent. This analysis demands redesigning the triadic (practice) diagram to be coherent with the intended paradigm for the triadic LandCare framework. The proposed redesign is captured in **Error! Not a valid bookmark self-reference..**

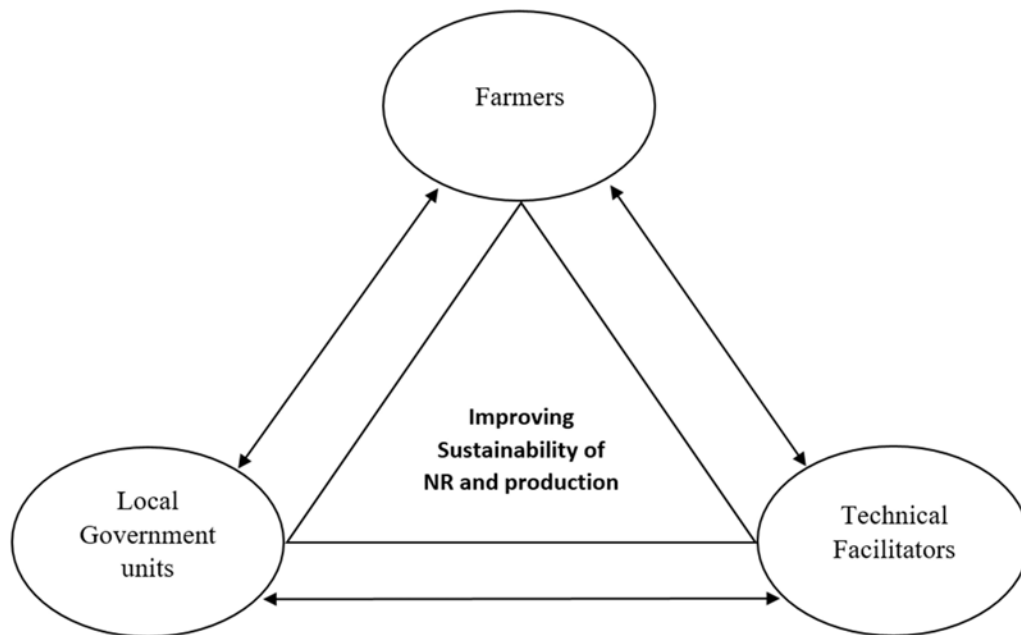


Figure 4: Redesign Triadic LandCare Framework

The redesign of the framework addresses two important aspects of LandCare triadic framework: The ‘relationship’ between the key actors; and the common ‘goal’ they want to achieve. The key actors in LandCare (farmers, Technical facilitators and Local government unit) remain unchanged. However, the dynamic is now depicted by a single set of two-way arrows signalling equality in the relationship. Information and support are collapsed as part of a holistic learning process pursued by all three actors to achieve a clearly articulated shared goal – concurrent improvement of the sustainability of NR and agricultural productivity. The journey toward achieving this goal is guided by LandCare’s principles: facilitation, quality participation, synergistic partnership between key actors, building human and social capital. This is similar to the four key instrumental interventions identified as needed to achieve coherence in the seemingly irreconcilable concurrent achievement of biodiversity conservation and food security: local knowledge facilitation; linkages; social capital; and education (Abdu-Raheem & Worth 2013).

3.8 Conclusion

From its origin, LandCare was built on the fundamental goal of improving agricultural production and sustainability of natural resource management. Caring for the land has long been a practice of human beings. It was superseded by short-sighted extraction economies which behaviours led to serious environmental degradation and as well as social injustice and economic inequality, particularly in colonized Africa. Initial efforts to ameliorate the impact of unsustainable land-use did not address the core issues. However, in Australia, after experiencing three major environmental crises which occurred as a result of failing to find the balance between improving agricultural production and management of natural resources, the modern concept of LandCare was born. It has taken different forms over years in terms of its scope of work, how it should be defined, and different approaches to it. However, it has not changed its fundamental values and principles: grassroots-driven sustainable community development and community-based natural resource management that fosters empowerment of local people through building capacity to manage their production enterprises and the sustainability context (environment and social capital) in which those enterprises operate. Australia's LandCare comprised three interdependent elements: placement of technology; community capacity building; and partnership building approach.

South Africa adopted the Australian concept of LandCare to combat issues resulting from decades of unsustainable agricultural practices. Like Australia, South Africa's LandCare policy uses the same LandCare framework including the principles and values to guide planning implementation of LandCare programmes: synergistic partnership among stakeholders/ key actors, building social capital, quality participation and facilitation. Policy reiterates that, when the principles are followed, LandCare programmes result in a locally owned intervention. While similar in description to Australian LandCare, South Africa's LandCare failed to entrench key elements of LandCare in practice. While acknowledging the three key stakeholders (farmers, government and technical expertise), the implementation design effectively disempowers the farmers in the decision-making process. This paper found that disempowerment was embedded in the way the triadic relationships were structured in practice. It was found that farmers are positioned in the triad not as equal partners, but as passive recipients of information and support – both designed based on feedback from farmers but designed in their absence and without their participation. This

study thus proposes a revised version of the partnership and introduces a simpler, more straightforward conception (**Error! Not a valid bookmark self-reference.**) which stresses ‘two-way’, collaborative learning in pursuit of the shared goal of concurrent improvement of sustainability of natural resources and of agricultural production. South African LandCare will be better able to build and strengthen the capacity of the key LandCare protagonists: farmers, technical facilitators and local government. The redesign is consistent with learning-based extension the aim of which is building capacity to manage farming operations in the context of social and environmental sustainability. This is significant, because, in South Africa extension is the primary vehicle for implementing LandCare. South Africa can ill afford a LandCare programme that does not genuinely develop the capacity of farmers to manage their own affairs, including their natural resources.

The refurbished LandCare model suggest that for farmers to be self-reliant and resilient in managing their production and NR they should be engaged in the planning, implementation, monitoring and evaluation of the LandCare programme offered to him. This could be done by losing the rigidity of the programme from being one-size-fits-all to being semi-structured in order to accommodate the complexities of farmers’ problems and offer them opportunity to participate in decision making about the assistance offered to him. In this way the protagonist will engage in collaboration learning and contributing joint effort toward achieving the desired and common goal.

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Chapter 4: Agricultural extension, LandCare and building farmer capacity: LandCare Capacity building Framework

4.1 Introduction

In South Africa, the sustainability of LandCare programmes is dependent on the effectiveness of agricultural extension services in building farmer capacity to be self-reliant in managing their natural resources (NR). This makes it imperative that extension officers understand the concepts of building capacity and natural resource management (NRM) if they are to make an effective contribution to improving the sustainability of impact of the LandCare programmes. Despite this imperative, South African LandCare is generally perceived to invest more effort on rehabilitating the degraded NR than on instilling in farmers NRM ethics and equipping them with relevant knowledge and skills, and facilitating the opportunity for farmers to manage their own NR sustainability. In brief, the LandCare programme focuses more on repairing the land than on building the capacity of farmers to manage their NR. It is suspected that this misaligned focus is a root-cause of the poor sustainability of the South African LandCare programmes.

Central to this discussion is an understanding that development interventions that involve human beings are subject to social dynamics which require a competent practitioner to address (Vanclay 2004). This applies equally to LandCare, highlighting extension's role in driving and implementing LandCare programmes. However, success does not lie merely with the presence of an extension practitioner; it also depends on the competency of the practitioner in facilitating social change in the context of prevailing social dynamics. Beilin and Andreatta (200: 51) cite Australia's experience as an example. Most of the extension practitioners and coordinators employed to drive LandCare programmes initially focussed on addressing technological aspects. They found that "many LandCare facilitators and coordinators did not have training in [soft skills] and were more comfortable with scientific technology transfer, which reflected their initial training". They argue that this approach effectively limits LandCare to remedial activities and limits its spread to other communities – both consequently limiting the sustainability of LandCare's impact. This is an on-going issue worldwide (Beilin & Andreatta 2001) and it is a big challenge in South Africa considering the

educational background of agricultural extension practitioners that reflects an absence of the so-called soft skills to deal with the human aspect of extension (Worth 2012).

Campbell (1994: 2) argued specifically that “LandCare blends elements of community and environmental education, action research and participatory planning to tackle a range of environmental and production issues in a tremendous diversity of bio-physical and administrative environments”. It can be further argued that it is not always a lack of competency to facilitate social change alone that hampers the sustainability of LandCare but the absence of adequate coordination and clear lines of command from authorities/funders is not conducive to creating conditions that will nurture social change (Beilin & Andreatta 2001). LandCare requires a collective and collaborative effort where actions from both public and private agents are driven by one common goal (Prager 2010).

Across countries that have established LandCare programmes, the fundamental outcome pursued is enhancing the capacity of the NR users, especially those in agriculture, to be self-reliant in managing and utilizing the NR in their care. Creating self-reliance, according to Ndlela and Worth (2019), lies in developing human capital. The LandCare programme must ensure that the participating farmers understand the fundamental outcomes and goal of the programme and must be upskilled to not only pass on the information but facilitate social change and build capacity of the succeeding generation of farmers to sustainably manage their NR (Nabben & Nduli 2005).

Ndlela and Worth (2019) identify six indicators to measure a self-reliant farmer: persistence; being accustomed to self-management; inclusive participation; drawing on own resources; being involved in decision-making; and taking responsibility for one’s actions. True self-reliance lies in the integration of these indicators. It is an iterative process with incremental progress which requires time, patience and persistence (Ndlela & Worth 2019). Applied to NRM and LandCare, this implies that the LandCare programme requires a model that relies less on technology transfer and more on participatory and learning based approaches to create self-reliance

This paper explores how to effectively build capacity of the farmers to be self-reliant in managing their NR sustainably through agricultural extension. It explores international

practice of LandCare and extension, South African Practice of LandCare and extension, and provides a framework for action to build NRM capacity through extension in partnership with South African LandCare.

4.2 Method

In addressing the key question of this study, the empirical method was used to explore insights about theory underpinning the LandCare programme and current LandCare practices in South Africa and Australia. The study used a secondary research method which according to Martins *et al.* (2018) is an analysis of data that has already been gathered and documented for the purpose of learning more about the specific topic. This paper reviewed and analysed published research articles, public LandCare documents and online documents for the purpose of learning about LandCare (South Africa and Australia) and the role of extension in LandCare in terms of building farmer capacity.

The selection of documents was informed by the research done in the previous theory papers which help the researcher develop and group themes to structure the discussion of this paper. The documents were reviewed by the researcher and were not open to coding. The discussion around LandCare conducted a comparison between LandCare implemented internationally and the in South African and was guided by 5 themes: origin, purpose, principles, implementation, and results and challenges. The discussion around the role of extension in LandCare is centred and guided by all the previous discussion on capacity in Chapter 1.

4.3 International practice on extension and LandCare/NRM

According to Johnson and Muller (2020), over 30 countries had formal if varied LandCare programmes with several other countries in the process of developing LandCare programmes. South Africa pioneered LandCare in Africa in 1997 and through this several more African countries established LandCare programmes, and the African LandCare Network was created (Global LandCare 2021). Catacutan *et al.* (2009:12) noted that the “maturity, scope and intensity of LandCare programmes vary” but share the fundamental LandCare principles:

- Community-based and led sustainable NRM

- Integrated sustainable NRM
- Simultaneous efforts to improve people's livelihoods and the natural resource base upon which they depend, in the wider context of social, economic, environmental and cultural sustainability

For the purpose of discussion, this paper uses the Australian experience with LandCare as the concept and fundamental principles originated from there.

4.3.1 Australian experience

4.3.1.1 Origin

In Australia, NRM did not begin with a formal LandCare programme but has existed in law in various forms since the late 1800s (Commonwealth of Australia 2015). The concept of LandCare came to existence in 1980 and gained impetus over years until it was formally introduced and used in 1989 in Australia. This concept was developed by the Minister of Conservation, Forestry and Lands, Joan Kirner, in seeking to create a state-wide and more holistic, sustainable and integrated programme to address environmental issues in local communities (Youl *et al.*, 2006; Commonwealth of Australia 2015). LandCare was developed by design to appeal to a wide range of people and to integrate the issues of agricultural production and land degradation (Campbell 1994; Youl *et al.* 2006).

NRM programmes prior to LandCare faced a number of challenges from its conception. More prominently was the gap between communities and development agencies caused by programmes being technically and technologically oriented and lacking social facilitation (Murray-Darling Basin Commission 1999). LandCare came into existence with an aim of bridging that gap using extension to facilitate synergistic partnerships between communities and funding agencies, and to refocus the programmes to address the true NR problems faced by communities (Millar 2011; Garrity 2000; Moore 2005; Cary & Webb 2000).

The LandCare programme was designed to adopt a grass-roots community-based natural resource management (CBNRM) approach that comprises three pillars: appropriate placement of technology; community and stakeholder capacity development; and building partnerships to work toward achieving the common goal among LandCare actors and

stakeholders. LandCare has three core spheres: the National LandCare Programme (NLP); Community LandCare; and the LandCare movement (Cary & Webb 2000; Garrity 2000).

4.3.1.2 Purpose

LandCare has three main purposes: individual and community empowerment; improving sustainable management of natural and productive landscapes; and building resilient ecosystems and communities (LandCare Australia 2021). The main purpose of Australian LandCare is to support farmers and fishers through encouraging the adoption of sustainable agricultural practices that seek to bring about balance between optimum productivity and sustainable management of NR (Australian Government 2020). The NLP aims to improve long-term productivity and to promote institutional partnerships and establish institutional structures and systems for developing and implementing policies and programmes to address environmental issues and encourage sustainable use of NR. Community LandCare aims to form community groups to foster self-reliance and build social capital and norms to promote adoption of sustainable agricultural practices (Cary and Webb 2000). Additionally, Australian LandCare is about building NRM partnerships between government, local communities and industries, and promoting change in the use and management of NR to benefit local and national economic, social health and sustainability of NR (Alexander 1995; Wensley 1994).

4.3.1.3 Principles

The Australian LandCare movement has four broad principles that serve as a foundation from which LandCare was developed and on which it is implemented:

Holistic and integrated: With an understanding that the NR crisis are interrelated in that one problem can lead to or influence another in some way, interventions to address these problems need to be viewed holistically and should be integrated in practice (Catacutan *et al.* 2009)

Local Participation: Degradation of NR (especially land degradation) affects multiple landscapes, downstream and upstream, and a vast number of landowners, land managers and local communities. This, then, necessitates the participation of local people in adopting

LandCare ethics and in implementing management practices that are more environmental sustainable (Catacutan *et al.* 2009).

Partnership: Partnerships between government, education institutions and non-government organisations is key in the implementation of LandCare as it facilitates integrating efforts toward addressing NR including enhancing knowledge and skills and providing technical and financial support. However, the government remains centrally responsible for improving sustainable management of NR and therefore play a crucial leading but non-dominant role in LandCare (Catacutan *et al.* 2009).

Inclusive: LandCare realises that degradation of NR affects people of different gender and age (men and women and children) differently whether directly or indirectly and recognises the critical contribution they can bring to the LandCare programme (Catacutan *et al.* 2009).

4.3.1.4 Implementation

According to Commonwealth of Australia (2015), the NLP was established in 1992 after the conception of the concept of LandCare. NLP came into existence to replace a number of government-led NRM and agricultural projects in response to diverse and complex concerns about poor integration of these earlier programmes. The Australian LandCare programme is implemented in two streams: national and regional (Commonwealth of Australia 2015).

National stream. The national stream focuses on long-term support and investment in the environment. One of the support priorities is protecting and retaining iconic and heritage areas such as the Great Barrier Reef off the Australian coast. The national stream also implements projects that are essential in managing and rehabilitating national biodiversity with emphasis on coastal rivers, endangered species, and specific ecosystems. Planting 20 million trees is another programme implemented in the national stream which seeks to encourage establishment of green corridors, in urban areas. The national stream also includes programmes that provide management of national crises such as outbreaks of pest infestations and diseases that affect the environment and agriculture productivity (Commonwealth of Australia 2015; Commonwealth of Australia 2017).

Regional stream. The regional stream consists of more than 45 regional NRM organisations (Commonwealth of Australia 2015) that are funded by the NLP under the state Department of the Environment and Energy and the Department of Agriculture and Water Resources to implement LandCare projects. Funding is allocated to each organisation based on size, population, assets and threats in the region (Commonwealth of Australia 2017). The State Department also is responsible for building and strengthening implementation partnerships and capacity among these LandCare actors to ensure that implementation is consistent with LandCare principles. Ultimately, the partnerships for LandCare implementation should yield environmental and sustainable agriculture outcomes and maximum community participation (Commonwealth of Australia 2015; Commonwealth of Australia 2017). The NRM organisations funded by LandCare with their delivery partners are expected to: (Commonwealth of Australia 2015)

- Plan, implement and monitor regional LandCare projects to achieve sustainable NRM and sustainable agriculture;
- Broker partnerships with stakeholders involved in implementing LandCare projects;
- Build NRM capacity amongst all key actors to ensure competency in delivering the project activities;
- Promote local participation and indigenous knowledge to empower local people to take ownership of local LandCare projects; and
- Raise awareness and share information about NRM priorities.

4.3.1.5 Results and challenges

The initial target for the Australian LandCare programme from its inception was to form 2000 LandCare groups by year 2000. LandCare over achieved their targets by obtaining over 5000 LandCare groups including people of all ages and culture and across geographical environment such as agriculture, indigenous, urban and coastal lands. The increase in LandCare groups over years has improved the state of natural resources and environment at large. The improvements included meeting the target of planting 20 millions of trees, re-vegetation of degraded lands, rehabilitation of eroded lands, improving and protecting water sources, protecting and retaining iconic and heritage areas, and building NRM capacity among people both in rural and urban lands. LandCare has also been successful in

implementing collective action in analysing and combating local socio-economic issues related to NR that goes beyond the capacity of individuals to address. This includes putting in place support structures and improving social cohesion in the communities that struggle to rebound from degraded natural assets (Australian Framework for LandCare Reference Group 2010).

Since LandCare originated in Australia in the 1980s, it has taken different forms in terms of its approaches and principles adapting to various challenges faced during implementing the programme. The current challenges that Australian LandCare currently faces are natural disasters (particularly drought and wild bush fires) and challenges arising from the Covid 19 Pandemic. These have brought devastation amongst NR users (especially farmers) including the death of many people, crippling the livelihoods of many households, and the death of livestock.

4.4 LandCare and extension: South African practice

4.4.1 South African LandCare and its origins

There are various perspectives on South African LandCare. DAFF (2017) and Mwangi and Muller (2013) define LandCare as a community-based initiative, while van Rhyn (2015) view LandCare from the country arial point of view by defining the concept as a national movement. On the other hand, Catacutan *et al.* (2015) view LandCare as a framework that provides guidelines for implementation by defining the concept as an approach rooted in the notion of caring for land. Musvoto *et al.* (2014) and Mnkeni & Mutengwa (2014) argue that LandCare is both a framework and community initiative by defining it as a community-based approach to integrated and sustainable NRM. As disparate as these may appear, these varying perspectives help shape the full vision of LandCare in South Africa.

South Africa's LandCare programme was established in 1997. It was inspired and built on the Australian grass-roots LandCare model. LandCare was adopted to combat issues that resulted from the adoption of industrialised agriculture that promoted farming practices that led to damage such as soil erosion, overgrazing, destruction of wetlands and watercourses, and bush

encroachment. This mismanagement of natural resources has been further traced to the lack of knowledge about and capacity of farmers to apply NRM practices. This was compounded by inadequate information on the consequences of their land management practices and the spin-off effect on other farmers utilizing the same resources (especially smallholders) (Toyne & Farley 2000).

4.4.2 Principles

South Africa (SA), like other countries that have adopted LandCare, has had a challenge finding the balance between optimum usages of NR and ensuring sustainable NRM. This has demanded a development approach that addresses social-ecological balance and promotes strengthening of institutional arrangements (Catacutan *et al.* 2015). Thus, LandCare in SA has been adopted as an approach that is centred in collective community-based development and action through application of innovative solutions to counteract issues related to NRM. Furthermore, LandCare in SA has been identified as being a bottom-up feedback approach implying that interventions are informed by the issues of the farmers/ NR users on the ground (Catacutan *et al.* 2015; Mwangi & Muller 2013). LandCare is guided by a number of key principles identified by various authors in the field: partnership; adaptability; integrated sustainable NRM; developing sustainable livelihoods; and capacity building.

4.4.2.1 Partnership

Partnership is one of the key principles of LandCare. It emphasises working together and synergy in all levels of the programme. It encourages partnerships at the national level between national public agencies and between public and private entities to foster collective action and joint visioning and use of resources toward ensuring sustainable management of natural resources (Termeera *et al.* 2018; DAFF 2019). Partnerships at this level also foster a blend of relevant policy processes with a bottom-up feedback mechanism (DAFF 2019). It encourages partnerships at regional and provincial levels which stresses equity and inclusiveness between and among NR users and local public and private sectors which are intended to support the grassroots approach. The grassroots approach is further intended to stimulate local partnerships to respond to and address locally relevant NR issues (Termeera *et al.* 2018). Another partnership which is key and core to the success of the LandCare

programme is among farmers/NR users. The trueness and synergy of this partnership is meant to strengthen the farmers/NR users' ability and willingness to take ownership of the process and outcomes of the programme on which the sustainability of the LandCare programmes ultimately depend (DAFF 2019). The key to achieving this kind of partnership amongst farmers is through employing a participatory approach that includes all users and is locally or community-led (Catacutan *et al.* 2015; Mwangi & Muller 2013).

4.4.2.2 Adaptability

Adaptability' is an element of resilience which, as noted earlier is a critical part of capacity building. While resilience refers to the ability to recover or bounce back from adversity or shocks (e.g. livelihood shocks), adaptability refers to the ability to adjust to the changing environment (e.g. livelihood stresses) (Nyamwanza 2012). In the context of LandCare programme, adaptability is key because it contributes to reducing vulnerability to NR degradation and the effects of climate change; building adaptive capacity amongst farmers so they will have greater command over factors putting pressure on their NR (Termeera *et al.* 2018).

4.4.2.3 Integrated sustainable NRM (ISNRM)

ISNRM demands that the LandCare policy and strategic framework adopts a holistic approach when identifying, analysing and addressing root causes of NR degradation (DAFF 2019; Catacutan *et al.* 2015; Mwangi & Muller 2013) to avoid the temptation to treat symptoms and rather focus on the root causes. ISNRM also implies shifting from destructive industrial farming systems to farming systems such as Conservation Agriculture that align with good NRM practice (DAFF 2019).

4.4.2.4 Developing sustainable livelihoods

Despite the fact that conceptually LandCare focuses on caring for land and the NR on it, it is crucial that the programme also focuses on the livelihood of the individuals, groups and communities that are dependent on these resources. This speaks to the fundamental challenge of NRM which is of finding a balance between optimum agricultural production and sustainable management of NR (Catacutan *et al.* 2015). Sustainable livelihood as an approach

reinforces putting the farmers/NR users first and in the centre of the development and empowering them to think about objectives, scope and priorities for their livelihoods to make them more sustainable, part of which is found in sustainable NRM (Serrat 2017; SWVR 2011). In LandCare this suggests a shift from a technology orientation toward a people-centred orientation that defines interventions in terms of people, their livelihoods and their management of NR as a part of their livelihoods.

4.4.2.5 Capacity Building

In South African LandCare, capacity building is defined as enhancing the skills, knowledge, attitudes and behaviour of stakeholders to promote joint participation in NRM, and empowering local people to make wise decisions about their NR and to own the outcomes of those decisions. This is executed by extension officers and LandCare officials by undertaking community motivation, and designing and facilitating education and training programmes. This capacity building is supported by LandCare officials pursuing training and ongoing learning about socio-economic dynamics that exist among resource users, and about approaches to combat farmer-specific unique NR challenges. (Catacutan *et al.* 2015; Mwangi & Muller 2013; Curtis *et al.* 2008).

4.4.3 Purpose of LandCare

Greenberg (2010) states that the goal and purpose of LandCare is to be derived from an understanding of the philosophy underpinning LandCare as a concept; 'Care for the land and the land will care for you'. DAFF (2017; 2015) and Greenberg (2010) describe the ultimate goal of South Africa's LandCare is to optimize the productivity and sustainability of NR. The broader purpose is to effect greater food security, job creation and a better quality of life (Greenberg 2010; DAFF 2015). Mustvoto *et al.* (2014) see LandCare with a scientific exercise to effect ecological sustainability which embraces the aim of restoring sustainable management of land and water (van Rhyn 2015). Notwithstanding the claim of optimizing productivity and NR sustainability, Greenberg (2010) views LandCare on the ground as being geared toward addressing technical problems associated with NR degradation.

4.4.4 Implementation

LandCare was developed to employ a systems-based problem definition approach which is cognizant that natural resource problems exist in interlinking systems, where each system affects and impact on the others. In practical terms this means that any decline in NR impacts the livelihoods of the NR users and, equally, the actions taken by the NR user directly impact the quality and quantity of NR (Mulder & Brent 2006). This has therefore focused the LandCare programme to link NR challenges with agricultural farming systems, food security, capacity building and poverty reduction.

Implementing the South African LandCare Programme comprised five elements: Major conservation works; Community and staff capacity building; Awareness; Policy and legislation; Research and monitoring. These approaches are discrete in practice but are jointly implemented depending on the situation of the community or site. Each element employs different methods and tools to achieve outcomes and goals (Mnkeni & Mutengwa 2014; DEFF 2020).

Potential LandCare projects are identified by the extension officers who work closely with smallholder farmers in each of South Africa's nine provinces. Extension officers are LandCare provincial-level coordinators or community representatives as they champion planning and implementing LandCare projects. Extension officers help farmers with degraded NR to apply for LandCare support by facilitating baseline studies, compiling technical reports, and drafting business plans which are required by LandCare. Undertaking a baseline study includes acquiring Conservation of Agriculture Resource Act (CARA) and National Water Act (NWA) permission, providing mapping and GIS services, and consulting with relevant stakeholders and communities to establish the status quo. These baseline studies also involve various government specialists including engineers, pasture scientists, social scientists and GIS services (Department of Environment, Fisheries and Forestry (DEFF 2020).

In terms of implementing major conservation works, extension officers appoint a project manager who takes the responsibility for developing the final management plan including the location of the work and the sequence of activities. In collaboration with the extension

officer, the project manager appoints a service provider through the government tender systems to undertake the implementation phase. The Extended Public Works Programme³ (EPWP) is engaged to facilitate hiring community members to work on the rehabilitation work.

4.4.5 Results and challenges

LandCare has been successful in that it has implemented programmes in all nine provinces. The programme's strength has been primarily rehabilitating degraded NR and creating employment opportunities championed by EPWP; raising awareness about the importance of LandCare; providing training to farmers that is relevant to management of NR; and getting a farmer to adopt environmentally-friendly agricultural practices. From 2014 to 2019, over 50% of the projects implemented were VeldCare, showing preference for or greater problems with NR among livestock farmers.

What is absent in the process is any real evidence of implementation being 'grassroots' as intended by policy. This is one of the dominant challenges in LandCare. The delivery model of LandCare (including the role of extension) has changed from being grassroots driven to policy driven. This suggests that the selection and implementation of LandCare programmes and projects are dominated by the government's priorities and less informed by grassroots community interests. This has ultimately hampered the sustainability of the impact of LandCare as this has lowered organic participation of the LandCare beneficiaries beyond the programme life (Johnson & Muller 2020: 23) which is essential if the impact (i.e. rehabilitation) is to be maintained.

Another challenge is that while EPWP has delivered exceptional services with regard to rehabilitating NR, its strong alignment with the LandCare programme tends to shift the focus from prioritizing the needs of the communities to creating opportunities for employment which generally does not go to the farmers. This in turn has created a false impression

³ Expanded Public Works Programme is a government programme that aims to provide poverty relief and income opportunity for poor households for short to medium-term

amongst communities that LandCare is a government employment programme (Johnson & Muller 2020).

These findings show that South African LandCare has been successful in meeting the short-term goals of the programme but they also show a disconnection between what they have achieved and the overall goal of LandCare which puts emphasis on sustainability rather than expediency. The disconnection is in part due to the way the projects have been implemented, a key aspect of which was to disregard key principles and approaches.

As a starting point, while the specific wording of LandCare policy aims and objectives may differ, the two programmes (Australia and South Africa) share the fundamental purpose of simultaneously improving sustainability of NRM and production from NR (especially agriculture).

However, South African LandCare focuses on agriculture and in particular smallholder farmers who are perceived as the ones mostly facing NR crises, while Australian LandCare embraces and tackles the whole range of issues that are relevant to environment including agriculture, heritage site, natural habitat, ecological systems and other biodiversity issues. Despite the very different scopes of the two programmes – South Africa being narrowly focussed on NR issues around smallholder agriculture and Australia dealing with a vast range of environmental issues – they, nonetheless, share key principles such as being grassroots, bottom up and participatory.

In terms of implementation, the South African LandCare relies on public extension to champion the whole process of delivering the LandCare programmes while Australian LandCare depends on a variety of organisations with relevant capacity to delivery LandCare programmes. In Australia it appears the government leads, while in South Africa, the government controls as it is essentially the only major actor in the programme. The broader approach – which in some ways reflects Korten’s (1990) “peoples’ movement –that Australian LandCare can cover far more affected people and issues than South Africa – the latter being severely constrained not only by its singular focus, but also by the limited number of public extensions officers with too many primary responsibilities available to service

LandCare. The results from study suggest further that in as much as extension is a capable and appropriate LandCare partner in South Africa, and capable of doing more, the workload and the dominant skill set of extension officers prohibit them from achieving the significant objectives of the programme which is improving sustainability of impact. Very much like the early days of Australian LandCare, South Africa's extension officers assigned to LandCare resort to the comfort zone of their primary training in agricultural production. As noted in the discussion, Australian LandCare has gone through a number of reforms based on the lessons learned from challenges through serious evaluations and commitment to learning. In South Africa, little reform has occurred. This suggests issues with evaluation such as poor evaluation systems and lack of commitment to learning and change, point to a need to review South African LandCare. While policy framework appears sound, it is the implementation framework and practice needing evaluation, especially in terms of building capacity, leading to a proper redesign that will ensure that LandCare achieves its intended goals. In addition to identifying lessons to be learned, the aim of such an investigation could be the beginning of a sustained process of planning, implementing, and reflecting with a commitment to implementing change as needed. It is proposed that the focus of such an investigation would be on building farmer capacity which is the key to sustaining the impact of LandCare.

4.5 Role of Extension and LandCare in Building farmer capacity

4.5.1 Role of extension in building capacity

While extension is known to play a number of roles in developing smallholder farmers, the essential outcome is enhanced resilience and self-reliance among farmers. This is best achieved through building capacity. The role of extension in building capacity, especially in South Africa, has revolved mostly around helping farmers improve and self-manage their agricultural enterprises – the goal being to increase yields and profit (Worth 2006). NRM had not been prioritized greatly in the day-to-day extension services and practices. NRM had been seen as belonging to the environmental scientist. However, a serious deterioration of NR among smallholder farmers forged the collaboration of a number of state departments and

NGOs on alleviating NR crisis in the agricultural sector and on finding the balance between production and NRM (Mwangi & Muller 2013).

Knowledge and skills alone define capability, they do not equate to capacity. Capacity building manifests in a combination of five key elements: knowledge; skills; structures; systems and the opportunity to command. Structures and systems refer to relevant environment and tools that the farmer has in place to exercise his capability (van Vuuren 2017). Command opportunity is the critical element that defines the extent to which the farmer has access, and the right to command structures and systems (Lammert *et al.*2015).

Extension builds capacity by engaging farmers in conversations to understand the status quo of the farmers' capacity and to plan and implement programmes to help farmers improve and strengthen the five key elements of capacity.

4.5.2 Building capacity in the context of LandCare

In South Africa, the relationship between extension and LandCare is a matter of policy. As has been discussed, extension has effectively been the vehicle for rehabilitating degraded NR. And yet, as also discussed, the true role of extension in any field is to build capacity of farmers, in essence, to make wise decisions. Among those decisions are decisions about using their NR. All the elements for achieving this are there. LandCare has built partnerships between government departments, NGOs and communities for collaborative action. But the action is not directed toward building capacity. LandCare does refer to building capacity and even defines its two main processes of learning and iterative consultation (Mwangi & Muller 2013). LandCare suggests that farmers can be regarded to have capacity to manage their NR when they are able through their own efforts identify the 'ideal' condition of their NR resource, assess the 'current' condition, and identify and implement actions to achieve or maintain the ideal (Abdallah *et al.*2018). What appears to be missing, in addition to the necessary change from expediency to capacity building, is a clear framework to guide the capacity building process. Developing such a framework has been the focus of this discussion and a proposed framework is set out in **Error! Reference source not found.**

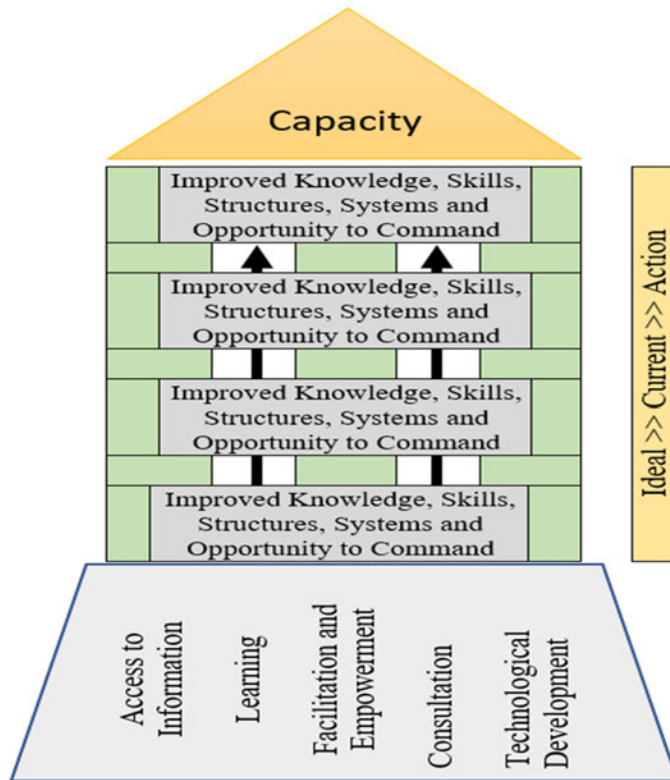


Figure 5: NRM Capacity building framework

In addition to providing a practical guide to designing and implementing NRM capacity building projects/programmes, the framework and its key features also provide a framework for evaluating existing LandCare projects in terms of its practices of building capacity.

The framework captures the five key elements of capacity building: knowledge, skills, structures, systems and opportunity to command – emphasising that all are required if capacity is to be built. The parallel arrows and the staggered boxes of capacity building elements reiterate that capacity building is iterative and on-going and is achieved through constant focus on advancing these elements; and not achieved through short-term rehabilitation projects.

The capacity building process is underpinned by the five fundamental processes critical to building capacity: access to information; learning; facilitation and empowerment; consultation; and participatory technological development. These processes help ensure that the farmers are able to persist with NRM post-project life and to continue building their

capacity. In the specific context of NRM, capacity is framed in the three linked “determining” capabilities: ideal, current and action. The evidence of NRM capacity having been built is when farmers can determine what is the ideal state of their NR, determine its current state, and determine (and implement) the actions required to restore or maintain their NR to its ideal state.

4.6 Conclusion

Despite the strategical differences between South African and Australian LandCare, they share common fundamental philosophical principles and ethics. They also share the ultimate two-fold aim of simultaneously ensuring the sustainability of NRM and the livelihoods of the people depending on NR. South African LandCare is championed and implemented through the public extension service with an understanding that extension is key in achieving the fundamental goal of building capacity of farmers to be self-reliant and to manage the sustainability of their NR. However, in practice LandCare does not focus on building farmer capacity. It focuses on rehabilitating NR. One aspect of this disconnect is the need for a capacity building framework to guide planning and implementation.

Building true capacity of farmers to successfully manage and solve NR degradation problems requires great investment in learning, where learning includes both improvements in technical capacity and the capacity for scientific enquiry. Learning is an integral element of capacity building as it ensures that farmers develop the capacity to engage in iterative learning and thereby continuously advance their capacity in the absence of external support. To achieve this, it will be essential to build all the elements of the proposed framework into LandCare and to ensure extension collectively applies them in practice. Following such a course of action will greatly improve the capacity of the farmers to manage their NR while attending to their livelihoods – thereby achieving the aims of the LandCare programme in such a way that they can be sustained.

One of the fundamental keys to the success of LandCare is ensuring that NRM and agricultural extension work symbiotically in both the policy and implementation level. This could be done through improving and tightening the integration of policies to effect the joint

development and implementation of programmes that will simultaneously address the issues (technical and capacity) around NRM and agricultural productivity/ related livelihood needs. This integration will in turn help extension officers think about the balance and not be tempted to treat agriculture development programme/projects as separate from NRM/LandCare.

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Chapter 5: Farmer Perceptions on the Role of Extension and SA LandCare in Building Natural Resource Management Capacity amongst Farmers

Abstract

Agriculture is an important element of the South African (SA) economy. However, increasing pressure to produce food has exacerbated pressure on natural resources (NR). The deteriorating state of NR is caused by multiple factors that vary from farm to farm. SA LandCare was established specifically to address this. However, LandCare programmes are perceived to focus primarily on relief and rehabilitation of NR rather than addressing the underlying fundamental complex causes. This study sought to explore the extent to which: LandCare attempts to mitigate core problems rather than symptoms; LandCare works to ensure long-term NR management (NRM) by farmers; and extension is contextualised in building farmer capacity to manage NR. This study also sought to provide a detailed analysis of the research problem and recommendations on the positioning of extension in the LandCare programme to improve the sustainability of NRM while maintaining its goal of improving household food security.

Primary research comprised semi-structured interviews with 45 key informants selected using purposive sampling and participant-observation. Key informants included 20 farmers, 20 provincial extension workers and five LandCare officials in the National Department of Agriculture.

The study has three findings: first, while the rehabilitation work is successfully achieved, there is a segment between LandCare policies and practices in terms capacity building which reduces the sustainability of LandCare projects. Second, the farmers have limited opportunity to command structures and systems and freedom to actively participate in all the processes of the development, putting the farmers in the receiving end of the programme. Lastly, the role of extension in LandCare undermines the significance of local knowledge and experiences and the fact that true capacity is built starting with what farmers know and have.

5.1 Background and introduction

LandCare sustainability, internationally and, specifically in South Africa, is dependent on the effectiveness of agricultural extension in implementing LandCare projects and programmes. Key to improving sustainability of LandCare programmes is appropriate capacity building amongst farmers and other key role-players in the mix. South African LandCare is perceived to be more oriented toward providing relief and imparting technical knowledge and skills to farmers that are experiencing NR crises. These farmer/rural level NR crises are complex in that the root cause is embedded within the socio-economic aspect of their livelihoods, and this requires an appropriate approach to addressing it.

LandCare has been successful in achieving some of its policy objectives such as rehabilitation of degraded NR, upskilling participating farmers with technical skills, raising awareness and creating employment amongst rural people in surrounding rural communities. However, pivotal to any development, which remains a key question of this study, is the extent to which the development programmes build sustainability, self-reliance and resilience. Vital to achieving these is prioritizing capacity building of farmers and all stakeholders involved, where learning and farmers are the focus of the development. This paper then explores the role of extension and LandCare in building farmer capacity for sustainable NRM.

In addressing the key questions of this study, an investigation was conducted amongst participating farmers, extension officers, and officials involved in policy-making and development to determine their respective perceptions about the role of LandCare and extension in building farmer capacity. This paper presents the finding from farmers' perception.

5.2 Theoretical framework

This study embraces two theories; learning-based agricultural extension and capacity building. These frameworks were adopted to clarify the research problem and to give structure for designing the research project and guiding data collection, analysis and interpretation.

5.2.1 Agricultural Extension

Literature suggests that agricultural extension is a relative term and that there is no universally accepted definition or approaches for the concept. Definitions vary from one institution to another. Similarly, the various extension approaches are appropriate only when applied in their respective relevant situations (World Bank 2012; Rezaei-Moghaddam & Karami 2008). Furthermore, extension has evolved in theory and practice from being oriented toward extending tertiary scientific knowledge to out of school people with no access to knowledge sources (Chauhan 2007) to embracing learning as an approach and also as a theory of improving self-reliance and resilience of people thereby improving sustainability of rural development projects/programmes (Terblanché 2008).

Given the numerous roles that extension plays in rural development and agriculture, it is essential to understand that what is implemented by extension workers on the ground is mostly informed by the policies of a specific institution rendering extension services. This implies that the role of extension in South Africa, in both the public and private sectors, varies depending on the policies informing planning and implementation. However, the growing consensus emphasises that extension should be more oriented toward helping farmers help themselves (Terblanché 2008). This prioritises careful selection of approaches to adopt when working with farmers' complex and diverse agricultural and livelihood scenarios. Helping farmers help themselves can be achieved realistically only through building farmer capacity where learning and effecting behavioural change are core and fundamental in framing the role that extension adopts (Boon 2009).

Learning-based extension is consistent with how 'helping the farmer help themselves' can be achieved. It posits that the role of extension is concerned primarily with building capacity of the farmers, researchers and extension workers in working towards facilitating the desired change in the context of farmers' current position and future aspirations. Learning-based extension does not dismiss other approaches to extension, nor does it disqualify any extension role; rather it embraces them all. It suggests that extension should be about building capacity for self-directed learning and empowering farmers to be equal partners in development. Learning-based extension further emphasises that, fundamental to helping farmers help

themselves, extension should place three things in the centre of development: farmer learning, appropriate placement of technology; and the farmers themselves (Worth 2006).

5.2.2 Capacity building

Capacity building is a popular term in rural development as an initiative and approach to improve the livelihoods of poor people in rural areas. Capacity building is applicable not only in rural development but more generally, it also implies providing education and training beyond schooling to enable people to partake in specific activities unaided (Rola-Rubzen & Gubunanda 2003). Before understanding capacity building as a concept and an approach, it is essential to grasp the meaning of the term capacity

5.2.2.1 Capacity

Generally capacity is equated to capability. However, they do differ in definition. Capability is defined as one's ability to perform a certain task which is characterised as possessing knowledge and skills (Van Vuuren 2017). In rural development, capability is not a synonym for capacity, but it is an element of capacity. Capacity is then defined as one's ability, aptitude or competency to perform a particular task successfully and sustain the achievement over time. Capacity comprises of attributes, assets, capabilities and relationships that enable one to be self-reliant in performing a task with resilience in the face of change (Walters 2007). Alba and Lavergne (2003) state succinctly that capacity is comprised of capabilities (knowledge, skills and competency); structures (effecting institutions and organisations) and systems (policies and rules governing and guiding the development process). In the context of farmer development, it then can be concluded that capacity 'as term' refers to one's ability to perform a certain task successfully within the provided resources and enabling systems in place. Additionally, true capacity is characterised by being less dependent on external support; resilient in the face of change and persistence in sense that development is sustained after the aid is withdrawn.

5.2.2.2 Capacity building as a concept

The United Nations Economic Commission for Africa (UNECA) (2014: 5) defines capacity building as: "the process through which individuals, groups and organisations, and societies

deploy, adapt, strengthen, and maintain the capabilities to define, plan and achieve their own development objectives on an inclusive, participatory, and sustainable basis” Similarly, Stavros (1998) defines capacity building as a ‘process’ of strengthening people and their organisations to be able to effectively serve its people and consider the impact on all stakeholders. Babu and Sengupta (2006) echo these definitions but add that capacity building should be centric to any development agenda and should be focused on affecting the farmers’ opportunity to take ownership of change initiatives and embrace local capacity.

5.2.2.3 Capacity building as an approach

Capacity building as an approach is defined as an on-going process or journey (Bolger 2000); not an outcome or output of a project (Pack 2018). A capacity building approach (CBA) obliges the development intervention to go beyond the project world, that focuses on delivering output within a timeframe, to realising and focusing on how the projects outputs impact on sustainability (Eade 2010) at the three levels within which the intervention operates: individually, organisational and systems level (Bester 2015). CBA is ‘continuous’ as it focuses the development intervention to constantly cultivate capabilities of people involved to enhance their problem-solving abilities related to their livelihoods, health and their NR. The World Bank suggests that CBA is an on-going ‘learning’ process driven by local people, facilitated and supported by change agents, which seeks to promote local ownership and achieve local aspirations. CBA also emphasises a synergistic learning partnership between local people and agents of change as this forms a strategic effort toward effecting economic and social change (Otoo *et al.* 2009).

CBA does not provide a fixed procedure of building capacity; rather it provides a framework built on five principles that guide the design, implementation and evaluation of capacity development interventions (Bolger 2000):

- Inclusive participation and local ownership;
- Learning and synergistic partnership between key stakeholders;
- Embracing local capacities;
- Continuous learning and adaptation; and
- Focusing on sustainable development.

5.2.3 Building capacity of farmers

Building capacity of farmers embraces CB as a concept and as an approach. It is as an on-going process which can be seen as a ladder (van Vuuren 2017) of improving technical knowledge, skills and attitude of individuals, organisations or communities (Photakoun 2010). Building farmer capacity prioritises improving the farmers' ability to learn continuously and be resilient, in an ever-changing environment in order to achieve their objectives (Nettle *et al.*2010). This can be achieved through improving farmers' access to structures and systems necessary for development to take place and effecting farmers' opportunity to command the structures and systems in place (Lammert *et al.*2015; Nettle *et al.*2010).

From the various definitions of the concept of capacity above abstracted from literature, this paper synthesises the definition of 'capacity' and refers to it as a set of elements that makes human systems function and be resilient. Capacity building comprised 5 elements: knowledge, skills, opportunity, structures and systems. For capacity building to work, it should be guided by three sub-processes: effecting access to information sources; facilitation and empowerment; and engaging in participatory technological development and mentorship (van Vuuren 2017). Information access is critical so that farmers do not develop dependency from external stakeholders but can be self-reliant in directly accessing the information they need. Facilitation and empowerment are central as they ensure that the process is iterative – an essential key to sustained learning. Technological development reinforces the importance of engaging farmers in the process of developing new technologies suited for them for purpose of learning and owning the outcome (Coutts & Roberts 2003).

5.3 Methods

This study employed a secondary research method using a desktop review to understand the themes that surfaced and to articulate the gap this study is attempting to fill. This research created the framework for the ensuing primary research.

Primary research comprised semi-structured interviews with 45 key informants selected using purposive sampling, and participant-observation. Key informants included 20 farmers, 20 provincial extension workers and five LandCare officials in the National Department of Agriculture (NDA). These three groups of informants were selected deliberately as they could provide more accurate information to fulfil the study objectives and help answer the underlying research question (Etikan & Bala 2017).

The researcher approached the NDA LandCare office and requested 5 key informants to participate in the research study. These key informants identified another informant at the KZN provincial Department of Agriculture who, in turn, identified 20 extension workers and provided a list of farmers involved in the implementation of LandCare projects. Twenty (20) farmers were selected using snowball sampling where referrals were given by extension workers and farmers themselves; the selection was based on their willingness to participate in the study (Taherdoost 2016).

This study used NVIVO software programme to analyse the data. Data was analysed through thematic analysis which, according to McNiff (2016), helps the researcher makes sense of the data gathered from respondents by identifying main points and themes for discussion, determining differences and similarities between responses and integrating themes and responses into a research report.

5.4 Findings

The 20 farmer respondents shared their detailed views about how the South African LandCare, and extension has impacted on their capacity to manage their NR unaided. The results are unpacked using the capacity building framework adapted from Coutts and Roberts (2003). This framework suggests that capacity to sustainably manage NR is built in three main areas: capacity to identify the ideal state of the NR; capacity to measure the current state of NR; and capacity to identify and implement the action needed to improve the condition of the NR. The framework further suggests that within the three areas of capacity, the farmer needs to have five things in place for capacity to be built or strengthened: structures; systems; knowledge; skills and opportunity to take command.

Table 2 shows that there is fair age distribution between respondents selected for this particular study. The majority of respondents were female with 60%. The most common qualification was secondary schooling (85%), with 1% having tertiary qualification. 50% of respondents were land reform beneficiaries with more 14 hectares (ha) of land and other respondents resided and farmed in communal land. Most respondents had various sources of income to sustain their livelihoods, while only 2% depended solely on farming as a source of income. Some 50% were farming both for sale and consumption, 20% farming mainly for selling and 60% farming both livestock and crops. It can then be contended that the characteristics of respondents' diversity suggests a variety of views regarding LandCare but all of which would be credible.

Table 2: Demographics and background of respondents (n=20)

Age (Years)	>50 6 (30%)	36-49 7 (35%)	18-35 7 (35%)	
Gender	Female 12 (60%)	Male 8 (40%)		
Level of Education	Tertiary 1 (5%)	Secondary 17 (85%)	Primary 2 (10%)	None 0
Land Size (Hectares)	>30 8 (40%)	15-29 2 (10%)	1-14 9 (45%)	Not sure 1 (5%)
Race	African 100%			
Source of Income	Farming 2 (10%)	Farming and social grant or off-farm employment 14 (70%)	Social grant or off-farm employment 4 (20%)	
Production Framework	Sales 4 (20%)	Sale and consumption 10 (50%)	consumption 6 (30%)	None 0
Type of produce	Small and large stock 7 (35%)	Vegetables and field crops 1 (5%)	Mix 12 (60%)	

5.4.1 Understanding of LandCare programme

Farmers were engaged through individual semi-structured interviews to gauge their understanding about LandCare in terms of its components: soils, water and vegetation. This was conducted to understand how each component addresses both capacity building and technological development.

5.4.1.1 Soils

In terms of the ‘major community works’, most farmers described LandCare as being focused on rehabilitating degraded arable land with a focus on farmers specialising in crops and vegetables. Some farmers described LandCare as being based on both rehabilitating degraded lands and installing erosion prevention measures. Rehabilitation was described as fixing of dongas and re-fertilizing crop lands that have lost nutrients through erosion. With regard to ‘capacity building’, most farmers perceived LandCare as focusing on creating awareness about erosion and providing training about how to control and prevent erosion. Some farmers identified awareness as being aimed at making them to understand the activities and practices that lead to degradation of soils e.g. dongas and topsoil erosion. Training offered to farmers is to capacitate them with farming practices that will prevent erosion occurrence, e.g., no till planting, building contour banks and planting vetiver grasses in sloping arable lands.

5.4.1.2 Water

In the ‘works’, most farmers have never heard or seen any water related LandCare projects and, therefore, have no knowledge about it. Some farmers indicated that water related projects focus on removal of alien species along water sources (rivers and dams). Others stated water related projects address problems such as silting, chemical and physical pollution and how to improve quality and quantity of water. A very few farmers perceived water related projects as focusing mainly on assisting farmers to have access to sources for livestock and irrigation. Most farmers identified raising awareness as the main way of ‘building capacity’ of farmers to sustainably use and better manage water resources. Awareness is built around issues of chemical and physical pollution, and infestation of alien species around water sources, their causes and how they can be prevented. Some farmers indicated that key farmers are trained on how to remove alien species and the key farmers train other farmers. One farmer stated that during awareness sessions they are made aware of water acts and legislations that they need to adhere in using water sources. None of the farmers interviewed in this research have seen any water related LandCare projects but were made aware of the information by a LandCare official.

5.4.1.3 Vegetation

Most respondents that participated in this study were involved in livestock farming which made them comfortable in responding to questions as they easily relate. Relevant to ‘major community works’ most farmers described LandCare as dealing mostly with rehabilitation of grazing land through controlling bush encroachment and removal of alien species. This rehabilitation is done to improve the quality and quantity of vegetation available for livestock grazing. For ‘building capacity’ of farmer to sustainably use and manage vegetation, LandCare does two things; raise awareness and provide training to farmers. The awareness programme focusses on the issues related to conservation and protection of vegetation as food for livestock such as causes and preventative measures for bush encroachment and alien plant infestation. Farmers attested that training is done to equip farmers with capabilities to identify relevant problems and their causes (e.g., bush encroachment and alien invasion), burning fire breaks, managing livestock grazing, removal of alien species (manual and mechanical), first aid and application of chemicals.

5.4.1.4 Integration

Collectively farmers understand LandCare to be about taking care of the environment and ensuring the viability and sustainability of farming business such as livestock and crop production. LandCare also provides training to farmers on some aspects of rehabilitating NR and on LandCare practices to adopt methods to minimise degradation of natural resources. The main objective of LandCare, according to farmers, is to build awareness around practices resulting in erosion, to implement rehabilitation projects and to provide training on prevention of NR degradation.

5.4.2 Capacity area: Ideal state of natural resource

The ideal state of natural resource, in the context of this paper refers to the farmer’s ability to determine the norm condition of the NR.

5.4.2.1 Structures and systems

Most of the farmers identified the provincial government extension officers as the main structure that assists farmers in determining the ideal state of the resource of particular concern. Extension officers play a role of raising awareness through presentations to farmers

mainly through teaching them about how to identify a degraded resource. Some farmers indicated that the awareness programme offers the opportunity for farmers to share their local knowledge of what a good and bad state of NR are.

Some farmers identified the district Department of Agriculture and Department of Environmental Affairs as relevant structures. These structures provide extension officers and environmental specialists to help train farmers in determining the ideal state of their NR.

Some farmers identified themselves and their local farmers association as essential structures in learning and sharing knowledge about how to determine the ideal state of the NR.

5.4.2.2 Knowledge and skills

Some farmers attested that they obtain knowledge about determining the ideal state of a NR during the awareness programmes that are conducted by extension officers at the beginning of the programme. This programme focuses on imparting the knowledge about the characteristics of degraded NR and partially on developing the skill of identifying them in a NR of concern. Some farmers revealed that, in their areas, the extension officer engages them in sharing their local understanding and ability to identify different states of NR of concern. Most farmers stated that no particular knowledge and skills about determining the ideal state of a NR are imparted to them in the LandCare programme; they mostly rely on their own local knowledge and experience.

5.4.2.2 Command opportunity

The farmers who received knowledge and training in determining the ideal state of NR, have confirmed they have freedom to use their knowledge and skills. However, they decide not to use them because they have an understanding that the extension officers will do everything on their behalf. With regard to farmers who have not received the awareness programme about this, they are not even certain if they have freedom to exercise their local understanding and experiences in the process of the programme.

5.4.3 Capacity area: Identifying current state of resources

Identifying the current state of the NR, in the context of this paper refers to the capacity to follow a certain procedural steps in assessing the current condition of one's own NR unaided or with minimum assistance.

5.4.3.1 Structures and systems

The Provincial Department of Agriculture, together with its District offices, was identified by most farmers to be the dominant structure that has introduced the LandCare programme to farmers and has also been providing them with extension services. The function of extension in the LandCare programme has been to form farmer groups for learning, to mobilise relevant stakeholders to help farmers learn about assessing NR of concern, and to provide training in the form of demonstrations relevant to understanding the process of NR Assessment. Some farmers indicated that extension officers are solely involved in conducting NR resource assessment on farmers' behalf providing understanding of the process and the outcome of it. Other farmers indicated that extension officers play the role of coordinating LandCare projects activities and allow scientists and specialists from the Department of Environmental Affairs to conduct the assessment and facilitate farmer learning.

5.4.3.2 Knowledge and skills

In terms of knowledge, most farmers affirmed to have received some knowledge about why the NR assessment is conducted, how the process is carried out (including the tools used) and how to interpret the results. Some farmers revealed to have been presented with the results from the assessment, not knowing how it was done. Other farmers did not receive any formal knowledge about the procedure, tools or interpreting assessment results and have described the process to exclude them from partaking in activities that will enable them to learn and be self-reliant in identifying the current state of their NR.

Regarding skills, most farmers are not engaged or given opportunity to actively participate in the process of conducting NR assessment. These farmers also have not been given skills on how to use the necessary tools to do the assessment and follow the correct procedure. A minority of farmers asserted that they have participated actively and have acquired

knowledge and skills to do the assessment, particularly of veld. All farmers have confirmed not to have been engaged about their indigenous knowledge of assessing mostly their soils and veld, and therefore presumed that structures (role-players) in place do everything on their behalf.

5.4.3.3 Command opportunity

The majority of farmers indicated they have limited opportunity to exercise their local abilities on their own farms within the programme. This happens because the extension officer, soil scientist and environmental specialist take charge of the whole process of assessing the current state of NR and communicating the results to the affected farmers. Some farmers felt that they have freedom to apply whatever capability they have on their farm. However, they also felt that they have been deprived of capacity and resources to conduct these assessments on their own.

5.4.4 Capacity area: Identifying action to improve the resource condition

In the context of this paper, the capacity to identify what actions to take to improve the NR comprises the capacity to interpret data against a norm (ideal) and plan appropriate action.

5.4.4.1 Structures and systems

The majority of the farmers identified the District Department of Agriculture as the main structure. This structure is responsible for providing services such as Extension, the Expanded Public Works Programme (EPWP), LandCare financial support, raising awareness and providing production specialists. Extension plays the role of coordinating all the activities and services rendered to farmers by external stakeholders. Extension is also responsible for training farmers on the effective agricultural practices that embrace environmental legislation. EPWP takes the responsibility of creating and facilitating employment of community members in the LandCare NR rehabilitation programme. LandCare provides funding for executing LandCare projects and also engages in raising awareness about the importance of managing NR sustainably. Some farmers identified the Department of Environmental Affairs (DEA) as a structure providing specialized training to farmers on environmental management. Farmers, on the other hand, also identified

themselves and the neighbouring commercial farmers as structures that provide learning amongst one another.

5.4.4.2 Knowledge and skills

There are two sets of farmer capabilities that are built in LandCare pertaining to actions to take: the ability to rehabilitate the degraded NR and the ability to adapt and/or adopt practices that do not abruptly degrade the NR. In rehabilitation, most farmers confirmed that they received training in the following areas: removal of alien species, chemical application, chain saw, first aid and health and safety. Farmers alluded that this training is provided mostly to farmers and community members that are employed under EPWP to do the rehabilitation. In most cases, the EPWP targets local community members who are youth, female and unemployed, which in most cases does not include the owners of the farms. It appears EPWP is training people to carry out its work, not necessarily build capacity of the farmer in managing NR.

Knowledge and skills pertaining to environmentally friendly agricultural practices include training on appropriate land preparation methods, application of chemicals on sloping areas, grazing management, veld burning, stocking density and fencing of grazing camps. Some farmers have received leadership training for farm management teams, as well as dehorning, branding, castration, calculating body condition score of livestock, planting and application of fertilizers and chemicals.

5.4.4.3 Command opportunity

The farmers who have freedom to apply their knowledge and skills are the ones who have participated in the training for a particular activity. In the case of removing alien species, the people who have the opportunity to apply acquired capability are the ones employed under EPWP (i.e. not the farmers). This practice deprives the beneficiaries of LandCare (i.e. the farmers) the opportunity to participate in the development of their farms. In terms of knowledge and skills related to production, most farmers alluded to have complete freedom to use the acquired capability in their own farm; although sometimes they are limited by unavailability of resources such as tools for castration, dehorning and applying chemicals and fertilizer.

5.5 Analysis

Figure 6 presents a graphic overview analysis of words from the interviews with farmers. The diagram does not provide content analysis; it depicts word frequency from the interviews.

Word frequency is commonly used to identify the most frequently occurring words and/or concepts from a transcript or information sources. In the context of this paper, word frequency is used to identify possible themes from the responses of farmers. The frequency query (in NVIVO) was run among the three capacity areas of the capacity building framework discussed earlier: identifying the ideal state of their NR; identifying the current state of their NR; and identifying and implementing the action needed to improve the condition of their NR. The results from running word frequency are then presented in the form of a word cloud as in Figure 6.

In the word cloud, the colour and word direction have no particular meaning and provide no analysis on or about the study. However, word size and location reflects the frequency of words. The most frequently used words and concepts in the word cloud are represented by being largest in size and closest to the centre of the cloud, and vice versa for the least frequently used word and concepts. The themes were then identified and formulated from the most frequently used words and concepts with an understanding of the issues identified by respondents in the interviews.

Drawing on the results of the word cloud captured in Figure 6, the three key themes of discussion for this paper were formulated from most frequently used words: farmer training; farmer opportunity to take command; and the role of extension.

Themes	Related issues
Farmer opportunity	<ul style="list-style-type: none"> • Farmers have limited opportunity in determining the ideal state of their NR; it is done on their behalf • Farmers have no opportunity in measuring the current state of their resources- it is done on their behalf by external stakeholders • EPWP employee get opportunity to exercise knowledge and skills of rehabilitating the degraded NR- few farmers participate • Farmers have the freedom to command any LandCare activity in the farms but get limited training as EPWP employs mostly community members • Farmers have opportunity and freedom in only commanding and executing activities relevant to their production
The role of extension	<ul style="list-style-type: none"> • Apply for LandCare funding for farmers and coordinate the training programmes • Mobilize role-players to facilitate LandCare training and rehabilitation works • Facilitate awareness programme to recipients of LandCare and community members • Provide production related training to farmers

5.6 Discussion

This study is first of its kind to investigate the sustainability of the impact of LandCare projects from the dual perspective of the role of extension and LandCare in building capacity of the farmers to be self-reliant in managing their NR. The discussion centres on the findings set out in Table 3. These are the perceptions of the farmers who were interviewed.

5.6.1 Farmer training

The finding presents the training taking place in the three capacity areas identified in literature: determining the ideal status, measuring the current status and identifying and implementing actions to improve NR to ideal state. The results shows that LandCare focuses primarily on training farmers and community members in implementing the actions to rehabilitate NR and adapting agricultural practices to be environmentally friendly. This focus is essential as it deals with solving the existing problems and building capacity of the farmer to prevent the problem from existing in future.

The results further show that community members (as opposed to farmers) are the main beneficiaries of training for rehabilitation of NR as EPWP employees. This is inconsistent

with the LandCare goal of promoting local participation of farmers in identifying and implementing action to solve local problems (Toyne & Farley 2000). This finding suggests that the training has been subverted to benefit the EPWP. This may be due to the demographics of the farmers, being predominantly older and female which may be seen as less attractive from a training perspective.

Further, the findings show that the training directed to adapt the current farming practices are not informed by the understanding the fundamental socio-economic factors driving these practices. An example is the training on grazing management, where farmers are automatically requested to reduce livestock numbers by selling to stay within the carrying capacity of the farm, not taking into account the social value of livestock to farmers. Farmers usually agree to sell but when the trainers have left, the farmers do not reduce their stock and may, in fact, increase the numbers. That the training ignores this fundamental cultural reality is inconsistent with LandCare's stated grass-root approach that suggests that the interventions should be developed to address issues that affect farmers and should take into consideration the knowledge, values and ideas of local people (Mercado & Sanchez 2020).

Capacity to determine the ideal state of the NR and measuring the current state of the NR are equally significant as they build toward the overall capacity to be self-reliant and resilient in managing NR sustainably (Terblanché 2008). The findings shows that farmers are not trained on these two aspects of capacity; rather they are provided with knowledge of the outcomes of the assessment, not knowledge of how the process was carried out. An example is when the farmers are provided with results from assessment of their grazing land carried out by an extension officer and/or environmental specialist. Farmers are trained how to interpret the results, not on how the assessment process is carried out. This is done with the assumption that the farmer does not need to know the process because there is someone to do it on their behalf. This is inconsistent with Coutts and Roberts (2003) who argue that building true capacity should reduce dependence on external support and foster greater self-reliance.

5.6.2 Opportunity to command

This theme refers to the opportunity that people have to utilise acquired capabilities and the freedom to command the structures and systems in place (Lammert *et al.* 2015). This study

found that in the three areas of capacity identified in literature, farmers only have some freedom to apply acquired skills in identifying and implementing actions to rehabilitate NR and prevent the problem from occurring again. In the midst of this, farmers feel they have more opportunity and freedom to apply acquired capacities in the aspect of production practices. Furthermore, farmers feel that they have limited opportunity to command structures and systems in terms of what they want to learn, thereby feeling powerless in the learning partnership. This is inconsistent with the learning-based extension theory and triadic LandCare approach suggesting that true capacity geared to building self-reliance lies in equal and synergistic partnership in learning between farmers and the development partners (Worth 2006; Mercado & Sanchez 2020).

Further, the results also show that farmers have limited opportunity in the aspects that deal directly with determining the ideal state of resource and measuring the current state of resources. Most farmers feel that the focus of the LandCare programme is to raise awareness about practices causing degradation of land and some features of degraded NR, to rehabilitate the NR of the farmers, and to teach farmers how to prevent the problem in future. Further, the results show that, in terms of NR rehabilitation, EPWP manages the employment process of people to conduct rehabilitation activities and they focus immensely on creating employment of local community members and meeting its own objectives rather than those of LandCare. It is a common reality that programmes directed at the same populations are not coherent in their design or application and often work independently of and at cross-purposes with one another – highlighting the need for greater coherence in design and implementation (Slater *et al.* 2016).

5.6.3 Role of extension

Extension has a variety of roles in the agricultural sector. However, drawing on the principles of learning-based extension, centric to all extension is the effort of building the learning capacity amongst farmers, researchers and extension practitioners in working toward facilitating the desired change in the context of farmers' aspirations (Worth 2006). In the context of LandCare, the role of extension is envisaged to be centred on facilitating capacity building amongst farmers in three areas identified in NRM: Determining ideal state of the NR, measuring the current state of the NR and identifying and implementing action to close

the gap. The result shows that extension is more focused on coordinating training programmes relevant to production and raising awareness about degradation of NR. However, farmers have affirmed that most training that takes place in the LandCare programmes are to make them change their local practices, as they are being deemed as the cause of NR degradation, to the one they perceive best for farmers. This is inconsistent with learning-based extension that embraces local knowledge and practices as a starting point in working toward achieving farmers' aspirations, and more importantly rather than leaving farmers dependent on repeated rescuing, works to ensure the farmer can take real command of the factors that affect the sustainability of their livelihoods.

The other role of extension is to mobilize relevant stakeholders into the LandCare programme for implementation. This is consistent with Australian partnership building approach (Mercado & Sanchez 2020). However, it is inconsistent with learning-based extension when the external stakeholders are focused on imparting knowledge and then proceed to do things on the farmers' behalf. It is also inconsistent with Mercado and Sanchez (2020) who suggest that the partnership should create systems for convergence of ideas and shared decision making to achieve desired impact and create more opportunities for the community to achieve their aspiration.

5.7 Conclusion

This study discovered a disconnection between LandCare policy intention of building farmer capacity and the actual practice of extension amongst farmers which contributes significantly to the flagging sustainability of LandCare programmes. Extension practices in the LandCare programme in SA also does not conform with the building capacity theory suggesting that true capacity building starts from building what farmers know and have. The study found that, drawing on the perspective of farmers who are part of the programme, the success of LandCare projects is measured primarily by the completion of the implementation (rehabilitation) phase and not by the impact of the project and its sustainability amongst farmers through building their capacity to manage this aspect of their livelihoods.

The study also found that LandCare programmes prioritise three things: creating employment for the surrounding community through rehabilitation works; raising awareness; and training farmers to change their current farming practices. The programme on the ground does not focus on building farmer capacity in determining the ideal state of local NR, measuring the current state of NR and the process of identifying what action needed to close the gap. Rather, it focuses on building capacity of external actors in implementing the corrective actions identified by the role-players. Further, the study found that farmers have limited opportunity to command existing structures and systems and freedom to participate in most processes of the programme except for those relevant to their production. This in the face of extension theory implies that farmers are at the receiving end of the project and not the equal partners in their development. It suggests that the LandCare programme itself is not sustainable because it fails to build the very capacity required to ensure the care of the land by the primary users of that land.

5.8 Implications

Capacity building practices in LandCare should be guided by LandCare policies and capacity building theory. Implementation of the policy should more closely adhere to its own stated intentions and not be diverted through the expediency of the short-term achievements of rehabilitated land.

Capacity building should be planned and executed to effect all three areas of capacity in NRM for farmers to be self-reliance and resilient in managing their NR.

Farmers should be engaged fully in planning and implementation of any LandCare projects for them to own the outcome of the projects.

There needs to be greater coherence in the setting and implementation of programmes that will ultimately operate in the same geo-social space. Concomitantly, those charged with implementation (in this case, extension officers) need to be trained for, directed toward and evaluated against the over-arching aim of building farmer capacity.

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Chapter 6: Extension Officers' Perception on the Role of Extension and SA LandCare in Building Natural Resource Management Capacity amongst Farmers

Abstract

Agriculture is an important element of the South African (SA) economy. However, increasing pressure to produce food has exacerbated pressure on natural resources (NR). The deteriorating state of NR is caused by multiple factors that vary from farm to farm. SA LandCare was established specifically to address this. However, LandCare programmes are perceived to focus primarily on relief and rehabilitation of NR rather than addressing the underlying fundamental complex causes. This study sought to explore the extent to which: LandCare attempts to mitigate core problems rather than symptoms; LandCare works to ensure long-term NR management (NRM) by farmers; and extension is contextualised in building farmer capacity to manage NR. This study also sought to provide a detailed analysis of the research problem and recommendations on positioning of extension in the LandCare programme to improve the sustainability of NRM while maintaining its goal of improving household food security.

Primary research comprised semi-structured interviews with 45 key informants selected using purposive sampling and participant-observation. Key informants included 20 farmers, 20 provincial extension workers and five LandCare officials in the National Department of Agriculture.

The study found three things: first, the role of extension is not adequately contextualized in LandCare in terms of building farmer capacity to manage NR. This is deduced from the findings showing that extension is mainly involved in facilitating the imparting of technical skills and not in the building of learning capacity for self-directed learning of farmers to become equal partners in their development. Secondly, the study found implementation of LandCare projects does not embrace local capacities but builds from scratch. This was concluded from the findings that extension officers perceive local capacities as not being credible since they are not informed by existing scientific theories. Thirdly, despite the good work LandCare has done on capacitating farmers to better manage their resources through

changing/adapting farming practices for the benefit of the future generation, implementation lacks effort toward empowering farmers to own the outcomes of the projects, thereby increasing the chances of sustaining them.

6.1 Background and introduction

LandCare sustainability, internationally and, specifically in South Africa, depends on the effectiveness of agricultural extension in implementing LandCare projects and programmes. Key to improving sustainability of LandCare programmes is appropriate capacity building amongst farmers and other key role-players. However, South African LandCare appears to be oriented toward providing relief and imparting technical knowledge and skills to farmers that are experiencing NR crises. These crises are complex in that the root cause is embedded within the socio-economic aspects of their livelihoods, and this requires an appropriate approach in addressing it.

LandCare has been successful in achieving some of its policy objectives such as rehabilitating degraded NR, upskilling farmers with technical skills, raising awareness, and creating employment amongst people in surrounding rural communities. However, pivotal to any development -which remains a key question of this study- is the extent to which the development programmes build sustainability, self-reliance and resilience. Vital to achieving these is prioritizing capacity building of farmers and stakeholders, where learning and farmers are the focus of engagement. This paper explores the role of extension and LandCare in building farmer capacity for sustainable NRM.

To address the key questions of this study, an investigation was conducted amongst farmers, extension officers, and officials involved in policy-making to determine their respective perceptions about the role of LandCare and extension in building farmer capacity. This paper presents the perceptions of extension officers.

6.2 Theoretical framework

This study embraces two theories: capacity building; and learning-based agricultural extension. These frameworks were adopted to clarify the research problem and to give structure for designing the research project and guiding data collection, analysis and interpretation.

6.2.1 Agricultural Extension

Literature suggests that agricultural extension is a relative term and that there is no universally accepted definition or approaches for the concept. Definitions vary from one institution to another. Similarly, the various extension approaches are appropriate only when applied in their respective relevant situations (World Bank 2012; Rezaei-Moghaddam & Karami 2008). Furthermore, extension has evolved in theory and practice from being oriented toward extending tertiary scientific knowledge to out of school people with no access to knowledge sources (Chauhan 2007) to embracing learning as an approach and also as a theory of improving self-reliance and resilience of people thereby improving sustainability of rural development projects/programmes (Terblanché 2008).

Given the numerous roles that extension plays in rural development and agriculture, it is essential to understand that what is implemented by extension workers on the ground is mostly informed by the policies of a specific institution rendering extension services. This implies that the role of extension in South Africa, in both the public and private sectors, varies depending on the policies informing planning and implementation. However, the growing consensus emphasises that extension should be more oriented toward helping farmers help themselves (Terblanché 2008). This prioritises careful selection of approaches to adopt when working with farmers' complex and diverse agricultural and livelihood scenarios. Helping farmers help themselves can be achieved realistically only through building farmer capacity where learning and effecting behavioural change are core and fundamental in framing the role that extension adopts (Boon 2009).

Learning-based extension is consistent with how 'helping the farmer help themselves' can be achieved. It posits that the role of extension is concerned primarily with building capacity of the farmers, researchers and extension workers in working towards facilitating the desired

change in the context of farmers' current position and future aspirations. Learning-based extension does not dismiss other approaches to extension, nor does it disqualify any extension role, rather it embraces them all. It suggests that extension should be about building capacity for self-directed learning and empowering farmers to be equal partners in development. Learning-based extension further emphasises that, fundamental to helping farmers help themselves, extension should place three things in the centre of development: farmer learning, appropriate placement of technology; and the farmers themselves (Worth 2006).

6.2.2 Capacity building

Capacity building is a popular term in rural development as an initiative and approach to improve the livelihoods of poor people in rural areas. Capacity building is applicable not only in rural development, but more generally it also implies providing education and training beyond schooling to enable people to partake in specific activities unaided (Rola-Rubzen & Gubunanda 2003). Before understanding capacity building as a concept and as well as an approach, it is essential to grasp the meaning of the term capacity.

6.2.2.1 Capacity

Generally capacity is equated to capability. However, they do differ in definition. Capability is defined as one's ability to perform a certain task which is characterised as possessing knowledge and skills (van Vuuren 2017). In rural development, capability is not a synonym for capacity; rather it is an element of capacity. Capacity is then defined as one's ability, aptitude or competency to perform a particular task successfully and sustain the achievement over time. Capacity comprises of attributes, assets, capabilities and relationships that enable one to be self-reliant in performing a task and resilience in the face of change (Walters 2007). Alba and Lavergne (2003) state succinctly that capacity is comprised of capabilities (knowledge, skills and competency); structures (effecting institutions and organisations) and systems (policies and rules governing and guiding the development process). In the context of farmer development, it then can be concluded that capacity 'as term' refers to one's ability to perform a certain task successfully within the provided resources and enabling systems in place. Additionally, true capacity is characterised by being less dependent on external

support; resilient in the face of change and persistence in sense that development is sustained after the aid is withdrawn.

6.2.2.2 Capacity building as a concept

The United Nations Economic Commission for Africa (UNECA) (2014: 5) defines capacity building as: “the process through which individuals, groups and organisations, and societies deploy, adapt, strengthen, and maintain the capabilities to define, plan and achieve their own development objectives on an inclusive, participatory, and sustainable basis” Similarly, Stavros (1998) defines capacity building as a ‘process’ of strengthening people and their organisations to be able to effectively serve its people and consider the impact on all stakeholders. Babu and Sengupta (2006) echo these definitions but add that capacity building should be centric to any development agenda and should be focused on effecting the farmers’ opportunity to take ownership of change initiatives and embrace local capacity.

6.2.2.3 Capacity building as an approach

Capacity building as an approach is defined as an on-going process or journey (Bolger 2000); not an outcome or output of a project (Pack 2018). A capacity building approach (CBA) obliges the development intervention to go beyond the project world, that focuses on delivering outputs within a timeframe, to realising and focusing on how the projects’ outputs impacts on sustainability (Eade 2010) at three levels within which the intervention operates: individually, organisational and systems level (Bester 2015). CBA is ‘continuous’ as it focuses the development intervention to constantly cultivate capabilities of people involved to enhance problem-solving abilities related to their livelihoods, health and their NR. The World Bank suggest that CBA is an on-going learning process driven by local people, facilitated and supported by change agents, which seeks to promote local ownership and achieve local aspirations. CBA also emphasises a synergistic learning partnership between local people and agents of change as this forms a strategic effort toward effecting economic and social change (Otoo *et al.*2009).

CBA does not provide a fixed procedure of building capacity; rather it provides a framework built on five principles that guides the design, implementation and evaluation of capacity development interventions (Bolger 2000):

- Inclusive participation and local ownership;
- Learning and synergistic partnership between key stakeholders;
- Embracing local capacities;
- Continuous learning and adaptation; and
- Focusing on sustainable development.

6.2.3 Building capacity of farmers

Building capacity of farmers embraces CB as a concept and as an approach. It is as an on-going process which can be seen as ladder (van Vuuren 2017) of improving technical knowledge, skills and attitude of individuals, organisations or communities (Photakoun 2010). Building farmer capacity prioritises improving the farmers' ability to learn continuously and be resilient, in an ever-changing environment, in order to achieve their objectives (Nettle *et al.*2010). This can be achieved through improving farmers' access to structures and systems necessary for development to take place and effecting farmers' opportunity to command the structures and systems in place (Lammert *et al.*2015; Nettle *et al.*2010).

From the various definitions of the concept of capacity above abstracted from literature, this paper synthesises the definition of 'capacity' and refers to it as a set of elements that makes human systems function and be resilient. Capacity building comprised 5 elements: knowledge, skills, opportunity, structures and systems. For capacity building to work, it should be guided by three sub-processes: effecting access to information sources; facilitation and empowerment; and engaging in participatory technological development and mentorship (van Vuuren 2017). Information access is critical so that farmers do not develop dependency from external stakeholders but can be self-reliant in directly accessing the information they need. Facilitation and empowerment are central as they ensure that the process is iterative – an essential key to sustained learning. Technological development reinforces the importance of engaging farmers in the process of developing new technologies suited for them for purpose of learning and owning the outcome (Coutts & Roberts 2003).

6.3 Methods

This study employed a secondary research method using a desktop review to understand the themes that surfaced and to articulate the gap this study is attempting to fill. This research created the framework for the ensuing primary research.

Primary research comprised semi-structured interviews with 45 key informants selected using purposive sampling, and participant-observation. Key informants included 20 farmers, 20 provincial extension workers and five LandCare officials in the National Department of Agriculture (NDA). These three groups of informants were selected deliberately as they could provide more accurate information to fulfil the study objectives and help answer the underlying research question (Etikan & Bala 2017).

The researcher approached the NDA LandCare office and requested 5 key informants to participate in the research study. These key informants identified another informant at the KZN Provincial Department of Agriculture who, in turn, identified 20 extension workers and provided a list of farmers involved in the implementation of LandCare projects. Twenty (20) farmers were selected using snowball sampling where referrals were given by extension workers and farmers themselves; the selection was based on their willingness to participate in the study (Taherdoost 2016).

This study used NVIVO software programme to analyse the data. Data was analysed through thematic analysis which, according to McNiff (2016), helps the researcher makes sense of the data gathered from respondents by identifying main points and themes for discussion, determining differences and similarities between responses and integrating themes and responses into a research report.

6.4 Findings

This part of the study presents the findings from the 20 extension officers. Through individual semi-structured interviews, the respondents shared detailed views about how they perceive the role of LandCare and extension in building farmers' capacity to manage the NR sustainably. The results are unpacked using the capacity building framework adapted from

Coutts and Roberts (2003). This framework suggests that capacity to sustainably manage NR is built in three main areas of capacity: to identify the ideal state of their NR; to measure the current state of their NR; and to identify and implement the action needed to improve the condition of their NR. In keeping with the earlier discussion about capacity, the framework further suggests that within the areas of capacity, farmers need the five generic elements to be in place to build and strengthen capacity to be: structures; systems; knowledge; skills; and opportunity to take command.

As shown in Table 4 the majority of the respondents (90%) were over the age of 36. The genders were nearly 50-50. The most common highest qualification was a first degree or Bachelor of Technology, with 15% having a post-graduate qualification. The vast majority were trained in either crops or livestock, while only a few were trained in agricultural management or extension. Some 70% had between five- and ten-years' experience. No respondent was without at least basic tertiary training or with less than 1 year of experience. It can thus be argued that the respondents were credible, trained and relatively experienced and thus in a good position to provide valuable insight into the objectives of the research.

Table 4: Demographics and background of respondents (n=20)

Age (Years)	≥50	36-49	18-35	
	7 (35%)	11 (55%)	2 (10%)	
Gender	Female	Male		
	11 (55%)	9 (45%)		
Level of Education	Matric	Diploma	Degree/BTech	Post grad
	0 (0%)	2 (10%)	15 (75%)	3 (15%)
Educational field	Crop	Livestock	Other	
	9 (45%)	9 (45%)	Agric. Management; Extension 2 (10%)	
Race	African	Coloured	White	
	20(100%)			
Years of Experience	≥10	5-9	1-4	None
	4 (20%)	10 (50%)	6 (30%)	0 (0%)

6.4.1 Understanding of LandCare programme

Extension officers asked to elucidate their understanding about LandCare in terms of its components: soils, water and vegetation. The context was their understanding of how each

component addresses capacity building and technological development (major community works).

6.4.1.1 Soils

In terms of ‘major community works’, most respondents alluded that LandCare focuses on rehabilitating eroded farmlands from topsoil erosion to dongas. Prior to rehabilitation there a number of diagnostic measures are conducted to identify main problems with the focus being to eliminate them. The diagnostic measures used by most extension officers to inform the rehabilitation plan are soil assessment and soil testing. Soil assessment applies procedural steps to judge the condition of the soil from observing its physiological horizons. Soil testing involves taking soil samples and having them tested for various characteristics at the departmental soil lab.

In ‘building farmer capacity’ about soil management, most respondents identified raising awareness and providing training to farmers. The awareness programme educates farmers about the principles and practices of conservation agriculture and how they help protect the environment (NR) while achieving optimum production. Some respondents create awareness about soil erosion and acidity, specifically causes, rehabilitation and preventative measures. Training is provided with the purpose capacitating farmers to identify symptoms of erosion, conduct basic soil assessments and take soil samples for testing.

6.4.1.2 Water

All respondents stated that they had never seen a LandCare project that focuses on water but have heard about them from LandCare officials. What they do know about the water component of LandCare major community works is that it prioritizes clearing alien plant species around/along water sources and catchment areas to improve water flow and quantity. Some respondents understood that LandCare provides rehabilitation and protection of natural water sources which provides habitats for many ecosystems such as wetlands. Few respondents were aware that this component of LandCare helps farmers have access to water, or that the activities include testing water quality for human and animal consumption and rehabilitating degraded water sources affected by siltation and pollution. Some of the respondents understood that, within LandCare, building capacity around water involves

educating farmers about the importance of conserving water sources and protecting them from pollution.

6.4.1.3 Vegetation

Most of the respondents indicated that most LandCare projects focus on vegetation, and that most major community works projects focus mainly on eradicating alien plant species and controlling bush encroachment on communal grazing land. Some respondents added that fencing grazing camps also forms part of the projects as it offers grazing management that allows the veld/vegetation to regrow. Regarding ‘capacity building’, most respondents identified creating awareness and training as the key focus. Awareness is directed toward helping farmers understand the importance of managing NR for sustainability and for use by future generations. Training aims at equipping farmers to better manage their grazing systems so that it does not yield to infestations of alien invasive species and bush encroachment. Some respondents indicated that training (including demonstrations) also included burning veld and fire brakes as part of good veld management practices.

6.4.1.4 Integration

The respondents felt that LandCare is about finding a balance between optimum use and conservation of NR through rehabilitating the already degraded NR and building farmer capacity. LandCare mostly deals with vegetation in KZN since most affected farmers are those farming livestock (cattle and goats) on communal grazing lands. This justifies the prioritisation of LandCare projects on eradicating alien species in grazing lands and on building capacity of farmers to better manage vegetation. Further, LandCare gives special attention to educate farmers and rural communities about the importance of protecting natural ecosystem habitat areas such as wetlands.

6.4.2 Ideal state of natural resource

In the context of this paper, the ideal state of NR refers to the farmers’ ability to determine the norm condition of their NR.

6.4.2.1 Structures and systems

Most respondents identified the following structures as the main structures helping farmers determine the ideal state of their NR: National Department of Agriculture (NDA); Provincial Department of Agriculture (PDA); District Department of Agriculture (DDA); and the Department of Environmental Affairs (DEA). NDA provides funding for implementing LandCare Programmes and offers officials to assist facilitating awareness projects about NRM. PDA provides scientists specializing in soils, grassland, and animal health science to help in understanding the farmers' issues and to raise awareness thereafter. DDA provides extension services to help coordinate the activities of LandCare projects that also raise awareness to help farmers determine the ideal state of their NR. DEA offers environmental specialists and scientists that help farmers in understanding the ideal state of their NR through interpreting Bio-Resource Unit (BRU) reports. Other respondents identified breeders associations and local auctioneers as structures in place involved in raising awareness about sustainable management of NR and abiding by correct stocking rates.

6.4.2.2 Knowledge and skills

The majority of respondents indicated that they normally use information days, training, and field visits to help impart necessary skills to farmers. The respondents said the knowledge imparted to farmers was limited to spotting the symptoms of erosion on NR, understanding the causes of erosion, having a picture of an ideal state of a resources and the importance of NRM for future generation use. Further, respondents stated that no practical skills are imparted to farmers other than spotting the symptoms of erosion/degradation in NR. Some respondents indicated that they do accept indigenous knowledge and experiences as valid to determine the ideal state of the NR of concern and thereby incorporate them in the process. A few respondents said they trained farmers in determining the veld condition benchmark. However, in most cases this is less effective given the low level of literacy of farmers making it difficult to impart scientific procedural skills.

6.4.2.3 Command opportunity

The majority of respondents believe that farmers have sufficient opportunity to apply either or both their indigenous capabilities and the ones acquired in the project. Some respondents

believe that farmers have only limited opportunity in determining the ideal state of their NR since the process is conducted on their behalf by the participating role-players. Few respondents do believe that farmers do not need opportunity to apply their capabilities on their own farms as the projects are designed to equip farmers to ensure they do not experience the same NR problem again.

6.4.3 Identifying current state of resources

Identifying the current state of the NR, in the context of this paper, refers to the capacity to follow certain procedural steps in assessing the current condition of NR unaided or with minimal assistance.

6.4.3.1 Structures and system

The respondents identified the following structures involved in measuring the current state of NR and building capacity of farmers to measure the NR status of their farms: NDA, PDA, DDA and DEA. NDA provides funding to implement the LandCare Programme and renders the extended public works programme to facilitate employment of local community members and farmers in rehabilitating NR. PDA provides scientists specializing in soils, grasslands, and animal health to help in measuring the current state of NR and impart knowledge and skills relevant to assessing the condition NR. DDA provides extension officers to help coordinate implementing LandCare project activities and train farmers in NR assessment. DEA offers environmental specialists and scientists that help farmers understand the ideal state of their NR through conducting veld assessments and demonstrations.

The respondents also identified Grain SA, TWK (input supplier), Agricultural Research Council (ARC), Lima, and LandCare officials as other structures that are usually involved in rendering services of measuring the current condition of NR and that partake in training farmers to measure the condition of their farms. These structures are not all involved in each and every LandCare project, but they were identified by different respondents to be participating in particular LandCare projects in particular areas.

6.4.3.2 Knowledge and skills

Most respondents indicated that the most significant role played by role-players involved in LandCare projects is helping farmers with NR assessments. The role-players also contribute to training farmers in basic skills of conducting assessments. Training is conducted on the day of assessing the farmers' NR; the farmers are called to observe how the assessment is conducted. Most respondents noted, however, that most farmers show little interest in the training. A few respondents affirmed the value of relying on the farmers' indigenous knowledge during assessments but noted that the scientists feel that 'action to be taken' cannot be deduced from findings that are not derived from scientific procedures.

6.4.3.3 Command opportunity

According to most respondents farmers have limited opportunity in commanding structures and systems in the sense that they have limited power to change the implementation plan of LandCare projects; the only power they have is to accept or reject the implementation. However, in terms of opportunity to apply their own and acquired knowledge to assess NR, most respondents felt that farmers have complete freedom and that it is entirely up to the farmers. Some respondents said that farmers are given opportunities to participate during training and demonstrations. Further, some respondents found it difficult to get farmers to implement what they have learnt during training and seem to prefer or depend on extension officers to conduct NR assessments on their behalf. A few respondents added that farmers believe more in their indigenous capacities to assess their NR and are more interested in rehabilitation of NR as it focuses on fixing the problem they are experiencing.

6.4.4 Identifying action to improve the resource condition

In the context of this paper, the capacity to identify what actions to take to improve the resource comprises the capacity to interpret data against a norm (ideal) and plan appropriate action.

6.4.4.1 Structures and systems

The majority of respondents identified the same government structures as in the previous areas: NDA, PDA, DDA and DEA. NDA provides funding through the LandCare programme and develops the implementation framework of LandCare projects. PDA coordinates and administers implementing the LandCare projects at the provincial level. PDA also provides scientists and specialists in animal health, engineering, soils, agricultural economics, agronomy, and grasslands to facilitate specialized training. DDA provides extension officers to facilitate the implementation of the LandCare project on the ground. DEA provides environmental specialists to train farmers in NR conservation practices.

The respondents also identified ARC, local auctioneers, forestry, Lima, Mahlathini, Grain SA and TWK as also being involved in training farmers in specialized areas relevant to agricultural production and NRM. Not all of the respondents identified all of these structures as being involved in individual projects nor are they necessarily mobilized specifically for LandCare projects. However, some, if not most, are partners for the agriculture projects steered by extension officer and may thus be involved in the wider LandCare initiative.

6.4.4.2 Knowledge and skills

Most responses suggested that imparting and enhancing knowledge and skills focus on the capacity to execute rehabilitation measures, and the capacity to manage the use and sustainability of NR. Capacity to rehabilitate is built through training and demonstration by extension officers, LandCare provincial officials, EPWP officials and individuals willing to execute rehabilitation work. EPWP, with local authority/leadership, decides who will be employed in the rehabilitation work - prioritizing youth, women and destitute households within the community. This implies that the capacity to rehabilitate the NR is not prioritized to the farmer-beneficiaries of LandCare projects for them to be able to address their problems, but that it is a system to create employment for needy households. The training focuses on: identifying alien species; manual removal of alien species; controlling bush encroachment; health and safety; first aid; chainsaw operation; safe application of chemicals; stone packing; fencing dongas; and correct and safe application of fertilizers.

Regarding building capacity for NRM, most respondents indicated that this is where the farmers are adequately engaged in training as this element is key toward improving the sustainability of LandCare projects. Capacity building in this aspect focuses on changing and/or adapting the farmers' practices that contributed to NR degradation. The training and demonstrations range from, but are not limited to: Grazing management; Animal production, Markets and marketing; Financial management; Veld management; Animal feed; Animal health; Conservation agriculture; and Stocking rate.

6.4.4.3 Command opportunity

As explained above, respondents noted that few farmers are engaged in the rehabilitation of NR; instead farmers are instructed to oversee if the work has been done adequately by EPWP employees. The EPWP employment selection criteria disadvantages the beneficiaries of the LandCare projects from participating in the rehabilitation of NR as priority is given to needy household as farmers are generally less needy than others. Farmers are, however, given opportunities to participate in relevant training and demonstrations and are free to apply acquired knowledge and skills on their own. Respondents further indicated that farmers have the freedom to accept or reject the trainings as they feel the need.

6.5 Analysis

Figure 7 presents a graphic overview analysis of words from the interviews with extension officers. The diagram does not provide content analysis; it depicts word frequency from the interviews.

Word frequency is commonly used to identify the most frequently occurring words and/or concepts from a transcript or information sources. In the context of this paper, word frequency is used to identify possible themes from the responses of 20 extension officers. The frequency query (in NVIVO) was run among the three capacity areas of the capacity building framework discussed earlier: identifying the ideal state of their NR; identifying the current state of their NR; and identifying and implement the action needed to improve the

the extension officers. Where possible, exact wording from one or more extension officers was used. The themes and their related issues are presented in Table 5.

Table 5: Key themes and their related issues developed from interviews with extension officers

Themes	Related issues
The Role of Extension	<ul style="list-style-type: none"> • Mobilizing role-players to train and do most of the work on farmers' behalf • Coordinating and monitoring implementation of LandCare projects • Providing specialised training to farmers • Facilitating awareness • Acquiring funding for implementing LandCare projects
Farmer access to information	<ul style="list-style-type: none"> • Farmers acquire NRM information from extension and participating role-players making farmers dependant on external people for information • The system of imparting knowledge is not informed by farmers current knowledge status • Information imparted to farmers is too scientific for them to grasp or at least being presented in the level of their literacy • Farmers are not given capacity to access information on their own • The method of imparting knowledge does not embrace local knowledge
Opportunity to advance knowledge and skills	<ul style="list-style-type: none"> • Implementation shows that LandCare is project oriented rather than programme centred • Opportunity is only fully afforded in matters related to their production and less on determining the ideal state and measuring the current state of farmers' NR • EPWP criteria marginalizes farmers • EPWP employees get opportunities to exercise knowledge and skills of rehabilitating the degraded NR; few farmers participate • Farmers are passive participants in the programme as extension and role-players does most of the work on farmers' behalf

6.6 Discussion

This study is first of its kind to investigate the sustainability of the impact of LandCare projects from the dual perspective of the role of extension and LandCare in building capacity

of the farmers to be self-reliant in managing their NR. The discussion centres on the findings set out in Table 5. These are the perceptions of the extension officers who were interviewed.

6.6.1 The Role of Extension

The results clearly indicate that a key role of extension in capacity building is mobilizing relevant stakeholders with specific expertise to contribute to the implementation of the LandCare projects. This is consistent with Christoplos' (2010) suggestion that extension should play a role in creating partnerships with relevant stakeholders in the implementation of the development interventions. The results also show that farmers are not fully engaged in decision-making about the development intended for them which is of concern when considering Worth (2006) and van Vuuren (2017) who suggest that sustainable development can be achieved only when capacity building places farmers' engagement and participation in the centre of the intervention to enable farmers to address and deal with their day-to-day problems.

The findings show that role-players that were mobilized to help with LandCare projects focused on two things: providing specialized training to farmers; and doing the work on the farmers' behalf. An example of this is when farmers are trained in conducting veld assessment, and the practical veld assessment on the farmer's farm is done by the participating role-player (veld specialist). This is inconsistent with the idea that the partnership should create systems for convergence of ideas and shared decision-making to achieve desired impact and create more opportunities for the community to achieve their aspiration (Mercado and Sanchez 2020).

The findings also show that extension engages in raising awareness about the importance of NRM and providing training to farmers in particular areas of specialization which is consistent with the Australian common procedure of building human capacity in LandCare which prioritizes raising awareness and upskilling of farmers in dealing with land degradation issues (Cary & Webb 2000).

6.6.2 Farmer access to information

According to Coutts and Roberts (2003), one of the key elements of building true capacity is facilitating farmers' access to reliable and relevant information sources to address their day-to-day challenges. However, the results show that the South African LandCare programme focuses only on disseminating information deemed necessary for farmers to know to practice sustainable use and management of NR; there is no effort to help farmers have access to information sources. Thus, instead of being put in the position of being able to make informed decisions about NR management (La Grange *et al.* 2010), farmers are made to be dependent on external agents. This implies that farmer capacity is not being built and that LandCare is far from developing self-reliant farmers able to sustain the impact of the project after external support has exited.

The findings also show that implementation of LandCare projects disregard local information and perceive it as void of sound theory and scientific facts. This reinforces the position that farmers should rely on the information brought about by LandCare. Paradoxically, some respondents felt that the information imparted to farmers is too scientific for them to grasp, or is at least not presented in a manner that is consistent with their literacy levels. This fosters LandCare to resort to doing things on the farmers' behalf. An example is at field days when farmers are given information on how to conduct veld assessments and calculating farm livestock caring capacities during, while their local knowledge and skills is disregarded. After training, farmers are deprived of the opportunity to practice on their farms what they learnt. Instead, the role-player (training agent) conducts the entire veld assessment for the farmers. This LandCare practice is inconsistent with the principle that building true capacity implies enabling farmers to take ownership of the change initiative – building on and reinforcing local capacity. Failure to advance local capacity ultimately is detrimental to the development efforts (Stavros 1998).

6.6.3 Opportunity to advance knowledge and skills

This study found that among three areas of capacity in NRM most farmers are being offered training in measuring the current state of the NR, and identifying and implementing the actions to rectify the problems. The results of the study indicate that regarding measuring the

current state of NR, farmers are trained because it is a requirement; not with intention to build their capacity. This is deduced from the findings showing that farmers are not trained to apply acquired capacity in their own farms,; rather they are deprived of the opportunity by doing things on their behalf. Further, it is found that farmers have limited opportunity to command the structures systems in place about the implementation of the project on their farms. Rather they have a single choice: adopt or reject the measures. If they adopt, the measures are implemented for them. This is inconsistency with capacity building theory suggesting that post-implementation sustainability of development initiatives relies strongly on building genuine capability and affording farmers the opportunity to command structures and systems to continue maintaining the outcomes beyond the life of the project (Lammert *et al.* 2015).

Regarding identifying and implementing actions to rectify identified NR problems, the findings show that capacity is built in two aspects: NR rehabilitation and NR degradation preventive measures. In rehabilitation, farmers have limited training and limited opportunity to apply their capacities. This is evidenced by the thinly veiled agenda of creating employment for community members at the expense of building farmer capacity. LandCare appears to have evinced the common reality that programmes directed at the same populations are not coherent in their design or application and often work independently of and at cross-purposes with one another highlighting the need for greater coherence in design and implementation (Slater *et al.*, 2016). In building capacity to prevent NR degradation, farmers are fully engaged in training and are afforded full freedom to apply their acquired capabilities since it is relevant to their day-to-day management of their farming enterprise.

6.7 Conclusion

In terms of capacity building, this study found that the implementation of the LandCare programme is unlikely to yield sustainable results. LandCare projects do not build from what farmers know and have; it does not embrace existing local capacities. The process starts from scratch, ignoring what is in place. They fail to facilitate farmers' access to reliable and relevant knowledge source which attracts the danger of creating dependency of farmers on external stakeholder. Farmers are not given the chance to practice what they have learned as there appears to be greater concern for effecting the specific rehabilitation and in creating

employment for the local community than there is for building self-reliant farmers capable of managing their NR and of identifying problems and developing and implementing solutions. Long-term sustainability is being sacrificed for short-term gains.

Paradoxically, failure to focus on building farmer capacity will likely defeat even the technical aim of LandCare to rehabilitate degraded land. The material outcomes of LandCare projects will unlikely be sustained by farmers post-implementation, and for relatively obvious reasons. Farmers are not actively engaged in the processes of the projects and, therefore, have no sense of empowerment and ownership of the outcomes of the project even if it is one of their own farms. Whether wittingly or unwittingly, the system seems to be designed to create dependency. Farmers are trained but not enabled. Farmers are provided with “necessary” information, but are not helped to access that and other information on their own. Farmers are excluded from those hired to implement the rehabilitation works. And community members employed to do the physical work of rehabilitation have no incentive to maintain the outcomes as this would represent loss of potential future income, and the projects are not on their land.

Thus, while LandCare has been successful in rehabilitating affected land, and theoretically imparting knowledge and skills of how to prevent NR degradation, the sustainability of the process is doubtful. LandCare appears to identify land to be rehabilitated, expend its training budget by training farmers without opportunity to practice and apply the training, and expend its operational budget through employment and implementing the physical rehabilitation works. It carries out its mandate, as noted before, sacrificing long-term impact for short-term gains.

In the context of learning theory, this study found that LandCare projects do focus on building partnerships which according to Worth (2006) is fundamental for sustainable development. However, they are not synergistic because the farmer is seen and treated as ‘inferior’ and in accordance with Worth (2006) has little or no power in all the processes of the project implementation. Farmers are subjected to training, but do not learn. This mitigates against any possibility of any genuine learning on the part of the farmers.

Finally, the study suggests that the approach taken by LandCare compromises the role of extension. Whether one argues the case of extension being technology transfer or learning-based, ultimately extension is about improving the capacity of farmers at its weakest by transferring technology and at its strongest by effecting learning. LandCare appears to do neither. LandCare appears to be more concerned with the land than with the farmer. The farmer is positioned to being a passive beneficiary of yet another project that has been conceived, planned and implemented in their absence – obviating any possibility of sustainability.

6.8 Implications

LandCare should realign its implementation protocols with its stated objectives of sustainability like allowing participation in all aspects of LandCare such as designing and implementation. The power of extension should be leveraged in a framework of a learning-based approach. The ultimate goal should be to ensure the proper use and management NR and rehabilitation of degraded land through the agency of self-reliant farmers who have learned through theory and practice and who have been included in every step of the LandCare processes. LandCare should prioritize genuinely building farmer capacity.

Capacity building should be planned and executed to effect all three areas of capacity in NRM for farmers to be self-reliant and resilient in managing their NR – Capacity to identify the ideal state of their NR; to measure the current state of their NR; and to identify and implement the action needed to improve the condition of their NR. Specifically, farmers should be engaged in all the activities of a project including planning. Where necessary, the perception of farmers by stakeholders and the self-perception of farmers should be transformed to one where they are perceived as equal partners in the process with knowledge, skills and wisdom to contribute. And they should be afforded the opportunity to apply their own knowledge and skills on their farms. This is essential for learning to be effective.

LandCare should continue focusing on building partnerships of learning amongst all role players. In doing so, the project must pay close attention to ensuring that farmers are perceived and engaged as equal partners.

There needs to be greater coherence in the setting and implementation of programmes that will ultimately operate in the same geo-social space. Concomitantly, those charged with implementation (in this case extension practitioners) need to be trained for, directed toward and evaluated against the over-arching aim of building farmer capacity.

Finally, rather than being a passive tool for implementing LandCare, extension needs to assert itself on the LandCare process. It should be imbued with some of the more pertinent extension principles, especially those that focus on starting with the farmers and through them address the issues of the land.

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Chapter 7: Key Informants Perception on the Role of Extension and SA LandCare in Building Natural Resource Management Capacity amongst Farmers

Abstract

Agriculture is an important element of the South African (SA) economy. However, increasing pressure to produce food has exacerbated pressure on natural resources (NR). The deteriorating state of NR is caused by multiple factors that vary from farm to farm. SA LandCare was established specifically to address this. However, LandCare programmes are perceived to focus primarily on relief and rehabilitation of NR rather than addressing the underlying fundamental complex causes. This study sought to explore the extent to which: LandCare attempts to mitigate core problems rather than symptoms; LandCare works to ensure long-term NR management (NRM) by farmers; and extension is contextualised in building farmer capacity to manage NR. This study also sought to provide a detailed analysis of the research problem and recommendations on positioning the role of extension in the LandCare programme to improve the sustainability of NRM while maintaining its goal of improving household food security.

Primary research comprised semi-structured interviews with 45 key informants selected using purposive sampling and participant-observation. Key informants included 20 farmers, 20 provincial extension workers and five LandCare officials in the National Department of Agriculture.

The study found three things: first, the LandCare policy seemed to be consistent with some of the learning-based extension theory but shows a large disconnection with how it is implemented. Secondly, LandCare projects focus on imparting technical skills of addressing and preventing particular NR crises and less on building problem-solving skills to increase self-reliance amongst farmers in addressing problems in their farming operations. Thirdly, LandCare involves farmers less on solving the NR problem and more on applying preventative measures which runs a risk of making farmers constantly dependant on external support in addressing their NR crisis.

7.1 Background and introduction

LandCare sustainability, internationally and, specifically in South Africa, is dependent on the effectiveness of agricultural extension in implementing LandCare projects and programmes. Key to improving sustainability of LandCare programmes is appropriate capacity building amongst farmers and other key role-players in the mix. South African LandCare is perceived to be more oriented toward providing relief and imparting technical knowledge and skills to farmers that are experiencing NR crises. These farmer/rural level NR crises are complex in that the root cause is embedded within the socio-economic aspects of their livelihoods; and this requires an appropriate approach in addressing it.

LandCare has been successful in achieving some of its policy objectives such as rehabilitation of degraded NR, upskilling participating farmers with technical skills, raising awareness and creating employment amongst rural people in surrounding rural communities. However, pivotal to any development -which remains a key question of this study- is the extent to which the development programmes build sustainability, self-reliance and resilience. Vital to achieving these is prioritizing capacity building of farmers and all stakeholders involved, where learning and farmers are the focus of the engagement. This paper explores the role of extension and LandCare in building farmer capacity for sustainable NRM

In addressing the key questions of this study, an investigation was conducted amongst participating farmers, extension officers, and officials involved in policy-making and development to determine their respective perceptions about the role of LandCare and extension in building farmer capacity. This paper presents the findings from the last grouping, referred to as key informants -- those who shape the environment in which extension operates.

7.2 Theoretical framework

This study embraces two theories: capacity building; and learning-based agricultural extension. These frameworks were adopted to clarify the research problem and to give structure for designing the research project and guiding data collection, analysis and interpretation.

7.2.1 Agricultural Extension

Literature suggests that agricultural extension is a relative term and that there is no universally accepted definition or approaches for the concept. Definitions vary from one institution to another. Similarly, the various extension approaches are appropriate only when applied in their respective relevant situations (World Bank 2012; Rezaei-Moghaddam & Karami 2008). Furthermore, extension has evolved in theory and practice from being oriented toward extending tertiary scientific knowledge to out of school people with no access to knowledge sources (Chauhan 2007) to embracing learning as an approach and also as a theory of improving self-reliance and resilience of people, thereby improving sustainability of rural development projects/programmes (Terblanché 2008).

Given the numerous roles that extension plays in rural development and agriculture, it is essential to understand that what is implemented by extension workers on the ground is mostly informed by the policies of a specific institution rendering extension services. This implies that the role of extension in South Africa, in both the public and private sectors, varies depending on the policies informing planning and implementation. However, the growing consensus emphasises that extension should be more oriented toward helping farmers help themselves (Terblanché 2008). This prioritises careful selection of approaches to adopt when working with farmers' complex and diverse agricultural and livelihood scenarios. Helping farmers help themselves can be achieved realistically only through building farmer capacity where learning and effecting behavioural change are core and fundamental in framing the role that extension adopts (Boon 2009).

One of the fundamental capacities that is key to helping farmers help themselves is 'problem-solving' which should be built by extension officers. Thus, Pólya's problem-solving method can be applied. Pólya outlines 4 sequential steps of what is essentially a reflexive process: (1) understand the problem; (2) plan the solution; (3) execute the solution plan; and (4) evaluating the results by looking back and reflecting. The method is deceptively simple to the point that it is common that one overlooks one step or executes it without sufficient care much to the detriment of the desire to solve the problem. Following these steps in earnest is essential if problem-solving is to yield consistent success and reliable outcomes (Moore 2018).

Learning-based extension is consistent with how ‘helping the farmer help themselves’ can be achieved. It posits that the role of extension is concerned primarily with building capacity of the farmers, researchers and extension workers in working towards facilitating the desired change in the context of farmers’ current position and future aspirations. Learning-based extension does not dismiss other approaches to extension, nor does it disqualify any extension role; rather it embraces them all. It suggests that extension should be about building capacity for self-directed learning and empowering farmers to be equal partners in development.

Learning-based extension further emphasises that, fundamental to helping farmers help themselves, extension should place three things in the centre of development: farmer learning, appropriate placement of technology; and the farmers themselves (Worth 2006).

7.2.2 Capacity building

Capacity building is a popular term in rural development as an initiative and approach to improve the livelihoods of poor people in rural areas. Capacity building is applicable not only in rural development but more generally it also implies providing education and training beyond schooling to enable people to partake in specific activities unaided (Rola-Rubzen & Gubunanda 2003). Before understanding capacity building as a concept and an approach, it is essential to grasp the meaning of the term capacity

7.2.2.1 Capacity

Generally capacity is equated to capability. However, they do differ in definition. Capability is defined as one’s ability to perform a certain task which is characterised as possessing knowledge and skills (Van Vuuren 2017). In rural development, capability is not a synonym for capacity; but it is an element of capacity. Capacity is then defined as one’s ability, aptitude or competency to perform a particular task successfully and sustain the achievement over time. Capacity comprises of attributes, assets, capabilities and relationships that enable one to be self-reliant in performing a task and resilience in the face of change (Walters 2007). Alba and Lavergne (2003) state succinctly that capacity is comprised of capabilities (knowledge, skills and competency); structures (effecting institutions and organisations) and systems (policies and rules governing and guiding the development process).

7.2.2.2 Capacity building as a concept

The United Nations Economic Commission for Africa (UNECA) (2014: 5) defines capacity building as: “the process through which individuals, groups and organisations, and societies deploy, adapt, strengthen, and maintain the capabilities to define, plan and achieve their own development objectives on an inclusive, participatory, and sustainable basis”. Similarly, Stavros (1998) defines capacity building as a ‘process’ of strengthening people and their organisations to be able to effectively serve its people and consider the impact on all stakeholders. Babu and Sengupta (2006) echo these definitions but add that capacity building should be centric to any development agenda and should be focused on effecting the farmers’ opportunity to take ownership of change initiatives and embrace local capacity.

7.2.2.3 Capacity building as an approach

Capacity building as an approach is defined as an on-going process or journey (Bolger 2000); not an outcome or output of a project (Pack 2018). A capacity building approach (CBA) obliges the development intervention to go beyond the project world, that focuses on delivering output within a timeframe, to realising and focusing on how the project’s outputs impact on sustainability (Eade 2010) at three levels within which the intervention operates: individually, organisational and systems level (Bester 2015). CBA is ‘continuous’ as it focuses the development intervention to constantly cultivate capabilities of people involved to enhance problem-solving abilities related to their livelihoods, health and their NR. The World Bank suggest that CBA is an on-going ‘learning’ process driven by local people, facilitated and supported by change agents, which seeks to promote local ownership and achieve local aspirations. CBA also emphasises a synergistic learning partnership between local people and agents of change as this forms a strategic effort toward effecting economic and social change (Otoo *et al.*2009).

CBA does not provide a fixed procedure of building capacity; rather it provides a framework built on five principles that guide the design, implementation and evaluation of capacity development interventions (Bolger 2000):

- Inclusive participation and local ownership;
- Learning and synergistic partnership between key stakeholders;

- Embracing local capacities;
- Continuous learning and adaptation; and
- Focusing on sustainable development.

7.2.3 Building capacity of farmers

Building capacity of farmers embraces CB as a concept and as an approach. It is as an on-going process which can be seen as ladder (van Vuuren 2017) of improving technical knowledge, skills and attitude of individuals, organisations or communities (Photakoun 2010). Building farmer capacity prioritises improving the farmers' ability to learn continuously and be resilient, in an ever-changing environment, in order to achieve their objectives (Nettle *et al.*2010). This can be achieved through improving farmers' access to structures and systems necessary for development to take place and effecting farmers' opportunity to command the structures and systems in place (Lammert *et al.*2015; Nettle *et al.*2010).

From the various definitions of the concept of capacity above abstracted from literature, this paper synthesises the definition of 'capacity' and refers to it as a set of elements that makes human systems function and be resilient. Capacity building comprised 5 elements: knowledge, skills, opportunity, structures and systems. For capacity building to work, it should be guided by three sub-processes: effecting access to information sources; facilitation and empowerment; and engaging in participatory technological development and mentorship (van Vuuren 2017). Information access is critical so that farmers do not develop dependency from external stakeholders but can be self-reliant in directly accessing the information they need. Facilitation and empowerment are central as they ensure that the process is iterative – an essential key to sustained learning. Technological development reinforces the importance of engaging farmers in the process of developing new technologies suited for them for purpose of learning and owning the outcome (Coutts & Roberts 2003).

7.3 Methods

This study employed a secondary research using a desktop review to understand the themes that surfaced and to articulate the gap this study is attempting to fill. This research created the framework for the ensuing primary research.

Primary research comprised semi-structured interviews with 45 key informants selected using purposive sampling, and participant-observation. Key informants included 20 farmers, 20 provincial extension workers and five LandCare officials in the National Department of Agriculture (NDA). These three groups of informants were selected deliberately as they could provide more accurate information to fulfil the study objectives and help answer the underlying research question (Etikan & Bala 2017).

The researcher approached the (NDA) LandCare office and requested 5 key informants to participate in the research study. These key informants identified another informant at the KZN P-provincial Department of Agriculture who, in turn, identified 20 extension workers and provided a list of farmers involved in the implementation of LandCare projects. Twenty (20) farmers were selected using snowball sampling where referrals were given by extension workers and farmers themselves; the selection was based on their willingness to participate in the study (Taherdoost 2016).

This study used NVIVO software programme to analyse the data. Data was analysed through thematic analysis which, according to McNiff (2016), helps the researcher makes sense of the data gathered from respondents by identifying main points and themes for discussion, determining differences and similarities between responses and integrating themes and responses into a research report.

7.4 Findings

The five key informants shared their detailed views about how they perceive the role of LandCare and extension in building farmer capacity to manage NR sustainably. The results are unpacked using the capacity building framework adapted from Coutts and Roberts (2003). This framework suggests that capacity to sustainably manage NR is built in three

main areas: capacity to identify the ideal state of the NR; capacity to measure the current state of NR; capacity to identify and implement the action needed to improve the condition of the NR. The framework further suggests that within the areas of capacity, the farmer need to have 5 things in place for capacity to be built or strengthened: structures; systems; knowledge; skills and opportunity to take command.

The respondents were relatively diverse (See Table 6). Three of the respondents each had more than 10 years of experience in LandCare related field, while two had more than five years of experience and one was relatively newly appointed. All of them held tertiary qualifications, four in what can be considered development disciplines and one in crops. This composition suggests that there would be a diversity of views regarding LandCare but all of which would be credible.

Table 6: Demographics and background of respondents (n=5)

Age (Years)	≥50	36-49	18-35	
	1 (20%)	3 (60%)	1 (20%)	
Gender	Female	Male		
	3 (60%)	2 (40%)		
Level of Education	Matric	Diploma	Degree/BTech	Post grad
	0 (0%)	0 (0%)	1 (20%)	80 (15%)
Educational field	Crop	Livestock	Development discipline	
	1 (20%) ¹	0 (0%)	4 (80%)	
Race	African	Indian	White	Coloured
	4 (80%)	1 (20%)	0 (%)	0 (0)
Years of Experience	≥10	5-9	1-4	None
	3 (60%)	2 (40%)	0 (0%)	0(0%)

7.4.1 Understanding of LandCare programme

The key informants were engaged through individual semi-structured interviews to determine their understanding about LandCare in terms of its components of soils, water and vegetation. This was conducted to understand how each component addresses both capacity building and technological intervention (major community works).

7.4.1.1 Soils

In terms of ‘major community works’, most respondents indicated that the programme is offered to farmers who have declared to have been experiencing problems with their soils. LandCare’s first response is to plan and implement rehabilitation programmes with the intention of helping farmers achieve better yields from their soils. Planning and implementing programmes is guided by policy and systems put in place by the National LandCare office. It is informed by the results of assessments conducted by LandCare provincial officials, extension officers and other supporting role-players. Assessments are conducted to determine the degree of soil degradation in addition to assessing erosion. Assessments include soil testing for fertility, acidity and salinity, and soil classification for use and potential yield. Rehabilitation programmes focus on corrective measures such as balancing soil Ph, fertilizing, building runoff control structures (primarily contours and planting vetiver grass), and helping farmers apply correct ploughing methods.

Regarding ‘building farmer capacity’, the respondents indicated that, according to policy, farmers are meant to be engaged in awareness programmes to educate them about the importance of NRM and conservation agriculture and to present the results from soil tests and assessments. They noted that policy also stipulates that farmers be trained in a basic understanding of science, and to take soil samples, interpret soil test results, and assess soil potential through conducting soil classifications. National LandCare officials train extension officers on relevant challenges to NRM enabling extension officers to better train farmers. One respondent noted that another significant element in raising awareness and training is effecting behavioural change amongst farmers where farmers adopt and apply farming systems that conserve NR.

7.4.1.2 Water

Regarding ‘major community works’, most respondents indicated that LandCare focuses on rehabilitation of wetlands, water sources and catchment areas. The common challenges that LandCare addresses include: alien species infestation near water sources; soil erosion in catchment areas; chemical and fertilizer water pollution; and degradation of wetlands. Rehabilitations programme activities act to counteract these challenges through removing

alien species, building contour banks to prevent chemicals and fertilizer washing into water sources, correcting soil erosion in catchment areas, and rehabilitation (planting indigenous grasses) and protecting wetlands. One respondent explained that the projects on water are done jointly with the NDA projects.

Respondents indicated that the farmer capacity building mainly comprises raising awareness and training. Awareness programmes educating farmers about the dangers of alien species, the effect of soil erosion on water sources, the effect of chemical water pollution on livestock, and the impact of wetland destruction on ecosystems. The training aims to upskill farmers on identifying symptoms of erosion and water source degradation, applying proper rehabilitation measures on water sources and adopting practices that pose less harm on water quality and quantity.

7.4.1.3 Vegetation

The dominant problem pertaining to vegetation, identified by respondents, was alien species invasion which explains why most projects focus on it. The ‘major community works’ for vegetation includes removing alien species and controlling bush encroachment in the grazing lands. Respondents identified overgrazing as the greatest contributor to degradation of vegetation as it encourages bush encroachment and alien species infestation. Achieving sustainability in dealing with the issues related to rehabilitating and managing vegetation remains a challenge since rehabilitated grazing lands keep deteriorating after the project has ended. Respondents indicated that continued deterioration occurs because extension officers and farmers do not understand the root cause.

‘Farmer capacity building’ for vegetation also focuses on raising awareness and training. The awareness programme aims to change farmers’ behaviour to replace farming systems that contribute to degradation of vegetation for systems that sustain vegetation. It seeks to help farmers understand how their farming systems have contributed to the problems they are facing, how to spot symptoms of degradation and how the proposed vegetation management system will improve the quality of the veld for livestock grazing. The respondents indicated that LandCare national officials train extension officers on appropriate rehabilitation methods and appropriate use and management of vegetation. Extension officers, in turn, train farmers

in farm planning, bush control and thinning, chainsaw operating, chemical application, fire burning management, erosion control, and first aid.

7.4.1.4 Integration

The respondents collectively defined LandCare programme as a community- and farmer-based government initiative that seeks to improve sustainability of rural farmers' livelihoods and their environment. This is pursued through improving the use and management of NR for the benefit of future generations and creating employment for participating community member and farmers. Other respondents further indicated that LandCare uses a bottom-up approach in the sense that farmers have to be experiencing NR problems to be part of the programme.

7.4.2 Ideal state of natural resource

In the context of this paper, the ideal state of NR refers to an ability to determine the norm condition of the NR.

7.4.2.1 Structures and systems

The respondents stated that at national level LandCare there are few participating structures except for the support from sister departments such as Department of Environmental Affairs (DEA) and NDA. LandCare, however, has a number of structures in respective provinces and districts including extension officers, TVET⁴ colleges, AgriSETA⁵, local municipalities, universities, the Agricultural Research Council, non-profit organisations and auctioneers. LandCare remains the main funder of the programme and the other structures provide

⁴ TVET College are a range of state-run tertiary institutions that provide technical and vocational education and training.

⁵ AgriSETA is the agricultural Sector Education and Training Authority (SETA). The SETAs are regulatory bodies responsible for improving and developing skills within its sector, to identify skills development needs, and to ensure that national standards are maintained.

technical support and training to farmers. Extension officers were identified as being responsible for acquiring grants on behalf of farmers, and for planning, implementing and coordinating the LandCare projects on the ground.

7.4.2.2 Knowledge and skills

All respondents affirmed that it is essential that farmers are capable of determining the ideal state of the NR as it will help them know what they are working toward if they have an idea of how a good NR looks like. The knowledge and skills that respondents feel farmers need to acquire from the programme include understanding the benchmark conditions of NR, identifying the difference between ‘good’ and ‘bad’ NR conditions, and the causes and effects of degradation of NR resources in agriculture. Respondents indicated that most NRM uses many scientific terms and that it is the role of the responsible extension officer to ‘simplify’ the scientific language for farmers to grasp them. NR knowledge and skills should be acquired through training and awareness days offered by extension officers and participating role-players.

7.4.2.3 Command opportunity

All respondents indicated that according to LandCare policy, farmers should be engaged in all the processes of the projects because farmers need to be able to continue with the project on their own after the support is withdrawn. Extension officers are the ones to take the responsibility of ensuring farmers participation in all the processes of projects to ensure they acquire knowledge, skills and the confidence to do things on their own. In practice, however, respondents felt that farmers are not engaged adequately as evidence by farmers continuing to depend on external support even after the project has exited.

7.4.3 Identifying current state of resources

In the context of this paper, identifying the current state of the NR refers to the capacity to follow specified procedural steps to assess the current condition of their NR unaided or with minimal assistance.

7.4.3.1 Structures and system

In terms of measuring the current state of NR, respondents identified the following structures to be in place in the implementation of the LandCare projects: DEA, District Department Agricultural (DDA), NDA, local municipality, ARC⁶, SANBI⁷, and universities. DEA provides environmental management specialists to train farmers and conduct veld assessments. DDA provides extension officers to offer extension services relevant to NRM and agricultural production. NDA provides training to extension officers on how to build capacity of farmers to manage their NR sustainably. Local municipalities, ARC and universities provide awareness to farmers about the significance of conserving NR resources.

7.4.3.2 Knowledge and skills

Most respondents indicated that LandCare policy encourages incorporating local capacities in implementing LandCare projects. The standard process for conducting NR assessments is too scientific and complex to be easily grasped by farmers, thereby making it important to embrace and incorporate local capacities in the training. The knowledge and skills that should be imparted to farmers by extension officers in this context are primarily conducting veld assessment and soils assessment. Further, respondents indicated that the National LandCare office offers training to extension officers about forming farmer study groups, facilitation and developing extension intervention.

7.4.3.3 Command opportunity

All respondents indicated that LandCare policy suggests that all participating farmers should be engaged in all the processes of the LandCare projects so that they will have capacity and

⁶ ARC- Agricultural Research Council is to be a premier science institution that conducts research with partners, develops human capital and fosters innovation to support and develop the agricultural sector.

⁷ SANBI- The South African National Biodiversity Institute, is a national entity and a research institute that coordinates research, monitors and reports on the state of biodiversity in South Africa. SANBI also provides planning and policy advice; pilots management models; and developed and implemented climate-resilient projects.

confidence to continue with the work when the project ends. Some respondents indicated that some extension officers only engage farmers in interpreting results from the assessments conducted by participating role-players. Other respondents stated that it is pointless to enable farmers' opportunity to perform tasks on their own without giving them proper knowledge, skills and opportunity during training. Further, other respondents indicated that farmers have all the opportunity to practice what they have learnt, but in most cases they lack resources to conduct those assessments. One respondent noted that farmers are ever dependent on external support and the fact that LandCare works with voluntary farmer groups are some of the reasons why it difficult to establish LandCare movements in South Africa.

7.4.4 Identifying action to improve the resource condition

In the context of this paper, the capacity to identify what actions to take to improve the NR comprises the capacity to interpret data against a norm (ideal) and plan appropriate action.

7.4.4.1 Structures and systems

In terms of building farmer capacity to identify and implement actions to improve the condition of the NR, respondents identified the following structures and systems: provincial LandCare office, DEA, Mahlathini farmer group, EPWP, PDA, Grain SA and farmers. The role of the Provincial LandCare officer is to help identify actions to take and to help with training to operate chainsaws and occupational safety for rehabilitating vegetation. DEA participates in training farmers about farming systems that farmers need to adopt to conserve their NR. Mahlathini farmer group contributes to training about agriculture provided to farmers.

7.4.4.2 Knowledge and skills

The results show that there are two sets of farmer capabilities that are built in LandCare pertaining to 'actions to take': the ability to rehabilitate degraded NR; and capacity to manage NR sustainably. Most respondents indicated that implementing rehabilitation programmes is coordinated by EPWP in partnership with extension officers and local leadership. These parties employ community members and train them how to rehabilitate degraded NR. This training focuses on imparting skills and knowledge relevant to using chainsaws to remove

alien species, first aid, application of chemicals and fertilizers, stone packing, and fencing of dongas. The training offered to these employees depends on the specific NR issues faced by the farmers. Rehabilitation is carried out under the supervision of extension officers and the farm owners.

In terms of building capacity of farmers to manage their NR sustainably, most respondents indicated that it is the responsibility of the extension officer and the participating role-players to train farmers in basic veld management, grazing and grazing camp management, and agricultural production management. Respondents also indicated that extension officers are products of universities which imply that the National Office has a role of training extension officers specifically on how LandCare projects are implemented and offer them opportunities to gain experience and confidence.

7.4.4.3 Command opportunity

All respondents indicated that LandCare policy expects farmers to be given opportunities to apply the knowledge and skills they acquire. Opportunities should be granted during training and on their farms to help them gain experience and confidence. In rehabilitation, it is evident that little opportunity is given to the farmers since this part of the project is actually focused on creating employment for community members. However, in capacity to manage NR sustainably, farmers should be given full opportunity and freedom to apply the capabilities they have acquired from training. The respondents further noted that farmers do not have opportunity to voice out what they wish to learn in the training, but they are afforded knowledge and skills deemed necessary for the type of crisis they are experiencing.

Additionally, respondents explained that LandCare projects on the ground often fail to attract sufficient relevant role-players to assist with additional funding and technical support during implementation. They also noted that extension officers generally fail to link the support of the existing role-players to the overall vision of LandCare. As a result these structures often work in silos. One respondent indicated that the selection criteria for LandCare beneficiaries need to be revised and refined since the process currently seems to attract farmers that have no passion for agriculture as a business. Another respondent indicated that politics have regularly influence the effectiveness and sustainability of LandCare projects by imposing

unrealistic deadlines for expenditure of funding. This puts pressure on the implementation process and creates room for many mistakes.

7.5 Analysis

Figure 8 presents a graphic overview analysis of words from the interviews with key informants. The diagram does not provide content analysis; it depicts word frequency from the interviews.

Word frequency is commonly used to identify the most frequently occurring words and/or concepts from a transcript or information sources. In the context of this paper, word frequency is used to identify possible themes from the responses of key informant. The frequency query (in NVIVO) was run among the three capacity areas of the capacity building framework discussed earlier: identifying the ideal state of their NR; identifying the current state of their NR; and identifying and implementing the action needed to improve the condition of their NR. The results from running word frequency are then presented in the form of a word cloud as in Figure 8.

In the word cloud, the colour and word direction have no particular meaning and provide no analysis on or about the study. However, word size and location reflects the frequency of words. The most frequently used words and concepts in the word cloud are represented by being largest in size and closest to the centre of the cloud, and vice versa for the least frequently used word and concepts. The themes were then identified and formulated from the most frequently used words and concepts with an understanding of the issues identified by respondents in the interviews.

Table 7: Thematic description developed from interview with key informants

Themes	Related issues
Extension role in building farmer NR problem solving skills	<ul style="list-style-type: none"> • LandCare focuses on building technical skills • Farmers are given information about the nature problem and how to identify the symptoms of problem • Farmers are not trained to identify the root cause of the problem • Farmers are not given skills of planning for actions to take to solve the problem • Farmers are provided with technical skills of how prevent the problem from reoccurring • Few farmers are provided with technical skills to rehabilitate the degraded NR • Farmers are not trained to evaluate the effectiveness of the measure implemented to solve the problem post project life
Farmers' opportunity to deal with NR issues	<ul style="list-style-type: none"> • LandCare policy encourages farmers participation in all the processes of project • Farmers are mostly given opportunity to apply technical skills of preventing NR problem from reoccurring on their farms • EPWP employees are given opportunity to rehabilitate the degraded NR • In some aspects the freedom is given but the knowledge and skills are not provided adequately

7.6 Discussion

This study is first of its kind to investigate the sustainability of the impact of LandCare projects from the dual perspective of the role of extension and LandCare in building capacity of the farmers to be self-reliant in managing their NR. The discussion centres on the findings set out in

Table 7. These are the perceptions of the key informants who were interviewed.

7.6.1 Extension role in building farmer NR problem-solving skills

Problem-solving in NR is not fundamentally different from problem solving in any other field. Application of Polya's method in LandCare implies that capacity building programmes intended for farmers should be guided by Polya's 4 sequential steps. In terms of

‘understanding the problem’ the results shows that SA LandCare programme executes this with sufficient care since they only engage farmers in learning about the causes of NR crisis through awareness programme conducted in the beginning of each programme. In ‘planning for solution’ the results shows that farmers are not engaged at all in the planning of how the problem would be resolved. With regards to ‘executing the solution plan’ step, the LandCare programme has two parts: rehabilitating the degraded NR and building farmer capacity to sustainably use and manage their NR. The findings reflect rehabilitation of degraded NR is executed without sufficient care since this is carried out by EPWP employees (community members) and excludes LandCare beneficiaries. The capacity building amongst farmers to manage and sustainable use the NR is carried out with sufficient care since all farmers are engaged in training about good agricultural practices that do not harm or degrade NR. The study further shows that the programme does not engage in executing the ‘evaluation’ step since all respondents declared to have not either conducted, trained or witnessed this step being executed. Overall and according to Moore (2018) this implies a great chance of the project losing track of what it wants to achieve and eventually will yield undesired outcomes.

7.6.2 Farmer opportunity to deal with NR issues

This theme refers to the opportunity that farmers have to utilise acquired capabilities and the freedom to command the structures and systems in place (Lammert *et al.* 2015). The key informants interviewed felt farmers should be involved in all the processes of the project to provide them with the experience of identifying the ideal state of the NR, measure the current state of their NR and identify and implement actions to rehabilitate their degraded NR. They noted, however, that on the ground it appears that farmers are only given opportunity in the aspect of applying preventative measures. This is inconsistent with Mohamed-Katerere’s (2001:116) suggestion that participation in NRM projects creates autonomy amongst farmers and can increase economic and managerial efficiency. He argues that this efficiency is created when “local populations who bear the cost of natural resource management to make decisions, rather than leave them in the hands of outsiders or unaccountable locals”. He argues further that the “proximity of local participants” reduces the “administrative and management transaction costs”. Finally he argues that this efficiency is created by using local knowledge, values and aspirations in project design, implementation, management and evaluation.

7.7 Conclusion

This study found, from the perspective of those enabling the LandCare system, that LandCare policy embraces the principles of learning-based extension and capacity building. However, on the ground LandCare is primarily focused on imparting technical skills of dealing with the current immediate problem and less on building farmers soft skills to be autonomous in dealing with problems they face in their day-to-day operations. Through the lens of learning-based extension, these findings imply that LandCare overlooks the fundamental and essential element of learning capacity that enables farmers to engage in scientific enquiry, thereby become equal partners in the development initiative. This suggests that while the immediate results of LandCare projects are positive, they are likely destined to be short-lived given the failure to include farmers in the process, to build their capacity to manage their NR effectively, and to afford them the all-important opportunity to command the processes that impact on their NR.

The study further found that this failure to build capacity stems from the disconnection between the LandCare policy and implementation where capacity building is sacrificed in favour of shorter-term outcomes – primarily short-term jobs creation and rapid repair of degraded NR. In brief, LandCare policy is on point with engaging farmers in all the processes of the development from planning, implementation to evaluation, but the actual implementation shows that farmers' participation is limited.

Further in the context of capacity building, this part of the study found that LandCare projects specifically invest more effort on upskilling farmers to change to farming systems that tend to conserve NR and less effort building their capacity to determine the ideal state of their NR, assess the current state of their NR and determine and take appropriate action. While training farmers in conversation-friendly farming systems is laudable, skills are learned without depth of understanding the underlying principles. Effectively, the farmers simply learn a 'new' method of farming without really understanding why. This implies that farmers will remain dependent on external support post project life to address NR issues.

7.8 Implications

LandCare policy and implementation must be coherent to improve the chances of achieving desired outcomes.

Proper monitoring and evaluation processes should be put in place to check if the projects are being implemented as expected in policy and heading toward the intended outcome, and if the project has impacted as planned.

LandCare should also focus on building soft skills among farmers as this will have a substantial positive impact on the sustainability of the outcomes and the overall success of LandCare.

Although implied in the other implications, LandCare needs to take special measures to ensure farmers are empowered to be and treated as equal partners in their development to improve their sense of ownership of the project, and, thereby, own the outcomes of the project. Anything less will limit LandCare to short-term successes and render the programme ultimately ineffective in its primary objective of creating a movement owned and driven by the people.

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Chapter 8: General discussion and conclusion

8.1 Background and introduction

South Africa (SA) LandCare was adopted from the Australian grass-roots model in 1997 (Aliber 2002) to combat issues that have existed since the origin of modern agriculture in South Africa which have promoted farming practices that led to soil erosion, overgrazing, wetland and watercourse destruction, and bush encroachment (Ward 2 Forum Team 2016). The mismanagement of natural resources has been traced to a lack of capacity of farmers to apply adequate natural resource management (NRM) practices, inadequate information about consequences of their land management practices and the spin-off effect on other farmers (especially smallholder farmers) utilizing the same resources (Mulder & Brent 2006; Ward 2 Forum Team 2016).

The South African LandCare programme was developed with an initial goal of optimising productivity and sustainability of natural resources to improve agriculture productivity, food security, job creation and better quality of life for all (Aliber 2002). Ward 2 Forum Team (2016) states that the LandCare goal stresses the development and implementation of integrated NRM approaches which are efficient, sustainable, equitable and consistent with the principles of ecological sustainable development. The goal of LandCare was derived from the vision which seeks to have a society that has adopted ecological sustainable approaches in the management of NR and environment while improving livelihoods (Ward 2 Forum Team 2016; Aliber 2002).

The sustainability of the impact of LandCare internationally and, specifically, in SA is dependent on the effectiveness of agricultural extension in implementing LandCare projects and programmes. Key to improving sustainability of LandCare programmes is appropriate capacity building amongst farmers and other key role-players in the mix. South African LandCare is perceived to be more oriented toward providing relief and imparting technical knowledge and skills to farmers that are experiencing NR crises. These farmer/rural level NR crises are complex in that the root cause is embedded within the socio-economic aspect of their livelihoods (Aliber 2002); and this requires an appropriate approach in addressing it.

LandCare has been successful in achieving some of its policy objectives such as rehabilitation of degraded NR, upskilling participating farmers with technical skills, raising awareness and creating employment amongst rural people in surrounding rural communities (Aliber 2002). However, pivotal to any development -which remains a key question of this study- is the extent to which the development programmes build sustainability, self-reliance and resilience. Vital to achieving these is prioritizing capacity building of farmers and all stakeholders involved, where learning and the farmers are the focus of the development (Worth 2006). Thus this study explored the role of extension and LandCare in building farmer capacity for sustainable NRM.

To address the key questions of this study, an investigation was conducted amongst farmers, extension officers, and officials involved in policy-making and development to determine their respective perceptions about the role of LandCare and extension in building farmer capacity. This paper presents the overall discussion and conclusion of the findings of the study.

8.2 Theoretical framework

This study embraced two theories; learning-based agricultural extension and capacity building. These frameworks were adopted to clarify the research problem and to give structure for designing the research project and guiding data collection, analysis and interpretation. The first concept to be discussed is agricultural extension.

8.2.1 Agricultural Extension

Literature suggests that agricultural extension is a relative term and that there is no universally accepted definition or approaches for the concept. Definitions vary from one institution to another. Similarly, the various extension approaches are appropriate only when applied in their respective relevant situations (World Bank 2012; Rezaei-Moghaddam & Karami 2008). Furthermore, extension has evolved in theory from being oriented in extending tertiary scientific knowledge to out-of-school people with no access to knowledge sources (Chauhan 2007) to embracing learning as an approach and also as a theory of

improving self-reliance and resilience of people, thereby improving sustainability of rural development projects/programmes (Terblanché 2008).

Given the numerous roles that extension plays in rural development and agriculture, it is essential to understand that what is implemented by extension workers on the ground is mostly informed by the policies of the specific institution rendering extension services. This implies that the role of extension in SA in the public and private sector varies depending on the specific policies informing planning and implementation. However, the growing consensus emphasizes that extension, while necessarily operating in a context, should be more oriented toward helping farmers help themselves rather than achieving some particular agricultural development objective (Terblanché 2008). This prioritises careful selection of approaches to adopt when working with farmers' complex and diverse agricultural and livelihood scenarios. Helping farmers help themselves can be achieved realistically only through building farmer capacity where learning and effecting behavioural change are core and fundamental in framing the role that extension adopts (Boon 2009).

Learning-based extension is consistent with how 'helping the farmer help themselves' can be achieved. It posits that the role of extension is concerned primarily with building capacity of the farmers, researchers and extension workers in working towards facilitating the desired change in the context of farmers' current position and future aspirations. Learning-based extension does not dismiss other approaches to extension, nor does it disqualify any extension role; rather it embraces them all. It suggests that extension should be about building capacity for self-directed learning and empowering farmers to be equal partners in development. Learning-based extension further emphasises that, fundamental to helping farmers help themselves, extension should place three things in the centre of development: farmer learning, appropriate placement of technology; and the farmers themselves (Worth 2006).

8.2.2 Capacity building

Capacity building is a popular term in rural development as a concept and approach to improve the livelihoods of poor people in rural areas. Capacity building is applicable not only in rural development but more generally, it also implies providing education and training beyond schooling to enable people to partake in specific activities unaided (Rola-Rubzen &

Gubunanda 2003). Before understanding capacity building as a concept and an approach, it is essential to grasp the meaning of the term capacity

8.2.2.1 Capacity

Generally, capacity is equated to capability; however, in definition they differ. Capability is defined as one's ability to perform a certain task which is characterised as possessing knowledge and skills (Van Vuuren 2017). In rural development, capability is not a synonym for capacity; but it is an element of capacity. Capacity is then defined as one's ability, aptitude or competency to perform a particular task successfully and sustain the achievement over time. Capacity comprises of attributes, assets, capabilities and relationships that enable one to be self-reliant in performing a task and resilient in the face of change (Walters 2007). Alba and Lavergne (2003) state succinctly that capacity is comprised capabilities (knowledge, skills and competency); structures (effecting institutions and organisations) and systems (policies and rules governing and guiding the development process).

8.2.2.2 Capacity building as a concept

The United Nations Economic Commission for Africa (UNECA) (2014: 5) defines capacity building as: "the process through which individuals, groups and organisations, and societies deploy, adapt, strengthen, and maintain the capabilities to define, plan and achieve their own development objectives on an inclusive, participatory, and sustainable basis". Similarly, Stavros (1998) defines capacity building as a 'process' of strengthening people and their organisations to be able to effectively serve its people and consider the impact on all stakeholders. Babu and Sengupta (2006) echo these definitions but add that capacity building should be centric to any development agenda and should be focused on effecting the farmers' opportunity to take ownership of change initiatives and embrace local capacity.

8.2.2.3 Capacity building as an approach

Capacity building as an approach is defined as an on-going process or journey (Bolger 2000); not an outcome or output of a project (Pack 2018). A capacity building approach (CBA) obliges the development intervention to go beyond the project world -that focuses on delivering output within a timeframe- to realising and focusing on how the project's outputs

impacts on sustainability (Eade 2010) at three levels within which the intervention operates: individually; organisational; and at systems level (Bester 2015). CBA is ‘continuous’ as it focuses the engagement to constantly cultivate capabilities of the people involved to enhance problem-solving abilities related to their livelihoods, health and, as in the case of this study, NR. The World Bank suggests that CBA is an on-going ‘learning’ process driven by local people, and facilitated and supported by change agents which seeks to promote local ownership and achieving local aspirations. CBA also emphasizes a synergistic learning partnership between local people and change agents as this forms a strategic effort toward effecting economic and social change (Otoo *et al.*2009).

CBA does not provide a fixed procedure for building capacity; rather it provides a framework built on five principles that guide the design, implementation and evaluation of capacity development interventions (Bolger 2000):

- Inclusive participation and local ownership;
- Learning and synergistic partnership between key stakeholders;
- Embracing local capacities;
- Continuous learning and adaptation; and
- Focusing on sustainable development.

8.2.3 Building capacity of farmers

Building capacity of farmers embraces CB as a concept and as an approach. It is an on-going process which can be visualised as a ladder (van Vuuren 2017) of improving technical knowledge, skills and attitude of individuals, organisations or communities (Photakoun 2010). Building farmer capacity prioritises improving the farmers’ ability to learn continuously and be resilient, in an ever-changing environment in order to achieve their objectives (Nettle *et al.*2010). This can be achieved through improving farmers’ access to structures and systems necessary for development to take place and effecting farmers’ opportunity to command the structures and systems in place (Lammert *et al.*2015; Nettle *et al.*2010).

From the various definitions of the concept of capacity above abstracted from literature, this paper synthesises the definition of ‘capacity’ and refers to it as a set of elements that makes

human systems function and be resilient. Capacity building comprises 5 elements: knowledge, skills, opportunity, structures and systems. For capacity building to work, it should be guided by three sub-processes: effecting access to information sources; facilitation and empowerment; and engaging in participatory technological development and mentorship (van Vuuren 2017). Independent access to information is also critical so that farmers do not develop dependency on external stakeholders but can be self-reliant in directly accessing, analysing and applying the information they need. Facilitation and empowerment are central as they ensure that the process is iterative – an essential key to sustained learning. They also foster ownership and self-reliance. Technological development reinforces the importance of engaging farmers in the process of developing new technologies suited for them for purpose of learning and owning the outcome (Coutts & Roberts 2003).

8.3 Discussion

In keeping with the objectives of the research study and ensuring that the research questions are answered, this discussion is presented using objectives and research questions as variables for discussions.

8.3.1 Agricultural extension in the context of capacity building

Agricultural extension is a relative concept and its theories and practices have evolved over years (Rezaei-Moghaddam & Karami 2008). La Grange *et al.* (2010) and Glendenning *et al.* (2010) defines agricultural extension as a facilitated exposure of farmers to information relevant to their livelihoods and farming operations which emphasises that the role of extension is focused on building farmer capacity to be in an informed position to decide on the appropriate changes to be implemented in their farming business. Extension is also embedded in the philosophy of ‘helping the farmers help themselves’ which prioritises behavioural change as a core principle of community development (Terblanché 2008). Worth (2006) earlier confirmed these definitions and referred to agricultural extension as being concerned primarily with building learning capacity among farmers, researchers and extension practitioners in working towards facilitating the desired change in the context of the farmers’ aspirations.

Capacity building as a concept is defined as a process of enhancing abilities of one or more people to define, plan and execute their own development objectives (UNECA 2014). Similarly, Stavros (1998) refers to capacity building as a process of extending boundaries and enhancing the organisation and its people's abilities to effectively serve its people and consider the impact of all stakeholders. Babu and Sengupta (2006:2) echo these definitions, but add that capacity building implies taking ownership of change initiatives and should be "an integral component of development agendas". More specifically, they argue that "development plans and goals cannot be achieved without adequate local capacity" and that lack of local capacity persists to the detriment of development efforts. Further, Otoo *et al.* (2009) define capacity building as an on-going learning process that is driven by local people while facilitated and promoted by leaders, coalitions and other agents of change -- enforcing institutional change to enhance local ownership for effectiveness and efficiency in the efforts towards achieving objectives.

This study synthesised the definition of capacity building from the definition abstracted from literature by referring to it as a set of elements that makes human systems function on their own and be resilient. True capacity building involves strengthening and/or putting in place the 5 capacity elements in place for human systems to function, survive and self-renew: knowledge, skills, opportunity, structures and systems. As depicted in Figure 2 in Chapter 2, and as noted above, for a capacity building process to work, it should be guided by three sub-processes: information access, facilitation and empowerment, and participatory technology development.

The role of extension in building farmer capacity is, then, to help farmers strengthen the five key elements of capacity through facilitating and coordinating the three main three sub-processes of building capacity. This implies that the role of extension is to 'help' the farmer climb the capacity ladder. 'Helping' does not imply pulling or pushing farmers up the ladder or in any way being the impetus for climbing; it does imply strengthening farmers' capability and enabling the opportunity for farmers to climb the ladder on their own, unaided. The key process to building capacity is through 'facilitation for empowerment' as it encourages farmers to actively participate in their development and own the outcomes of their decision and actions.

8.3.2 Relationship between Agricultural Extension and the LandCare programme

In SA Landcare policy, this study found that the role of extension is contextualised in three processes: awareness programme, major community works, and capacity building.

In the *awareness programme*, agricultural extension, often in collaboration with other role players in the public and private sectors, informs people who are dependent on NR, about the potential detrimental outcomes of the unsustainable use of natural resource in agriculture and the impact that it has on the livelihoods of the farmers and on the social and economic spheres locally and nationally. Extension also informs people about policies and institutions that are responsible for supporting farmers (particularly) who are engaging in unsustainable use of natural resources as well as those farmers who are already suffering from the consequences of poor use and management of NR.

In *major community works*, agricultural extension is responsible for three things: identifying farm and/or other areas in the community that exhibit significant degradation of NR; acquiring funding from LandCare; and implementing the rehabilitation work.

In *capacity building*, agricultural extension, through its field officers and in collaboration with resource conservation officers and operatives from other relevant government departments and NGOs in the NRM field, takes the responsibility of undertaking community motivation and designing and facilitating the LandCare educational programme. Included as part of this programme of building farmer capacity is the restructuring of the extension services and extension training facilities to include primary-level conservation and production advisory services (Curtis *et al.*2008).

According to the findings of this study, in practice and in accordance with the framework of building farmer capacity to manage NR (Chapter 4, **Error! Reference source not found.**), extension is contextualised in three capacity areas: determining ideal state of NR; measuring current state of NR; and identifying and implementing action to solve the NR problems. The primary roles of extension in three areas of NRM capacity are mobilizing relevant stakeholders to LandCare projects and coordinating implementation activities including raising awareness, rehabilitating and maintaining NR and upskilling farmers in sustainable agricultural practices.

8.3.3 How does the LandCare programme ensure the sustainability of its impact?

Literature suggests that sustainability of any development intervention is dependent on building true capacity. This study has described sustainability of impact as being dependant on three factors: knowledge and skills; opportunity to command; and access to information sources.

8.3.3.1 Knowledge and skills

The findings of this study show that community members (as opposed to farmers in particular) are the main beneficiaries of training for rehabilitation of NR. Rather than developing the knowledge and skills of farmers, the Expanded Public Works Programme, which is the programme through which the training is implemented, employs non-farming community members in an effort towards achieving the separate and unrelated objective of creating employment (particularly in rural communities). While this may be due to the demographics of the farmers, being predominantly older and female, which may be seen as less attractive from a training perspective, it is inconsistent with the LandCare goal of promoting local participation of farmers in identifying and implementing action to solve local problems (Toyne & Farley 2000) since it deprives them of opportunity to acquire capacity to do so.

The findings further show that capacity building amongst farmers is focused primarily on actions to prevent NR crises; this focus appears to be felt as critical in ensuring that the problem does not arise in future. Less attention is placed on determining the ‘ideal state of the NR’ and measuring the ‘current state of the NR’ which are equally significant as they build toward the overall capacity to be self-reliant and resilient in managing NR sustainably. Further related to actions around the ideal and current state of NR, the findings shows that farmers are provided only with the information (outcomes) from assessments of the current state of NR, not with the knowledge and procedures of how the process was carried out. A common example of this is when the farmers are only engaged in interpreting results from assessment of their grazing land conducted by other participating role-players. This is done on the assumption that the farmer does not need to know the process because there is someone to do it on their behalf. This is inconsistent with researchers such as Coutts and

Roberts (2003) who argue that building true capacity should reduce dependence on external support and foster greater self-reliance.

Problem-solving in NR is not fundamentally different from problem-solving in any other field. Thus, Pólya's problem-solving method can be applied. Pólya outlines four sequential steps which is essentially a reflexive process: (1) understanding the problem; (2) planning the solution; (3) executing the solution plan; and (4) evaluating the results. While this method seems obvious and oversimplified, overlooking one step or executing it without sufficient competence is common, invariably to the detriment of the desire to solve the problem. Following these steps in earnest, as deceptively simple as they appear, is essential and yields consistent success and reliable outcomes (Moore 2018).

Applying Pólya's method to LandCare implies that capacity building programmes intended for farmers should walk the farmers through Pólya's four sequential steps to build their problem-solving capacity. And thus the findings of this study can be examined in their light. Outwardly, the four steps are followed. The NR problem is understood, at least in the form of identifying degraded NR. A solution is planned; to rehabilitate the NR. The plan is executed. And the results are evaluated; the measure being that the degradation has been addressed. However, the findings show that the farmer is almost entirely absent as an active learner in the process.

In terms of 'understanding the problem', the findings show that the SA LandCare programme engages farmers in learning about the general causes of NR degradation through awareness programmes conducted in the beginning of each programme. As noted earlier, the farmers are not involved in determining what would be ideal NR on their farms nor in the assessment of its current state. They are not even informed of how the assessment is done. They are merely informed of the results of the assessment done by others.

In 'planning the solution', the findings show that farmers are not engaged at all in the planning of how the problem would be resolved. Plans are done by LandCare specialists and often predetermined as standard rehabilitation procedures.

With regard to 'executing the solution plan', the LandCare programme potentially has two opportunities to walk with farmers: rehabilitating the degraded NR; and building farmer

capacity to sustainably use and manage their NR – the latter as a means of limiting and addressing future NR degradation. The findings indicate that farmers are not involved in implementing the plan to rehabilitate degraded NR. The work is carried out by EPWP employees (community members) and excludes LandCare beneficiaries. The study did find that LandCare does walk with the farmers in building their capacity to manage and sustainably use NR; all farmers in the programme are engaged in training about good agricultural practices that do not harm or degrade NR. However, the capacity building effort is limited particularly in terms of how the effort is conducted on the ground where little focus is given to facilitating farmers' access to information and knowledge sources as a mechanism to reduce dependency with regard to acquiring, analysing and applying knowledge.

And finally, the study shows that the programme does not walk with the farmers in executing the 'evaluation' step. It would appear that Polya's fourth problem-solving step is not done at all. All of the respondents indicated that they have not conducted, trained or witnessed this step being executed.

Against this assessment using Polya's four steps, farmers in the LandCare programme are essentially not being walked through the problem-solving process. This implies that the capacity of farmers to solve NR problems is not being built. Further, these findings imply, as argued by Moore (2018), that there is a great risk of the project losing track of what it wants to achieve, eventually yielding undesired outcomes, and defeat its primary purpose.

8.3.3.2 Opportunity to command

This theme refers to the opportunity that people have to utilise acquired capabilities and the freedom to command the structures and systems in place (Lammert *et al.* 2015). The key informants interviewed felt farmers should be involved in all the processes of the project to provide them with the experience of identifying the ideal state of the NR, measure the current state of their NR and identify and implement actions to rehabilitate their degraded NR. They noted, however, that on the ground it appears that the only opportunity afforded farmers is in the aspect of applying preventative measures on their own farms. Effectively, farmers are passive learners, learning by rote how to prevent NR degradation – and this at the end of the multi-step process. This is inconsistent with the finding of researchers such as Mohamed-

Katerere's (2001:116) who posited that participation in NRM projects creates autonomy amongst farmers and can increase economic and managerial efficiency. He argues that this efficiency is created "by allowing local populations who bear the cost of natural resource management to make decisions, rather than leave them in the hands of outsiders or unaccountable locals". He argues further that the "proximity of local participants" reduces the "administrative and management transaction costs". Finally he argues that this efficiency is created by "using local knowledge, values and aspirations in project design, implementation, management and evaluation."

With regard to identifying and implementing actions to rectify identified NR problems, the findings show that capacity is potentially built in two aspects: NR rehabilitation; and NR degradation preventive measures. However, the farmers in this study revealed that they have only limited freedom to apply acquired skills in identifying and implementing actions to rehabilitate NR and prevent the problem from occurring again. In the midst of this, farmers felt they have more opportunity and freedom to apply acquired capacities in the aspect of production practices. Further, it was found that the farmers have limited opportunity to command the structures and systems in place driving the implementation of the project on their farms. They do have the freedom to adopt/accept or reject measures applicable to them. This is inconsistent with capacity building theory suggesting that sustainability of development initiatives is strongly reliant on one's (e.g. the farmer's) capability and opportunity to command the relevant structures and systems in order to maintaining the development outcomes beyond the project life (Lammert *et al.*2015).

Participation is directly associated with the concept of opportunity presented in this study which found that farmers did not participate in any meaningful way in the projects and, thus, little opportunity was afforded to them. The argument here is that while on the surface the LandCare projects appear efficient from the perspective of budget expenditures and the immediate rehabilitation of the particular NR issue, in the long-term, the projects are less efficient than they would be if farmers had genuinely participated. Such participation would have led to greater opportunity to command the processes affecting their NR. Farmers had little opportunity to engage in decision-making about the development intended for them. This suggests that the NR problems are likely to recur and that the farmers will be in no substantially better position to address them than they were before the project – ultimately

requiring a repeat project at additional expense. This is the very antithesis of true economic and managerial efficiency. Slater *et al.* (2016) further indicate that it is a common reality that programmes directed at the same populations are not coherent in their design or application and often work independently of and at cross-purposes with one another – highlighting the need for greater coherence in design and implementation.

8.3.3.3 Access to information sources

According to Coutts and Roberts (2003) one of the key elements of building true capacity is facilitating farmers' access to reliable and relevant information sources to address their day-to-day challenges. However, the findings show that the South African LandCare programme focuses only on disseminating information deemed necessary for farmers to know to practice sustainable use and management of NR; there is no effort to help farmers have access to information sources. Thus, instead of being put in the position of being able to make informed decisions about NR management (La Grange *et al.* 2010), farmers are made to be dependent on external agents. This implies that farmer capacity is not being built and that LandCare is far from developing self-reliant farmers able to sustain the impact of the project after external support has exited.

The findings also show that implementation of LandCare projects disregard local information and perceive it as void of sound theory and scientific facts. This reinforces the position that farmers should rely on the information provided by LandCare. Paradoxically, some respondents felt that the information imparted to farmers is too scientific for them to grasp, or is at least not presented in a manner that is consistent with their literacy levels. This encourages LandCare to resort to doing things on the farmers' behalf. An example is at field days when farmers are given information on how to conduct veld assessments and calculating farm livestock caring capacities during, while their local knowledge and skills is disregarded. After training, farmers are deprived of the opportunity to practice on their farms what they learnt. Instead, the role-player (training agent) conducts the entire veld assessment for the farmers. This LandCare practice is inconsistent with the principle that building true capacity implies enabling farmers to take ownership of the change initiative – building on and reinforcing local capacity. Failure to advance local capacity ultimately is detrimental to the development efforts (Stavros 1998).

6.3.4 Mitigating core problems rather than focussing on symptoms

The findings show that the training directed to adapt the current farming practices is not informed by any understanding of the socio-economic factors driving unsustainable agricultural practices. An example is the attempt to reduce overgrazing, where farmers are requested to reduce livestock numbers through selling to avoid exceeding the carrying capacity of the farm. This is done without taking into account the social value of livestock to farmers. Farmers agree to sell but when the project agents have left, the farmers keep, and sometimes increase their livestock numbers. Training that ignores this or other fundamental cultural realities is inconsistent with LandCare's purported grass-roots approach that suggests that the interventions should be developed to address issues that affect farmers and should take into consideration the knowledge, values and ideas of local people (Mercado and Sanchez 2020).

8.4 Conclusion

This study found that the LandCare project has been successful in rehabilitating most of the NR problems faced by affected farmers. It has also been successful in imparting knowledge and skills to farmers to prevent future NR degradation. However, the sustainability of the project remains in doubt. In the light of capacity building theory, this study found that the implementation of the LandCare is less likely to yield sustainable results. This is based essentially on the discovery of the disconnection between the intention of LandCare policy to build farmer capacity and the actual practice of LandCare extension amongst farmers. Extension practices in the LandCare programme do not conform to the building capacity theory suggesting that true capacity building starts from building on what farmers know and have. Further, the study found a disconnection between the goals of the farmers and of LandCare. The disconnection is caused by the exclusion of farmers in the full process of addressing NR issues and, rather, positions them as passive participants on the receiving end of the project.

In the context of capacity building, this study found that the LandCare project invests more effort on upskilling farmers to adopt and implement farming systems that tend conserve NR

and less on understanding the dynamics of managing NR, particularly in determining the ideal state of their NR, measuring the current state of their NR and then planning, executing and implementing appropriate responses. This implies that farmers will remain dependent on external support post project life as the project has left them with limited capacity and experience to deal with potential NR crises. The study further found that while the LandCare policy is on point with engaging farmers in all the process of the development from planning, implementation to evaluation, the evidence around implementation shows that farmers' participation is limited – thereby limiting capacity building.

In the context of learning-based extension theory, this study found that LandCare projects do focus on building partnerships for development. However, these partnerships are not synergistic because the farmer is inferior and has far less power than the other partners in all the processes of the project. The study also found that the role of extension is not adequately contextualized in LandCare; it does not focus on building farmer capacity for self-directed learning to become equal partner in the development of farmer's situation.

The study found that farmers have limited opportunity to command existing structures and systems and have limited freedom to participate in most processes of the programme except for those relevant to their production. This, in the face of extension theory, implies that farmers are at the receiving end of the project and not the equal partners in their development. It suggests that the LandCare programme itself is not sustainable because it fails to build the very capacity required to ensure the care of the land by the primary users of that land.

Drawing on the perspective of farmers who are part of the programme, the success of LandCare projects is measured primarily by the completion of the implementation (rehabilitation) phase, and not by the impact of the project and its sustainability amongst farmers through building their capacity to manage this aspect of their livelihoods. The study also found that the LandCare programme prioritises three things: creating employment for the surrounding community through rehabilitation works; raising awareness; and training farmers to change their current farming practices. While each action has merit, they make little contribution to and seem to be the antithesis of the intentions of the LandCare programme and intention of the theory of learning-based extension and capacity building.

8.5 Recommendations

This section addresses the following research question: What changes in extension and the LandCare programme are needed to ensure that farmer capacity to manage NR is effective? Drawing on the findings and conclusions of the study, the following actions are recommended:

- Implementation of LandCare should be aligned to policy to improve the chances of achieving desired outcomes;
- To improve their sense of ownership of the project, and, thereby, own the outcomes of the project, farmers should be empowered, engaged in all the activities of project including planning and be afforded an opportunity to apply their own knowledge and skills in their farms; as a part of this, farmers should be empowered to be and treated as equal partners in the full LandCare cycle;
- In addition to the technical skills it currently imparts, LandCare should also focus on building soft skills among the farmers as this will contribute immensely on the sustainability of the project;
- Capacity building practices in LandCare should adhere to the intention of LandCare policies and guided further by capacity building theory. Specifically, implementation of the policy should more closely adhere to its own stated intentions and not be diverted through the expediency of the short-term achievements of rehabilitated land;
- To foster self-reliance and resilience among farmers in managing their NR, capacity building should be planned and executed in all three areas of capacity in NRM (as depicted in **Error! Reference source not found.** in Chapter 4);
- There needs to be greater coherence in the setting and implementation of programmes that will ultimately operate in the same geo-social space. Concomitantly, those charged with implementation (in this case, extension practitioners) need to be trained for, directed toward and evaluated against the over-arching aim of building farmer capacity;
- Proper monitoring and evaluation of the programme and its various projects should be put in place to check if the projects are heading toward achieving the right outcomes and if the project has impacted as planned; farmers must be involved in designing, implementing and analysing the results of monitoring and evaluating; and

- LandCare projects should focus on building partnership for learning amongst all role players.

8.6 Recommendations for further research

This study investigated the role of extension and LandCare policy in building farmers' capacity to manage NR in the context of the LandCare programme, KwaZulu-Natal, South Africa. The findings of the study raised new questions the answers to which can provide more insight on how the sustainability of LandCare, and farmers livelihoods can be improve. Thus, the following further research is recommended:

- Impact of LandCare on household livelihoods
- Impact of LandCare on rural economies
- Engaging the next generation of farmers in LandCare
- Current attitudes about NRM of livestock farmers
- The impact of Covid 19 on the implementation of LandCare

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Appendices

Appendix 1: Ethical Clearance



**UNIVERSITY OF
KWAZULU-NATAL**
INYUVESI
YAKWAZULU-NATALI

01 August 2019

Mr Sithembiso Ndlela (211503616)
School of Agriculture, Earth & Environmental Sciences
Pietermaritzburg Campus

Dear Mr Ndlela,

Protocol reference number: HSS/0760/018M
Project title: The role of Agricultural Extension and South African Landcare Policy in terms of building farmer capacity to manage natural resources: The case of the LandCare Programme in KwaZulu-Natal, South Africa


Approval Notification – Expedited Application

In response to your application received on 27 June 2018, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 1 year from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.


Yours faithfully







.....
Dr Rosemary Sibanda (Chair)

/ms

Cc Supervisor: Professor S Worth
cc Academic Leader Research: Professor Trevor Hill
cc School Administrator: Ms Marsha Manjoo

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Appendix 2: Interview guide- Farmers

Research Topic: Role of South African Landcare and Extension in Building Farmer Capacity to Manage sustainability of their Natural Resources

Demographics

1. Age
2. Gender
3. Level of education
4. Land Size
5. Race
6. Source of Income
7. Production purpose
8. Type of Produce

1. What is your understanding of Landcare?

	Works	Capacity
Soil (Acidity, salinity, fertility, erosion et P/c.)		
Water (catchment areas, chemical and physical pollution, silting, water use in Agric.) impact on plants, animals and human)		
Vegetation (Overgrazing, erosion/ degradation, veld value and capacity, bush encroachment alien species invasion)		
Integration (relation between soil, water and vegetation)		
Other information (How do they identify the root- cause of the		

problems)		
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2. What is the goal of Landcare in terms of farmer capacity and how do you go about building capacity to manage natural resource and social viability?

	Structures	Systems	Knowledge	Skill	Opportunity
Ideal					
Current					
Action					

Notes:

1. Capacity to determine what is the **ideal** status for their NR is (accounting for local conditions)
2. Capacity to measure and determine the **current** status of their NR (applying tools and methods and analyzing data)
3. Capacity to identify what **actions** to take to fill the gap (interpreting data against a norm (ideal) and planning appropriate action)

	Determine the 'Ideal' state of NR (water, soils and vegetation)
Structures	
Systems	
Knowledge	
Skills	
Opportunity	
Other information (Including issues around social viability)	

	Measure the 'current' status of NR (tool, method and application) (water, soils and vegetation)
Structures	
Systems	
Knowledge	
Skills	
Opportunity	

Other Information (Including issues around social viability)	
--	--

	Identifying 'actions' to take to fill the gap (water, soils and vegetation)
Structures	
Systems	
Knowledge	
Skills	

Opportunity	
Other Information (Including issues around social viability)	

Appendix 3: Interview guide: Extension Officers

Research Topic: Role of South African Landcare and Extension in Building Farmer Capacity to Manage sustainability of their Natural Resources

Demographics

9. Age

10. Gender

11. Level of education

12. Education field

13. Race

14. Years of Experience in the current field

3. What is your understanding of Landcare?

	Works	Capacity
Soil (Acidity, salinity, fertility, erosion etc.)		
Water (catchment areas, chemical and physical pollution, silting, water use in Agric.) impact on plants, animals and human)		
Vegetation (Overgrazing, erosion/ degradation, veld value and capacity, bush encroachment alien species invasion)		
Integration (relation between soil, water and vegetable)		

Other information		
(How do they identify the root- cause of the problems)		

4. What is the goal of Landcare in terms of farmer capacity and how do you go about building capacity to manage natural resource and social viability?

	Structures	Systems	Knowledge	Skill	Opportunity
Ideal					
Current					
Action					

Notes:

4. Capacity to determine what is the **ideal** status for their NR is (accounting for local conditions)
5. Capacity to measure and determine the **current** status of their NR (applying tools and methods and analyzing data)
6. Capacity to identify what **actions** to take to fill the gap (interpreting data against a norm (ideal) and planning appropriate action)

	Determine the ‘Ideal’ state of NR (water, soils and vegetation)
Structures	Structure in place to help farmers gain capacity to determine the ideal state of their NR
Systems	How do structures go about building/ strengthening farmer capacity to determine the ideal state of their NR
Knowledge	What knowledge is imparted to farmers to effectively determine the ideal state of NR How is the knowledge imparted?
Skills	What skills is imparted to farmers to effectively determine the ideal state of NR How are the skills imparted?
Opportunity	Are the farmers engaged in the process of determining the ideal state of their resources and to what extent? Will they be more self-reliant after the project exit?
Other information (Including issues around social viability)	Are there any social forums or group where farmers engage with other farmers to share experiences, successes and constraints? Do you build farmer capacity to manage social viability?

	Measure the ‘current’ status of NR (tool, method and application) (water, soils and vegetation)
Structures	Structure in place to help farmers gain capacity to measure the current status of their NR
Systems	How do structures go about building/ strengthening farmer capacity to measure the current status of their NR
Knowledge	What knowledge is imparted to farmers to effectively Measure the current state of their NR How is the knowledge imparted?
Skills	What skills is imparted to farmers to effectively measure the current state of their NR? How are the skills imparted?
Opportunity	Are the farmers engaged in the process of determining the ideal state of their resources and to what extent? Will they be more self-reliant after the project exit?

<p>Other Information (Including issues around social viability)</p>	<p>Are there any social forums or group where farmers engage with other farmers to share experiences, successes and constraints?</p>
--	--

	<p>Identifying ‘actions’ to take to fill the gap (water, soils and vegetation)</p>
<p>Structures</p>	<p>Structure in place to help farmers gain capacity to identify ‘actions’ to take to fill the gap</p>
<p>Systems</p>	<p>How do structures go about building/ strengthening farmer capacity to identify ‘actions’ to take to fill the gap</p>
<p>Knowledge</p>	<p>What knowledge is imparted to farmers to effectively identify actions to take to fill the gap</p> <p>How is the knowledge imparted?</p>
<p>Skills</p>	<p>What skills is imparted to farmers to identify action to take to fill the gap</p> <p>How are the skills imparted?</p>

Opportunity	Are the farmers engaged in the process of determining the ideal state of their resources and to what extent? Will they be more self-reliant after the project exit?
Other Information (Including issues around social viability)	Are there any social forums or group where farmers engage with other farmers to share experiences, successes and constraints?

Appendix 4: Interview guide- Key informant

Research Topic: Role of South African Landcare and Extension in Building Farmer Capacity to Manage sustainability of their Natural Resources

Demographics

15. Age

16. Gender

17. Level of education

18. Education field

19. Race

20. Years of Experience

5. What is your understanding of Landcare?

	Works	Capacity
Soil (Acidity, salinity, fertility, erosion etc.)		
Water (catchment areas, chemical and physical pollution, silting, water use in Agric.) impact on plants, animals and human)		
Vegetation (Overgrazing, erosion/ degradation, veld value and capacity, bush encroachment alien species invasion)		
Integration (relation between soil, water and vegetable)		
Other information (How do they identify the root- cause of the problems)		

6. What is the goal of Landcare in terms of building farmer capacity and how does the programme go about building capacity to manage natural resources and social viability?

	Structures	Systems	Knowledge	Skills	Opportunity
Ideal (norm)					
Current					
Action					

Notes:

7. Capacity to determine what is the **ideal** status for their NR is (accounting for local conditions)
8. Capacity to measure and determine the **current** status of their NR (applying tools and methods and analyzing data)
9. Capacity to identify what **actions** to take to fill the gap (interpreting data against a norm (ideal) and planning appropriate action)

	Determine the ‘Ideal/norm’ state of NR (water, soils and vegetation)
Structures (individuals, institutions, organisations etc.)	Which structure are (or supposed to be) in place to ensure that farmers have capacity to determine the ideal status of NR
Systems (what function does each structure perform)	What systems are (or supposed to be) in place to support farmers determine the ideal status of their NR
Knowledge	What knowledge do you want the farmers to acquire in terms of determining the ideal status of the resources How is the knowledge imparted?
Skills	What skills do you want the farmers to acquire in terms of determining the ideal status of the resources How are the skills imparted?
Opportunity	In which process are (and do you wish) farmers to be exposed to and be given a chance to do on their own with minimum assistance from outsiders?

<p>Other information</p> <p>(Including issues around social viability)</p>	<p>Are there (and should there be) any social forums or group where farmers engage with other farmers to share experiences, successes and constraints? Does the policy prioritise social viability?</p>
	<p>Measure the ‘current’ status of NR (tool, method and application) (water, soils and vegetation)</p>
<p>Structures</p> <p>(individuals, institutions, organisations etc.)</p>	<p>Which structure are (or supposed to be) in place or strengthened to help farmers acquire capacity to measure the current status of their NR</p>
<p>Systems (what function does each structure perform)</p>	<p>Which structure are (or supposed to be) in place or strengthen to help farmer gain capacity to measure the current status of the NR</p>
<p>Knowledge</p>	<p>What knowledge do farmers need to acquire in order in order to have understanding of how the current status of their NR is measured?</p> <p>How is the knowledge imparted?</p>
<p>Skills</p>	<p>What skills do farmers need to acquire in terms of measuring the current status of their NR</p> <p>How should the skills imparted?</p>
<p>Opportunity</p>	<p>Should the farmer be given opportunity to measure the current status of the NR and to what extent?</p>

Other Information (Including issues around social viability)	Are there any social forums or group where farmers engage with other farmers to share experiences, successes and constraints?
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	Identifying ‘actions’ to take to fill the gap (water, soils and vegetation)
Structures (individuals, institutions, organisations etc.)	Structure in place to help farmers gain capacity to identify ‘actions’ to take to fill the gap
Systems (what function does each structure perform)	How do structures go about building/ strengthening farmer capacity to identify ‘actions’ to take to fill the gap
Knowledge	What do farmers need to understand about identifying the actions to take to fill the gap How is the knowledge imparted?
Skills	What skills do farmers need to identify action to take to fill the gap How are the skills imparted?

Opportunity	Should farmer be given full opportunity after they have been trained? How should farmers engaged in the process of identifying actions to take to fill the gap? Will they be more self-reliant after the project exit?
Other Information (Including issues around social viability)	Are there any social forums or group where farmers engage with other farmers to share experiences, successes and constraints?