The significance of women empowerment on rural livelihood outcomes among irrigation and dry-land farming households in Msinga, South Africa

By

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DETAILS OF CONTRIBUTION TO DRAFT PUBLICATION MANUSCRIPTS that form part and / or include research presented in this dissertation.

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Sharaunga S., Mudhara M. & Bogale A. Effects of _women empowerment' on household food security in rural KwaZulu-Natal Province. [Under review].

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All the papers were conceived by Stanley Sharaunga. Data collection and analysis and writing up of the papers were also done by Stanley Sharaunga. Mudhara M & Bogale A, contributed valuable supervision, guidance, insights and comments on every stage of coming up with the papers.

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ABSTRACT

Women are major players in ensuring households‘ wellbeing in most rural areas of developing countries, including South Africa. The capacity to improve the livelihoods of their households is hampered because they are disempowered economically, socially, in agriculture and in civic arenas. Women need a sense of agency and more access and control of resources, which together constitute the empowerment capabilities, to improve their livelihoods. Thus, women empowerment is considered important to provide them with the means to meet their needs and desired livelihood outcomes. Since empowerment is multi-dimensional, and women empowered in one dimension are not necessarily empowered in the other, it is essential to evaluate the significance of the various forms of women empowerment on their livelihood outcomes, in order to inform policy. This study investigates the various dimensions of women empowerment that are critical to the improvement of their livelihood outcomes in rural areas.

The study proposes a concise definition and develops a methodology to systematically measure women empowerment. It uses capabilities (i.e., comprising of resources and agency) as indicators of empowerment. Principal Component Analysis (PCA) was then applied to the levels of capabilities at each of the four main dimensions of women empowerment (i.e., economic, social, civic and agricultural), to quantitatively measure levels of women empowerment (i.e., represented by PC factor scores) and identify the dominant dimensions of women empowerment (i.e., represented by the dominant PCs). Multinomial logit model was used to identify the dominant dimensions of empowerment influencing women‘s self-reliance status. Women‘s self-reliance status had been established by applying k-means cluster analysis to the four main sources of women‘s incomes. Ordered logit model was used to identify the dimensions of women empowerment influencing household food security status. The household food security status had been established using the Household Food Insecurity Access Scale (HFIAS). Binomial logit model was used to determine the dimensions of ‗women‘s empowerment in agriculture‘ that reduce household‘s vulnerability to food insecurity. The households‘ vulnerability status had been established using the Vulnerability as Expected Poverty approach. All the analyses were based on a cross section data that were collected from 300 women practicing either irrigation or dry-land farming in Msinga rural areas of KwaZulu-Natal province.

Application of PCA to indicators of economic empowerment (i.e., levels of resources and agency) identified economic agency, human, financial and physical capital forms of empowerment as well as _empowerment in vocational skills‘ as the dominant dimensions of women‘s economic empowerment. Social agency, social capital empowerment and informational asset empowerment were identified as the dominant dimensions of women‘s social empowerment. Dominant dimensions of women‘s empowerment in agriculture included empowerment in crop management skills, farm financial management skills, water-use security, animal husbandry skills and weed and pest management skills. The dominant dimensions of civic empowerment identified in this study, include legal resource empowerment, civic agency, knowledge of legal rights, political and psychological forms of empowerment.

Further analysis found that certain dimensions of women‘s empowerment and other household socio-economic characteristics (e.g., husband‘s income, household size, dependency ratio, etc.) are critical for women to attain desired livelihood outcomes. Women with high levels of financial and human capital forms of empowerment were more likely to be self-reliant. Moreover, women with higher levels of informational resource empowerment and water-use security are more likely to be self-reliant. On the other hand, primary female head-of-households who are young, educated, with vocational skills as well as those who are psychologically empowered are less likely to rely on independent/self-driven rural livelihood activities (i.e., farm and off-farm) because they perceive such manual activities are _dirty‘ jobs suitable for the low social class groups. Although access to irrigation is believed to be key to self-reliance among rural South Africans, women with access to irrigation were not significantly more self-reliant than those without.

The study showed that income of husband is the most significant determinant of household food security among rural women‘s households in Msinga. Furthermore, the likelihood of a household becoming food secure also increases with higher levels of economic agency, physical capital empowerment, farm financial management skills and psychological empowerment. Moreover, older women‘s households are more likely to be food secure than those with younger primary female-head of households. On the other hand, women with higher levels of socio-cultural hindrances to agriculture and those with high levels of social capital were less likely to have food secure households.

The probability of a household becoming vulnerable to food insecurity in Msinga decreases with increasing levels of women's economic agency, physical capital empowerment, socio-cultural empowerment and husband's income. However, women with high levels of financial capital empowerment, because they earned more social grants and remittances were more likely to be vulnerable to food insecurity. Such women depended more on social grants and remittances, and invested less in livelihood assets. As a result, they were less likely to be resilient to shocks threatening their agricultural production or off-farm incomes in the future. Likewise, women from households with high dependency ratios and women experiencing more socio-cultural hindrances to agricultural production were also more likely to be vulnerable to food insecurity. Most importantly, household vulnerability to food insecurity in the study areas of KwaZulu-Natal is not significantly improved by getting access to irrigation water alone but by having higher levels of water-use security.

It was concluded that taking a holistic approach that considers the multidimensional aspects of women empowerment is a more appropriate way to measure women empowerment. Since capabilities (i.e., both resources and a sense of agency) are pre-requisites for women to achieve their desired livelihood outcomes, they are the most appropriate indicators of empowerment. Moreover, it was concluded that specific dimensions of empowerment are critical for the achievement of each specific livelihood outcome. The dimensions of women empowerment that influence self-reliance are not necessarily the same as those that improves household food security or reduce vulnerability to food insecurity. Thus, certain empowerment interventions are needed to achieve a specific livelihood outcome.

Financial and human capital resources are the most important economic forms of empowerment important for women to achieve self-reliance as they facilitate the attainment of most, if not all the other forms of capital empowerment. In agriculture, women need to be freed from customary and cultural bondages that hinder their full participation in agricultural production to achieve self-reliance. Moreover, access to irrigation alone should not be considered a panacea for women to achieve self-reliance through agriculture. Women need, most importantly, secure access to the right quantity and quality of water for productive purposes (i.e. water-use security) to pursue independent/self-driven livelihoods in agriculture. Women also need higher levels of informational resources to pursue independent/self-driven livelihoods. Access to information

enables the acquisition of knowledge and other factors of production needed for both agricultural production and off-farm investments. The stereotype perceptions of regarding agriculture as a dirty job, which are common among primary female head-of-households who are young, educated, with vocational skills as well as those who are psychologically empowered, are a major hindrance to the attainment of self-reliance through women empowerment in agriculture in rural South Africa.

To achieve household food security, primary female head-of-households need a sense of economic agency and higher levels of physical capital empowerment. A higher sense of agency enables women to define their own goals and act upon them. Higher levels of physical capital resources among primary female heads-of-households help improve household food security by ensuring consistently high levels of agricultural production and more off-farm income opportunities. They also allow households to diversify incomes, thereby, ensuring stability of access to food. Improving the farm financial management skills of the primary female heads-of-households improves the food security status of their households. Farm financial management skills are necessary for running a successful farming enterprise. However, increasing women‘s capabilities alone is not a panacea for household food security; other socio-economic factors have to be addressed. This includes increasing husband‘s income earning opportunities and reducing households‘ dependency ratios. Since income is the most significant determinant of food security in South Africa, improving income opportunities for both women and their husbands improves their household food security.

To reduce rural households‘ vulnerability to food insecurity, women need to increase their sense of economic agency and physical capital empowerment to ensure stable off-farm incomes and giving households the capacity to survive shocks affecting food security. Physical capital empowerment is essentially needed to enable households to resist shocks threatening food security in future. Moreover, socio-cultural inhibitions affect women‘s participation in agriculture and make their households vulnerable to food insecurity. Therefore, empowering women in socio-cultural aspects that might create hindrances to agricultural production among women can reduce household vulnerability to food insecurity. However, empowerment in agriculture alone is not adequate to reduce household vulnerability to food insecurity.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICIES

LIST OF ACRONYMS

AC	: Agricultural Capabilities
CC	: Civic Capabilities
CPI	: Consumer Price Index
CIDA	: Canada's International Development Assistance
DAFF	: Department of Agriculture, Forestry and Fisheries
DFID	: Department for International Development
EC	: Economic Capabilities
FAO	: Food and Agriculture Organisation of the United Nations
FCV	: Food Consumption Value
FEWS	: Famine Early Warning Systems
FGLS	: Feasible Generalized Least Squares
FS	: Food Secure
HFIAS	: Household Food Insecurity Access Scale
HFSSM	: Household Food Security Survey Module
IFAD	: International Fund for Agricultural Development
MDG	: Millennium Development Goals
MFI1	: Mildly Food Insecure
MFI2	: Moderately Food Insecure
MNL	: Multinomial Logit Model
MRC	: Medical Research Council
NGO	: Non-Governmental Organization
OLS	: Ordinary Least Squares Regression
PC	: Principal Component
PCA	: Principal Component Analysis
SC	: Social Capabilities
SDC	: Social Development Commission
SFI	: Severely Food Insecure
SLA	: Sustainable Livelihood Approach
SLF	: Sustainable Livelihood Framework
UN	: United Nations
UNDP	: United Nations Development Programme
USAID	: US Agency for International Development
US	: United States of America
USDA	: US Department of Agriculture
VEP	: Vulnerability as Expected Poverty
VER	: Vulnerability as Uninsured exposure to Risk
VEU	: Vulnerability as low Expected Utility
VET	: Vocational Education and Training
VIF	: Variance Inflation Factors
WEAI	: Women‘s Empowerment in Agriculture Index

CHAPTER 1: INTRODUCTION

1.1 Background

Since the late 1990s, strategies for tackling global poverty have begun to emphasize the importance of empowering marginalized people to advocate for their own change (Ashby et al., 2011). According to Pandya (2008), empowerment has become the key strategy for addressing many socio-economic problems as it initiates the process of obtaining the basic opportunities for marginalized people, either directly by the affected people, or through the help of others who may not be marginalized but willing to share their own access to these opportunities. While the process of empowerment is applicable to both sexes, it is more relevant for women since their disempowerment is more pervasive as it cuts across class and other social distinctions, and is made more complicated by the fact that household and intra-familial relationships are a major source of women‘s powerlessness (Malhotra & Schuler, 2005).

In addition to it being an end goal in itself, women empowerment is also considered as a means to achieve other important livelihood outcomes such as more income (e.g., cash), increased well-being (e.g., non-material goods, like self-esteem, health status, access to services, sense of inclusion), reduced vulnerability (e.g., better resilience through increases in asset status), improved food security (e.g., increase in financial capital to buy food) and a more sustainable use of natural resources (e.g., appropriate property rights), improvements in child nutritional status, and self-reliance (van den Bold et al., 2013; Moyo et al., 2012). Mayoux (2006) argues that empowering women can also lead to other broader development outcomes, such as greater participation in local government processes, rural development and overall poverty reduction. According to World Bank (2001) and Alsop et al. (2006), empowerment gives individuals or groups capabilities to make purposive choices and to transform those choices into desired actions and outcomes. Therefore, the ultimate goal of empowering the poor is for them to achieve their desired livelihood outcomes.

According to Haque et al. (2012), Moser (1999) and Keller & Mbwewe (1991), the core outcome of ‗women empowerment‘ lies in the ability of a woman to control her own destiny and be self-

reliant. Hence, self-reliance is an integral outcome of women empowerment, since; ideally, development should foster self-reliance (Binns & Nel, 1999). In rural areas of developing countries, the primary goal of any household is to achieve food security. Lack of empowerment among women, is one of the root causes of rural household food insecurity (Mwaniki, 2005). Since women are the major players in ensuring rural household food security, this study argues that the second major aim of women empowerment is the attainment of household food security (Moyo et al., 2012). In addition to households being food secure at present time, it has been noted that households frequently move in and out of a state of under-nutrition, suggesting that the notion of food insecurity is best thought of in a dynamic sense. Moreover, widely accepted empirical findings show that access to adequate and sufficient food in many countries is unstable (FAO, 2009). Yet, empowerment includes encouraging and developing the skills for self-sufficiency, with a focus on eliminating the future need for charity in individuals or groups (Pandya, 2008). Thus, this study argues that the third main goal of women empowerment is to give individuals the capacity to withstand shocks affecting food security in future. Therefore, it is crucial to understand the impact of women empowerment on the three main livelihood outcomes namely; self-reliance, food security and vulnerability to food insecurity.

Various authors (e.g., Kabeer, 1999; Malhotra et al., 2002; Mosedale, 2005) have pointed out that empowerment is a multidimensional and complex process which can be interpreted in different ways. Therefore, development agencies committed to the empowerment of women need to question which dimensions of empowerment have positive and significant effects on improving rural women‘s livelihoods (Kabeer, 1999; Mayoux, 2006). A lack of distinction between the various dimensions of empowerment and clarity about the appropriate strategies to address women‘s disempowerment can mean that many empowerment-focused interventions fail to explicitly address women‘s livelihood challenges. Being aware of the different forms of women‘s empowerment and their dynamic nature helps to identify the kinds of strategies needed to shift unequal power dynamics (Luttrell et al., 2009). In line with the arguments highlighted above, this study evaluates the significance of the various dimensions of women‘s empowerment on livelihood outcomes in Msinga rural areas of KwaZulu-Natal, in order to inform policy on ways to improve livelihoods in South African rural areas with similar settings. This study is peculiar in the sense that it employs a holistic approach to investigate the significance of all the

possible dimensions of women empowerment in improving livelihoods. This follows the understanding that women empowerment is multidimensional and the various forms of women empowerment are not mutually exclusive in influencing livelihood outcomes. The study was undertaken as part of a project (K5/2179) initiated, managed and funded by the Water Research Commission (WRC) entitled, _Empowerment of women in rural areas through water use security and agricultural skills training for gender equity and poverty reduction in KwaZulu-Natal Province‘.

1.2 Research problem

Women in rural areas are key players in ensuring household livelihood outcomes (Prakash, 2003). They often manage complex households and pursue multiple livelihood strategies. They play key roles in maintaining food security: as food producers and agricultural entrepreneurs who dedicate their own time, income and decision-making to maintain food and nutritional security of their households and communities; and ensuring the stability of food supplies in times of economic hardship (Diouf, 2012). Rural women are also involved in other non-farm income generating activities, household activities such as fetching water and firewood, and taking care of basic education and health issues of family members (Quisumbing et al., 1995). Thus, rural women are key agents for achieving the transformational economic, environmental and social changes required for sustainable development (UN-Women, 2014). In South Africa, women‘s responsibilities are worsened by the fact that more than half of rural households are headed by women who, together with children, make up the poorest of the poor (Bob, 2002). Almost 40% of children under the age of seven years live only with their mothers, while many live with their grandmothers. Male outmigration for wage labour increases the work load for, and the responsibilities of women (SAHO, 2012).

Despite their contributions in ensuring wellbeing in rural areas, rural women in most developing countries, including South Africa, are considerably more disadvantaged than their male counterpart because of an explicit gender bias in land allocation, access to credit, and access to rural organisations, marketing channels and agricultural services. Unlike men, they face a number of constraints and obstacles which disempower them, including limited access to resources, socio-cultural inhibitions and alternative demands on their time from childcare and

other domestic duties (World Bank, 2001). In South Africa, women living in traditional rural areas form part of the most economically and socially disempowered groups (SAHO, 2012; Bob, 2002).

Despite the government‘s efforts to empower rural women through agriculture, many South African studies have shown that smallholder farmer‘s households only derive a minuscule proportion of their livelihoods directly from agricultural sources (Aliber & Hart, 2009; Baiphethi & Jacobs, 2009). In place of agriculture, smallholder farmers, who are mostly women, partake in a diversified number of off-farm livelihood strategies to attain their livelihood goals (Baiphethi & Jacobs, 2009; Mudhara, 2010). The government‘s continued emphasis on agriculture, which rural households do not rely on for livelihoods, could be reflecting a case of misguided and inappropriate empowerment interventions, and the need to re-investigate the appropriate empowerment interventions necessary to improve rural people‘s livelihoods. According to Eneyew & Bekele (2012), one of the main questions central to any rural empowerment intervention strategy revolves around which aspects of women‘s empowerment significantly improves people‘s livelihoods and wellbeing. Therefore, understanding the dimensions of women‘s empowerment that result in improved livelihoods is crucial for policies aimed towards empowerment of women in South Africa.

1.3 Objectives of study

Considering the problems associated with women empowerment and livelihood outcomes in South Africa mentioned above, the objectives of the study were:

- To review the commonalities among definitions of women empowerment and propose a concise definition and methodology for systematically measuring it;
- To isolate the determinants of women empowerment;
- To identify the dimensions of women empowerment which influence their level of self-reliance;
- To identify the dimensions of _women empowerment‘ that influence food security among rural households;
- To determine the dimensions of _women empowerment in agriculture‘ that are crucial in reducing vulnerability to food security among rural households.

1.4 Rationale of study

A key feature for sustainable and improved rural livelihoods clearly, is to develop capacity of the principal actors of household wellbeing, who are women. Most developmental organisations recognize the linkages between poverty and gender issues, and places great importance on women empowerment as a means to reduce poverty and food insecurity (IFAD, 2011). There is growing evidence that investments in women empowerment contribute to improved broader development outcomes related to health, education, poverty reduction, improved food security, and economic growth (Mayoux, 2006). Since most women living in traditional rural areas of South Africa form part of the most economically and socially disempowered groups (SAHO, 2012), this study is useful for identifying and describing the women who should be targeted to improve rural livelihoods through empowerment programmes. This identification and description is based mainly on, among other things, the demographics of women i.e., age, gender, marital status, level of education, literacy and numeracy levels, composition of households and livelihood strategies followed by those women.

On the other hand, empowerment is a multidimensional and complex process and women empowered in one dimension (e.g., economic) may not necessarily empowered in the other (e.g., Mosedale, 2005, Malhotra et al., 2002; Moore, 2001; Kabeer, 1999). Moreover, women and their households do not depend on one livelihood strategy, but pursue a number of activities to achieve a set of desired livelihood outcomes. In fact, it has been realised that the various forms of women empowerment are not mutually exclusive in influencing livelihood outcomes. This realisation is despite most studies having concentrated their focus on economic forms of empowerment as the only important dimension enabling women to achieve their livelihood potential (USAID, 2012). Since this study adopts a holistic approach and identifies all the dominant dimensions of empowerment relevant to rural women, it has the capacity to provide an in-depth understanding of the significance of the various dimensions of women empowerment in improving livelihood outcomes (e.g., food security; self-reliance etc.).

In 2000, the United Nations (UN) developed eight Millennium Development Goals (MDGs) as a basis for measuring progress towards the eradication of global poverty. The third Millennium Development Goal is aimed at promoting gender equality and women empowerment (Boateng et

al., 2012). The South African post-apartheid government has undertaken massive reforms aimed at empowering the vulnerable groups to improve their livelihoods. Amongst other programmes, it has invested in irrigation schemes, initiated the land redistribution and other empowerment programmes (Perret, 2002). Despite such efforts, the government continues to run short of its target for empowerment outcomes. Thus, this study seeks to understand the 'output' of the current configuration of empowerment interventions (i.e., economic, social, civic and agricultural) influencing poor rural people‘s livelihood outcomes as a way of evaluating and monitoring the progress made so far in empowering them. Failure to identify the dominant sub-dimension in which women are empowered, and failure to re-evaluate the areas in which women are disempowered results in poor targeting of women and inappropriate interventions which retard the growth of the communities where they reside.

In many developing nations, agriculture still holds the key to improving rural people‘s livelihoods (Collett & Gale, 2009). In South Africa, while poor women's diversified livelihood activities have been acknowledged; there remains a weak empirical and conceptual basis to understand the agricultural skills training needed to improve self-reliance, food security and reduce vulnerability to food insecurity (Bob, 2002). Skills training for women living in rural areas are crucial to achieving the MDGs of eradicating extreme poverty and food insecurity by 2015 (FAO, 2007). This study, therefore, seeks to fill this gap, specifically, by investigating the skills training (i.e., as sub-dimensions of ‗women‘s empowerment in agriculture‘) that are appropriate and necessary for improving rural women‘s livelihood outcomes.

In addition to other dimensions of women‘s empowerment, access to water is a vital resource and hence, an empowerment capability to achieve food security (Hussain et al., 2003). Lack or poor access to reliable water for both household and productive purposes is one central feature of poverty and food insecurity in developing countries (Merrey et al., 2005). Within agriculture, access to water is crucial for both crop production and animal husbandry (Merrey et al., 2005). Investment in some non-agricultural income-generating projects (e.g., brick making) require access to large quantities of water. However, as far as livelihood activities are concerned, the ability to use water and make it available at the right place and time, in the right quantity and quality (i.e. water-use security) is more important than just the availability of the water (FAO,

1999). Thus, this study also seeks to investigate the significance of improved water-use security levels, as an empowerment intervention, towards improved rural women's livelihoods.

1.5 Study hypotheses

The hypotheses of this research were derived from field observation and extensive literature review. The hypotheses of this thesis were as follows:

- Empowerment is a multidimensional and complex process (Mayoux, 2006; Mosedale, 2005; Uphoff, 2003; Moore, 2001). It was therefore, hypothesised that women are empowered in various sub-dimensions across the four main dimensions of empowerment namely; economic, social, civic and agricultural. Allowing for overlap, the different sub-dimensions of women empowerment include: financial, human capital, material/physical, socio-cultural, familial/interpersonal, legal, political, psychological, agricultural etc. (Alsop et al., 2006; Mayoux, 2006; Mosedale, 2005; Kabeer, 2005; Malhotra et al., 2002).
- A key requirement for any escape from poverty and achievement of self-reliance is to have access to productive resources (Kabeer, 1999). However, in the context of women's empowerment, this study argues that in addition to livelihoods assets, people need a sense of agency to achieve their livelihood outcomes. Therefore, households use their empowerment capabilities (i.e., resources and agency), not just capital assets, to pursue activities that will enable them to achieve the best possible livelihood. Therefore, it was hypothesized, that women with higher levels of empowerment along certain critical dimensions are more likely to be self-reliant.
- Since women are the principal actors of household food security in rural areas (Diouf, 2012; Collett & Gale, 2009; Quisumbing et al., 1995), it is hypothesized that women with higher levels of empowerment along each critical dimension are more likely to have food secure households. This is because they possess the capabilities (i.e., resources and agency) needed for both own agricultural production and for market purchases through off-farm incomes.
- Agriculture has been recognised to be an engine for reducing household vulnerability to food security in rural areas through own production (Aliber & Hart, 2009; Baiphethi & Jacobs, 2009). Investment in economic capabilities also helps to reduce household

vulnerability to food insecurity through stable off-farm incomes. It is, therefore, hypothesised that woman who exhibit high levels of the critical agricultural and economic dimensions of empowerment are able to resist shocks that threaten their food security in the future.

1.6 Scope and limitations of the study

Several measures, such as participation in household decision-making (Garikipati, 2008; Anderson & Eswaran, 2009; Ashraf et al., 2010), relative status (Beegle et al., 2001) or asset ownership and control over money-use (Beegle et al., 2001; Garikipati, 2008) have been proposed and used in the literature to conceptualize and measure women empowerment. However, most of these studies have used one or a few indicators to measure women empowerment, yet empowerment is a multidimensional and complex process. This study argues that women empowerment is incomplete and biased if it uses only a few indicators and fails to recognize its multidimensionality. Thus, this study argues that empowerment is multidimensional, and empowerment should be measured along different dimensions using a holistic approach that captures the multidimensional aspects. Since most of the indicators are closely related, the study proposes the use of PCA to identify and quantitatively measure the dominant dimensions of women empowerment.

Although there are various ways of defining and conceptualizing empowerment, this study incorporates both the multidimensional approach and the resource-agency-outcome approach for its conceptualization at the individual and household levels. Although empowerment occurs at a number of levels (i.e., individual, household, community and in broader arenas) (Kabeer, 1999), this study only considers women empowerment at individual and household levels. The study did not consider women empowerment in broader arenas (e.g., community and at national level), due to the assumption that, women are subjected to the same set of hindrances and are restricted by the same set of customary rules, norms and values in broader arenas.

Literature shows that empowerment materialises through a variety of different processes/domains that are variously defined as: resources, agency and achievements (Kabeer, 2001); control over resources and agency (Malhotra et al., 2002); agency and opportunity structure (Alsop et al., 2006); agency, structures and relations (CARE, 2006); assets, knowledge,

will and capacity (Charlier & Caubergs, 2007). However, this study follows the resource-agency-outcome approach arguing that according to the sustainable livelihood framework, individuals and households utilize their resources and their agency to develop the capacity needed to achieve desired livelihood outcomes, on a sustained basis.

Some authors have used the approach proposed by Kabeer (1999), which views empowerment as a process. Studies following this approach have tried to measure it as an ongoing process and to capture the changes in capabilities by collecting data for at least two points in time. However, this study was a ‗snapshot' picture showing the levels of empowerment capabilities women were endowed with at that given moment (i.e. 2013) and how they were influencing women's livelihood outcomes. Much of the literature on empowerment also analyses the power dynamics in terms of clashes over conflicting claims and the ability of some individuals to dominate others. However, in the framework adopted in this study, women empowerment implies the levels of capabilities (i.e., resources and agency) that are at their disposal to pursue livelihood outcomes and not power relations between women and men or husbands and wives. Since household's socio-cultural inhibitions are the major source of women's disempowerment, the study captures women's access and control of resources as a measure of their levels of resources.

Since the study focused on investigating women empowerment, it only included women for the sample and did not compare levels of empowerment between men and women. Thus, the study was limited to investigating only the constraints and opportunities facing women and not any other marginalized groups of people needing empowerment interventions. However, since some livelihood outcomes (i.e., food security and vulnerability to food insecurity) were measured at household level, regression models to analyse the factors influencing such livelihood outcomes incorporated both dimensions of women empowerment together with those of their partners.

Although this study adopts the sustainable livelihood framework, it only considers women's empowerment capabilities (i.e., agency and resources) in analyzing livelihood outcomes and does not consider the transforming structures (e.g., levels of government, private sector interventions) and processes (e.g., laws, policies, culture, institutions) that create opportunities for women to pursue livelihood outcomes as indicated by the sustainable livelihood framework. Although some studies (e.g., Rahmana, 2009) have viewed empowerment as an outcome and use

livelihood outcomes as indicators of empowerment, this study argues that the outcomes are the output of empowerment and therefore, adopts Sen (1985), which refer to empowerment as the expansion of capabilities of poor people to improve their livelihood outcomes. Following Sen (1985), this study uses women's capabilities as indicators of empowerment in the different dimensions of their lives. It uses both quantitative (e.g., access to financial resources) and as well as qualitative data (e.g., participation in household decision-making, change in the level of self-confidence, self-esteem, level of spatial mobility and level of awareness). This study further applies PCA on the four main aspects of empowerment to quantitatively measure dimensions of women empowerment.

1.7 Organisation of the study

The remainder of this thesis is divided into six chapters, five of which constitutes separate journal articles (i.e., Chapters 2-7). Chapter 2 reviews literature on conceptualisation and measurement of women empowerment. The chapter attempts to concisely define and develop a methodology to systematically measure levels of empowerment among rural women in Msinga KwaZulu-Natal drawing from a review of theoretical, methodological, and empirical literature on the subject from the fields of demography, sociology, anthropology, and economics.

Chapter 3 investigates and identifies the dominant dimensions of economic, social, civic and agricultural forms of empowerment that improves women's livelihood outcomes. It firstly, reviews literature on women empowerment and develops a framework to conceptualise and measure women empowerment. In the methodology section, it discusses and explains how Principal Component Analysis was used to identify and quantitatively measure the dominant dimensions of women empowerment. The chapter also presents the results and a discussion on the PCs that were retained and were meaningfully interpreted. Finally, the chapter presents the conclusions and recommendations drawn from the chapter of the study.

Chapter 4 investigates the sub-dimensions of women empowerment that promote self-reliance and reduces women's dependency on social grants and remittances. Firstly, a literature review on women empowerment and self-reliance is provided. This is followed by a detailed discussion of the research methodology employed to meet the objectives. In the methodology section, the chapter discusses how women's self-reliance status was established using cluster analysis. It also

discusses the multinomial model used to estimate women's self-reliance status as a function of the various sub-dimensions of women empowerment. This is followed by the results and discussions of the sub-dimensions of women empowerment that promotes self-reliance. Finally, the conclusions and recommendations drawn from the findings are provided.

Chapter 5 investigates the sub-dimensions of _women's empowerment' that influence household food security among rural women in Msinga, South Africa. It also comprises of an abstract, introduction, brief literature review on women empowerment and food security, a methodology section, results and discussion and finally, a conclusion and recommendations. In the methodology section, the procedure to identify households' food security status, using the Household Food Insecurity Access Scale (HFIAS), is explained. This is followed by a discussion of how the ordered logit model was used to analyze households' food security status as a function of the household's socio-economic factors and the sub-dimensions of women's empowerment.

Chapter 6 investigates the sub-dimensions of women's empowerment in agriculture that reduce households' vulnerability to food insecurity among the sampled women's households. It also comprises of an abstract, literature review, methodology, results and discussion and conclusions and recommendations. The literature review concentrates on how women empowerment affects households' vulnerability to food insecurity. The methodology section provides a thorough explanation of how the Vulnerability as Expected Poverty approach was used to estimate the ex-post probability of a household becoming food insecure in the future. This was followed by an explanation of how the binomial logit model was used to estimate the household's vulnerability to food insecurity as a function of the sub-dimensions of _women's empowerment in agriculture' that reduces household's vulnerability to food insecurity.

Finally, chapter 7 provides the general conclusions drawn from the all study results. It also provides the policy recommendations on women empowerment and livelihood outcomes based on the findings of the study. Lastly, the chapter provides recommendations for further research that were drawn from field observations, scope and limitations of the study.

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CHAPTER 2: CONCEPTUALISATION AND MEASUREMENT OF WOMEN EMPOWERMENT REVISITED

Abstract

The ability to concisely define and systematically measure women empowerment is essential for evaluating and monitoring of most government and Non-Governmental empowerment interventions. Although a number of studies have attempted to conceptualise and measure women empowerment, meanings/terminologies and the methodologies to measure and track changes in its levels are not well established. This paper reviews the commonalities among definitions of empowerment and proposes a concise definition and methodology to systematically measure women empowerment. A review of the literature showed that empowerment is multidimensional and women empowered in one dimension may not be necessarily empowered in the other. It was also observed that a considerable number of studies suggest the use of women's agency as an indicator that closely capture women's levels of empowerment. On the other hand, the majority of studies agree that access to and control of resources is a pre-requisite for women's empowerment. Since women need resources and a sense of agency to independently achieve their livelihood outcomes, it was therefore, concluded that both agency and resources (combined) are the best indicators of women's level of empowerment. Considering that women empowerment is multidimensional, this review therefore, proposes the use of principal component analysis (PCA) on women's level of agency and resources to quantitatively generate factor scores (i.e., indicators of each woman's level of empowerment) at each dimension of empowerment (i.e., indicated by each PC).

Key words: Women empowerment, measurement, resources, agency, indicators

2.1 Introduction

The third Millennium Development Goal (MDG 3), adopted as part of the United Nations Millennium Declaration in 2000, explicitly aims to promote gender equality and empower women. Furthermore, the Food and Agriculture Organization's (FAO) (2011) report, _The State of Food and Agriculture: Closing the Gender Gap for Development', states that closing the gender gap in agriculture is essential to increasing agricultural productivity, achieving food security, and reducing hunger. The World Bank's (2011) report reinforces this message and

identifies the significant effects of women‘s empowerment on the efficiency and welfare outcomes of project or policy interventions. As a result, empowering women and reducing gender inequalities have become the two most important objectives of development policy (Alkire et al., 2013). Various national and international communities have made attempts to address women‘s issues, including efforts to empower them (Gupta & Yesudian, 2006). In South Africa, the post-apartheid government has sought to correct the inherited inequalities through various interventions to empower women (Oberhauser & Pratt, 2004).

While the concept of ‗equality‘ is intuitively easy to understand, ‗empowerment‘ is a broad concept that is used and defined differently by various writers, depending on the context or circumstance (Alkire et al., 2013; van den Bold et al., 2013). The meanings and terminologies associated with the concept vary, and methods for systematically measuring and tracking changes in levels of empowerment are not well established. A diverse body of literature has emerged regarding the conceptualization and measurement of women‘s empowerment and its relationships with other variables of interest in international development (Narayan, 2005). Therefore, if one is to develop and then use measures of empowerment in policy initiatives, it is essential to be explicit about the understanding being used (Khwaja, 2005).

Many policy reports, such as those of the FAO (2011) and World Bank (2011), make explicit links between gender equality and development outcomes, not necessarily between empowerment and desired outcomes. This is partly attributable to the difficulty of measuring empowerment. Although empowerment is intrinsically experienced by individuals, existing indices of empowerment and gender are typically measured at the aggregate country level (Alkire et al., 2013). To some, empowerment is a political concept that involves a collective struggle against oppressive social relations. To others, it refers to the consciousness of individuals and the power to express and act on one's desires. These differences stem from the many different origins and uses of the term. As a result, there is a range of definitions and approaches used by different organisations to conceptualise and measure women empowerment (Luttrell et al., 2009).

Given the contested nature of the concept of women empowerment, it is important to review literature so as to clarify how it is conceptualised and let alone measured in this study. Drawing from a review of literature on empowerment from the fields of demography, sociology,

anthropology, and economics, this chapter develops a methodology for systematically measuring and tracking changes in levels of empowerment. This review analyses the basic definitional and conceptual issues, identifies common threads in the various definitions used, and attempts to develop a concise and acceptable definition of women empowerment. It then discusses some of the key issues to be addressed when measuring women empowerment empirically, and proposes a methodology to systematically measure it.

2.2 Salient features of women empowerment

This section reviews some of the definitions of empowerment and identifies their commonalities as well as areas of divergence. It also reviews a number of studies on women empowerment to make some methodological points about the measurement of empowerment. The section also describes the frameworks that have been adopted to conceptualise and measure women empowerment.

2.2.1 Definition of women empowerment

Literature reflects considerable diversity in the emphases, agendas, and terminologies used to define women's empowerment (Narayan, 2005). The debate on the meaning and measurement of empowerment has been captured by several reviews and papers. The terms that most often span various definitions refer to choice, power, options, control, and agency (van den Bold et al., 2013). Moreover, it is not always clear whether authors who use terms such as "women's empowerment," "gender equality," "female autonomy," or "women's status" are referring to the same concepts (Narayan, 2005). Although, there is no single definition of women's empowerment in the literature, it is variously conceptualised as a process or outcome, an end-state or a means to an end, a capacity (Kabeer, 2001; Malhotra et al., 2002; Alsop et al., 2006; Martinez, 2006), a matter of gaining power, and as a matter of agency (Kabeer, 1999; Narayan, 2005).

2.2.1.1 Empowerment as a process or outcome

Some studies (Kabeer, 2001; Oxaal & Baden, 1997; Rowlands, 1995) have defined empowerment as the process of removing the factors which cause powerlessness. Kabeer (2001: 86), whose definition is the most widely accepted, defines empowerment as "the expansion of people's ability to make strategic life choices in a context where this ability was previously

denied to them". Bennett (2002: 23) described empowerment as "the enhancement of assets and capabilities of diverse individuals and groups to engage, influence and hold accountable the institutions which affect them". Keller & Mbwewe (1991: 45) described women empowerment as "a process whereby women become able to organize themselves to increase their own self-reliance, to assert their independent right to make choices and to control resources which will assist in challenging and eliminating their own subordination". Rowland (1997) viewed empowerment as a dynamic process aimed at finding "more space for control" to encompass change at the personal and collective level.

Many developmental organisations, such as SDC, CIDA, DFID and Oxfam, view empowerment as both an outcome and a process. Others (such as the US Agency for International Development (USAID) and United Nations Development Programme (UNDP)) take an instrumentalist view of empowerment and focus more narrowly on the importance of process and the assumption that participation alone will lead to empowerment (Scrutton & Luttrell, 2007). These distinctions have obvious operational implications. An emphasis on process leads to a focus on organisational capacity building or an increase in participation of previously excluded groups in the design, management and evaluation of development activities. An emphasis on outcomes leads to a focus on economic enhancement and increasing access to economic resources (Luttrell et al., 2009). On the other hand, some scholars (e.g., Oxaal & Baden, 1997; Townsend et al., 1999) say that empowerment is a bottom-up process rather than something that can be formulated as a top-down strategy. This means that nobody can claim to „empower someone'.

2.2.1.2 Empowerment as an end or a means to an end

The literature on empowerment also shows two positions of the concept. Empowerment is sometimes understood as a means to a specific end, such as increased welfare of the empowered agent. It is also often conceived as an end valuable for its own sake (Khwaja, 2005). For example, one aspect of empowerment defined in the World Bank's empowerment sourcebook (Narayan, 2002) is expanding poor people's capabilities. This is undoubtedly an important goal. However, it is important for researchers to assert whether they are taking the view that such capabilities are important only because they lead to an increase in the welfare or well-being of the poor, as measured by standard socioeconomic indicators, or whether an expansion in these capabilities has value even if they do not influence any other aspect of welfare. In either case, the

assumption is that empowerment is valuable because it affects an agent‘s overall welfare. The distinction here is whether this effect is true by definition, that is, empowerment is defined as a component of an agent‘s welfare or utility (empowerment as an end), or whether it is true by causation, that is, empowerment influences a component of welfare such as the agent‘s income or health status (empowerment as a means to an end) (Khwaja, 2005).

2.2.1.3 Empowerment as an expansion of agency

Other authors (e.g., Kabeer, 1999; Narayan, 2005) view empowerment from an agency perspective, and argue that women themselves must be significant actors in the process of change that is being described or measured. Thus, hypothetically there could be an improvement in gender equality by various measures, but unless the intervening processes involve women as agents of that change, rather than merely as its beneficiaries, it would not be considered as empowerment. However desirable, it would merely be an improvement in outcomes from one point in time to another (Malhotra, 2003).

Among the various concepts and terms encountered in the literature on empowerment, ―agency‖ probably comes closest to capturing what the majority of writers see as the essence of empowerment. It encompasses the ability to formulate strategic choices and to control resources and decisions that affect important life outcomes (Narayan, 2005). The importance of agency in the discourse on empowerment emerges from the undesirability of ―top-down‖ approaches to development (Malhotra, 2003). At the institutional and aggregate levels, this concept emphasizes popular participation and social inclusion. At the micro level, it is embodied in the idea of self-efficacy and the significance given to the individual woman‘s realization that she can be an agent of change in her own life (Narayan, 2005; Malhotra, 2003). In many ways, the emphasis on agency in the literature on women‘s empowerment is comparable to the emphasis in the overall empowerment literature on generating demand for information and accountability, and on facilitating inclusion, participation, and mobilization of those who are in disadvantaged positions (Narayan, 2005).

2.2.1.4 Empowerment as a precondition to exertion of agency

Other definitions of empowerment focus not upon the person‘s freedom to act, but upon the concrete material, social and institutional preconditions required to exert agency. A widely cited

definition of empowerment of this kind is that of the World Development Report (2000/2001), which views empowerment as the process of enhancing the capacity of the poor people to influence the state institutions that affect their lives, by strengthening their participation in political processes and local decision-making. It means removing the barriers (i.e., political, legal and social) that work against particular groups and building the assets of poor people to enable them to engage effectively in markets (World Bank, 2001). Narayan (2002) defines empowerment as the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control, and hold accountable institutions that affect their lives. He identifies four main elements necessary for the exertion of agency. These include access to information, inclusion and participation, accountability and local capacity. In addition, Narayan (2005) argues that people‘s ability to exert agency is also influenced by their individual (material, human, social and psychological) and collective (voice, organisation, representation and identity) assets and capabilities.

Other authors draw attention to additional intervening variables, such as information, immobilisation, ownership or moral collective action. Khwaja (2005) argues that _workable‘ definition of empowerment needs to include two main aspects namely, influence and information, which allow people to express their preferences and have an effective impact on particular decisions. Alsop et al. (2006) focuses on the importance of choice and defines empowerment as a group‘s or individual‘s capacity to make effective choices, that is to make choices and then to transform those choices into desired actions and outcomes. She explains that people‘s agency can be constrained by the _opportunity structure‘ i.e., the institutional climate (information, inclusion/participation, accountability, local organisation capacity) and the social and political structures (openness, competition and conflict) in which people live. An effective exercise of agency entails the overcoming of significant institutional and informal obstacles, including those mentioned above, as well as the domination of existing elite groups or of unresponsive public programmes (Smulovitz & Walton, 2003). The exercise of human agency, therefore, requires a _change in the rules of the game‘ (i.e., the formal and informal institutions that condition the effectiveness of human agency) (Alsop et al., 2006).

Empowerment is also defined based on social mobilisation that gives people voice and allows them to demand change (Bennet, 2002). Friedman (1992) defines empowerment as a _bottom-up

process that originates from moral relations, territory-based social formalities and the involvement of individuals in socially and politically relevant actions‘ (Friedmann, 1992; 33). Other definitions focus on moral aspects of empowerment, such as fulfilment, human rights, the removal of opposition and injustice (Oxfam, 1995). Authors also emphasise different processes that generate an increase in empowerment, such as democratisation and participation. The UNDP‘s Human Development Report (1995) argues that to be empowered, people need to fully participate in decisions and processes that shape their lives. Empowerment in the political domain is often related to democratisation and political participation as well as the strengthening of grassroots and civil society organisation and the participation of marginalised social groups in national and local politics (Oxaal & Baden, 1997; Oakley, 2001).

Many argue that empowerment requires some essential economic resources that improve peoples‘ opportunities to gain a better income. Accordingly, a number of studies have focussed on the role of micro-credit in empowering marginalised social groups, especially women (Gobezie, 2010; Malhotra, 2002; Mayoux, 2000; Oxaal & Baden, 1997). Chambers (1993) describes it as a process that gives the poor control over their lives as well as ownership of productive assets to secure a better livelihood. However, there are also many examples in the literature showing that women‘s access to resources does not necessarily lead to their greater control over resources. Thus, while resources (i.e., economic, social, and political) are often critical in ensuring that women are empowered, they are not by themselves sufficient. Without women‘s individual or collective ability to recognize and utilize resources in their own interests, resources cannot bring about empowerment (Narayan, 2005).

2.2.1.5 Empowerment as gaining of power

Several authors frame empowerment as an increase in power, which is understood as control or a real ability to affect change (Ibrahim & Alkire, 2007). Empowerment is about the extent to which categories of people are able to control their own destiny, even when their interests are opposed by those of other people with whom they interact (Mason & Smith, 2003). Uphoff (2003) distinguishes ‗power resources‘ i.e., the accumulated, invested and exchanged assets from the ‗power results‘ i.e., activities that are achieved by using these resources.

An empowerment process, according to Uphoff (2003), needs to provide access to these ‗resources' and also to allow people to effectively use them to gain more ‗power'. Oakley (2001) differentiates two types of power; power to cause radical change and power as the ability to do and to gain control. He argues that power can be either ‗variable-sum' or ‗zero-sum'. The former refers to a process through which the powerlessness can be empowered without altering the nature and the levels of power already held by existing powerful groups. The later argues that any gain in power by one group inevitably results in a reduction of the power exercise by others (Oakley, 2001). Rowlands (1997) introduces four categorisation of power i.e., power *over* (ability to resist manipulation), power *to* (creating new possibilities), power *with* (acting in a group) and power *from within* (enhancing self-respect and self-acceptance) (Rowlands, 1997).

2.2.1.6 Empowerment as a capacity to achieve livelihood outcomes

The World Bank (2001) defines empowerment as the process of increasing the capacity of individuals or groups to make choices and to transform those choices into desired actions and outcomes. According to Krishna (2003), empowerment means increasing the capacity of individuals or groups to make effective development and life choices, and to transform these choices into desired actions and outcomes. It is, by nature, a process and/or outcome (Krishna, 2003).

Finally, Monkman (1998) gives another definition of women's empowerment, stating that collective mobilization and organization are central to the development of empowerment and to effecting change at a societal level. This author points out that individual empowerment has to be accompanied by significant and related social change because it is difficult to sustain feelings of empowerment when only small changes are occurring in the broader social environment.

Having reviewed various definitions of empowerment and suggested its potential value, the following section discusses the methodological challenges that confront measurement of empowerment, the indicators and questions that are used to capture this complex concept.

2.3 Measurement of empowerment

Since empowerment is a value-laden term and the consequence of further value-laden processes (e.g. participation, demanding and realising rights) with no common definition (Jupp et al.,

2010), its measurement and operationalization has also varied widely (van den Bold et al., 2013; Jupp et al., 2010). Moreover, because the processes of empowerment and exercise of agency cannot be easily observed, attempts to monitor and measure it have typically relied on proxy indicators (Jupp et al., 2010; Narayan, 2005). However, proxy measures have the challenge that they do not provide much information on the ~~"d~~ecision-making dynamics or mechanisms of impact" (Quisumbing, 2003, 197). Where causality is often ambiguous, these measures are, therefore, better defined as correlates or indirect measures of empowerment rather than determinants (Malhotra et al., 2002). However, where causality is clear, they may be defined as determinants or direct measures of empowerment (Samman & Santos 2009). The main correlates or indirect measures of empowerment most frequently cited in the literature (with some overlap) include the following:

- education (for example, female literacy, female enrolment in secondary school, maternal education)
- labour market status (e.g., childcare options, labour laws, female labour force participation, gender wage differentials, women's share of earned income)
- legal frameworks (e.g., property rights law, marriage and family law, inheritance law, labour laws)
- marriage and kinship (e.g., whether marriage is endogamous or exogamous, age difference between spouses, family structure, number of children, rates of female versus male migration)
- land ownership (e.g., proportion of women who own land according to legal or customary tenure systems, control over income generated from land, legal reform on inheritance laws)
- social norms (e.g., women's physical mobility)
- political representation (e.g., proportion of seats in parliament held by women) (Samman & Santos, 2009; Malhotra et al., 2002)

While these correlates are important indicators (i.e., in and of themselves) that may facilitate empowerment, they do not necessarily directly or automatically translate into empowerment. To overcome various challenges inherent in the use of proxy measures, attempts to use direct measures of empowerment have increased. The majority of these researches have focused on the

individual and household levels, and primarily on household decision-making processes and access to and control over resources (van den Bold et al., 2013).

Individual and household-level indicators often used to directly measure empowerment relate to the following:

- Women‘s involvement in household decision-making (economic decisions related to finances (e.g., Bernasek & Bajtelsmit, 2002; Parveen & Leonhauser, 2004), expenditures, resource allocation (Randriamaro, 2006); social and domestic matters regarding marriage; and child-related decisions such as schooling (Tayyib et al., 2013), health, and nutrition) (van den Bold et al., 2013).
- Women‘s access to or control over resources (e.g., access to or control over cash, assets, household income, unearned income, participation in paid employment).
- Women‘s freedom of movement or mobility
- Power relations between husband and wife
- Men‘s and women‘s attitudes towards abuse and intimate partner violence, and attitudes towards gender roles
- Sources of power such as media exposure, education, or paid employment (e.g., Bhagowalia et al., 2012, Malhotra et al., 2002; Samman & Santos, 2009).

Other, perhaps less commonly used, indicators includes the following:

- Management and knowledge (e.g., farm management, accounting knowledge, managerial control of loans)
- Marriage, kin, and social support (e.g., social status of family of origin, assets brought to marriage, traditional support networks, educational differences between husband and wife, age at first marriage (Smith and Haddad, 2000), widowhood and remarriage (Van de Walle, 2011)
- Settings of power such as social hierarchies (Bhagowalia et al., 2012), or indicators such as appreciation in the household, and sense of self-worth (Malhotra et al., 2002)

Studies that measure women‘s empowerment have used the above measures to various extents and in various combinations. These measures or indicators have more or less relevance,

depending on the level at and dimensions along which women's empowerment can occur. Malhotra et al. (2002) lay out the various dimensions along which women can be empowered (economic, sociocultural, familial and interpersonal, legal, political, and psychological) and also the different levels at which empowerment can occur: the household and community, as well as national, regional, and global. In this conceptualization, individual and household level indicators are more related to direct measures than those at the aggregate level, such as national and regional, which are more related to indirect measures (van den Bold et al., 2013).

2.3.1 Measurement issues

Various studies (e.g., Mahajan, 2012; Haque et al., 2011; Narayan, 2005 & Khwaja, 2005) have cited problems and challenges of measuring women empowerment. Key measurement issues to be addressed include the multidimensional character of empowerment, the need to operationalize the concept at various levels of aggregation (Malhotra et al., 2002) and across different contexts, the infrequency of "strategic life choices" that figure in the basic definition of empowerment (Kabeer, 1999), and the difficulties inherent in measuring a process (Ibrahim & Alkire, 2007). Other methodological issues revolve around the selection of indicators of empowerment and include whether or not to measure aspects that are intrinsic or instrumental; context specific or universal; individual or collective; whether to include psychological determinants or not; the appropriate unit of analysis; issues of causality and whether to collect quantitative or qualitative data (Ibrahim & Alkire, 2007; Narayan, 2005). This study considers all the concerns raised by Narayan (2005) in selecting indicators of women empowerment and these are addressed in section 2.5.3

2.3.1.1 Multidimensionality

Early writers, including Acharya & Bennett (1981), noted that status is a function of the power attached to a given role, and because women fill a number of roles, it may be misleading to speak of "the status of women." Another early writer on the topic, Mason (1986), pointed out that the phenomenon of gender inequality is inherently complex and spread across different dimensions, including the social, economic, political, and psychological, among others. She contends that men and women are typically unequal in various ways, and that the nature or extent of their inequality can vary across these different dimensions (as well by social setting and stage in the

life cycle). A number of more recent studies (e.g., Mahajan, 2012; Mosedale, 2005; Malhotra et al., 2002) have argued that women may be empowered in one area of life while not in others. Thus, it should not be assumed that if a development intervention promotes women‘s empowerment along a particular dimension, empowerment in other dimensions will necessarily follow (Narayan, 2005).

2.3.1.2 Levels of aggregation

Many writers (e.g., Alsop & Heinsohn, 2005; Malhotra et al., 2002; Malhotra, 2003; Mayoux, 2000; Bisnath & Elson, 1999) have noted that because power relations operate at different levels, so does empowerment. However, there is considerable variation in exactly how these levels are defined. For example, when economists differentiate between the macro and micro levels, the macro level is generally meant to include market and political systems, while the micro level often comprehends not only individuals and households but also communities and institutions. In contrast, when sociologists and demographers refer to the micro level, they usually mean the individual or the household, while the macro level may include anything from the community to the polity (Jejeebhoy & Sathar, 2001; Narayan et al., 2000; Kritz et al., 2000). If a researcher follows the view held by sociologists and demographers, the question is whether the indicators of empowerment should be measured at the individual, household, group, community, local government, national government or global level (Narayan, 2005; Malhotra et al., 2002).

2.3.1.3 Intrinsic or instrumental value

Empowerment has intrinsic value. It is an end in itself. Feeling self-confident, walking with dignity, feeling respected, living without fear, is of value in itself. Empowerment is also important as a means of achieving specific development outcomes, ranging from improved attendance of teachers at schools to increased incomes for poor people (Narayan, 2005). The challenge is whether researchers should measure the empowerment people value or the powers they have even if they do not value them (Ibrahim & Alkire, 2007). Thus, for the purposes of constructing a specific evaluation, it is important to specify whether empowerment is conceptualized as a means, an end or both.

2.3.1.4 Universal/context specific

The other issue concerns the comparability of indicators and the extent to which they should be universal or context specific. A prior question is whether it is possible to get meaningful international indicators of empowerment at all (Ibrahim & Alkire, 2007). However, it is also clear that internationally comparable indicators may not be sufficient for many purposes, because they do not provide information on the socio-cultural environment including culture and embedded social relationships (Oxaal & Baden, 1997; Bartlett, 2004). Kabeer (2001) argues that the aspect of tradition and culture, which is often taken for granted, is important in conceptualising women empowerment. Internalised subordinate social status, for example, affects human agency and the ability to make choices (Malhotra et al., 2002). The contextual nature of empowerment and problems of adaptive preferences poses a major challenge to agency measurement (Khwaja, 2005) and context-dependent measures of empowerment may be useful in many cases to complement internationally comparable measures (Oxaal & Baden, 1997; Khwaya, 2003:5; Malhotra, 2003).

2.3.1.5 Individual or collective

There are different views in literature with some studies measuring empowerment at collective/group level while others measure at individual level (Ibrahim & Alkire, 2007). The unit of analysis in most poverty research is the individual, yet literature on social exclusion show that opportunities are not equally distributed but are stratified by social group. Thus, in attempting to measure the empowerment of those previously excluded, it is essential to locate individuals within the historical, social, and political context of their social groups in order to correctly interpret the impact of development interventions (Narayan, 2005).

2.3.1.6 Dynamics

There are conflicting approaches with whether researchers and scholars should measure empowerment as the process of change or perceptions of whether change has occurred. To measure empowerment dynamics properly, researchers would require panel data, as well as indicators that might capture the dynamic process of changes (Ibrahim & Alkire, 2007). Smulovitz & Walton (2003) argue that types of information that need to be gathered to capture

the empowerment process include; (1) factors affecting the capabilities of individuals to act as agents, (2) the actual exercise of agency; and (3) influences on the institutional context.

2.3.1.7 Who measures: self or others?

A fundamental principle of evaluation is objectivity and dispassion in measurement. To achieve objectivity, it is generally assumed that the subject should not be the person doing the measuring and that the measures themselves should be objective as far as possible (Narayan, 2005). However, empowerment not only has multiple definitions, but also objective and subjective dimensions (Holland & Brook, 2004:1). This raises the question of whether to use data that draws on the perceptions of the poor and if so, how to use this data so that it strengthens rather than discredit rigorous analysis (Ibrahim & Alkire, 2007). Moreover, even the so-called objective measures such as income or land holdings are not free from reporting bias. For example, land holdings may be self-reported, based on actual measurement of field sizes, or based on land records, all of which are subject to error (Narayan, 2005).

2.3.1.8 Quantitative or qualitative data

There has been debate across disciplines on the value of different data collection methods to measure women empowerment (Narayan, 2005). Quantitative indicators are widely used by agencies as they standardize measurements of change at the international level, making comparisons across countries possible (Moser, 2007). However, they are insufficient at reflecting all changes in gender-related outcomes. Qualitative indicators permit more in-depth examination of social processes, social relations, power dynamics, and gender equity. These indicators capture perceptions, opinions, and experiences. Thus, although, quantitative data are more informative, qualitative and participatory data are necessary to triangulate, guide and deepen the analysis in many contexts (e.g., Ibrahim & Alkire, 2007).

2.4 Conceptualising women empowerment

According to Oxaal & Baden (1997), given the diversity in the definition of empowerment, it is beneficial to clearly define and conceptualise empowerment in each analysis. However, a concise analytical framework is needed to conceptualise and precisely measure women empowerment. A better analytical tool for doing so is the sustainable livelihoods approach (SLA) because it

ascertains how individuals make a living and achieve their desired livelihood outcomes. Therefore, the following section uses the SLA to analyse how individuals make a living and adapts it to propose a concise definition of women empowerment and a systematic methodology for its measurement.

2.4.1 Framework for conceptualising women empowerment

The sustainable livelihoods framework provides a comprehensive, and complex, approach to understand how people make a living. De Haan & Zoomers (2005) summarized this by noting that the central objective of SLA was to search for more effective methods to support people and communities in ways that are more meaningful to their daily lives and needs, as opposed to ready-made interventionist instruments. This implies that the SLA, as an analytical tool, provides a better basis for understanding the relationship between people's resources, livelihood strategies and their desired livelihood. The framework is also useful for analysing most of the cultural-related gender concerns, since they form part of the transforming structures and processes (Lakwo, 2006). According to Lakwo (2006), the approach is suitable for analysing the constituent elements of women empowerment as it is people-centred, and takes into account what they have and do as agents for, rather than victims of, their own change. This is because, as Long (1997) cited in de Haan & Zoomers (2003: 352) stresses:

> Livelihood best expresses … _individuals and group struggles to make a living, attempting to meet their various consumptions and economic necessities, coping with uncertainties, responding to new opportunities, and choosing between different value positions.'

From Long's assertion, livelihood as a struggle is about social relations where first, gender relations occur on a day-to-day basis as men and women struggle to make a living. In the process, women (as actors) interact with the rules of their society (structures) to either reinforce or challenge them. Second, in the process of making a living, resources are accessed, used, and transformed. This process represents resources as entangled with power dynamics, which reveals how gender discrimination is continuously (re)produced. Third, a given livelihood practice has micro, meso, and macro interactions. This multi-dimensionality that de Haan & Zoomers (2005) refer to as a _pandora's box' provides a basis for evaluating how external factors as microfinance intervention enables or constrains change within a given gendered livelihood practice. Finally,

the approach (i.e., Figure 2.1) calls for a methodology that gives voice to the women whose life-worlds are (re)shaped by their gendered livelihood practices.

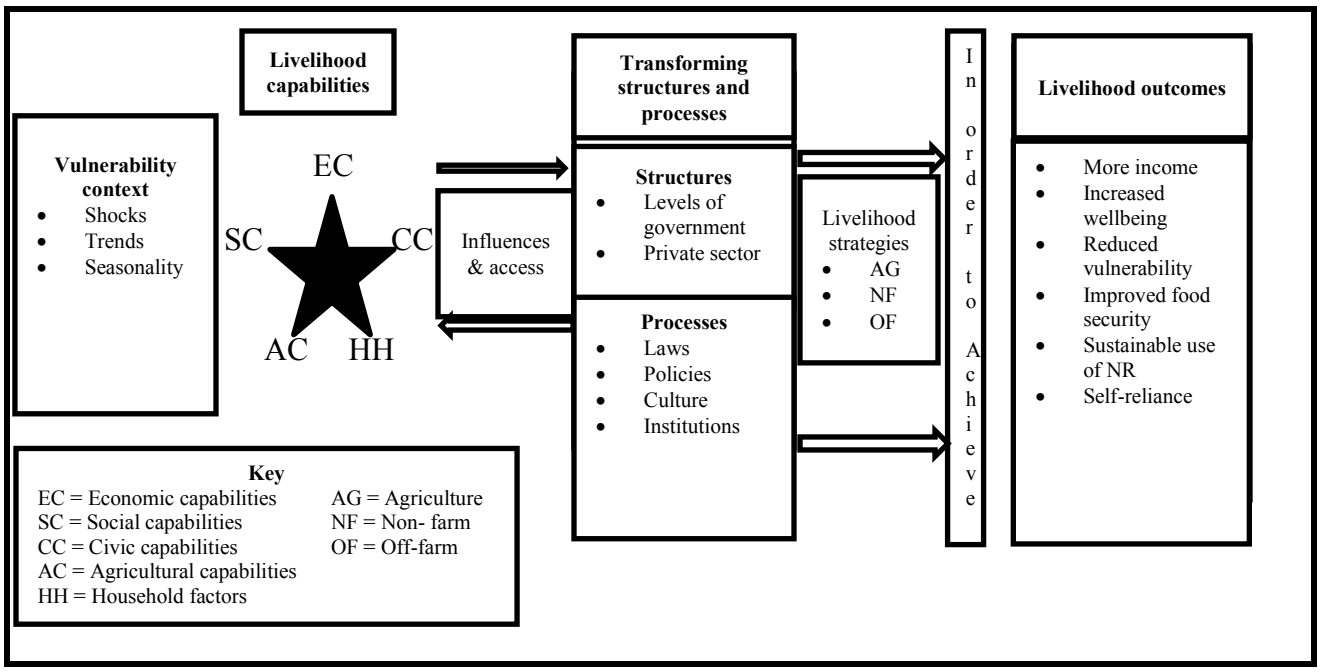

Figure 2. 1: Sustainable livelihood framework

Source: Adapted from DFID (1999).

Therefore, the SLA was adapted for this study, as a guide to:

- define women empowerment
- identify the most suitable indicators of women empowerment and,
- analyse how several dimensions and sub-dimensions of women‘s empowerment affect livelihood outcomes.

Based on the SLA, livelihood assets are the resources on which people draw in order to carry out their livelihood strategies (Chambers & Conway, 1992; Ellis & Allison, 2004). However, in the context of women‘s empowerment, this review argues that in addition to livelihoods assets, people need a sense of agency to achieve their livelihood outcomes. Therefore, households use their empowerment capabilities (i.e., resources and agency), not just capital assets, to pursue activities that will enable them to achieve the best possible livelihood for themselves. Therefore, in place of the different types of capital resources identified in the DFID (1999)‘s sustainable livelihood framework, this review argues that women‘s capabilities (i.e., agency and resources) influence women‘s capacity to independently attain their desired livelihood outcomes. According

to Mahajan (2012), Mosedale (2005) and Malhotra et al. (2002), women empowered in one dimension are not necessarily empowered in the other. Based on the sustainable livelihood framework, this implies that women use their economic, social, political, familial, legal and psychological capabilities (i.e., resources and agency) to achieve livelihood outcomes (Figure 1).

Based on the above key aspects of empowerment from literature, this review therefore, incorporates the multidimensional framework with the agency-resource-outcome to operationalize empowerment. A description of how the two frameworks have been combined to capture the dimensions of women empowerment is described in section 2.5.3.

2.4.2 Multidimensional framework

The multidimensional framework is rooted in the fact that women or communities empowered in one dimension (e.g., economic) are not necessarily empowered in the other (Mayoux, 2006; Malhotra et al., 2002; Moore, 2001). Analysis of the different studies on empowerment (Mahajan 2012; Mosedale, 2005; Malhotra et al., 2002; Kabeer, 1999) identified the following domains of women‘s empowerment: economic, social, political, legal, physical, familial/personal, informational, moral and psychological. Although other studies (e.g., Uphoff, 2003) have distinguished six or more dimensions of women‘s empowerment, this review categorises women empowerment into four main dimensions (i.e., economic, social, civic and agricultural), which can further be divided into sub-dimensions. For example, economic empowerment can be divided into physical, human, financial, capital asset empowerment while informational resource, familial and social capital resources are part of social empowerment. A detailed description of these dimensions of women‘s empowerment is given in the following sections.

2.4.2.1 Women’s economic empowerment

A large part of literature recognises women‘s economic empowerment as the key strategy in addressing gender inequality, and as a prerequisite for sustainable development and pro-poor growth (Dominic & Jothi 2012). Women‘s economic empowerment is the process which increases their real power over economic decisions that influence their lives and priorities in society (SIDA, 2009). To achieve economic empowerment, women, especially those living in rural areas, must get access to and control over resources, including, land and other natural resources. Women‘s economic empowerment includes having the appropriate human capital,

material, financial and physical resources needed to pursue secure and sustainable incomes and livelihoods (SIDA, 2009). Hence, human, physical, financial and social-capital, in addition to economic agency, are the dimensions of women‘s economic empowerment.

2.4.2.2 Social empowerment

Women‘s social empowerment is the process of developing a sense of autonomy and self-confidence, and acting individually and collectively to change social relationships and the institutions and discourses that exclude poor people and keep them in poverty (Blomkvist, 2003). Women‘s social empowerment and their ability to hold others to account is strongly influenced by their individual assets (e.g., land, housing, livestock, savings) and capabilities such as human (e.g., good health and education), social (e.g., social belonging, a sense of identity, leadership relations) and psychological (self-esteem, self-confidence, the ability to imagine and aspire to a better future). Also important are women‘s collective assets and capabilities, such as voice, organisation, representation and identity (Blomkvist, 2003). The capacity for women‘s social empowerment is tied to institutions and laws, which define what they may do or not. This dimension, therefore, relates to the socio-cultural aspects of the society in which they live. The dimensions of this category include familial, social capital, organisational, cultural and informational forms of empowerment.

2.4.2.2 Civic forms of empowerment

Women‘s civic empowerment refers to the access and control of the means to actively engage in the public sphere. The main dimensions of women‘s civic empowerment are legal and political empowerment. Legal empowerment of women can be understood as the process of systemic change through which women are protected and enabled to use the law to advance their rights and their interests as citizens and economic actors (Masser, 2009). Legal empowerment of the poor seeks to establish the rule of law, and ensure equal and equitable access to justice, and tackle the root causes of exclusion, vulnerability and poverty (Masser, 2009). Political empowerment refers to the process of transferring various elements of power (resources, capabilities, and positions) to those who do not have it (Mayoux, 2006). It gives women the capacity to analyse, organise and mobilise, participate in collective action for change, related to empowerment of citizens to claim their rights and entitlements (Piron & Watkins, 2004). It is

also about their ability to influence policy, making demands and calling the state to account (OECD, 2012).

2.4.2.4 Women's empowerment in agriculture

Over 80% of rural women depend on agriculture for survival. Hence, women's empowerment in agriculture is a major dimension of their empowerment. Women play a critical and potentially transformative role in agricultural growth in developing countries, but they face persistent obstacles and economic constraints limiting further inclusion in agriculture (Alkire et al., 2012). The process of empowerment in agriculture is, therefore, more relevant for rural women since they have previously been denied access and control of the assets and capabilities crucial for making strategic choices in agriculture (Malhotra & Schuler, 2005). Several studies have attempted to measure women's empowerment in agriculture. One significant effort towards this has been the development of Women's Empowerment in Agriculture Index (WEAI) by the US government's Feed the Future Initiative in 2012. This WEAI is a significant innovation towards increasing understanding of the connections between women's empowerment, food security, and agricultural growth. It measures the roles and extent of women's engagement in the agriculture sector in five domains: (1) decisions about agricultural production, (2) access to and decision-making power over productive resources, (3) control over use of income, (4) leadership in the community, and (5) time use. It also measures women's empowerment relative to men within their households (Alkire et al., 2012).

This review argues that the WEAI developed by the Feed the Future Initiative in 2012, only captures the socio-cultural inhibitions affecting women's participation in agriculture. In addition to the indicators developed by the Feed the Future Initiative in 2012, this review argues that women's sense of agency, water-use security and their agricultural skills are important resources of empowering them in agriculture. Women need _the power from within' (i.e., sense of agency) to pursue agricultural-based livelihoods activities. According to a number of studies (e.g., Cai et al., 2010; Rosegrant et al., 2009; Wenhold, 2007 & Rosegrant et al., 2002), irrigated cereal yields are 60% higher, on average, than rain-fed yields. This indicates that secure access to adequate water for agriculture is essential for achieving sustainable agriculture and food security (Wenhold, 2007). Likewise, participation in agricultural training and extension programs has been recognised as an important step towards increasing rural agricultural production (Collett &

Gale, 2009; DAFF, 2009). This study therefore, adapts the WEAI and incorporates indicators of agency, water-use security and agricultural skills in identifying dimensions of women empowerment in agriculture (Appendix 4).

2.4.3 Resource-agency-outcome empowerment framework

The second approach to evaluating women s empowerment considered in this study involves identifying the different processes/domains which define empowerment. These domains are variously defined as: resources, agency and achievements (Kabeer, 2001); control over resources and agency, (Malhotra et al., 2002); agency and opportunity structure (Alsop et al., 2006); agency, structures and relations (CARE, 2006); assets, knowledge, will and capacity (Charlier & Caubergs, 2007). In most cases, these elements are then broken down into sub-domains with associated indicators for measurement (Jupp et al., 2010). According to the sustainable livelihood framework, individuals and households utilize their resources and their agency to develop the capacity needed to achieve their desired outcomes on a sustained basis. Based on this framework, this study adopts Kabeer (2001)'s resource-agency-outcome framework to explore the concept of women's empowerment (Figure 2.2). Below, each of these dimensions is considered in turn, as are their interrelationships in the context of empowerment (Kabeer, 2005).

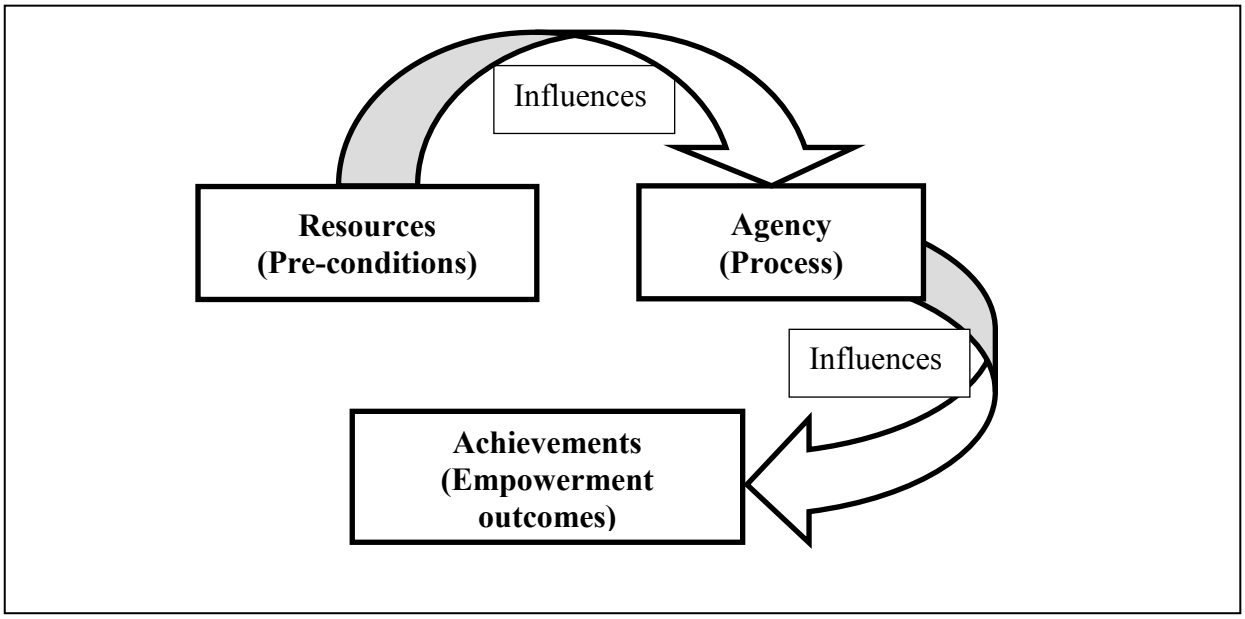

Figure 2. 2: Resource-agency-outcome conceptual framework

Source: Adopted from Kabeer (1999), Alsop and Heinson (2005) and Alsop et al. (2006)

2.4.3.1 Resources

One aspect of empowerment entails the expansion of the resources that are required to achieve livelihood outcomes. However, with regards to women, this study recognizes that the availability of resources at household or community level does not, on its own, translate into empowerment. In addition to availability, women need to have access and control of resources at the household, community level and broad arenas of life (Kabeer, 2001). In the context of empowerment, resources include not only material assets in the more conventional economic sense, but also the various human and social resources which enhance one's ability to exercise choice (Kabeer, 1999). They also include information and skills as well as supportive measures to act upon their choices. Knowledge about the law, for example, strengthens the ability of women to bargain and re-negotiate relationships within the household. Women's access to and control over resources, is critical and needs to be promoted since resources are the medium through which agency is exercised (Figure 2.2). Women not only need access and control of productive resources, they also need a sense of agency to use those resources efficiently.

2.4.3.2 Agency

The concept of human agency and self-efficacy frequently appears in definitions of empowerment. Many definitions of empowerment contain the idea that a fundamental shift in perceptions or "inner transformation" is essential to the formulation of choices. This means that women should be able to define self-interest and choice, and consider themselves as not only able but also entitled to make choices (Kabeer, 2001; Rowlands, 1995; Nussbaum, 2000; Sen, 1989). Agency is more than just observable action. It also encompasses the meaning, motivation and purposes which individuals bring to their activity, their sense of agency, or "the power within'. It can take the form of bargaining and negotiation, deception and manipulation, subversion and resistance as well as intangible, cognitive process of reflection and analysis (Kabeer, 1999).

2.4.3.3 Achievements

Resources and agency together constitute what Sen (1985) refers to as capabilities, that is, potential for living the lives one wants (Figure 2.2). The term "achievements' refers to the extent to which this potential is realized or fails to be realized; that is, to the outcomes of people's

efforts. In relation to empowerment, achievements have been considered in terms of both the agency exercised and its consequences. For example, taking up waged work would be regarded by the MDGs as evidence of progress in women's empowerment. However, it would be far more likely to constitute such evidence if work was taken up in response to a new opportunity or in search of greater self-reliance, rather than as a 'distress sale' of labour. It is also far more likely to be empowering if it contributes to women's sense of independence, rather than simply meeting survival needs (Kabeer, 2005).

2.5 Findings and discussions

This section highlights and discusses the main insights on definitional and measurement of women empowerment obtained from the literature review. The insights on definitions of women empowerment in the literature and the SLA are used in this section as guides to redefine women empowerment and to propose a concise methodology for systematically measuring it.

2.5.1 Redefining women empowerment

While cognizant of the context-specificity of women empowerment, literature reveals that the following conditions are necessary for empowerment to occur:

- A woman should have initially been disempowered. This makes the empowerment specific to her areas of disempowerment. It also recognizes that women are heterogeneously (dis)empowered. As a result, this review proposes that women empowerment is considered as multidimensional.
- Resource bases (endowment and entitlements) accessed and controlled by women should increase. As a result, this review proposes the use of resources as a critical indicator of empowerment.
- The agency power of the disempowered woman is (or women are) cardinal in directly claiming her/their empowerment, rather than being given it. This power should be directed at changing her/their points of disempowerment. As a result, this review recognizes women's agency as a critical indicator of empowerment.
- It can be attained at individual, collective, or both levels using individual or group efforts. However, since women are exposed to different socio-cultural circumstances by the

households they belong to, this review proposes that women empowerment is more relevant at the individual and not at the collective level.

Moreover, based on the sustainable livelihood framework, it can be noted that resources are needed for individuals to purse the livelihoods they want. However, other studies have also noted that access to resources alone is not a panacea for people to achieve their desired livelihood outcomes. Other studies have acknowledged that empowerment is multidimensional, and women empowerments in one area of their lives are not necessarily empowered in the other. This further suggests that resources and agency together constitute the capabilities that give individuals' a capacity to achieve livelihood outcomes. Based on this argument, this study regards women's empowerment as:

> **'The multidimensional process of increasing the capacity/capabilities (i.e., resources and agency) of individuals or groups to make choices and to transform those choices into desired actions and outcomes'.**

Having defined empowerment, this review proposes a methodology to systematically measure women empowerment. The following sections describe the indicators and the empirical methods required to quantitatively measure women's levels of empowerment.

2.5.2 Empirical approach to quantitatively measure women's empowerment

Analysis through literature indicates that empowerment is multidimensional. The resource-agency-outcome frameworks and the SLF (Figure 2. 3) analysed in this review suggest that capabilities (i.e., resources and agency) are the best indicators of women's empowerment. Since empowerment occurs at the four dimensions (i.e., economic, social, civic and agricultural) which can be divided into their respective sub-dimensions (e.g., cultural, familial/interpersonal, legal, political, and psychological), Principal Component Analysis (PCA) can be used as a tool to identify the underlying dimensions of women empowerment provided the PCs can be meaningfully interpreted (Koutsoyiannis, 1987). Each estimated PC would show a different dimension in, or interrelationship between, the p Xs in the data as the PCs are orthogonal (i.e., uncorrelated). Moreover, since women empowerment is multidimensional, it has a large number of indicators, and there is some possibility of redundancy in those variables (i.e., some of the variables are correlated with one another, possibly because they are measuring the same construct). Due to this redundancy, PCA is a more suitable data reduction technique for reducing

the observed variables into a smaller number of PCs (artificial variables) that are not correlated (Koutsoyiannis, 1987).

Considering that women empowerment is multidimensional, this study therefore, proposes the use of PCA on women‘s level of agency and resources to quantitatively generate factor scores (i.e., indicators of each woman‘s level of empowerment) at each dimension of empowerment (i.e., indicated by each PC) as a suitable methodology for systematically measuring women empowerment. The PC scores can also be used in subsequent analyses to represent the values of the principal components instead of a large number of correlated variables. Although a number of studies (Kawaguchi et al., 2014; Tefera, 2013; Bhagowalia et al., 2012 & Gupta & Yesudian, 2006) have used PCA to analyse women empowerment, they have disregarded the multidimensional feature of empowerment and have failed to use both resources and agency as the best indicators of women‘s capacity to achieve desired livelihood outcomes.

2.5.3 Indicators of women empowerment

Based on the definition adopted in this review, women‘s resources and their sense of agency are proposed to be the best indicators of women‘s empowerment. This is because, together, they constitute the empowerment capabilities that are needed for individuals to pursue livelihoods and achieve desired livelihood outcomes. However, most resources used by women to pursue livelihoods are owned by the household and not at individual level. Yet, household‘s socio-cultural inhibitions are the major source of women‘s disempowerment. As a result, with regards to tangible assets, this review recommends the use of women‘s level of access and control of resources as better indicator than just household resources. Since, both resources and agency can be grouped/categorised into economic, social, civic and agricultural resources and agency, they should also be categorised according to each respective dimension when they are used as respective dimensions of empowerment (Figure 2.3).

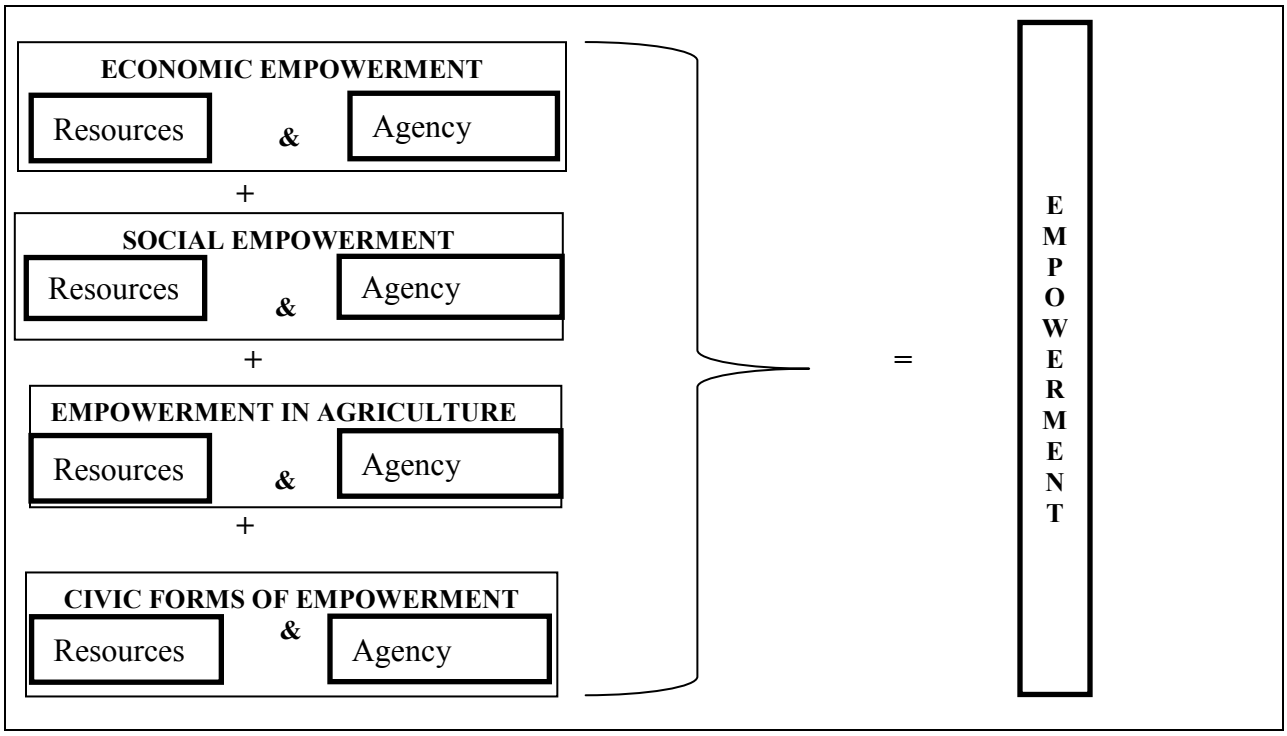

Figure 2. 4: Framework used to conceptualise women's empowerment levels

Source: Adapted from Mayoux (2006); Malhotra et al. (2002); Moore (2001) and Kabeer (1999)

A proposed list of indicators that captures the level of women's empowerment at each dimension is provided in appendix 2 to 4. This follows Malhotra et al. (2002), who constructed a list of the most commonly used dimensions of women's empowerment, drawing from the frameworks developed by various authors in different fields of social sciences. This study however, argues that the major limitation to the methodology of Malhotra et al. (2002) is that they did not combine levels of resources with agency at each dimension of empowerment. It also did not identify the dominant dimensions of women empowerment.

2.5.3.1 Considerations in the selection of indicators

This review considers all the concerns raised by Narayan (2005) in selecting indicators of women empowerment. To address the challenges of the multidimensional nature, this review proposes a holistic approach and takes the view that empowerment can occur at four main dimensions (i.e., economic, social, agricultural and civic), in which other sub-dimensions (e.g., physical, informational and moral) are part of. For example, physical assets are part of economic

resources, while informational and moral assets are part of the social resources that individuals can have.

Concerning the challenge with regards to whether researchers should measure the empowerment people value or the powers they have even if they do not value them, the study propose the use of survey questions that measure both. By default, the majority of questions on personal and household decision-making relate to power the respondent has while the other questions capture whether the respondent values the power or not.

With regards to the issue on whether to use universal or context specific indicators to measure empowerment, this study propose the use of both kinds of data to measure empowerment from a holistic approach. Although universal indicators can be compared across contexts (Malhotra et al., 2002), it was realised that internationally comparable indicators may not be sufficient to capture many dimensions of empowerment. Moreover, they do not provide information on the socio-cultural environment including culture and social relationships (Oxaal & Baden, 1997; Bartlert, 2004). Thus, a combination of both universal and context-specific indicators is recommended for measuring women empowerment in this study.

With regards to whether to measure empowerment at collective/group or individual level, this review proposes that women empowerment should use indicators that capture levels of resources and agency at the individual levels. This is because even women from the same social groups are exposed to different social, economic and cultural circumstances in their households and that household environments are the major source of their disempowerment. Hence, measuring empowerment at group level is an over-generalised measure of women‘s empowerment. However, when it comes to the level of aggregation (i.e., individual, household, community, national or global levels), this review proposes that women empowerment should be measured at the individual and household levels. This is because some resources are accessible to the women at the household level and not at the individual level.

Although some studies on women empowerment have attempted to measure it as process and others have measured perceptions of change in women‘s capabilities, this review recommends the use of the current level of resources and agency as a measure of the level of empowerment. This study does not recommend the use of perceptions of whether or not it has increased, or the

process by which it has come about. This is because such a methodology does not reflect whether the identified women have the capacity to independently achieve desired livelihood outcomes or not. The study recommends the measurement of women's level of agency and resources as a _snapshot' at a given point in time.

Concerning the issue of who has to measure women's empowerment, this study proposed the use of a survey that has both objective and subjective questions. Levels of resources that cannot be measured objectively can be rated subjectively on a five point Likert scale as shown in appendix 2 to 4. This study puts forward the use of quantitative data rather than qualitative data arguing that quantitative data support the application of PCA to generate composite indices quantitatively measuring women's levels of empowerment (i.e., PCA factor scores) at each dimension of women (i.e., physical capital empowerment, legal resource empowerment, e.t.c.).

2.6. Conclusions and recommendations

This review was motivated by the need to propose a concise definition and a methodology for systematically measuring the levels of empowerment among rural women in KwaZulu-Natal that can be used to evaluate and monitor progress made by government and Non-Governmental empowerment interventions in improving livelihood outcomes. The review, firstly, analysed literature to determine commonalities in definitions and methodologies used in the measurement of women empowerment. This is followed by proposing a concise definition and a methodology for systematically measuring women empowerment.

Based on the review of the literature, it was concluded that women empowerment is a multidimensional process occurring at four main dimensions (i.e., economic, social, civic and agricultural) in which other sub-dimensions (e.g., physical, informational and moral, etc.) are fitted. It was also concluded from literature that resources are undoubtedly the most important aspect of women's empowerment. However, it was also noted that resources on their own are not adequate for allowing individuals to achieve desired livelihood outcomes. Women also need a sense of agency to be able to independently utilise resources and achieve their desired livelihood outcomes. As a result, it was concluded that women's capabilities (i.e., resources and agency combined) are the most suitable indicators of women empowerment. However, with regards to women, the household institutional settings (emanating from their socio-cultural norms and

values) are the major source of their powerlessness. Hence, women's resources should be measured as their level of access and control of each household resource. Since women empowerment is multidimensional, this review, therefore, proposes the application of PCA on women's level of agency and resources to quantitatively generate factor scores (i.e., indicators of each woman's level of empowerment) at each dimension of empowerment (i.e., indicated by each PC).

2.7 Summary

This chapter has reviewed literature on the conceptualization and measurement of women empowerment. It has reviewed commonalities and divergences in defining and measurement of women empowerment. Based on the literature review, the study has proposed and developed a methodology to systematically measure women empowerment. The review showed that empowerment is multidimensional and complex process that occurs at four main categories namely; economic, social civic and agricultural in which other sub-dimensions are fitted. It was also realised that both resources and agency are the best indicators of women empowerment. Thus, the study proposed the use of Principal component analysis on women's levels of capabilities to identify the levels of women (i.e., indicated by factor scores) at each dominant dimensions of empowerment.

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CHAPTER 3: MEASUREMENT OF WOMEN'S EMPOWERMENT LEVELS IN MSINGA RURAL AREAS, SOUTH AFRICA

Abstract

It is crucial to assess the levels of empowerment among rural women in order to inform policy on ways to empower them and alleviate poverty and household food insecurity in South African rural areas. Considering that empowerment is multidimensional, this study applies Principal Component Analysis (PCA) to the levels of capabilities at each of the four main dimensions of women empowerment (i.e., economic, social, civic and agricultural), to identify the dominant dimensions of women empowerment (i.e., represented by the dominant PCs) and quantitatively measure levels of women empowerment (i.e., represented by PC factor scores) at each dimension. Economic agency, human capital empowerment, financial capital empowerment, empowerment in vocational skills and physical capital empowerment were identified as the dominant dimensions of women's economic empowerment. Social agency, social capital empowerment and informational asset empowerment were identified as the dominant dimensions of women's social empowerment. Dimensions of empowerment in agriculture included empowerment in crop management skills, farm financial management skills, water-use security, animal husbandry skills and weed and pest management skills. Legal resource empowerment, civic agency, political and psychological empowerment were identified as dominant dimensions of civic empowerment. Although women need both resources and agency to achieve livelihood outcomes, the agency aspect appears to be the most dominant dimension of women's empowerment. It was recommended that empowerment agencies (i.e., stakeholders, mostly NGO's, working to empower women) should always consider the multidimensional nature of empowerment in considering ways to empower them.

Key words: women empowerment, multidimensional, holistic approach, South Africa

3.1 Introduction

The ability to accurately measure the levels of empowerment among rural women in developing countries like South Africa is crucial for assessing its contribution to the achievement of livelihood outcomes. Various national and international bodies have addressed women's issues and taken a variety of efforts to empower them so as to enhance their livelihoods, and to involve them in developmental activities (Gupta & Yesudian, 2006). In South Africa, the post-apartheid

government has sought to correct inherited inequalities through various interventions designed to empower women (Oberhauser & Pratt, 2004). Although many interventions have been put in place to address their disempowerment plight, women continue to face immense challenges. Among the challenges are high rates of illiteracy, exclusion from decision-making processes, lack of resources and a host of socio-cultural bottlenecks (SAHO, 2012; Bob, 2002; Oberhauser & Pratt, 2004; McEwan, 2003). Women living in traditional rural areas of South Africa and most other developing countries, form part of the most economically and socially disempowered groups (SAHO, 2012; Bob, 2002). Thus, it is crucial to investigate the levels of empowerment among rural South African women, as a way of evaluating and monitoring the progress made in empowering them. Failure to identify the dominant dimension in which women are empowered, and failure to re-evaluate the areas in which women are disempowered results in poor targeting of women and implementation of inappropriate interventions, with the net effect of retarded alleviation of poverty and growth of their communities.

Although studies have boosted the understanding of the various dimensions of women‘s empowerment, most of the studies do not categorise women‘s empowerment into its constituent dimensions. Traditionally, measurement of women‘s empowerment has used single variables as proxies, such as, education (e.g. Kishor, 2000), knowledge and income under management of women (e.g., Ackerly, 1995) and health (e.g., Durrant & Sathar, 2000). This study however, agrees with other studies (e.g., Kishor, 2000; Estudillo, et al. 2001) that argue that a single indicator is insufficient for measuring even a single dimension of empowerment and follows the methodology proposed in Chapter 2 to measure the levels of empowerment among rural women in Msinga. As was noted in Chapter 2 of this study, women empowerment is a multidimensional and complex process that captures a multitude of constructs (Mosedale, 2005). The dimensions of women empowerment are dynamic, interlinked and mutually reinforcing, hence women empowered in one dimension, may not necessarily be empowered in another (Kabeer, 1999; Malhotra et al., 2002; Mosedale, 2005). Hence, the identification of the dimensions in which women are empowered or disempowered allows empowerment agencies in developing countries, including South Africa, to be more effective in designing interventions and increase the standard of living for rural women and their families.

Considering that empowerment is multidimensional, this study seeks to identify the dominant dimensions of women empowerment and measure levels of empowerment along each dimension, among rural women in KwaZulu-Natal province, in order to inform policy on how to enhance livelihoods in rural areas with similar settings. The study takes a holistic approach, where the entire ranges of the dominant dimensions in which women are empowered are identified. Within these dimensions, a set of indicators is then used for measuring each dimension. Although other studies have used PCA to measure the dimensions of women empowerment (e.g., Gupta & Yesudian, 2006), this study combines the multidimensional approach suggested in previous studies (Mahajan, 2012; Mosedale, 2005; Malhotra et al., 2002; Kabeer, 1999) and the resource-agency-outcome approach that Kabeer (1999) used, for coming up with various dimensions of women‘s empowerment.

3.2 Research methodology

This section provides a discussion of how the methodology proposed in Chapter 2 was employed to identify the dominant dimensions of women empowerment and quantitatively measure the levels of women empowerment along each dimension. It provides a conceptual framework and empirical approach to measure the levels of women empowerment along each dimension.

3.2.1 Conceptual framework for measuring women’s empowerment

Empowerment is seen to occur at different levels, to cover a range of dimensions and to materialize through a variety of processes (Kabeer, 1999). A list of the most commonly used dimensions of women‘s empowerment was synthesised from the multidimensional approach suggested by Mahajan (2012), Mosedale (2005), Malhotra et al. (2002) and Kabeer (1999) and the resource-agency-outcome approach (Kabeer, 1999). Allowing for overlap, the multidimensional framework suggests that rural women‘s empowerment occurs along the following dimensions and their sub-dimensions: economic (e.g., physical capital, human capital, natural capital, and financial capital empowerment), socio-cultural (i.e., social capital, familial/interpersonal, organisational, cultural and informational empowerment), agricultural (e.g., access to agricultural resources, crop production skills, animal husbandry skills, water-use security levels) and civic forms of empowerment (e.g., legal, political, and psychological). Based on a review of definitions of empowerment in literature, this study defines empowerment as the multidimensional process of increasing the capacity/capabilities (i.e., resources and agency) of

individuals or groups to make choices and to transform those choices into desired actions and outcomes. According to the resource-agency-outcome approach, resources and agency together constitute what Sen (1985) refers to as capabilities, that is, their potential for living the lives they want. Thus, it is argued, in this study, that the most important predictors of empowerment are the capabilities (i.e., resources and agency) that determine women's ability to achieve their desired outcomes. This study advances the multidimensional approach used by Malhotra et al. (2002), which only considers the resource/asset forms of empowerment, by adding the agency component to give a complete measure of empowerment (i.e., capabilities) within each dimension of women's empowerment (Figure 3.1). In operationalizing these dimensions, the study considered indicators at the individual and household levels of social aggregation and not at community as well as in broader arenas of life.

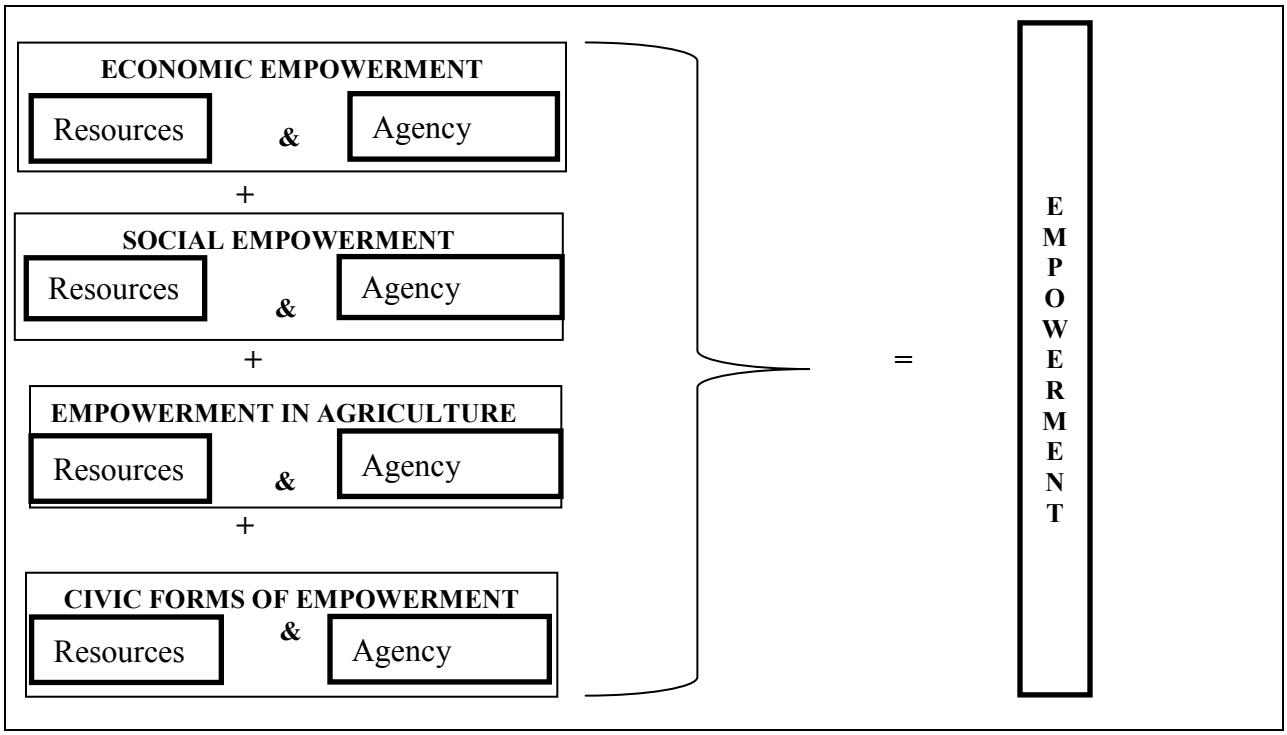

Figure 3. 1: Framework used to conceptualise women's empowerment levels

Source: Adapted from Mayoux (2006), Malhotra et al. (2002), Moore (2001) and Kabeer (1999)

3.2.2 Empirical approach for identifying and measuring levels of women empowerment

The approach used in this study firstly identifies all indicators of women's capabilities (i.e., resources and agency), under each dimensions of empowerment, in the context of South African rural areas (Appendices 2 to 5). The indicators that capture women's access and control of resources and their agency at each dimension of empowerment were compiled following Uphoff (2003), Kabeer (1999; 2001; 2005), Alsop and Heinson (2005) and Alsop et al. (2006). With the help of an enumerator, each woman respondent rated their levels of capabilities (i.e., resources and agency) on a five point Likert scale. Principal Component Analysis (PCA) was applied on the levels/scores of resources and agency at each of the four dimensions of empowerment (i.e., economic, social, agricultural and civic) to generate indices representing the different sub-dimensions namely financial capital, human capital, physical capital, economic agency, social capital, etc. The dominant PCs (i.e., with Eigen values greater than one using the Kaiser criterion) were retained in each dimension. Following other studies (e.g., Nieuwoudt, 1977), absolute PC loadings greater than 0.50 were considered dominating and indicated a strong association among the resources used to generate that particular PC. PCA was also chosen over other variable reduction techniques (e.g., cluster analysis and factor analysis) because most of the indicators of empowerment capabilities are correlated and can be grouped by PCA into few principal components (i.e., dimensions of empowerment), which account for most of the variance of the indicators.

3.2.3 Methods of data collection

3.2.3.1 Study area

Since access to irrigation is one of the essential opportunities to achieve increased food production and a critical factor towards achieving sustainable agriculture and food security, the availability of an irrigation scheme with a neighbouring rain-fed area was the main determinant for selection of the study sites. This was important for comparing the effect on women, of farming in rain-fed agriculture and irrigation, and the consequences on agricultural productivity and household food security. Thus, women practising irrigation were sampled from Tugela Ferry and Mooi River Schemes while those practising dry-land agriculture were taken from Machunwini communal area, which lies between the two irrigation schemes. Two irrigation schemes were used to increase the numbers as well as the variability among respondents with

respect to the explanatory variables. The three study areas all lie under the Msinga Municipality, KwaZulu-Natal province, South Africa. The Msinga Local Municipality is an administrative area in the Umzinyathi District and its geographical coordinates are 28.7461° S, 30.4525° E.

3.2.3.2 Sampling procedures for the survey

Social organization and culture can significantly influence the division of labour between men and women in rural households. Moreover, gender relationships influence male and female heads-of-households to pursue different livelihoods activities (Gladwin et al., 2001). Thus, this study considers a household as having two heads (i.e., a primary female and a primary male head-of-household) who head the household in pursuing different livelihood activities. Only women who were the primary female heads-of-households were selected for this study. A primary female head-of –household was defined as the most senior women in the household who could also be a de-jure ora de facto household head, in the temporary absence of a male figure. Households in the three study sites were stratified into three main groups namely; gravity–fed irrigators, pump-fed irrigators and dry-land farmers (Table 3.1). The gravity-fed and pump-fed women irrigators/farmers were obtained from Tugela and Mooi River Irrigation Schemes. However, gravity-fed irrigators/farmers in Tugela Ferry were not included in the study because the irrigation scheme was undergoing a major revitalisation at the time of the survey. Moreover, the farmers had not been producing food for almost a year, which made it difficult to assess the impact of the irrigation scheme on household‘s livelihood outcomes. The dry-land women farmers were sampled from the Machunwini area.

Stratified proportional random sampling method was used to select the women used for the study to equally represent the three methods by which farmers‘ access water for agricultural purposes (i.e., gravity-fed, pump-fed and dry-land farmers). Households in the three study areas were divided into three different subgroups or strata (i.e., gravity-fed, pump-fed and dry-land farmers). Households were then randomly selected proportionally from the different strata such that each stratum contributed 100 primary female heads-of-households. Thus, the number of females sampled from each of the three areas was calculated based on the proportion of the total number of households in each area (e.g., 40 for Tugela Ferry = 270/(403+270)). Every woman in identified households who met the definition of a primary female head-of household was

included in the study. The total number of households from which the sample was drawn was about 2380. Thus, the sample size was about 12.6% of the total population (Table 3.1).

Table 3. 1: Distribution of sampled women farmers in each study area

Irrigation method	**Total number of households**			**Number of respondents sampled**			**Total**
	Tugela Ferry	**Mooi river**	**Machunwini**	**Tugela Ferry**	**Mooi river**	**Machunwini**	
Gravity-fed	0	473	0	0	100	0	100
Pump-fed	245	403	0	40	60	0	100
Dry-land	0	0	1234	0	0	100	100
Total							**300**

Source: Survey data (2013)

3.3 Results and discussions

3.3.1 Socio-demographic characteristics of study areas

Table 3.2 summarises the socio-demographic characteristics of the sampled primary female heads-of-households and those of their households across the three study sites. The women in Machunwini tended to be younger (i.e., mean of 50.9 years) than the other two communities. The households sampled from Machunwini had few members while those from Tugela Ferry had a lower dependency ratio of about 0.7. The majority (57.7%) of the primary female heads-of-households in the three communities were not married (i.e., either single, widowed or divorced/separated). In addition, most of the women (92.0%) were unemployed and the percentage of unemployed women was highest in Tugela Ferry (Table 3). The majority of the sampled women (72.3%) had no formal education, with only about 1.3% having reached tertiary education. Similarly, most (43.6%) of the husbands of the primary female heads-of-households also had no formal education. Most of these husbands, just like their wives, were not formally employed. Machunwini had the highest proportion of women whose husbands were informally employed. This is possibly because dry-land agriculture could not offer income opportunities like the irrigation schemes where households could largely rely on incomes from the irrigation scheme. Most of the women‘s households across the three communities (58.0%) followed Christianity as a religion. The majority of the women in the study areas were also the de jure household heads as 59.0 per cent of them were single, widowed or divorced/separated.

Table 3.2: Socio-demographic characteristics of sampled primary female heads-of-households and their households

Characteristic	Mooi River (n=160)	Tugela Ferry (n = 40)	Machunwini (n = 100)	Overall (n = 300)	p-level
Average age of women (Years)	54.5	54.9	50.9	53.3	0.087
Household size	7.8	7.9	6.8	7.8	0.377
Mean dependency ratio	1.2	0.7	1.1	1.1	0.012
Marital status (%)					0.059
• Married	35.5	33.3	52.5	41.0	
• Single	21.9	12.8	14.1	18.1	
• Widowed	49.0	53.8	31.3	38.9	
• Separated/Divorced	2.6	0	2.0	2.0	
Employment status (%)					0.578
• Unemployed	90.0	95.0	94.0	92.0	
• Informal / non-permanent employment	8.8	5.0	6.0	7.3	
• Formal employment	1.3	0	0	0.7	
Husband's employment status (%)					0.193
• Unemployed	47.2	75.0	53.8	53.0	
• Informal / non-permanent employment	28.3	16.7	36.5	30.8	
• Formal employment	24.5	8.3	11.5	17.1	
Women's level of education (%)					0.113
• No formal education	72.5	77.5	70.0	72.3	
• Primary education	14.4	12.5	10.0	12.7	
• Secondary education	9.4	10.0	20.0	13.0	
• Tertiary education	2.5	0%	0	1.3	
Husbands level of education (%)					0.064
• No formal education	41.5	33.3	48.1	43.6	
• Primary education	30.2	16.7	15.4	22.2	
• Secondary education	20.8	50.0	36.5	30.8	
• Tertiary education	0	0	0	3.4	
Both male and female heads of households present	26.8	30.5	46.6	34.0	0.650
De jure female-headed h/holds (%)	73.5	66.7	47.4	59.0	
De facto female-headed h/holds (%)	8.7	2.7	5.9	6.9	

Source: Survey data (2013)

NB: p-level shows significance level of the independent t-test and χ^2 for continuous and categorical variables, respectively

3.3.2 Dominant dimensions of empowerment among rural women in Msinga

Analysis of the different scores of indicators of empowerment through PCA generated a number of dimensions of women‘s empowerment in each of the four main dimensions of empowerment. The following section presents and discusses the dominant PCs in each dimension of empowerment.

3.3.2.1 Dominant dimensions of women’s economic empowerment

Application of PCA to variables or indicators of women‘s economic empowerment produced twelve principal components (PCs) that had Eigen values greater than one using the Kaiser criterion and jointly explained 65.0% of the total variation in the variables used. From these twelve PCs, the first five PCs were retained because they had Eigen values greater than one and also allowed for meaningful interpretation of the PCs (Table 3). These first five components explained 13.5%, 7.0%, 6.5%, 5.5% and 5.5% of the variation, respectively (Table 3.3). The different factors represented the different dimensions of economic empowerment among the primary female heads-of-households in the three rural communities of KwaZulu-Natal.

Based on the dominant component loadings, the first PC shows that primary female heads-of-households with a high capacity to envisage change or to aspire for better things in life, They also had high levels of bargaining or negotiation power, deception power, manipulation power, subversion power, resistance power, reflection power and analysis power. These indicators are all associated with the _the power within‘ necessary for one to define own goal and act upon them (Kabeer, 1999). This inner transformation that enables people‘s capacity to define their own life-choices and to pursue their own goals is called their agency. According to Kabeer (1999), agency is the ability to define one‘s goals and act upon them and can take the form of bargaining and negotiation, deception and manipulation, subversion and resistance as well as more intangible, cognitive processes of reflection and analysis. Since this agency was exercised in the economic arenas, the first and dominant PC represented the economic agency among rural women.

Table 3. 3: Dominant dimensions of economic empowerment among women in Msinga

Indicators of economic empowerment	**Principal components (Eigen value)**				
	Economic agency	Human capital	Financial capital	Vocational skills	Physical asset
Land under women control	0.018	0.030	0.091	-0.037	-0.005
Tropical livestock units	0.056	0.069	0.017	-0.100	-0.022
Value of machinery women control	0.078	0.370	0.327	0.290	-0.078
Road access	-0.030	-0.112	-0.081	-0.101	0.364
Communication infrastructure	0.118	0.113	0.127	-0.045	**0.738**
Electricity reliability	0.065	0.073	-0.045	0.065	0.096
Reliability of domestic water supply	-0.094	-0.123	-0.098	0.198	**0.594**
Education level	0.071	**0.597**	0.207	-0.077	0.092
Numeracy level	0.246	**0.782**	-0.035	0.126	0.007
Health status	0.152	0.275	0.038	-0.407	0.461
Employment status	0.038	0.187	-0.095	-0.073	-0.101
Literacy level	0.178	**0.826**	-0.041	-0.132	-0.001
Crop production skills	0.224	0.218	0.032	0.073	0.046
Animal production skills	0.013	-0.032	-0.066	-0.016	-0.026
Business management skills	0.141	0.213	0.183	0.044	0.275
Craftwork skills	0.156	0.094	-0.123	**0.752**	-0.017
Construction skills	0.072	-0.034	0.014	**0.627**	0.105
Saloon skills	-0.095	0.166	0.127	0.241	-0.100
Sewing skills	-0.093	-0.028	0.015	-0.105	-0.033
Cooking skills	0.250	0.324	0.053	**-0.513**	-0.076
Total credit value	-0.024	-0.006	0.027	0.186	0.307
Farm income	0.057	0.019	**0.972**	-0.063	0.028
Non-farm income	0.057	0.019	**0.972**	-0.063	0.028
Old-age-grant income	-0.051	0.002	-0.147	0.227	-0.059
Child-grant income	-0.049	-0.006	-0.032	0.060	0.037
Disability-grant income	-0.145	-0.063	-0.002	-0.068	0.041
Power to aspire ‗in economic arena‘	**0.601**	0.099	0.038	-0.074	0.178
Bargain power "	**0.668**	-0.067	0.056	-0.087	0.103
Manipulation power "	**0.656**	0.383	0.069	-0.057	0.204
Subversion power "	**0.771**	0.021	-0.010	0.070	-0.025
Resist power "	**0.686**	-0.144	-0.068	0.136	-0.189
Reflect power "	**0.707**	0.168	0.086	0.126	-0.383
Analysis power "	**0.625**	0.227	0.021	-0.111	-0.214
Level of motivation "	**0.736**	0.080	-0.003	0.037	0.101
Level of determination "	**0.649**	0.222	0.026	0.053	0.145
Level of resilience "	**0.663**	0.156	0.076	-0.014	0.028
% of variation	**16.2**	**7.4**	**5.8**	**5.4**	**5.2**
Cumulative %	**16.2**	**23.6**	**29.4**	**34.8**	**40.0**

Source: Survey data (2011)

NB: PC loadings greater than 0.5 are indicated in bold

The results indicate that the most important sub-dimension of women‘s economic empowerment is the economic agency. According to Alsop et al. (2006), agency is inherently multidimensional and can be exercised in different spheres, domains and levels. Spheres refer to societal structures in which people are embedded, which can give rise to, shape, and or constrain the exercise of agency. These are typically the state, in which a person is a civic actor; the market, in which the person is an economic actor; and society in which the person is a social actor (Alsop et al., 2006). Similarly, in many studies, having a sense of agency has been hypothesized and confirmed, that it can serve as a means to other development outcomes. The agency of women for instance, has been shown to affect positively the wellbeing of all those around them (Sen, 1989). In as much as access to and control of resources is important, women need a sense of agency, i.e., observable action in the exercise of choice within decision-making, protest, bargaining and negotiation, as well as the motivation and purpose that women bring to their actions (Kabeer, 2003).

The second PC indicates that primary female heads-of-households with high levels of education also have high literacy and numeracy levels. According to Dhakal & Nawaz (2009), human capital empowerment refers to the stock of competencies, knowledge, social and personality attributes, including creativity, embodied in the ability to perform labour so as to produce economic value. It refers to the time, experience, knowledge and abilities of an individual, household or a generation, which can be used in the production process (Dhakal & Nawaz, 2009). Human capital theory predicts that high educational and literacy attainment among women are important tools in achieving individual‘s set of skills. Educated women have better labour market opportunities, higher earnings, greater decision-making power within the household, and serve as excellent role models for their children. Thus, literacy, numeracy and education levels are measures of individuals‘ human capital stock (Mitra & Singh, 2007). As a result this PC was named human capital empowerment dimension.

The third dimension under economic empowerment indicated that primary female heads-of-households with high levels of access and control of farm income also had more access and control of off-farm income. This dimension of women‘s empowerment is concerned with women‘s access and control of financial issues. As a result, this dimension was called financial capital empowerment. The fact that women with high levels of off-farm incomes also had high

levels of on-farm incomes could be attributed to the fact that off-farm incomes can be used to finance agricultural activities resulting in increased on-farm incomes. It explained 7.4 per cent of the variation in the variables included in the model.

The dominating variables in the PC, which explained 12.1 per cent of the variation in the variables, were craftwork skills (0.752), construction related skills (0.627) and cooking skills (-0.513). The negative sign on cooking skills suggest that women that have excellent cooking skills have poor skills in craftwork and construction related jobs. Vocational education and training (VET) basically consists of practical courses through which one gains skills and experience directly linked to a career. Examples of such skills include cookery, dressmaking, carpentry, masonry as well as working in the industries (Jamal & Mandal, 2013). Hence, this PC was named ‗women's empowerment in vocational training skills'.

The fifth component was dominated by availability and reliability of communication infrastructure (0.738) and reliability of domestic water supply (0.594) and explained 10.2 per cent of the variation in the variables. The positive signs on both communication infrastructure and domestic water supply suggest that women with very reliable communication infrastructure also had access to very reliable domestic water supply. According to Quisumbing & Meinzen-Dick (2001) physical capital resources include buildings, houses, infrastructure such as roads and electricity, transportation, and various technologies and are the most tangible forms of assets. Physical assets include tools and equipment (i.e., producer goods that people use to function more productively) and infrastructure (i.e., a commonly a public good that is used without direct payment). Since households' domestic water supply is often privately owned, and some other infrastructure are accessed for a fee related to usage (e.g., toll roads and energy supplies) (Kollmair & Gamper, 2002), the PC was named ‗physical capital empowerment' because it comprised of both producer good and infrastructural goods and services.

3.3.2.2 Dominant dimensions of women's social empowerment

Application of PCA on variables that indicate women's social dimensions produced seven principal components (PCs) that had eigen values greater than one using the Kaiser criterion and jointly explained 62.6 per cent of the total variation in the variables used. Table 3.4 presents the first three PCs that were retained because they had eigen values greater than one and also

allowed for meaningful interpretation of the PCs considering absolute PC loadings greater than 0.50 following Nieuwoudt (1977).The different factors extracted represented the different dimensions of women's social capital empowerment.

Table 3. 4: Dominant dimensions of social empowerment among women in Msinga

Indicators of social empowerment	**Principal components (Eigen value)**		
	1	2	3
	Social agency	Social capital	Informational asset
Social participation	0.242	0.**788**	0.243
Social support	0.055	0.139	-0.043
Reciprocity and trust	0.128	**0.753**	-0.046
Cooperation	0.394	0.312	0.**612**
Shared norms	-0.053	0.386	-0.465
Number of organisation	-0.202	0.150	0.009
Involvement in social groups	0.245	**0.819**	0.195
Radio listening	-0.127	0.180	**0.742**
Television watch	0.006	0.022	**0.662**
Communication infrastructure	-0.090	0.103	0.297
Literacy level	0.231	0.003	**0.644**
Participation in decision making	0.000	0.089	-0.250
Partition in family planning	0.086	0.012	0.439
Freedom of choosing spouse	0.206	0.399	-0.009
Freedom of domestic violence	0.064	-0.064	-0.025
Power to aspire _in social arena'	**0.560**	0.043	0.051
Bargaining power _'	**0.711**	0.052	-0.020
Manipulation power _'	**0.615**	0.101	0.359
Subversion power _'	**0.769**	0.201	0.072
Resist power _'	**0.654**	0.310	-0.084
Reflect power _'	**0.624**	0.215	0.105
Analysis power _'	0.430	0.181	0.233
Level of motivation _'	0.430	0.428	-0.014
Level of determination_'	0.463	0.188	0.180
Level of resilience _'	**0.555**	0.193	0.161
% of variation	**26.4**	**10.4**	**6.8**
Cumulative %	**26.4**	**36.8**	**43.6**

Source: Survey data (2011)

NB: PC loadings greater than 0.5 are indicated in bold

Dominating indicators in the first PC were power to aspire or envisage, bargaining power, negotiation power, deception power, manipulation power, subversion power, resistance power,

reflection power and analysis power. Individuals‘ sense of agency is indicated by their decision-making power, protest, bargaining and negotiation, as well as the motivation and purpose that women bring to their actions (Kabeer, 2003: 171-172). Just like in the category of economic empowerment, all the dominant variables indicate social agency as the dominant dimension of women‘s empowerment. Thus, the PC was named social agency as it demonstrate power within them in the social arena. This indicates that the inner motivation or the individual‘s sense of agency or the desire to achieve better in life is the most dominant factor of women‘s social empowerment. This is because the extent to which any individual pursues any livelihood strategy depends on the level of ‗power from within him‘ (i.e., agency). The findings of this study supports Karl (1995), who argued that empowerment is a process not something that can be given to people, and for it to prevail women need to be able to assert their own agency to breakout of gender inequality. Thus, this study supports feminist development theorists, who advocates for the recognition of social agency of women as the best way towards attaining the desired empowerment (Chitsike, 2000; Endeley, 2001; Ntseane, 2004).

The second dominant PC under women‘s social empowerment comprised of social capital indicators including level of social participation, level of reciprocity and trust and women‘s level of involvement in social groups. Putnam (1993) defines social capital as norms of generalized reciprocity, networks of civic engagement, social trust to reduce defects and uncertainty, and provide models for further cooperation of the society. The PC also shows that women with high levels of social participation also had high levels of trust and reciprocity as well as high levels of involvement in social groups. This PC, therefore, reflected women‘s social capital dimension and was named social capital empowerment.

The third PC under women‘s social empowerment included radio listening level, television watching level, literacy level and level of cooperation. All the four variables are important indicators of an individual‘s capacity to access information. The positive signs on these variables indicate that women who frequently listen to the radio also frequently watches television, and have high levels of literacy and cooperation. This sub-dimension of women‘s social empowerment was named women‘s informational empowerment, showing the adage that information is power (Al-Ashtal, 2010). Literacy is part of this category showing the importance

of information literacy, which is the ability to find and use information. Informational assets are used to connect women to new and wider markets, broaden their social networks and provide them with information that opens up important economic opportunities (Al-Ashtal, 2010).

3.3.2.3 Dominant dimensions of women's empowerment in agriculture

Application of PCA to variables or indicators of women's empowerment in agriculture produced twelve principal components (PCs) that had eigen values greater than one using the Kaiser criterion and jointly explained 73.4 per cent of the total variation in the variables used. From these twelve PCs, the first six PCs were retained because they not only had eigen values greater than one but also allowed for meaningful interpretation of the PCs (Table 3.5). These first six components explained 18.1%, 12.1%, 8.8%, 7.8%, 6.6% and 5.9% of the variation, respectively (Table 3.5). The different factors represented the different dimensions of empowerment in agriculture among women in Msinga.

The first PC under women's empowerment in agriculture comprised of indicators like level of expertise in determining seed depth, selecting appropriate planting methods, determination of plant spacing, knowledge of water conservation methods, fertilizer application, determination of nutrient deficiencies, herbicide and pesticide application, use of a knapsack sprayer, and storage of produce. All the indicators show women's crop management skills. Thus, this dimension was named _crop management skills empowerment'.

The dominant indicators in the second PC under _women's empowerment in agriculture' consist of women's farm financial knowledge, marketing skills, price determination, and knowledge of product markets (Table 3.5). The positive signs on these variables indicate that individuals who are excellent in any one of these financial management skills, is also excellent in all the other. All the indicators show women's farm financial management skills. As a result, the PC was named _empowerment in farm financial management'.

Table 3. 5: Dominant dimensions of ‗empowerment in agriculture' among primary female heads-of-households in Msinga

Indicators of empowerment in agriculture	**Principal components (Eigen value)**					
	Crop Manag. skills	Farm financial manag.	Water use sec.	Socio-cult. inhibition	Animal husb. skills	Weed and Pest manag.
Decisions on crop production	0.051	-0.097	0.018	0.054	-0.029	0.498
Freed on what to produce	0.065	-0.091	0.017	0.056	-0.061	0.491
Access and control of land	0.156	-0.075	0.010	0.014	-0.104	0.143
Decisions on credit	0.118	-0.077	-0.134	0.102	0.126	0.073
Control of income	-0.082	0.137	-0.104	0.165	0.027	0.297
Confidence to speak	-0.012	0.433	0.039	0.388	0.162	0.334
Satisfaction with leisure time	0.182	-0.003	-0.018	**0.721**	-0.053	0.147
Domestic with workload	0.185	-0.173	0.109	**0.758**	0.058	-0.048
Hindrance by customary law	0.038	-0.106	0.093	**0.838**	0.029	0.087
Satisfaction with institution	-0.157	-0.040	0.012	**0.845**	-0.104	0.088
Satisfactn. with water consistency	-0.007	0.135	**1.021**	0.136	0.012	-0.130
Satisfactn. with water sufficiency	-0.007	0.176	**0.878**	0.185	-0.034	-0.079
Satisfactn. with water quality	-0.076	-0.034	**1.075**	0.047	-0.011	0.131
Satisfactn. with capacity to pay	-0.122	-0.343	**0.859**	-0.031	0.103	-0.024
Satisfaction with claim to water	0.029	0.208	**1.062**	-0.325	-0.064	0.556
Determining seed depth	**0.773**	0.130	-0.043	0.017	0.024	0.011
Select appropriate planting method	**0.818**	0.111	-0.006	0.091	0.004	-0.026
Determining spacing	**0.771**	0.029	-0.033	0.024	0.006	0.032
Water conservation methods	**0.839**	0.072	-0.049	0.121	0.122	0.292
Fertiliser application	**0.586**	0.064	0.086	0.099	0.027	0.267
Determining nutrient deficiency	**0.599**	0.179	0.004	-0.010	0.103	0.290
Herbicide/pesticide application	**0.816**	0.121	0.065	0.220	0.050	**0.936**
Use of snapsack	**0.735**	0.227	0.111	0.227	0.007	**0.921**
Harvesting methods	0.374	0.107	0.383	0.068	-0.019	0.159
Packaging produce	0.483	0.363	0.047	-0.258	-0.086	-0.156
Storage or produce	**0.525**	0.397	0.097	-0.219	-0.043	-0.293
Record keeping	0.255	0.470	0.136	-0.067	0.167	-0.011
Financial management	0.159	**0.638**	0.058	-0.050	0.137	-0.068
Knowledge of marketing contracts	0.135	**0.681**	0.031	0.015	0.047	-0.008
Price determination	0.006	**1.022**	-0.075	-0.135	0.039	-0.088
Knowledge of product market	0.016	**0.880**	0.112	-0.138	0.027	0.060
Knowledge of animal health	0.253	-0.100	-0.153	0.016	**1.030**	-0.026
Animal nutrition	0.118	0.063	-0.048	-0.022	**1.060**	-0.071
Welfare requirements	-0.055	0.191	-0.010	0.031	**0.912**	-0.007
Meat processing skills	-0.022	0.136	0.062	-0.035	0.265	0.005
% of variation	18.1	12.2	8.8	7.8	6.6	5.9
Cumulative %	18.1	30.3	39.2	47.0	53.6	59.4

Source: Survey data (2011)

NB: PC loadings greater than 0.5 are indicated in bold

The third PC had satisfaction with consistence of water supply (1.021), satisfaction with sufficiency of water supply (0.878), satisfaction with quality of water supplied (1.078), satisfaction with capacity to pay (0.859) and satisfaction with claim to water (1.062) as the dominant indicators. The positive signs on these indicators mean that women, who were satisfied with the consistence of water supply, were also satisfied with the sufficiency and quality of water supplied. The same women were also satisfied with their capacity to pay for the water and that their claim to water for agricultural purposes was good. These indicators all reflect a dimension in agriculture known as water-use security. Thus, the PC was named ‗empowerment through water-use security'. This dimension is important because the ability to use water and make it available at the right place and time, in the right quantity and quality (i.e. water-use security) of access is central to every individual's livelihood (FAO, 1999).

The fourth PC shows that women who are satisfied with their leisure time (0.721) are also satisfied with their household or domestic workload (0.758) and do not face any hindrances in agricultural production due to customary laws (0.838) and are also happy with socio-cultural institutions governing their participation in agriculture (0.845). Unlike men, women face a number of labour constraints and obstacles to enhanced agricultural productivity, including alternative demands on their time from childcare and other domestic duties (World Bank, 1989). Customs or traditions further contribute to this burden through division of labour between men and women. In addition to farming activities, women do most of the household labour, collecting water and firewood, cooking, cleaning and washing (Action Aid International, 2011). Therefore, this dimension of women's empowerment reflects the socio-cultural circumstances limiting women's participation in agriculture. The PC was thus named women's socio-cultural hindrances to agriculture.

The fifth PC under the main category of women's empowerment in agriculture showed that women with excellent knowledge of animal health had excellent knowledge of animal nutrition and excellent knowledge in animal welfare requirements. All the three indicators reflect women's animal husbandry/production skills. Thus, this PC was named ‗women's empowerment in animal production skills'.

The sixth PC had knowledge of herbicide application (0.936) and use of a snapsack sprayer (0.921) as the dominant variables. The positive signs on these variables indicate that women who have excellent skills and knowledge in herbicide application also have knowledge over the use of a snapsack sprayer. These variables indicate women‘s skills and knowledge of pest management. This PC hence, was named women‘s empowerment in pest management skills.

3.3.2.4 Dominant dimensions of women’s civic empowerment

Application of PCA to the civic dimension of women‘s empowerment produced seven principal components (PCs) that had Eigen values greater than one using the Kaiser criterion and jointly explained 69.7 per cent of the total variation in the variables used. Table 3.6 presents the first five PCs that were retained because they had Eigen values greater than one and also allowed for meaningful interpretation of the PCs considering absolute PC loadings greater than 0.50 following Nieuwoudt (1977). The first five components extracted from the rotated covariance matrix explained 30.0%, 11.0%, 6.0%, 5.2%, 6.4% and 5.8% of the variation, respectively (Table 3.6). The different factors extracted represented the civic dimensions of women‘s empowerment.

Based on the dominant component loadings (Table 3.6), the first PC shows that women who find it easy to approach the police (1.244), also find it easy to approach the courts (1.249) are the same ones who believe in the fairness of the police (1.199) and courts (1.221) as well. This PC explained 25.1% of the variation in the variables included in the model. All the indicators reflect women‘s access and faith in the legal systems. Thus, this dimension of women‘s empowerment was named ‗women‘s legal empowerment‘.

The second PC under civic forms of empowerment again indicated the importance of agency as a sub-dimension of women‘s empowerment in the civic arenas. The PC shows that women with high levels of bargaining power (0.678) in the civic arenas also have high levels of manipulation power (0.636), subversion power (0.842), and resistance power (0.665) and reflection power. According to Boyte (2008), civic agency is the capacity of human communities and groups to act cooperatively and collectively on common problems across their differences of view. It involves questions of institutional design (that is, how to constitute groups, institutions, and societies for effective and sustainable collective action) as well as individual civic skills (Boyte, 2008). Just like in all the other dimensions, this category reflects women‘s civic agency, further supporting

the argument by (Sen, 1989) that empowerment is not just about resources but the agency which together, he termed capabilities.

The third PC under the civic forms of empowerment had knowledge of legal rights (1.233), security of legal rights (1.045) and ability to exclude others from own property, especially land (0.885). The positive signs on these variables show that those with more knowledge of their legal rights also believe that their legal rights are very secure and that they are able to exclude others from their own property. This dimension of indicate women‘s empowerment in legal rights. The PC was named empowerment in legal right. According to this PC, it can be argued that rural women do not only need the legal resources but awareness of their rights enshrined in the legal systems in place.

The fourth PC had self-esteem (0.851), self-efficacy (0.647) and overall wellbeing (0.661) and the dominant variables. The positive signs indicate that women with high levels of self-esteem have high levels of self-efficacy and overall wellbeing. These three variables are part of the list which other studies including Uphoff (2003), Kabeer (1999; 2005), Alsop and Heinson (2005) and Alsop et al. (2006) have used as indicators of psychological empowerment. As a result this PC was named women‘s psychological empowerment‘.

The dominant variables in the fifth PC include manipulation power (0.593), knowledge of political system (0.937) and knowledge of people with political posts (0.915). The positive signs on these indicators show that women with high levels of manipulation power also have more knowledge of the political system and more knowledge of people with political posts. The three variables all show high levels of political resources. Thus, the PC was named women‘s political empowerment.

Table 3. 6: Dominant dimensions of civic empowerment among women in Msinga

Indicators of civic empowerment	**Principal components (Eigen value)**				
	Legal resource	Civic agency	Knowledge of rights	Psychol. resource	Political resource
Power to aspire ‗in civic arenas'	0.3	0.327	0.03	0.019	0.2
Bargain power ‗.'	0.063	**0.678**	0.091	0.079	0.203
Manipulation power ‗.'	0.641	**0.636**	0.288	0.456	**0.593**
Subversion power ‗.'	0.206	**0.842**	0.074	0.144	0.076
Resist power ‗.'	0.108	**0.665**	0.154	0.052	-0.196
Reflect power ‗.'	0.071	**0.642**	0.32	0.071	-0.043
Analysis power ‗.'	0.052	0.403	0.191	0.272	0.059
Level of motivation ‗.'	0.151	0.368	0.074	0.175	0.196
Level of determination ‗.'	0.229	0.316	0.035	0.079	0.3
Level of resilience ‗.'	0.181	0.575	0.125	0.164	0.312
Knowledge political system	0.209	0.037	0.202	-0.199	**0.937**
Freedom to exercise voting rights	-0.057	0.106	0.245	-0.044	0.096
Interest to participate in voting	-0.096	0.161	0.32	0.052	0.007
Involvement in the political process	0.07	-0.111	0.016	0.231	-0.008
Fairness of electoral process	0.177	0.165	-0.111	0.038	0.453
Community awareness of political sys	0.417	-0.025	0.115	0.329	**0.915**
Freedom of participation in politics	0.018	0.17	0.089	-0.034	0.354
Self esteem	0.178	0.259	-0.034	**0.851**	0.06
Self-efficacy	0.154	0.232	0.092	**0.647**	0.089
Overall wellbeing	0.215	0.126	0.218	**0.661**	0.097
Level of loneliness	0.027	-0.036	0.01	0.305	0.02
Participation in meeting	0.078	0.128	0.137	0.367	0.036
Exclusion from community	-0.016	0.048	0.077	0.011	0.134
level of interaction/sociability	0.162	0.358	0.263	0.137	0.074
Hopeful for a better future	-0.178	0.191	0.093	0.203	-0.019
Longing for piece	0.01	0.074	0.012	0.108	0.133
Personal control	0.015	0.536	0.305	0.319	-0.047
Knowledge of legal right	0.472	0.154	**1.233**	0.478	0.343
Security of right	0.234	0.299	**1.045**	-0.055	0.111
Ability to exclude other	0.064	0.352	**0.885**	0.126	-0.084
Threats of eviction	0.055	-0.041	0.212	-0.011	0.078
Easy to approach police	**1.244**	0.124	0.265	0.049	0.167
Easy to approach court	**1.249**	0.224	0.283	0.068	0.183
Fairness of police	**1.199**	0.225	-0.036	0.256	0.172
Fairness of courts	**1.221**	0.251	-0.009	0.285	0.196
% of variation	30.0	11.0	6.0	5.2	4.5
Cumulative %	30.0	41.0	47.0	52.2	56.7

Source: Survey data (2011)

NB: PC loadings greater than 0.5 are indicated in bold

3.4 Conclusions and policy recommendations

This study was motivated by the fact that the identification of the dominant dimensions of women‘s empowerment in developing countries including in South Africa, is crucial for policy makers to adequately understand the progress made so far in women‘s empowerment. Moreover, several other studies have analysed single dimensions with very few indicators to measure the dimensions of empowerment. Rather, this study employs a holistic approach to determine the dominant dimensions of empowerment. It was concluded that women are empowered along several dimensions. Although most empowerment agencies have focused on empowering women by assisting them with resources, women‘s agency is the most dominant sub-dimension of women‘s empowerment. This implies that women‘s agency is significantly the most important sub-dimension of empowerment women need to acquire in order to achieve their livelihood outcomes.

Apart from women‘s agency, there are various resource/capital forms of empowerment through which women can be empowered. These resource forms of empowerment can be grouped into a number of dimensions. The dominant economic dimensions, in the study areas, include human capital, financial capital, vocational skills training and infrastructural asset empowerment. However, women in the study areas were less empowerment in tools and equipment since this dimension was not among the list of dominant economic dimensions of empowerment. Important social resource forms of empowerment in the study areas include social capital empowerment and informational asset empowerment. As far as the social forms of empowerment are concerned, women in the study areas are still less empowered with regards to the familial, organisational and cultural dimensions of empowerment as they were not among the dominant forms of empowerment in this category. As far as agriculture is concerned, women in Msinga were empowered in several dimensions which are mostly related to agricultural skills. However, women‘s empowerment in agricultural tools and equipment was not among the dominant dimensions indicating the need for empowering women in the study areas with agricultural resources. Although discussions around empowerment are commonly limited to activities associated with _œconomic‘, _social‘ and _political‘ forms of empowerment, transforming power relations require interventions to go beyond such a sectoral approach and to take a holistic approach to explore other dimensions that have practical implications to women‘s empowerment.

The study recommends that empowerment agencies should improve women's sense of agency as a first step before assisting them with resources since women's sense of agency is the most important sub-dimension that gives women the power from within to pursue livelihood goals. Secondly, empowerment agencies should also target several areas of empowerment to avoid empowerment in one dimension at the expense of the other. Lastly, empowerment agencies should consider different strategies for empowering women with household characteristics by targeting and strengthening the asset base in which they are not empowered.

3.7 Summary

This chapter employs Principal Component Analysis on the four main categories of women empowerment to identify the dominant dimensions of women empowerment. Economic agency, human capital empowerment, financial capital empowerment, empowerment in vocational skills and physical capital empowerment were identified as the dominant dimensions of women's economic empowerment. Social agency, social capital empowerment and informational asset empowerment were identified as the dominant dimensions of women's social empowerment. Dimensions of empowerment in agriculture included empowerment in crop management skills, farm financial management skills, water-use security, animal husbandry skills and weed and pest management skills. Legal resource empowerment, civic agency, political and psychological empowerment were identified as dominant dimensions of civic empowerment.

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CHAPTER 4: DIMENSIONS OF EMPOWERMENT INFLUENCING SELF-RELIANCE AMONG RURAL WOMEN IN MSINGA, SOUTH AFRICA

Abstract

Since women empowerment is multidimensional, understanding the different dimensions that promote self-reliance and reduce dependency among rural women is indispensable in any attempt to empower them. Cross sectional data were collected from 300 women practicing either irrigation or dry-land farming in Msinga rural areas of KwaZulu-Natal, South Africa. Principal Component Analysis (PCA) was applied to the indicators of women's empowerment as a way to identify the dominant dimensions of their empowerment. This was followed by application of k-means cluster analysis to the four main sources of women's incomes in order to identify their self-reliance status. Finally, the multinomial logit model was used to investigate the dimensions of women's empowerment that promote self-reliance. The study found that primary female head-of-households who are young, educated, with vocational skills as well as those who are psychologically empowered are less likely to rely on farm and off-farm activities because they perceive such activities as unsuitable for their social class. However, women's human and financial capital forms of empowerment are critical for women to achieve self-reliance and to rely less on remittances and social grants. The study also noted that access to irrigation is not sufficient to enable self-reliance among women. Instead, women need higher levels of water-use security to achieve self-reliance. It was recommended that empowerment agencies should focus first, on eliminating the stereotyped-perceptions against agriculture that are common among young and educated rural South Africans while government continues to create alternative employment opportunities for rural women.

Key words: Dimensions of women empowerment, self-reliance, South Africa

4.1 Introduction

The identification of the dimensions of women's empowerment that influence their levels of self-reliance is crucial for recommending policies to empower them. Self-reliance is an integral outcome of empowerment and all development interventions should foster it (Binns & Nel, 1999). The persistence of rural poverty has given rise to numerous strategies and initiatives to reduce it both at the household and community level. Self-reliance has been advanced in the 1980s and early 1990s as a viable alternative strategy to "dependent development" and donor-led

–structural adjustment" in developing countries. Self-reliance is considered not merely a necessity but a matter of survival (Galtung et al., 1980). Development in recent years emphasizes the provision of equal opportunities to men and women by removing gender bias, and empowering and creating self-reliance among women (Mridula, 1998). Thus, failure to identify the dimensions of women empowerment that are most influential in fostering self-reliance can result in empowerment interventions that do not creatively address women's real problems, resulting in prolonged dependency and lack of self-reliance among them (Lord & Hutchison, 1993).

In South Africa, government, through the Department of Social Development seeks to empower communities and engender self-reliance by creating conditions for sustainable livelihoods. This involves expanding the range of livelihood choices available to communities, households and individuals (South African Department of Social Development, 2013). Since the advent of democracy in 1994, South Africa has been promoting women's empowerment through various ways which include improving smallholder irrigation and vocational skills training as ways of achieving poverty reduction and self-reliance. Despite the government's efforts to empower rural farmers (i.e., who are mostly women) through agriculture, many South African studies have shown that the number of rural households engaging in subsistence agriculture as a main source of food and income is declining, while there is a rise in the number of households relying on remittances and social grants (Aliber & Hart, 2009; Baiphethi & Jacobs, 2009). This trend suggests that the long-term attainment of sustainable livelihoods is threatened. In the Eastern Cape Province, a study by de Wet (1993) cited by Nel & Davies (1999), established that many inhabitants in Ciskei were not self-reliant but relied on gifts, state pensions and migrant labour remittances for household survival. Therefore, understanding the dimensions of empowerment that promotes self-reliance and reduce women's dependency on social grants and remittances is crucial for policies aimed at empowering women in South Africa and achieving independent/self-driven livelihoods. This study is peculiar in that it identifies women's self-reliance status and takes a holistic approach to investigate how various dimensions of their empowerment (i.e., financial, human capital, material/physical, social, political, familial, legal, and psychological, improved water use security and skills training etc.) influence their levels of self-reliance.

4.2 Relationship between women empowerment and self-reliance

The concept of self-reliance is located centrally within the discourse of community development and is connected to related concepts like self-help, mutual-help, indigenous participation and rural development (Fonchingong & Fonjong, 2003). It advocates the need for people to improve their condition using local initiatives and their own resources. The concept has been accepted as a new formula for community development since the 1960s. Its widespread acceptance in the development planning of most African countries gave them greater stimulus and cohesiveness to community development (Anyanwu, 1992). Self-reliance is defined as a state of mind that regards one‘s own mental and material resources as the primary stock to draw on, in pursuit of one‘s objectives, and finds emotional fulfillment not only in achieving the objectives but of having achieved them primarily by using one‘s own resources (Fonchingong & Fonjong, 2003). It is the social and economic ability of an individual, household or community to meet basic needs (including protection, food, water, shelter, personal safety, health and education) using their own resources in a sustainable manner and with dignity (UNHCR, 2011). Self-reliance is thus, development on the basis of a country‘s, households‘ or individual‘s own resources, based on the potential of the cultural values and traditions (Galtung et al., 1980). Communities and individual people with self-reliance define their own development according to their own needs, values and aspirations. Self-reliance at community, household or individual levels demands that the respective subjects apply their knowledge and skills in the utilization of the resources at their disposal (Fonchingong & Fonjong, 2003).

The promotion of women‘s empowerment as a development goal is based on a dual argument. Firstly, it is argued that social justice is an important aspect of human welfare and is intrinsically worth pursuing. Secondly, it is argued that women‘s empowerment is a means to other ends (e.g., rural development, household food security, poverty reduction and self-reliance) (Moyo et al., 2012). According to Haque et al. (2012) and Keller & Mbwewe (1991) the core outcome of women‘s empowerment lies in their ability to control their destiny and be self-reliant. Hence, self-reliance is an integral outcome of women empowerment, since; ideally, development should foster self-reliance (Binns & Nel, 1999). Therefore, women empowerment (i.e., women‘s access and control over resources and their agency) is a pre-requisite to achieve self-reliance.

4.3. Research methodology

Three main steps were followed to address the main objective of this study. Section 4.3.1 discusses the conceptual framework followed to understand the relationship between empowerment and self-reliance. Section 4.3.2 discusses the methodology employed to identify the dimensions of women empowerment. Section 4.3.3 discusses the methodology used to group women into clusters based on their self-reliance status. Section 4.3.4 discusses the Multinomial Logit (MNL) model used to identify the dimension of empowerment determining women's self-reliance status.

4.3.1 Conceptual framework

The sustainable livelihoods framework (Figure 4.1) provides a comprehensive, and complex, approach to understand how people make a living. It was adapted in this study, as a guide to the analysis of how several dimensions of women empowerment determine their self-reliance. Livelihood assets are the resources on which people draw in order to carry out their livelihood strategies (Chambers & Conway, 1992; Ellis & Allison, 2004). However, in the context of women's empowerment, this study argues that in addition to livelihoods assets, people need a sense of agency to achieve their livelihood outcomes. Therefore, households use their empowerment capabilities (i.e., both resources and agency), not only capital assets, to pursue activities that will enable them to achieve the best possible livelihoods. Following Sen (1985), this study uses women's capabilities as indicators of empowerment in the four main dimensions of their lives. Based on the sustainable livelihood framework (Figure 4.1), women use their economic, social, agricultural and civic capabilities (i.e., each comprising of resources and agency) to achieve livelihood outcomes, including self-reliance. Therefore, in place of the different types of capital resources identified in the DFID (1999)'s sustainable livelihood framework, this study argues that women's ability to achieve self-reliance depends on the levels of their empowerment capabilities. As such, each woman's self-reliance status can be expressed as a function of the capabilities that indicate women's empowerment levels along with other household factors. It is hypothesized, in this study, that women with higher levels of empowerment along each sub-dimension are more likely to be self-reliant.

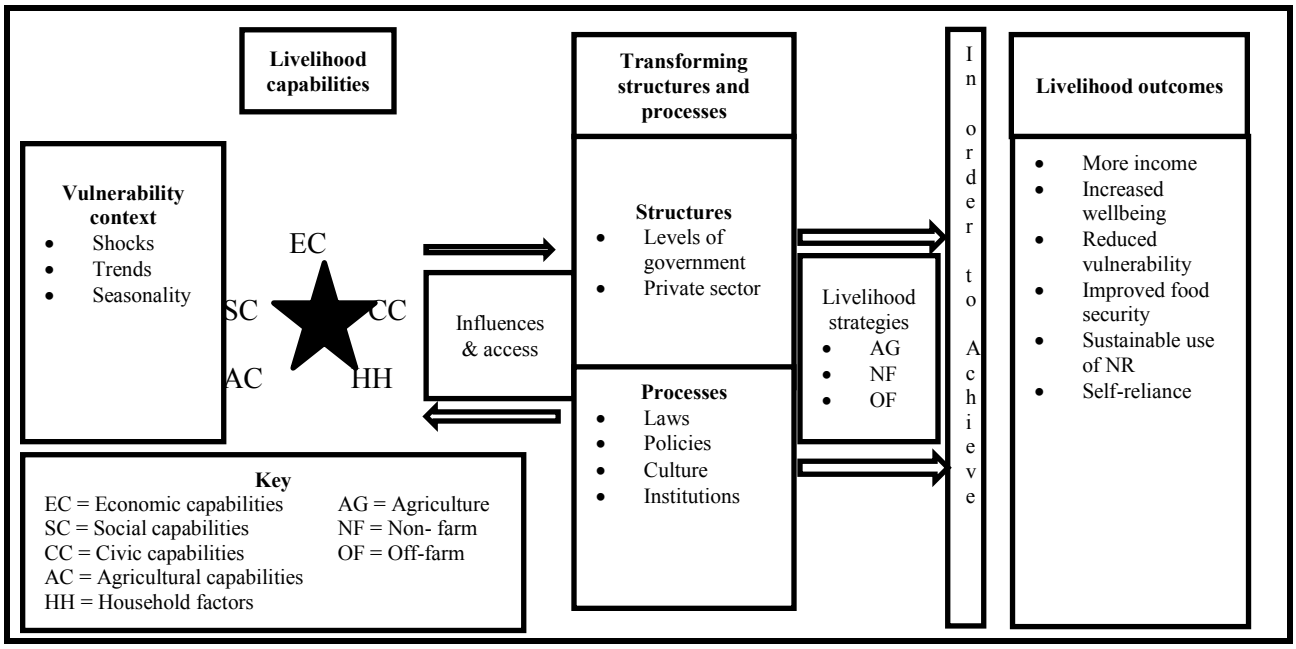

Figure 4. 1: Sustainable livelihood framework for analyzing women's self-reliance

Source: Adapted from DFID (1999).

4.3.2 Empirical approach for identifying dimensions of women empowerment

The approach used in this study is fully described in Chapter 3. Firstly, all indicators of women's capabilities (i.e., comprising of resources and agency), under each dimensions of empowerment, in the context of South African rural areas were identified. These were quantified as either continuous variables or ordinal variables on a five point Likert scale (Appendix 2-5). The indicators for capturing women's access and control of resources and their agency at each dimension of empowerment were compiled following studies by Uphoff (2003), Kabeer (1999; 2005), Alsop & Heinson (2005) and Alsop et al. (2006). PCA was applied on the levels/scores of resources and agency at each of the four main dimensions of empowerment (i.e., economic, social, agricultural and civic empowerment) to generate indices representing the different dimensions namely; financial capital, human capital, physical capital, economic agency, social capital etc. The dominant PCs (i.e., with eigen values greater than one using the Kaiser criterion) were retained in each dimension. Following other studies (e.g., Nieuwoudt, 1977), absolute PC loadings greater than 0.50 were considered dominating and indicated a strong association among the resources used to generate that particular PC.

4.3.3 Empirical approach for identifying women's self-reliance status

Based on the village level preliminary survey, all the sources of women's incomes in the study areas were identified. The survey identified fourteen core activities that contribute to women's total annual income. With the help of an enumerator, each woman respondent estimated the monthly, as well as annual incomes obtained from each livelihood activity.

There are several methods in literature for clustering individuals/households according to their livelihood strategies (Mutenje et al., 2010). These include proportion of income from each livelihood activity, average time allocation on different productive activities and land-use patterns. However, income proportions from household activities have been widely used to categorize livelihood strategies (Birch-Thomsen et al., 2001). Although other studies have argued that a household's income for a given period may be influenced by random events such as weather conditions, this study used income proportions to categorize women's levels of self-reliance, arguing that allocation of income reflects the utility they get from such an activity, rather than time allocation and land use pattern. Moreover, in contemporary South Africa, income is the principal determinant of household survival (Aliber & Hart, 2009).

Since agglomerative hierarchical cluster analysis can give rise to misclassification of observations at the boundaries between clusters (Wishart, 1999), k-means cluster analysis was, instead, used in this study. In k-means cluster analysis, observations are initially randomly assigned to each of k clusters, and then reassigned using an iterative method to minimize within-cluster variance and maximize between-cluster variance (Wishart, 1999). In order to apply k-means clustering, fourteen sources of women's incomes (e.g., crop production, animal production, off-farm wage, craftwork, formal employment forestry product sales, own business, social grants, remittances etc.), were pre-defined into three main income sources namely; farm and non-farm income sources, social grants and remittances. Z-scores instead of the original income values were used to group the women into separate clusters. This was done to standardize the incomes of the women from the various activities since some of the income was measured as income under women's control (i.e., a product of the income and the level of control that a woman had over that income). The identification of clusters was empirically based rather than guided by appropriate economic theory (Hair et al., 1998). The reasoning is that there are

some latent common features that enable the agglomeration of individual observations into a smaller number of groups, based on the similarity along particular, pre-determined dimensions of the individuals in each group.

4.3.4 Multinomial logit model to estimate rural women's self-reliance status

To identify the dimensions of empowerment influencing rural women's self-reliance status, the MNL model was used. The assumption was that; depending on the level of empowerment, a rural woman falls among the mutually exclusive categories of women's self-reliance statuses as depicted by the cluster analysis (i.e., 1 = remittance-dependent women; 2 = farm and off-farm-dependent women; 3 = social grant dependent women). In the studied communities, women depending more on farm and off-farm livelihoods for income lies within the UNHCR (2011)'s conceptualized definition of self-reliance since they had a higher capacity to meet their basic needs using own resources in a sustainable and dignified manner. Therefore, women in this category were considered the most self-reliant as they used their own capabilities to achieve livelihood outcomes. Women in the category remittance dependent woman' were considered less self-reliant than those relying on farm and off-farm incomes. However, they were relying on their immediate family members and were considered more self-reliant than those relying on government social grants.

Letting P_j (j = 1, 2 & 3) to be the probabilities of a household being in each category of self-reliance and assuming that (j = 2) is the reference category, the MNL showing the relative probabilities of a woman being in the three categories that indicate their levels of self-reliance, as a linear function of X_k for the i^{th} woman, according to Greene (2003), is estimated as:

$$\ln (P_j/P_2) = \log_e (P_j/P_2) = \beta_{0j} + \beta_{1j}X_{1i} + ... \beta_{kj}X_{ki} + u_{ji} \quad (4.1)$$

For j = 1,3 and i = 1,2...n households; where:

- ln = the natural logarithm (or $\log_e$)
- P_1 = the probability that the woman relies on family members through remittances;
- P_2 = the probability that the woman is self-reliant/ relies on farm and off-farm incomes (i.e., the reference category);
- P_3 = the probability that the household relies on the government through social grants.
- β_{kj} are the MNL coefficients to be estimated, and,

- X_{ki} is the k^{th} explanatory variables describing the i^{th} household

Following Carter-Hill et al. (2008), the conditional probability of the i^{th} household being in the three alternative categories (j = 1, 2 or 3) are estimated by equations 4.2 to 4.4 as a function of the estimated β_{kj} and the X_{ki} as:

$$P_i(j=1) = \frac{\exp(\beta_{01} + \beta_{11}X_{1i} + \ldots + \beta_{k1}X_{ki})}{1 + \exp(\beta_{01} + \beta_{11}X_{1i} + \ldots + \beta_{k1}X_{ki}) + \exp(\beta_{03} + \beta_{13}X_{1i} + \ldots + \beta_{k3}X_{ki})} \quad (4.2)$$

$$P_i(j=2) = \frac{1}{1 + \exp(\beta_{01} + \beta_{11}X_{1i} + \ldots + \beta_{k1}X_{ki}) + \exp(\beta_{03} + \beta_{13}X_{1i} + \ldots + \beta_{k3}X_{ki})} \quad (4.3)$$

$$P_i(j=3) = \frac{\exp(\beta_{03} + \beta_{13}X_{1i} + \ldots + \beta_{k3}X_{ki})}{1 + \exp(\beta_{01} + \beta_{11}X_{1i} + \ldots + \beta_{k1}X_{ki}) + \exp(\beta_{03} + \beta_{13}X_{1i} + \ldots + \beta_{k3}X_{ki})} \quad (4.4)$$

According to Madalla (1983), the reference category is usually the one that makes most sense (i.e., is of most interest to the researcher). In this study the _farm and off-farm income sources' category was the category of most interest to the researcher because all women are expected to achieve self-reliance hence, was used as the reference category. Choosing this as the reference category allowed for comparison of those women that were less self-reliant (i.e., in categories _remittance reliant' and _social grant reliant') to those that were self-reliant through farm and off-farm incomes.

4.3.4.1 Regression model diagnostics for the MNL model

Testing for the overall significance of the MNL regression model was done using the chi-square value and the log-likelihood ratio criteria in line with Greene (2003). The Akaike's Information Criterion (AIC) was used for selecting variables in the MNL model. The overall model was run using only the most powerful predictors of women's self-reliance status among the underlying determinants of women's self-reliance in the conceptual framework. One of the main assumptions of the MNL model is that it is correctly specified and that no multicollinearity exists between the explanatory variables. The degree of multicollinearity between explanatory variables was checked by examining variance inflation factors (VIF). Since the β_{kj} are estimated by the method of maximum likelihood, the MNL assumes that the researcher uses large samples of data to avoid micronumerosity. The size of standard errors was checked to detect micronumerosity (Garson, 2009).

4.3.4.2 Description of dependent and explanatory variables used

Table 4.1 provides a description of the dependent and explanatory variables used in the MNL model.

Table 4. 1: Variables used in the MNL regression model

Variable	Description
Dependent	
Women's self-reliance status	A score from cluster analysis; (i.e., cluster 1 = remittance dependent women; cluster 2 = farm & off-farm dependent women; cluster 3 = social grant dependent women)
Explanatory	
AGE	Continuous variable for the primary female head-of-household's age
EMPLYMNT_STAT	Dichotomous; 1 if woman is formally employed and 0 otherwise
EDUC_LEVEL	Number of years spent by the woman in formal education
DEPEND_RATIO	A ratio of able-bodied aged between 15 to 65 to those who are otherwise
ECONMC_AGENCY	PCA index representing the woman's level of economic agency.
HUMAN_CAP_EMP	An index representing the woman's level of financial capital empowerment. (Composite factor from PCA)
FINANC_CAP_EMP	An index representing the woman's level of human capital empowerment. (Composite factor from PCA)
VOCAT_SKL_EMP	An index representing the woman's level of vocational skills empowerment. (Composite factor from PCA)
PHYSIC_CAP_EMP	An index representing the woman's level of physical capital empowerment. (Composite factor from PCA)
SOCIAL_AGENCY	An index representing the woman's level of social agency. (Composite factor from PCA)
SOCIAL_CAP_EMP	An index representing the woman's level of social capital endowment. (Composite factor from PCA)
INFORMAT_EMP	An index representing the woman's level of informational resource empowerment. (Composite factor from PCA)
WATER_USE_SEC	An index representing the level of water use security of the households. (Composite factor from PCA)
SOCIO-CULT_EMP	An index representing the woman's empowerment in socio-cultural aspects hindering agriculture. (Composite factor from PCA)
ANIML_PROD_SKL	PCA index representing the woman's level of empowerment in animal production skills
LEGAL_RES_EMP	PCA index representing the woman's level of legal asset empowerment.
RIGHTS_KNOW	An index from PCA representing women's knowledge in their rights.
PSYCHOLOG_EMP	An index from PCA representing the woman's level of psychological asset endowment. (Composite factor from PCA)
IRRIG_TYPE	Irrigation system dummy; 1 if women is using irrigation and 0 if in rain-fed agriculture
D1	Area dummy: 1 if household is from Tugela Ferry and 0 otherwise
D2	Area dummy: 1 if household is from Mooi River and 0 otherwise

4.3.5 Methods of data collection

4.3.5.1 Study area

Since access to irrigation is one of the essential opportunities for achieving increased food production and a critical factor for sustainable agriculture, and attaining self-reliance among rural women, the availability of an irrigation scheme with a neighbouring rain-fed area was the main criterion for the selection of the study sites. This was very crucial in order to make comparisons between women farming in rain-fed agriculture and those using irrigation with regards to agricultural productivity, household food security and poverty. Thus, women practising irrigation were sampled from Tugela Ferry and Mooi River irrigation Schemes while those practising dry-land agriculture were taken from Machunwini communal area, which lies between the two irrigation schemes. Two irrigation schemes were used to increase the numbers as well as the variability among respondents with respect to the explanatory variables. The three study areas all lie under the Msinga Municipality.

4.3.5.2 Sampling procedures for survey

Households in the three study sites were stratified into three main groups namely; gravity–fed irrigators, pump-fed irrigators and dry-land farmers (Table 4.2). The gravity-fed and pump-fed irrigators/farmers were obtained from Tugela and Mooi River Irrigation Schemes. However, gravity-fed irrigators/farmers in Tugela Ferry were not included in the study because the irrigation scheme was undergoing a major revitalisation at the time of the survey. Moreover, the farmers had not been producing food crops for almost a year, which made it difficult to assess the impact of the irrigation scheme to household‘s livelihood outcomes. The dry-land farmers were sampled from the Machunwini area.

Proportional random sampling method was used to select the women used for the study to equally represent the three categories by which farmers‘ access water for agricultural purposes (i.e., gravity-fed, pump-fed and dry-land farmers). Households in the three study areas were divided into three different subgroups or strata (i.e., gravity-fed, pump-fed and dry-land farmers). Households were then randomly selected proportionally from the different strata such that each stratum contributes 100 primary female heads-of-households. Thus, the number of females sampled from each of the three areas was calculated based on the proportion of the total number

of households in each area (e.g., 40 for Tugela Ferry = 270/(403+270)). Every woman in identified households who met the definition of a primary female-head-of household was included in the study.

Table 4. 2: Distribution of sampled women farmers in each study area

Irrigation method	**Total number of households in each scheme**			**Number of respondents sampled in each scheme**			**Total**
	Tugela Ferry	**Mooi river**	**Machunwini**	**Tugela Ferry**	**Mooi river**	**Machunwini**	
Gravity-fed	0	473	0	0	100	0	100
Pump-fed	245	403	0	40	60	0	100
Dry-land	0	0	1234	0	0	100	100
Total							**300**

4.4 Results and discussions

The results of this study have been divided into four separate sections. Section 4.4.1 discusses the results of PCA employed to identify the dimensions of women empowerment. Section 4.4.2 discusses the results of cluster analysis used to group women into categories based on their self-reliance status as well as the socio-demographic characteristics of women in the identified clusters. Section 4.4.3 discusses the results of the MNL model used to identify the sub-dimension of empowerment influencing women‘s self-reliance status.

4.4.1 Dominant dimensions of empowerment among rural women in Msinga

Table 4.3 summarises the dominant dimensions of women empowerment that were obtained by applying PCA on primary female heads-of-household‘s level of economic, social, civic and agricultural capabilities (i.e., resources and agency). Economic agency, human capital empowerment, financial capital empowerment, empowerment in vocational skills and physical capital empowerment were identified as the dominant dimensions of economic empowerment. Social agency, social capital empowerment and informational resource empowerment were identified as the dominant dimensions of women‘s social empowerment. Crop management skills, farm financial management skills, water-use security, animal husbandry skills and weed and pest management skills were identified as the dominant dimensions of women‘s empowerment in agriculture. Lastly, the study identified legal resource empowerment, civic agency, political and psychological empowerment as the dominant dimensions in that category

(Table 4.3). Overall, the PCs jointly explained 65.0%, 62.6%, 73.4% and 69.7% of the total variation in the variables used, respectively.

Table 4. 3: Dimensions of women empowerment identified in Msinga

Main dimension	Sub-dimension	% of variation	Cumulative for the dominant dimensions only %
Economic empowerment	Economic agency	16.2	16.2
	Human capital empowerment	7.4	23.6
	Financial capital empowerment	5.8	29.4
	Empowerment in vocational skills	5.4	34.8
	Physical capital empowerment	5.2	40
Social empowerment	Social agency	26.4	26.4
	Social capital empowerment	10.4	36.8
	Informational resource empowerment	6.8	43.6
Empowerment in agriculture	Empowerment in crop management skills	18.1	18.1
	Farm financial management skills	12.2	30.3
	Water-use security	8.8	39.2
	Empowerment in socio-cultural aspects	7.8	47
	Animal husbandry skills	6.6	53.6
	Weed and pest management skill	5.9	59.4
Civic forms of empowerment	Legal resource empowerment	30	30
	Civic agency	11	41
	Knowledge of legal rights	6	47
	Political empowerment	5.2	5.2
	Psychological empowerment	4.5	56.7

Source: Adapted from Chapter 3, Tables 3.3 to 3.6

4.4.2 Clusters of women's self-reliance status

Application of cluster analysis to the three pre-defined categories of women's income sources produced five clusters of women in Msinga (Table 4.4). The highly significant ANOVA F-tests for each variable indicates that the variables discriminate well between clusters. The first cluster comprised of women who had low percentage contribution of combined farm and off-farm income and social grants but with a high percentage contribution of remittances to their income. This is indicated by the negative signs on the z-scores for (FARM_AND_OFF_FARM_INC) and (SOCIAL_GRANTS) together with the positive sign on the z-score for

(REMITTANCES_INCOME). The first strategy (Cluster 1) represents high ‗remittance dependent women' and contains 61.0% of the sampled households.

The second cluster comprised of only two women who were receiving very high levels of farm and off-farm income but very little social grants and remittances. The third cluster also comprised only of one woman, who relied heavily on both social grants and remittances and minimal contribution of farm and off-farm income. Since, each of these two clusters had two and one women, respectively; they were regarded as outliers and were not considered for further analysis to avoid problems of micronumerosity.

Women in the fourth cluster relied more on both farm and off-farm incomes but less on social grants and remittances. This is shown by the positive sign on the z-score for (FARM_AND_OFF_FARM_INC) and the negative signs on (SOCIAL_GRANTS) and (REMITTANCES_INCOME). These women had high percentage contribution of both farm and off-farm income combined, but had the lowest percentage contribution of social grants and remittances. This group, therefore, indicated the ‗farm and off-farm-dependent' group of women. These women were considered to be more self-reliant since they were relying on own means and less on remittances and social grants for survival.

In the fifth cluster, the z-score on (FARM_AND_OFF_FARM_INC) and (REMITTANCES_INCOME) were negative while those for (SOCIAL_GRANTS) were positive. The women in the fifth cluster relied mainly on social grants and very little income from farm, off-farm or remittances. The percentage contribution of social grants to their incomes was the highest while the percentage contribution of combined farm and off-farm income, and remittances was relatively low. This cluster represented the ‗social grant dependent' women.

Table 4. 4: Clusters of livelihood diversification patterns for survey women in Msinga (n = 300)

Cluster characteristics	**Clusters**				
	1	**2**	**3**	**4**	**5**
Zscore(FARM_AND_OFF_FARM_INC)	-0.247	8.019	-0.520	1.672	-0.225
Zscore(SOCIAL_GRANTS)	-0.497	-1.232	0.089	-0.307	1.188
Zscore(REMITENCES_INCOME)	0.025	-0.282	12.337	-0.108	-0.151
ANOVA F-tests	0.001	0.001	0.001	0.001	0.001
Number of Cases in each Cluster	**180**	**2**	**1**	**30**	**75**

4.4.2.1 Socio-demographic characteristics of women in the three dominant clusters

A comparison of the socio-economic characteristics of women in the three clusters (i.e., clusters 1, 4 and 5), that were used in further analysis is shown in Table 4.5.

Table 4. 5: Socio-demographic characteristics of women in the three dominant clusters

Socio-economic characteristics	**Cluster**				**p-level**
	1	**4**	**5**	**Overall**	
	Remittance dependent women	Self-reliant women	Social grant dependent women		
Contribution of livelihood activities					
% contribution of farm income	15.4	55.3	7.3	13.9	0.021
% contribution of non-farm income	10.5	20.5	2.6	12.6	
% contribution of social grants	64.6	23.3	88.7	66.9	
% contribution of remittances	9.5	0.9	1.3	6.5	
Socio-economic status					
Average age of women (Years)	50.9	53.4	58.6	53.3	0001
Household size	6.3	8.1	10.0	7.5	0.001
Mean dependency ratio	0.9	1.0	1.5	1.1	0.001
Marital status (%)					0.288
Married	40.5	46.4	41.8	42.9	
Single	17.8	21.4	17.7	19.0	
Separated/Divorced	1.6	0.0	3.8	1.8	
Widowed	40.0	32.1	36.7	36.3	
Separated/Divorced	2.5	0.0		1.3	
Employment status (%)					0.746
Unemployed	90.8	92.9	94.1	92.6	
Informal employment	8.1	7.1	5.9	7.0	
Formal employment	1.1	0.0	0.0	0.4	
Women's level of education (%)					0.028
No formal education	72.4	64.3	77.1	71.3	
Primary education	12.4	10.7	14.5	12.5	
Secondary education	14.1	17.9	8.4	13.5	
Tertiary education	1.1	7.1	0.0	2.7	
Religion (%)					0.936
Christianity	58.9	53.6	59.0	57.2	
African traditions	25.4	39.3	24.1	29.6	
Shembe	15.7	7.1	16.9	13.2	

NB: p-level shows significance level of the independent t-test and χ^2 for continuous and categorical variables, respectively

According to Table 4.5 women in cluster 5 (i.e., social grant dependent) were much older than the other two clusters. They also had larger-sized households and a higher dependency ratio compared to cluster 1 and 5. The majority of women (77.1%) in the same cluster were uneducated compared to the other two clusters. On the other hand, cluster 1 (i.e., remittance dependent) had much younger women, lowest household sizes and dependency ratio but with the highest percentage of widowed women. Cluster 4 (i.e., farm and off-farm dependent) had the highest percentage of women who were married (46.4%) and the lowest percentage of widowed women (32.1%) (Table 4.5). Cluster 4 and 5 were renamed as cluster 2 and 3, respectively, in MNL model, since cluster 2 and 3 had been relegated.

4.4.3 MNL model to estimate women's self-reliance status

Table 4.6 presents the Multinomial Logit Model (MNL) empirical results generated to identify the dimensions of empowerment that influence self-reliance and reduce the dependency syndrome among primary female head-of-households in Msinga. The significant p-values (i.e., significant below 5% level) and the associated likelihood ratio chi-square values in Table 4.6 suggests the fitness of the MNL model. The degree of multicollinearity among the variables used in the MNL model was minimal (i.e., mean VIF less than 10). The estimated standard errors for the estimated parameter estimates were relatively low (i.e., below 10), indicating that micronumerosity (small sample size) was not a problem (Pedhazur (1997) cited by Garson, 2009). The AIC and BIC values were the smallest indicating that the four model was the best-fitting one.

Table 4. 6: Dimensions of empowerment influencing primary female head-of-household's self-reliance

Variable	Odds contrast							
	In(P1/P2) /Contrast 1				In(P3/P2)/ Contrast 2			
	Coeff.	Stand. Error	P>z	(dy/dx)	Coeff.	Stand. Error	P>z	(dy/dx)
AGE	**-0.16****	0.09	0.08	**-0.01***	-0.12	0.09	0.19	**0.01***
EMPLYMNT_STAT	-6.59	3.90	0.10	0.00	-6.76	3.95	0.10	-0.03
EDUC_LEVEL	**4.25***	2.24	0.06	0.04	**4.03***	2.27	0.08	-0.04
DEPEND_RATIO	**-2.53****	0.83	0.00	**-0.17****	**-1.48****	0.76	0.05	**0.17****
ECONMC_AGENCY	-1.59	3.62	0.66	-0.21	-0.29	3.65	0.94	0.21
HUMAN_CAP_EMP	**-4.46***	2.38	0.06	-0.03	**-4.25***	2.42	0.08	0.03
FINANC_CAP_EMP	**-10.53****	4.72	0.03	**0.46****	**-13.38****	4.90	0.01	**-0.46****
VOCAT_SKL_EMP	**2.26***	1.35	0.09	-0.09	**2.83****	1.38	0.04	0.09
PHYSIC_CAP_EMP	-1.50	1.18	0.20	-0.04	-1.24	1.18	0.30	0.04
SOCIAL_AGENCY	1.63	2.43	0.50	0.20	0.37	2.46	0.88	-0.20
SOCIAL_CAP_EMP	0.74	1.73	0.67	0.08	0.23	1.74	0.90	-0.08
INFORMAT_EMP	**-2.89****	1.64	0.08	-0.01	**-2.83***	1.65	0.09	0.01
WATER_USE_SEC	-2.08	1.45	0.15	0.07	**-2.53***	1.47	0.09	-0.07
SOCIO-CULT_EMP	**-3.17***	1.88	0.09	-0.04	-2.90	1.89	0.13	0.04
ANIML_PROD_SKL	-1.33	1.13	0.24	-0.01	-1.28	1.15	0.27	0.01
LEGAL_RES_EMP	-1.24	1.34	0.36	-0.04	-1.01	1.35	0.45	0.04
RIGHTS_KNOW	1.49	1.28	0.24	0.04	1.27	1.29	0.33	-0.04
PSYCHOLOG_EMP	**2.82****	1.43	0.05	0.03	**2.61***	1.44	0.07	-0.03
IRRIG_TYPE	0.78	0.91	0.39	0.03	0.57	0.92	0.53	-0.03
D1	-3.71	3.40	0.28	0.02	-3.82	3.40	0.26	-0.02
D2	-2.71	3.49	0.44	-0.11	-2.13	3.50	0.54	0.11
_cons	15.11	7.79	0.05		11.36	7.72	0.14	
Goodness-of-Fit								
	(χ2)	**df**	**Sig.**		Pseudo R2 = 0.16			
Chi-squared (χ2)	93.50	40.00	0.00		Number of obs = 248			
Pearson	969.10	210.00	0.00		AIC = 216.09.6; BIC = 340.19			
Deviance	137.90	210.00	1.00		Mean VIF = 1.34			
Classification								
Observed	**Predicted**							
	Remittance dependent		**Self-reliant (Farm/off-farm)**		**Social grant dependent**		**% Correct**	
Remittance dependent	68.00		2.00		6.00		0.90	
Self-reliant	2.00		10.00		1.00		0.77	
Social grant depend.	16.00		2.00		17.00		0.49	
Overall %	**0.69**		**0.11**		**0.19**		**0.77**	

Source: November 2013 survey

Notes: ***, **, * refer to 1%, 5% and 10% levels of significance, respectively.

- Contrast 1 = (Remittance dependent vs Self-reliant).
- Contrast 2 = (Social grant dependent vs Self-reliant).

4.4.3.1 Household factors influencing women's self-reliance

The negative and statistically significant coefficient estimate for the woman's age, in the first contrast, indicates that it was less likely that a woman was depending on remittances if they were old. Several studies in South Africa, including Brown (2012), DAFF (2009), Kritzinger (2002), have established that the youth do not like to engage in agriculture because they perceive it as a dirty, low paying work and associate it with manual hard labor. As a result, younger women are less likely to rely on farm and off-farm activities (i.e., self-reliant livelihood activities). However, older women tend to engage in more self-reliant livelihood activities because they have more access and control of resources accrued over years, especially land and equipment, which are crucial for farm and off-farm investments than younger ones (DAFF, 2009; Titus & Adetokunbo, 2007). Since age captures the experience accumulated in livelihood skills, older women engage in self-reliant activities because they are more experienced, and therefore, have better opportunities to engage in independent/self-driven livelihoods (Albert & Collado, 2004). According to Titus & Adetokunbo (2007), older women tend to pursue independent/self-driven livelihoods because they have an additional source of labor available from _adult children' which can be allocated between farm and off-farm activities. Moreover, although the studied communal areas have a long history of male out-migration in search of waged employment (Cousins, 2012); the majority of older primary female head-of-households were widowed and were less likely to receive remittances as would most young women with spouses working elsewhere.

The positive and statistically significant coefficient estimate for education level (EDUC_LEVEL) in both the first and second contrasts shows that women with more years of formal education were more likely to rely on both social grants and remittances. The unexpected finding could be explained by the fact that many young and educated people have a stereotyped perception of agriculture (IFAD, 2013; Brown, 2012; DAFF, 2009; Kritzinger, 2002). A study by DAFF (2009), aimed to analyse the access barriers to Agricultural Education and Training (AET) in South Africa, also established that many educated and, specifically among black people, regard agriculture and most off-farm manual jobs as dirty activities for the low social class people (DAFF, 2009). Moreover, the link between education and increased self-reliance can also be compromised when there are no economic opportunities for people to pursue independent/self-driven livelihoods (Ensor, 2010). The Msinga municipality is a grossly

underdeveloped area with poor infrastructure (most severely felt in the community's difficulty to access water), high unemployment, and low levels of economic activity and education (Coan, 2009). According to Dearlove (2007), the Msinga Municipal area was rated to be the municipality with the least job and business opportunities compared to the rest of other municipalities in South Africa. Thus, the perception that agriculture is a low paying job for the uneducated, coupled with the lack of alternative employment opportunities, force more educated primary female head-of households to rely on remittances and social grants than farm and off-farm manual work.

Women from households with larger dependency ratios (DEPEND_RATIO) were less likely to rely on both social grants and remittances. As household dependency ratio increases, the household income and food demands also increases (e.g., Bogale & Shimelis, 2009; Babatunde et al. 2007). Thus, women from household with larger dependency ratio are less likely to be relying on remittances but invest in farm and off-farm income opportunities to meet the increased household income and food demands. According to Fowler (2007), the major contributor of the high household dependency ratios in the study areas is the high prevalence of HIV/Aids (32% of total population and ±65% of sexually active females). As a result, most women were taking care of their grandchildren and minors from other extend family members, mostly following the death of their parents. This limits the primary female head-of-household from getting any remittances since their parents had passed on. Such circumstances together with the poor economic opportunities in the study areas, forces women from households with high dependence ratios not to look down upon agriculture as a _dirty activity' (DAFF, 2009) as it is their main means of meeting the increased household and income demands.

4.4.3.2 Dimensions of economic empowerment influencing self-reliance

The coefficient estimates for human capital empowerment (HUMAN_CAP_EMP) and financial capital empowerment (FINANC_CAP_EMP) (i.e., composite indices from PCA) in the first and second contrast, respectively, were negative and statistically significant. This indicates that it was unlikely that a woman was depending on remittances or social grants if they had higher levels of financial capital and human capital forms of empowerment. However, the coefficient estimate for women vocational empowerment (VOCAT_SKL_EMP) was positive and

statistically significant. This implies that women with high levels of vocational empowerment were more likely to be relying on remittances or social grants.

According to De Satge (2002) and Mulugeta (2009), livelihood strategies of the poor are determined by the range of assets available to them to pursue different activities that would enable them to secure sustainable livelihoods. As a result, women with high levels of financial capital are more likely to depend on farm and off-farm incomes than social grants and remittances because they have the finances necessary to invest in either farm or off-farm livelihood activities (Chambers & Conway, 1992; Ellis & Allison, 2004). Women‘s financial capital empowerment also determines the availability of key material assets, such as land, livestock units, irrigation land and machinery. Such assets provide opportunities for investments in alternative farm as well as off-farm enterprises (Abdulai & Crole Rees, 2001).

Women‘s level of self-reliance is also influenced by their level of human capital. Human capital empowerment, which is directly linked to the skills, knowledge, ability to labour and good health and physical capability, is important for the successful pursuit of different livelihood strategies (Carney, 1998). Both quantity and quality of women‘s human capital assets are important to the fulfilment of productive livelihood tasks (Rodriguez & Smith, 1994). While investment in farm enterprises is labour intensive, better quality human capital assets are required for non-farm income opportunities. Hence, higher levels of women‘s human capital empowerment among studied women mean high agricultural productivity levels and more off-farm income opportunities (Mulugeta, 2009). Many studies such as Lanjouw (2001) and Mulugeta (2009) have found that skilled people are more likely to find employment in the non-farm sector than non-skilled (Lanjouw, 2001). Other studies (e.g., Collett & Gale, 2009; Mulugeta, 2009) have also shown the importance of agricultural skills in improving farm productivity and incomes which promote self-reliance.

In the study areas, women with more vocational work skills were more likely to rely on social grants and remittances. This is indicated by the positive and statistically significant coefficient estimates for (VOCAT_SKL_EMP), in the first and second contrasts. This result was unexpected as vocational skills acquisition training has been identified as an effective strategy for self-reliance and poverty reduction in developing economies (Egunyomi & Ekom, 2010; Collett & Gale, 2009). Such unexpected findings could be explained by Collett & Gale (2009) who argued

that many training interventions for women do not cater for their specific needs and are often directed towards typical female occupations with low potential to raise income. Some studies in Sub-Saharan Africa (e.g., Wallace et al., 1999; Collett & Gale, 2009) suggest that many vocational skills curricula have shortcomings of being unresponsive to socio-economic, technological, physical and environmental changes in the rural sector and are inappropriate for the local context. Moreover, the Msinga Municipal area has very few job and business opportunities (Dearlove, 2007) such that although some women may have high levels of vocational skills empowerment, they were more likely to rely on social grants and remittances rather than use their vocational skills because of the very low income opportunities their skills offer. The marginal effects for (VOCAT_SKL_EMP) shows that a unit increase in women's vocational empowerment, reduces the likelihood of a _remittent dependent' women becoming self-reliant but increases the chances of a _social grant dependent' woman to be self-reliant. The findings of this study may mean that investing in vocational skills of rural women requires that it is complemented by empowerment in other aspects of their lives, especially their physical assets and other economic opportunities (Collett & Gale, 2009).

4.4.3.3 Dimensions of social empowerment influencing women's level of self-reliance

One dimension of women's social empowerment influencing women's self-reliance, in the study communities, is the level of women's informational empowerment. Women with higher levels of informational empowerment (INFORMAT_EMP) were more likely to rely on farm and off-farm income than remittances and social grants. Access to information possibly influences women to engage in agricultural production through increased knowledge, access to inputs, improved seed, credit and land. It also brings knowledge on technologies to produce, manage and preserve harvests. In off-farm investments, access to information means better market access needed to help poor producers take advantage of new and emerging opportunities (Quisumbing & Meinzen-Dick, 2001). Thus, access to information brings knowledge and other factors of production needed for both agricultural production and off-farm investments. The marginal effects of women's informational empowerment are positive in both contrasts showing that a unit increase in women's informational empowerment increases the likelihood of woman being self-reliant.

4.4.3.4 Dimensions of agricultural empowerment influencing women's level of self-reliance

The coefficient estimates for the woman's empowerment in socio-cultural aspects hindering agriculture (SOCIO-CULT_EMP) and water-use security levels (WATER_USE_SEC) in the first and second contrasts were negative and statistically significant. This shows that women who face lower socio-cultural hindrances in agriculture are less likely to rely on remittances but more likely to rely on farm and off-farm incomes. Customs or traditions contribute to the lack of self-reliance among women due to the increased burden of household workloads emanating from the cultural-based division of labor. Customary laws in favor of patriarchal organization that restricts women ownership of property, especially land, limit the extend women can achieve self-reliance through agriculture (Gudhlanga & Chirimuuta, 2012). Curran & Bonthuys (2004) argue that while there are statutes that seek to empower women married according to customary law; _living' customary law continues to oppress them. For example, although most women had their crops destroyed by livestock which are managed by males, they were prohibited by customary laws to argue with the male livestock owners or take them to court, in the event of crop damage. Hence, primary female head-of-households who were empowered to deal with such socio-cultural hindrances had more incentives to investment in independent farm or off-farm livelihoods.

The negative and statistically significant parameter estimate for the water-use security levels (WATER_USE_SEC) in the second contrast indicates the importance of improving women's access to reliable and sufficient water for agricultural purposes. Improving _water-use security' is an important way of helping to diversity livelihoods and reducing the vulnerability of poor farm households (Thobani, 1995). Water is one of the essential resources in food production, making it a critical factor essential for sustainable agriculture and achieving food security (Wenhold, 2007). In some non-agricultural income-generating activities that require access to large quantities of water, such as brick making, the lack of secure, long-term access to water discourages investment in them. However, as far as livelihoods are concerned, the ability to use water and make it available at the right place and time, in the right quantity and quality (i.e. water-use security) is more important than just the availability of the water (FAO, 1999). Thus, women with better access to water for productive purposes had access to the most crucial production input and, hence, were more likely to lead independent/self-driven livelihoods. The

findings of this study, thus, supports (Bhawana, 2003) who argued that access to water in equitable manner and the improved management of water are imperative to self-reliance, sustainable development and poverty alleviation. Although most studies (e.g., Sinyolo et al., 2014; Lahiff, 2000) have found that access to irrigation plays a positive role in the welfare of rural households, this study finds that access to irrigation on its own is not a panacea to improve women's level of self-reliance. The non-significant coefficient estimates for irrigation system (IRRG_TYPE) indicates that women with access to irrigation in Mooi River Irrigation scheme were not significantly more self-reliant than dry-land farmers in Machunwini.

4.4.3.5 Dimensions of civic empowerment influencing women's level of self-reliance

Although most studies (e.g., Masser, 2009; Quisumbing & Meinzen-Dick, 2001) have emphasised that legal empowerment of the poor is important for self-reliance by establishing the rule of law, and ensure equal and equitable access to justice, and tackle the root causes of exclusion, vulnerability and poverty, the parameter estimate for legal resources (LEGAL_RES_EMP) or knowledge of rights (RIGHTS_KNOW) was not statistically significant. This implies that women's legal resources empowerment was not significantly influencing the probability of them being in any of the categories of self-reliance. However, the only civic dimension of women empowerment influencing their levels of reliance was the psychological resource empowerment. The positive and statistically significant coefficient estimates for (PSYCHOLOG_EMP) in the first and second contrast indicates that women with higher levels of psychological resource empowerment are more likely to rely on remittances and social grants, respectively. This was also not according to expectation because primary female head-of-households with higher levels of psychological empowerment have more _desire to control', _self-perception' and _self-efficacy'. These three indicators of wellbeing, respectively, reflect intrapersonal capacity to lead, motivation to exert control and interpersonal skills which are all necessary to acquire and utilise resources, and achieve self-driven livelihood goals (McCarthy & Zald, 1977). The fact that women with high levels of psychological empowerment were relying on social grants and remittances possibly further reflects the negative perception that _better-off' primary female head-of-households in the study areas have towards agriculture, even against a backdrop of poor economic opportunities in Msinga (Coan, 2009; Dearlove, 2007) and their ability to claim resources from relatives in employment and government transfers.

4.5 Conclusions and policy recommendations

This study has been motivated by the need for more understanding on the dimensions of rural women empowerment that influence their levels of self-reliance. Moreover, more and more women and households in South Africa continue to rely on remittances and social grants despite efforts by the post-apartheid governments to empower the rural poor. It was concluded that primary female head-of-households who are young, educated, with vocational skills as well as those who are psychologically empowered are less likely to rely on farm and off-farm rural activities because they perceive such manual activities are _dirty' jobs suitable for the low social class groups. These stereotype perceptions are a major hindrance to the attainment of self-reliance through women empowerment in agriculture and other manual off-farm activities. The problem is worsened by the fact that there are fewer alternative economic opportunities in which rural women in the study area of Msinga can be employed. Thus, empowering women through various capabilities requires that there also be economic opportunities in an area for women to lead independent lives.

In spite of such perceptions, financial and human capital forms of empowerment are the most important economic and resource forms of empowerment needed for women to achieve self-reliance as they facilitate the attainment of most, if not all the other forms of capital empowerment. In agriculture, women need to be freed from customary and cultural bondages that hinder their full participation in agricultural production to achieve self-reliance. Moreover, access to irrigation alone is not a panacea for women to achieve self-reliance through agriculture. Women need, most importantly, secure access to the right quantity and quality of water for productive purposes (i.e. water-use security) to pursue independent/self-driven livelihoods in agriculture. Women also need higher levels of informational resources to pursue independent livelihoods. Access to information enables the acquisition of knowledge and other factors of production needed for both agricultural production and off-farm investments.

Apart from their levels of empowerment, women's self-reliance status is also influenced by other individual and household's socio-economic circumstances. Older primary head-of-households are relatively more likely to be self-reliant than their younger counterparts because they have more access to capital assets accumulated over years to pursue independent/self-driven

livelihoods. A high household dependency ratio creates a high household food and income demand pressurizing women to adopt independent/self-driven livelihood strategies.

The study recommends the following:

- Government has to create an enabling environment for more business and economic opportunities for women empowered though education, vocational training and psychological empowerment to realize their full economic potential and achieve self-reliance.
- Women's vocational skills should be re-evaluated such that they allow integration of women into the mainstream of the economy.
- Empowerment agencies should also prioritise financial and human capital forms of empowerment since they allow the attainment of other forms of empowerment.
- The South African government should continue to invest in irrigation agriculture, revitalization of old schemes, control and supervise the management and distribution of irrigation water to ensure high water-use security levels necessary for women to achieve independency.
- There is need to invest on labour-saving technologies, including "no-dig" systems and vertical gardening systems since these approaches significantly reduce the amount of physical exertion in production so that the young and educated people can be attracted into agriculture.
- There is need to instil a more positive image towards agriculture and eliminate negative stereotype perceptions among young and educated rural South Africans.

4.7 Summary

This chapter identifies the dimensions of women empowerment that are critical for women to achieve self-reliance. It uses the MNL model to estimate women's self-reliance given their levels of empowerment along each dimension. Women's self-reliance status had been identified using cluster analysis while their level of empowerment along each dimension had been identified using PCA. It was concluded that certain dimensions of women empowerment are critical for women to achieve self-reliance.

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CHAPTER 5: EFFECTS OF 'WOMEN EMPOWERMENT' ON HOUSEHOLD FOOD SECURITY IN RURAL KWAZULU-NATAL PROVINCE

Abstract

Understanding the dimensions of _women empowerment' influencing household food security among rural households is crucial to inform policy. This study uses the Household Food Insecurity Access Scale (HFIAS) to identify the household food security status of 300 primary female heads-of-households in Msinga, South Africa. Principal Component Analysis was then used to identify the various dimensions along which the sampled rural women were empowered. The Ordered Logit model was finally used to identify the dimensions of women's empowerment, alongside other socio-economic and demographic factors that influence household's food security status. It was found that certain dimensions of women empowerment are critical for rural households to achieve food security. Women with higher levels of economic agency, physical capital empowerment, psychological empowerment and farm financial management skills empowerment were more likely to be food secure. Moreover, households generally become more food secure with more income from any source. Hence, improving the income opportunities for both the primary female head-of-households and their husbands improves their household food security. This highlights the need for drastic empowerment interventions among the de-jure female-heads of households who do not draw on support from husbands. It was concluded that women need both a sense of agency and access to livelihood resources to achieve household food security. The paper recommends that empowerment agencies should consider a variety of strategies for empowering women with different household characteristics by strengthening the most critical dimensions to improve household food security.

Key words: women empowerment, food security, PCA, ordered logit, South Africa

5.1 Introduction

Identification of the various dimensions of women's empowerment that result in the improvement of household food security is a necessary step towards finding appropriate and effective ways to reduce food insecurity (Wenhold et al., 2007). In most developing countries, rural women play important roles in ensuring household food security, i.e., as producers of food, income earners, stabilizers of food access, and caretakers of household food and nutrition security (Quisumbing et al., 1995). However, despite their contributions to ensuring food

security in rural areas, women in most developing countries form part of the most economically and socially disempowered groups in society (Pandya, 2008).

A key feature for achieving sustainable rural productivity and food security is to develop capacity for the principal actors, who are largely women. Since the late 1990s, strategies for tackling global poverty have begun to emphasize the importance of empowering marginalized people to advocate for their own change (Pandya, 2008). It has become the key strategy for addressing many social problems as it initiates the process of understanding the basic opportunities available to marginalized people. Although strategies for tackling global poverty have begun to emphasize the importance of empowering women to become their own advocates (Malhotra & Schuler, 2005), it has been emphasized that empowerment is a multidimensional and complex process and, that individuals or communities empowered in one dimension (e.g., economic) are not necessarily empowered in the other (Mayoux, 2006; Mosedale, 2005; Uphoff, 2003; Moore, 2001). Therefore, identifying the different dimensions of _women's empowerment' which contribute to the improvement of households' food security status is crucial for informing food security policies in South Africa. This study, therefore, aims to identify the dimensions of _women's empowerment' that influence household food security among rural women in Msinga, South Africa.

5.2 Relationship between women empowerment and household food security

The promotion of women's empowerment as a development goal is based on a dual argument. Firstly, it is argued that social justice is an important aspect of human welfare and is intrinsically worth pursuing. Secondly, it is argued that women's empowerment is a means to other ends (e.g., rural development, household food security and poverty reduction) (Moyo et al., 2012). Women are the major players in ensuring household food security in rural areas (Moyo et al., 2012; Quisumbing et al., 1995). Hence, one of the main achievements/outcomes of rural women's empowerment is the attainment of household food security. According to Mwaniki (2006), lack of empowerment among women, is one of the root causes of food insecurity and global hunger. Empowering women enables them to have more control over their lives, thus, reducing poverty, strengthening food security and driving human development. In many countries, increasing

assets that women control (i.e., resource empowerment) has had a positive impact on household food security and poverty reduction (Quisumbing & Meinzen-Dick, 2001).

5.2.2 Household-level socio-economic determinants of food security

Apart from the various forms of women‘s empowerment, a number of other household-level socio-economic factors have been observed in the literature to influence household food security. The major determinant of the access component of food security is the level of household income (Bogale & Shimelis, 2009). A number of studies (e.g., Aidoo et al., 2013; Bashir et al., 2012; Jacobs, 2009) have found a significant positive relationship between the food security status of households and income. This is because household income determines the household‘s ability to secure food. It is the purchasing power of households that is the most critical determinant for food security through access to the means to acquire food (Ndobo, 2013). Hence, households which manage to secure larger incomes from any source, have better access to food than those which do not (Bogale & Shimelis, 2009).

Some studies have also identified household size and composition to be one of the major determinants of household food security. Having a large household can be either a risk or benefit to household food security. As family size increases, the number of people to be fed from the available food increases. Likewise, a high dependency ratio is, expected to be negatively associated with food security as it increases the number of people to be fed by a few working household members (Tawodzera, 2011). Larger household sizes require increased food expenditure and competition for limited resources (Jacobs, 2009). Hence, some studies (e.g., Bashir et al., 2012; Bashir et al., 2010; Bogale & Shimelis, 2009; Babatunde et al., 2007; Sikwela, 2008) have found a negative relationship between family size and food insecurity. On the other hand, there is also a possibility that the large family size may provide more working members, thereby decreasing the family‘s risk of being food-insecure through increased own production. As a result, some studies including Sindhu et al. (2008) in India, found that an increase in one family member increases the chances of a household becoming food secure.

The food security status of a household is also influenced by the gender of its head. A number of studies (e.g., Ndodo, 2013; Babatunde et al., 2007; Kaloi et al., 2005) have found that food insecurity is more prevalent among female-headed households than male-headed households.

This has been attributed to the gender inequalities in terms of resources available to male and female-headed households due to socio-cultural and customary norms and values (Kabeer, 1999). As a result a result, male-headed households possess more resources than female-headed households (Babatunde et al., 2007). Moreover, these gender disparities have increased more access to education, land and off-farm activities of male-headed than female-headed households. In contrast, within gender comparison, Bahiigwa (1999) observed that female-headed household were more food secure than male-headed households. This has been attributed to the fact that women spent a relatively larger proportion of their income on food compared to male head of households (Thomas, 1997).

A number of studies (Ndobo, 2013; Elijah, 2010; Haliu et al., 2007) have noted that marital status of the household head has a significant effect on the food security status of households. However, conflicting results have been reported with some studies including Ndobo (2013) indicating that households headed by unmarried people are more likely to be food secure than those headed by married people. He argued that households whose heads were not married were more likely to be food secure because they tend to have few household members. On the contrary, some studies including Haliu et al. (2007) in Ethiopia, Kaloi et al. (2005) in Uganda and Elijah (2010), have found that households whose heads are married are more food secure. This has mainly been attributed to the extra support that such heads receive from their partners.

The food security status of a household is also influenced by the age of the head. Some studies (e.g., Eneyew & Bekele, 2012; Bashir et al., 2012; Titus & Adetokunbo, 2007) have found a negative relationship between the age of household head and household food security. The studies have explained the negative effect of age on household food security arguing that younger heads of households are stronger than the elderly ones and can perform tougher jobs in field and other off-farm activities. Thus, ageing of the household head might mean a decrease in income-earning potential, thus increasing vulnerability to food insecurity (e.g., Bashir et al., 2012; Titus & Adetokunbo, 2007). On the contrary, Onianwa & Wheelock (2006) in USA, and Arene & Anyaeji (2010) in Nigeria, found that older household heads have higher probability of being food secure. They argued that this is expected because incomes of those households were likely to be higher as a result of longer stay on their public or private endeavours, following the assumptions of lifecycle hypothesis (Arene, 2008). Moreover, increase in the farmer‘s age

implies an increase in exposure and farming experience. This will, in turn, boost household‘s food crop production and, therefore, increases the chance of a household‘s food security due to increased own production (Olagunju et al., 2012; Asogwa & Umeh, 2012).

Household food security also depends on the household head‘s education levels. A number of studies including Bashir et al. (2012), Amaza et al. (2006) and Kaiser et al. (2003) have found that higher level of education increases the chances of a household becoming food secure. A higher level of education was found to improve the chances of household food security by 59% in Nigeria (Amaza et al., 2006) and 29% in the USA (Kaiser et al., 2003). Other studies (e.g., Bashir et al., 2012; Bashir et al., 2010) found that having a particular education level (i.e., intermediary level of education and graduate level of education) increases the chances of a household becoming food secure. Education equips individuals with the necessary knowledge of how to make a living. It creates more off-farm employment opportunities which enables the household to diversify incomes and become food secure. It also enables rural food crop farmers to acquire knowledge and skills which, in turn, increases their productivity and reduce food insecurity. Educated heads of households are also more likely to benefit from agricultural technologies and, thus, become food secure (Bogale & Shimelis, 2009).

Other studies including Aidoo et al. (2013) and Gebre (2012) have found household food security status to be influenced by the employment status of the household head. According to Aidoo et al. (2013) off-farm employment has a paramount significance in diversifying the sources of farm households‘ livelihoods (Gebre, 2012). It enables farmers to modernize their production through acquisition of machinery that are necessary to reduce the risks of food shortage during periods of unexpected crop failures. Income from these off-farm activities is also invested in agriculture to increase production and food availability at the household level (Aidoo et al., 2013).

5.3 Research methodology

Three main steps were followed to address the main objective of this study. Section 5.3.1 discusses the conceptual framework followed to address the study objective. Section 5.3.2 discusses the methodology employed to identify primary female heads-of-households household food security statuses. Section 5.3.3 discusses the methodology used to identify the dimensions

of women empowerment among the sampled women. Section 5.3.3 discusses the ordered logit model used to identify the sub-dimension of empowerment influencing women's household food security.

5.3.1 Conceptual framework

The sustainable livelihoods framework (Figure 5.1) provides a comprehensive, and complex, approach to understand how people make a living. It was adapted in this study, as a guide to the analysis of how several dimensions of women empowerment affect household's food security. Livelihood assets are the resources which people draw upon in order to carry out their livelihood strategies (Chambers & Conway, 1992; Ellis & Allison, 2004). However, in the context of women empowerment, this study argues that in addition to livelihoods assets, people need a sense of agency to achieve their livelihood outcomes. Therefore, women use their empowerment capabilities (i.e., both resources and agency), not only capital assets, to pursue activities that will enable them to achieve the best possible livelihood.

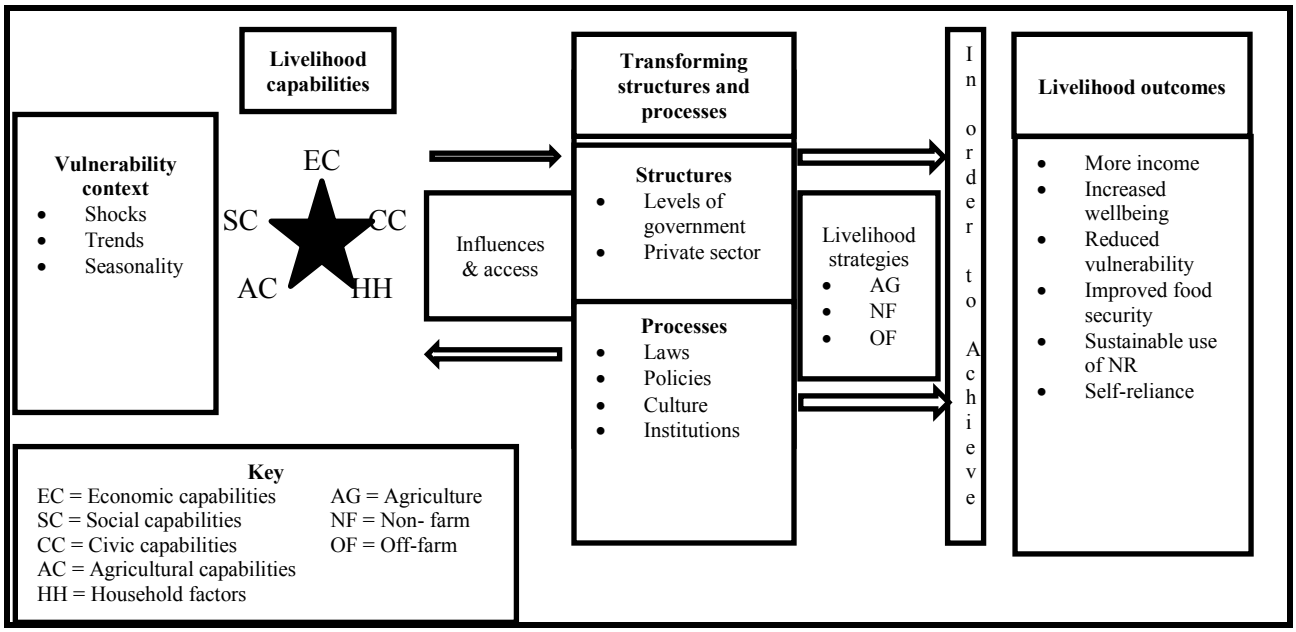

Figure 5. 1: Sustainable livelihood framework to assess household food security status

Source: Adapted from DFID (1999).

Following Sen (1985), this study uses women's capabilities as indicators of empowerment in the four main dimensions of their lives. Therefore, in place of the different types of capital assets identified in the DFID (1999)'s sustainable livelihood framework, this study argues that the various dimensions of women's empowerment, as indicated by the level of capabilities, influence their livelihood strategies and food security status. Based on the sustainable livelihood framework, the household food security status can, therefore, be expressed as a function of these capabilities indicating women's empowerment levels plus other household factors. Since women are the principal actors of household food security in rural areas, it is hypothesized in this study, that women with higher levels of empowerment along each sub-dimension are more likely to have food secure households.

5.3.2 Measurement of household food security status

Food security is a multidimensional concept, and measuring it has been an on-going challenge for researchers and practitioners (Coates et al., 2007). In response to the need to improve the tools and frameworks for targeting food security interventions (especially for the vulnerable segments of a population) to achieve optimum resource allocation, the Food and Nutrition Technical Assistance (FANTA) project of the US Agency for International Development developed the Household Food Insecurity Access Scale (HFIAS), which is an adaptation of the eighteen-item Household Food Security Survey Module (HFSSM) used by the US Department of Agriculture (USDA) and other US agencies to measure the access component of food insecurity in the USA (Coates et al., 2007).

One limitation of the US Household Food Security Survey Module (US HFSSM) is that it was not universal across different cultural and social contexts. There are other studies where the US HFSSM questions have been translated, with some adaptation, to developing country settings and found to be correlated with poverty and food consumption indicators (Coates et al., 2007; Perez-Escamilla et al., 2004). However, the HFIAS was developed on the notion that households across different cultural or social contexts respond to food insecurity in universal ways (Coates et al., 2007). The method is based on the idea that the experience of food insecurity (i.e., poor household food access) causes predictable reactions and responses that can be captured and quantified through a survey and summarized in a scale. According to Deitchler et al. (2011), the HFIAS reflects the three universal domains of the experience of inadequate household-level food

access which are: anxiety about household food supply; insufficient quality, which includes variety and preferences; and lastly, insufficient quantity of food supply, the amount consumed, and the physical consequences of insufficiency. Thus, in HFIAS, respondents are asked directly whether the household has experienced conditions typical of a food-insecure household during a specified recall period. The three domains in HFIAS are illustrated in Figure 5.2.

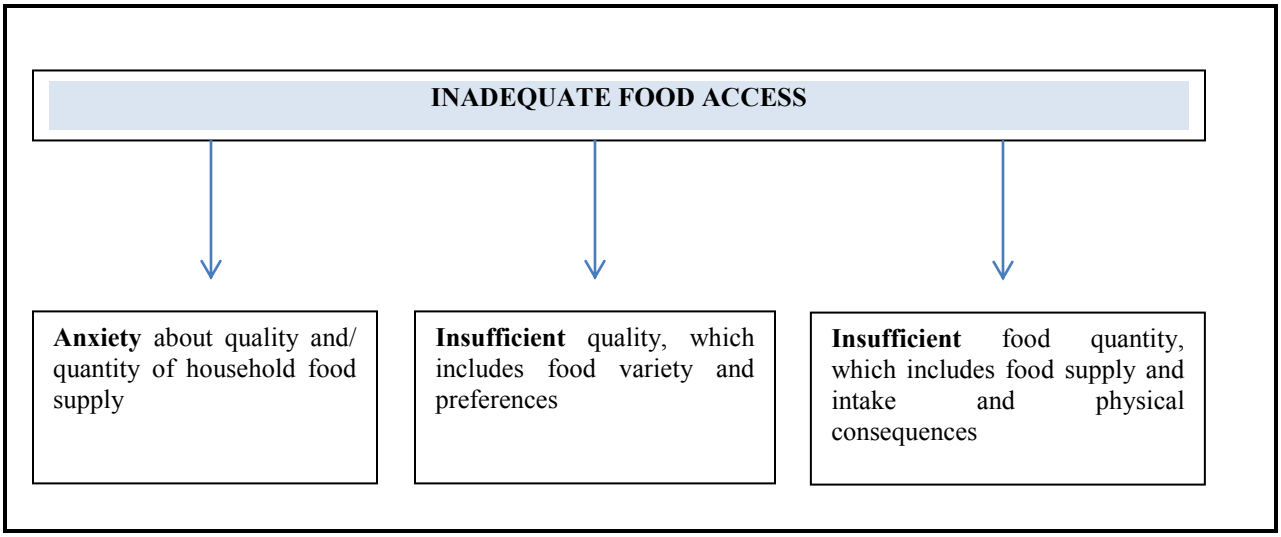

Figure 5.2: Universal domains of inadequate household-level food access

Source: Adapted from Deitchler et al. (2011)

The HFIAS, therefore, serves as a universally appropriate tool for assessing the access component of household food insecurity in different cultural settings across countries (Deitchler et al., 2011). The HFIAS has the advantage that it tends to be cost effective, unlike most other household-level measures of food access, such as income and caloric adequacy that are technically difficult, data-intensive, and costly to collect. The HFIAS is also more sensitive to changes in household food insecurity and is also user friendly (Kirkland et al., 2011). This study therefore, adopts the HFIAS to categorise households in the Msinga Local Municipality according to their household food insecurity status. Based on the three domains of food insecurity determined through the HFIAS, four categories of household food insecurity status can be established. The four categories are severely food insecure, moderately food insecure, mildly food insecure and food secure. A brief explanation of these categories is given below:

- Food secure (FS): These households do not express anxiety about quality and/quantity of household food supply because they have access, at all times, to enough food for an active, healthy life for all household members.
- Mildly food insecure (MFI1): Such household express anxiety about quality and/quantity of household food supply over the recall period, although they have adequate quantities of food.
- Moderately food insecure (MFI2): Such households experience insufficient quality, which includes limited food variety and preferences.
- Severely food insecure (SFI): Such households experience insufficient food quantities, which include food supply and intake, and the accompanying physical consequences.

5.3.3 Empirical approach to identify dimensions of women empowerment

The approach used to identify dimensions of women empowerment in this study is fully described in Chapter 3. The approach firstly, identifies all indicators of women's capabilities, under each dimensions of empowerment, in the context of South African rural areas. These were quantified as either continuous variables or ordinal variables on a five point likert scale (Appendix 2-5). The lists of indicators to capture women's access and control of resources, and their agency at each dimensions of empowerment were compiled following studies by Uphoff (2003), Kabeer (1999; 2005), Alsop & Heinson (2005) and Alsop et al. (2006). Principal Component Analysis was applied on the levels/scores of resources and agency at each of the four main dimension of empowerment (i.e., economic, social, agricultural and civic forms of empowerment) to generate indices representing the different dimensions namely; financial capital, human capital, physical capital, economic agency, social capital etc. (*see* Tables 3.2 - 3.5). The dominant PCs (i.e., with eigen values greater than one using the Kaiser criterion) were retained in each dimension. Following other studies (e.g. Nieuwoudt, 1977), absolute PC loadings greater than 0.50 were considered dominating and indicated a strong association among the resources used to generate that particular PC.

5.3.3.1 Empirical model to determine the factors influencing household food security status

To identify the dimensions of empowerment that influence women's household food security status, the Ordered Logit model was used. Since the β_{kj} are estimated by the method of maximum

likelihood, the Ordered Logit model assumes that large samples of data are used to avoid micronumerosity. In small samples, the estimated standard errors of the estimated β_{kj} may be relatively high. The size of standard errors was checked to detect micronumerosity (Garson, 2009). Various models have been used in developing countries for determining factors influencing food security status of households e.g., Tobit model (Etim & Solomon, 2010), Probit model (Oluyole et al., 2009) and Logit (Babatunde et al., 2007). The selection of the Ordered Logit model in this study is in line with Greene (2003) since the dependent variable (the household food security status) is both categorical and ordinal. The women's household food security status was expressed as a function of the different dimensions of women's empowerment, in addition to other household socio-economic variables.

The Ordered Logit model is specified as follows:

$$Y^* = \beta X + \varepsilon \quad (5.1)$$

Where: Y* is the exact but unobserved dependent variable, but what is observed is:

$y = 1$ if $Y^* \leq 0$,

$= 2$ if $0 < Y^* \leq \mu_1$,

$= 3$ if $\mu 1 < Y^* \leq \mu_2$,

$= 4$ if $\mu_{2\leq} Y^* \leq \mu_3$ and;

X is the vector of independent variables, β is the vector of regression coefficients which are to be estimated and ε is the error term whose distribution is estimated to be normal (Greene, 2003), and the categories of the response variable Y* are:

$Y^* =$ { 1 = Severely food insecure (SFI); 2 = Moderately food insecure (MFI1); 3 = Mildly food insecure (MFI2); 4 = Food secure (FS) }

The μ's are unknown parameters to be estimated with β. In this case a household has its own food security status, which depends on certain measurable factors X and certain unobservable factors ε. Given only the four possible household food security statuses, the HFIAS reflects the universal domains of the experience of household-level food access that closely represents a

household‘s food access status. Thus, the response variable, (i.e., household food security status) was treated as ordinal under the assumption that the levels of household food security status have a natural ordering (low to high), but the distances between adjacent levels are unknown. The explanatory variables used in the Ordered Logit model are described in Table 2.

5.3.3.2 Regression model diagnostics for the Ordered Logit model

One of the main assumptions of the Ordered Logit model is that the relationship between each pair of outcome groups is the same (i.e., the proportional odds assumption) (Long, 2012). The Brant Test was used to check whether the proportional odds assumption had not been violated. Testing for the overall significance of the Ordered Logit regression model was done using the chi-squared value and the log-likelihood ratio criteria. The Akaike‘s Information Criterion (AIC) was used for selecting variables in the ordered logistic regression model. The overall model was run using only the most powerful predictors of household‘s food security status in the conceptual framework (Figure 5.1). The degree of multicollinearity between explanatory variables was checked by examining variance inflation factors (VIF).

5.3.3.3 Description and measurement of explanatory variables used in the empirical model

Table 5.1 describes the explanatory variables used in the Ordered Logit model and their measurement.

Table 5. 1: Explanatory variables used in the Ordered Logit model

Dependent variable	**Description**
HH_FD_SEC_STAT	Categories of women's household food security status; (i.e., 1 = SFS; 2 = MFS1; 3 = MFS2; 4 = FS).
Explanatory	**Description**
AGE	Continuous variable for age of the primary female head-of-household
HHD_SIZE	The total number of persons in each household
HUSB_INCOME	The total amount of annual income obtained by the husband
DEPEND_RATIO	The ratio of number of dependents (i.e., below 14 and above 65 years, those with disabilities or chronic illnesses) to adult abled persons
ECONMC_AGENCY	PCA index representing the level of economic agency of primary female head-of-household
FINANC_CAP_EMP	PCA index representing the woman's level of financial capital empowerment
HUMAN_CAP_EMP	PCA index representing woman's level of human capital empowerment
VOCAT_SKL_EMP	PCA index representing woman's level of vocational skills empowerment
PHYSIC_CAP_EMP	PCA index representing woman's level of physical capital empowerment
SOCIAL_AGENCY	PCA index representing the woman's level of social agency.
SOCIAL_CAP_EMP	An index representing woman's level of social capital endowment
INFORMAT_EMP	PCA index representing the woman's level of empowerment in informational resources
CROP_MX_SKILLS	PCA index representing woman's empowerment in crop management skills
FARM_FINAN_SKL	PCA index representing the woman's empowerment in farm financial skills
WATER_USE_SEC	PCA index representing the woman's water-use security level
SOCIO-CULT_EMP	PCA index representing the woman's empowerment in socio-cultural aspects hindering agriculture
ANIML_PROD_SKL	PCA index representing the woman's level of empowerment in animal production skills
LEGAL_RES_EMP	PCA index representing the woman's level of legal asset empowerment
CIVIC_AGENCY	PCA index from PCA representing the woman's level of civic agency
RIGHTS_KNOW	PCA index representing women's knowledge of their rights
PSYCHOLOG_EMP	An index representing the woman's level of political empowerment
POLITICAL_EMP	An index from PCA representing the woman's level of psychological asset endowment. (Composite factor from PCA)
IRRIG_TYPE	Irrigation system dummy; 1 if women is using irrigation and 0 if in rain-fed agriculture
D1	Area dummy: 1 if household is from Tugela Ferry and 0 otherwise
D2	Area dummy: 1 if household is from Mooi River and 0 otherwise

5.3.4 Methods of data collection

5.3.4.1 Study area

Since access to irrigation is one of the essential opportunities to achieve increased food production and a critical factor towards sustainable agriculture and achieving food security, the availability of an irrigation scheme with a neighbouring rain-fed area was the main determinant for selection of the study sites. This was important for allowing comparisons between women of the effect of farming in rain-fed agriculture and irrigation, and the consequences of agricultural productivity and household food security. Thus, women practising irrigation were sampled from Tugela Ferry and Mooi River irrigation Schemes while those practising dry-land agriculture were taken from Machunwini communal area, which lies between the two irrigation schemes. Two irrigation schemeswere used to increase the numbers as wells as the variability among respondents with respect to the explanatory variables.The three study areas all lie under the Msinga Municipality, South Africa.

5.3.4.2 Sampling procedures for survey

Social organization and culture can significantly influence the division of labour between men and women in rural households. Moreover, gender relationships influence male and female heads-of-households to pursue different livelihoods activities (Gladwin et al., 2001). Thus, this study considers a household as having two heads (i.e., a primary female and a primary male head-of-household) who head the household in pursuing different livelihood activities. Only women who were the primary female heads-of-households were selected for this study. Households in the three study sites were stratified into three main groups namely; gravity–fed irrigators, pump-fed irrigators and dry-land farmers (Table 5.2). The gravity-fed and pump-fed women irrigators/farmers were obtained from Tugela and Mooi River Irrigation Schemes. However, gravity-fed irrigators/farmers in Tugela Ferry were not included in the study because the irrigation scheme was undergoing a major revitalisation at the time of the survey. Moreover, the farmers had not been producing food for almost a year, which made it difficult to assess the impact of the irrigation scheme on household‘s livelihood outcomes. The dry-land women farmers were sampled from the Machunwini area.

Proportional random sampling method was used to select the women used for the study to equally represent the three methods by which farmers‘ access water for agricultural purposes (i.e., gravity-fed, pump-fed and dry-land farmers). Households in the three study areas were divided into three different subgroups or strata (i.e., gravity-fed, pump-fed and dry-land farmers). Households were then randomly selected proportionally from the different strata such that each stratum contributes 100 primary female heads-of-households. Thus, the number of females sampled from each of the three areas was calculated based on the proportion of the total number of households in each area (e.g., 40 for Tugela Ferry = 270/(403+270)). Every woman in identified households who met the definition of a primary female-head-of household was included in the study.

Table 5. 2: Distribution of sampled women farmers in each study area

Irrigation method	**Total number of households**			**Number of respondents sampled**			**Total**
	Tugela Ferry	**Mooi river**	**Machunwini**	**Tugela Ferry**	**Mooi river**	**Machunwini**	
Gravity-fed	0	473	0	0	100	0	100
Pump-fed	245	403	0	40	60	0	100
Dry-land	0	0	1234	0	0	100	100
Total							**300**

Source: Survey data (2013)

5.5 Results and discussions

5.5.1 Socio-demographic characteristics of sampled primary female heads-of-households

Table 5.3 summarises the socio-demographic characteristics of four categories of household food security which were classified based on the HFIAS. The majority of women‘s households (43.0%) in the study area, were severely food insecure, while a few (19.0%) were food secure. Primary female heads-of-households with food secure households were much older (i.e., mean of 55.4 years) than in the other three categories. They also had a lower dependency ratio of about 0.9 compared to women in the other clusters. However, there were no significant differences between women‘s households in the three clusters with respect to the household size . Food secure households also had the highest proportion (30.4%) of primary female heads-of-households with formally employed husbands. The same category had more primary female heads-of-households (67.9%) who had never been to school compared to the other three

categories. None of the households with women who had received tertiary education were food insecure. Likewise, all women with husbands that reached tertiary education, were food secure.

Table 5. 3: Socio-demographic characteristics of primary female heads-of-households in the four categories of food security

Characteristic	1 = SFI	2 = MFS1	3 = MFI2	4 = FS	p-level
No. in each category	129	63	42	57	
Average age of women	53.6	51.4	51.1	55.4	0.046
Household size	7.4	7.8	6.1	8.4	0.302
Mean dependency ratio	1.2	1.0	1.1	0.9	0.065
Women's marital status (%)					0.051
Married	37.8	51.7	34.1	38.6	
Single	18.9	10.0	36.6	14.0	
Widowed	40.2	38.3	29.3	47.4	
Separated/Divorced	3.1	0	0	0	
Women's employment status (%)					0.544
Unemployed	89.1	96.8	92.9	93.0	
Informal employment	9.3	3.2	7.1	7.0	
Formal employment	1.6	0	0	0	
Husband's employment status (%)					0.161
Unemployed	64.6	44.8	30.8	43.5	
Informal employment	29.2	31.1	46.2	26.1	
Formal employment	6.2	24.1	23.2	30.4	
Women's level of education (%)					0.600
No formal education	75.6	74.6	69.0	67.9	
Primary education	13.4	14.3	11.9	10.7	
Secondary education	11.0	11.1	16.7	17.9	
Tertiary education	0	0	2.4	3.6	
Husbands level of education (%)					0.153
No formal education	51.1	31.0	38.5	40.9	
Primary education	10.6	44.8	23.1	18.2	
Secondary education	36.2	20.7	38.5	31.8	
Tertiary education	2.1	3.4	0	9.1	
De facto female-headed hholds (%)	2.3	13.9	7.9	11.7	0.212
De jure female-headed households (%)	62.3	48.3	65.9	61.4	
Both male and female heads of households present	35.4	43.8	26.2	26.9	

Source: Survey data (2013)

NB: p-level shows significance level of the independent t-test and χ^2 for continuous and categorical variables, respectively

On the other hand, primary female heads-of-households who were from severely food insecure households had the highest mean household-dependency ratio and the majority of the husbands were unemployed. The majority of women (75.6%) in this group had no formal education, and none of them had reached tertiary education. Likewise, most (43.6%) of the sampled women's husbands in the severely food insecure group also had no formal education and none had also reached tertiary education. There were also very few formally employed women (1.6%) among the food insecure households. Likewise, very few women (6.3%) in this group had formally employed husbands. The majority of food insecure household had primary female heads-of-households as the *de jure* household heads (i.e., single, widowed or divorced/separated).

5.5.2 Dominant dimensions of empowerment among rural women in Msinga

Table 5.4 summarises the dominant dimensions of women empowerment that were obtained by applying PCA on primary female heads-of-household's level of economic, social, civic and agricultural capabilities (i.e., resources and agency). A detailed discussion on these PCs is provided in Chapter 3.

Economic agency, human capital empowerment, financial capital empowerment, empowerment in vocational skills and physical capital empowerment were identified as the dominant dimensions of economic empowerment. Social agency, social capital empowerment and informational resource empowerment were identified as the dominant dimensions of women's social empowerment. Crop management skills, farm financial management skills, water-use security, animal husbandry skills and weed and pest management skills were identified as the dominant dimensions of women's empowerment in agriculture. Lastly, the study identified legal resource empowerment, civic agency, political and psychological empowerment as the dominant dimensions in that category (Table 5.4). Overall, each of the four PCs jointly explained 65.0%, 62.6%, 73.4% and 69.7% of the total variation in the variables used, respectively.

Table 5. 4: Dimensions of women empowerment identified in Msinga

Main dimension	Sub-dimension	% of variation	Cumulative %
Economic empowerment	Economic agency	16.2	16.2
	Human capital empowerment	7.4	23.6
	Financial capital empowerment	5.8	29.4
	Empowerment in vocational skills	5.4	34.8
	Physical capital empowerment	5.2	40.0
Social empowerment	Social agency	26.4	26.4
	Social capital empowerment	10.4	36.8
	Informational resource empowerment	6.8	43.6
Empowerment in agriculture	Empowerment in crop management skills	18.1	18.1
	Farm financial management skills	12.2	30.3
	Water-use security	8.8	39.2
	Empowerment in socio-cultural aspects	7.8	47.0
	Animal husbandry skills	6.6	53.6
	Weed and pest management skill	5.9	59.4
Civic forms of empowerment	Legal resource empowerment	30.0	30.0
	Civic agency	11.0	41.0
	Knowledge of legal rights	6.0	47.0
	Political empowerment	5.2	5.2
	Psychological empowerment	4.5	56.7

Source: Adapted from Chapter 3, Tables 3.3 to 3.6

5.5.3 Ordered Logit model to estimate sampled women's household food security status

Table 5.5 presents the Ordered Logit empirical results generated to identify the dimensions of women empowerment that influence household food security status among the primary female heads-of-households in Msinga.

Table 5. 5: Dimensions of empowerment influencing women's household food security (n = 300)

Variable	Coeff.	Stand. Error	P>z	Marginal effects			
				SFS	MFI1	MFI2	FS
AGE	**0.03****	0.02	0.03	-8.6E-3**	6.7E-4	**4.8E-3****	**3.2E-3****
HHD_SIZE	0.00	0.05	0.94	8.9E-4	-6.9E-5	-4.9E-4	-3.3E-4
HUSB_INCOME	**3E-5*****	1.1E-5	0.00	**-8E-6*****	6.4E-7	**4.6E-6****	**3.0E-6****
DEPEND_RATIO	-0.08	0.16	0.61	0.02	0.00	-0.01	-0.01
ECONMC_AGENCY	**2.26****	0.99	0.02	**-0.56****	0.04	**0.31****	**0.21****
HUMAN_CAP_EMP	0.34	0.36	0.35	-0.08	0.01	0.05	0.03
FINANC_CAP_EMP	0.16	0.15	0.30	-0.04	0.00	0.02	0.01
VOCAT_SKL_EMP	0.22	0.31	0.47	-0.06	0.00	0.03	0.02
PHYSIC_CAP_EMP	**0.78****	0.29	0.01	**-0.19****	0.02	**0.11****	**0.07****
SOCIAL_AGENCY	-1.10	0.71	0.12	0.27	-0.02	-0.15	-0.10
SOCIAL_CAP_EMP	**-1.02****	0.40	0.01	**0.25****	-0.02	**-0.14****	**-0.09****
INFORMAT_EMP	-0.05	0.37	0.90	0.01	0.00	-0.01	0.00
CROP_MX_SKILLS	-0.28	0.31	0.36	**0.07****	-0.01	**-0.04****	-0.03
FARM_FINAN_SKL	**0.52***	0.27	0.06	-0.13	0.01	0.07	**0.05***
WATER_USE_SEC	0.08	0.26	0.77	-0.02	0.00	0.01	0.01
SOCIO-CULT_EMP	**-0.66****	0.31	0.04	**0.16****	-0.01	**-0.09****	**-0.06****
ANIML_PROD_SKL	-0.03	0.21	0.89	0.01	0.00	0.00	0.00
LEGAL_RES_EMP	0.00	0.39	0.99	0.00	0.00	0.00	0.00
CIVIC_AGENCY	-0.11	0.79	0.89	0.03	0.00	-0.02	-0.01
RIGHTS_KNOW	0.50	0.34	0.15	-0.12	0.01	0.07	0.05
PSYCHOLOG_EMP	**0.85****	0.32	0.01	**-0.21*****	0.02	**0.12****	**0.08****
POLITICAL_EMP	0.07	0.34	0.83	-0.02	0.00	0.01	0.01
IRRIG_TYPE	-0.33	0.21	0.12	0.08	-0.01	-0.05	-0.03
D1	-0.49	0.64	0.44	0.12	-0.01	-0.07	-0.04
D2	0.27	0.68	0.69	-0.07	0.00	0.04	0.03
Number of obs = 224				Prob> chi2 = 0.0001			
LR chi2(14) = 63.12				Pseudo R2 = 0.2021			
Mean VIF = 1.34							
/cut1	1.061	1.169		Brant Test	Chi^2	DF	$P>Chi^2$
/cut2	1.832	1.172			33.03	26	0.161
/cut3	3.413	1.201					

Source: Survey data (2013)

The chi-squared value and the log-likelihood ratio criteria were used to evaluate the effectiveness of the Ordered Logit model in line with Green (2003). The significant p-values (i.e., significant below 5% level) and the associated likelihood ratio chi-square values in Table 5.5 suggests that the model was well-fitting. The pseudo R-square associated with Ordered Logit model was

observed as an inappropriate measure of the predictive power of ordered response model. The results of the Brant Test showed that the proportional odds assumption had not been violated in the model. The degree of multicollinearity among the variables used in the Ordered Logit model was minimal (i.e., mean VIF less than 10). The estimated standard errors for the estimated parameter estimates were all below two, indicating that micronumerosity (small sample size) was not a problem (Pedhazur (1997) cited by Garson, 2009)). There was no intercept in the model because it was not identified independently of the cut-points and the STATA package sets the constant to zero and estimates the cut points for separating the various levels of the response variable. The cut-off points shown at the bottom in Table 5.5 indicate where the latent variable is cut to make the four food security groups.

5.5.3.1 Household factors influencing food security

The positive and statistically significant parameter estimate for age (AGE) shows that a household becomes more likely to be food secure as the primary female head-of-households becomes older. The increase in the likelihood of older primary female head-of-households to be food secure may be because older women, above sixty five years in South Africa, are entitled to government transfers in the form of pensions. Moreover, older women, in general, tend to have more access and control of resources accrued over years, especially land and equipment, which are crucial for farm and off-farm investments than younger ones (DAFF, 2009; Titus & Adetokunbo, 2007). Since age reflects the experience accumulated in both farm and non-farming, it may, therefore, be associated with better income opportunities leading to food security (Albert & Collado 2004). Households with older primary female head-of-households also tend to be food secure because they tend to have adult children who become part of the labour force in agricultural production. In most cases, older women‘s households are usually smaller in size as older children move out to start their own families. Such households also become food secure because of an additional income in the form of remittances from ―adult-working children" (Titus & Adetokunbo, 2007).

The coefficient estimate for husband‘s income (HUSB_INCOME) was positive and highly significant showing that household food security in the study areas was highly influenced by husbands‘ level of income. In contemporary South Africa, income is the principal determinant of

household food security even among rural households (Kirsten et al., 2003). This is because smallholder agriculture is not fulfilling its pivotal role and rural households only derive a small proportion of their livelihoods directly from agricultural sources. In its place, non-agricultural sources such as remittances, off-farm work, government transfers have all been gradually strengthened in light of the demise of agriculture (Mudhara, 2010; Baiphethi & Jacobs, 2009). Thus, household income earned from any source determines the household's ability to secure food (Kirsten et al., 2003). The parameter estimate for husband's income was expected to significantly influence household food security since husbands in the study communities are expected to shoulder responsibility of their families. The marginal effects of husband's income are negative at lower levels of food security (i.e., SFS) but positive at higher levels of food security (i.e., MFI2 and FS) (Table 9). This means that increasing husband's income reduces the likelihood of a household to be severely food insecure but increase the likelihood of that household to be food secure. This is expected since according to Engel's law, the total expenditure share on food increases with increasing income (Cirera & Masset, 2010).

Although a growing number of studies have shown that women's incomes are more strongly associated with improvements in household food security than men's incomes (Quisumbing et al., 1995), the coefficient estimate for women's financial capital empowerment (FINANC_CAP_EMP) (i.e., a measure of women's access and control over financial resources) was not statistically significant. According to Bigsten et al. (2002), men invest more in acquiring livelihood assets than women. They also have a better opportunity to access such assets. Thus, the most probable reason why men's income rather than women's access and control of financial resources influences household food security in the study area is that men's income facilitate household's access to assets (Bigsten et al. 2002), that ensure stability of incomes from either agricultural production or off-farm investments. Moreover, since most of the women in the study areas were having high levels of financial capital empowerment earned through social grants and remittances, they had low levels of household assets, possibly because of the dependency syndrome of relying on the state and relatives for income.

5.5.3.2 Dimensions of women's economic empowerment influencing household food security status

Economic agency reflects the extent to which women exercise their sense of agency in economic arenas (Alsop et al., 2006). According to Jain et al. (2010), of all the facets of women development, economic empowerment is of utmost significance to achieve lasting and sustainable solutions to address poverty and food insecurity as it is directly linked to control of the means of production. Women with high levels of economic agency (ECONMC_AGENCY) are more likely to have food secure households because they have the _inner drive' to access and have control over the means of production (Jain et al., 2010). Therefore, women who exercise their agency in economic arenas are more likely to have food secure households because they are self-motivated to acquire and utilize economic resources to achieve food security (Kabeer, 1999; Barker, 2005). A higher sense of economic agency also mean more motivation to pursue diversified livelihoods that ensures stability of incomes and, hence, food security. They also have high levels of own aspirations, bargaining, negotiating, and analytical power which are needed for independent/self-driven livelihoods (Barker, 2005). This study, therefore, supports the _agency perspective', which emphasises on the importance of developing individuals' capacity to act in bringing about change in their lives (Sen, 1989), rather than designing policies to target specific groups (e.g., women, poor, ethnic minorities), whose members are implicitly seen as passive recipients. These results also confirm that the sense of agency matters most in bringing other development outcomes (Sen, 1989).

The positive and statistically significant coefficient estimate for women's physical capital empowerment (PHYSIC_CAP_EMP) implies that increasing levels of access and control of physical capital among the primary female head-of-households is associated with an increase in the probability of a household being food secure. Higher levels of physical capital empowerment among the primary female head-of-households increase household food security status because the more stock of physical capital (buildings, houses, infrastructure such as roads and electricity, transportation, and various technologies) are the most tangible forms of assets required for pursuing livelihood strategies. They influence household food security since they play a major role, not only in economic production, but also in providing security against difficult times (Matshe, 2009). The marginal effects of women's physical capital empowerment show that a unit

increase in the level of women‘s physical capital empowerment decreases the probability of a household being severely food insecure but increases the probability of that household becoming food secure.

5.5.3.3 Dimensions of women’s social empowerment influencing household food security status

The coefficient estimate for the level of social capital empowerment (SOCIAL_CAP_EMP) was negative and statistically significant. A substantial amount of research evidence suggests that people‘s stores of social capital play a vital role in improving household food security (Misselhorn, 2009; Martin et al., 2004). They argue that social capital, a measure of trust, reciprocity and social networks, is a crucial mechanism through which livelihood assets are distributed, accessed, and claimed to improve livelihood outcomes like food security (Thomas et al., 2013). The negative and statistically significant coefficient estimate for the level of social capital suggests that primary female heads-of-households that had higher levels of social capital were less likely to have food secure households. In many different contexts, aid agencies have hesitated to provide food and other aid for extended periods because of fears that this may create a _dependency syndrome‘ among beneficiaries (Harvey & Lind, 2005).. Based on these results, this study argues that high levels of social capital among women could possibly have resulted in a _dependency syndrome‘ among those in the study area resulting in their failure to accumulate assets to curb shocks threatening their livelihoods in the future. As a result, such women and their households are more likely to be vulnerable to food insecurity in the future (Kawachi, 1999).

5.5.3.4 Dimensions of women’s empowerment in agriculture that influence household food security

Results show that increasing levels of women‘s empowerment in farm financial management skills (FARM_FINAN_SKL), increases the likelihood of a household being food secure. Farm financial management skills among smallholder women are crucial in finding ways to increase profitability, and fulfil their agribusiness long-term goals (Collett & Gale, 2009). Financial management is one of the most important aspects of any business to remain viable. The ability of smallholder women to control and plan finances is necessary to run a successful farming enterprise. According to Collett & Gale (2009), smallholder women who understand the

difference between income and profits, cost production inputs (including the cost of labour), establish produce selling prices, and work out their profit margins, are more likely to run a successful and viable farming enterprises. Thus, women with high levels of farm financial empowerment are more likely to invest in profitable farming enterprises resulting in food security. The marginal effects also show that increasing the farm financial management skills among women reduces the probability of a household to be food insecure but increases the likelihood of such households to be food secure.

The negative and statistically significant coefficient estimate for the primary female head-of-household‘s level of empowerment in socio-cultural aspects (SOCIO-CULT_EMP) shows that households with women who indicated low hindrances in agriculture (i.e., more empowered in socio-cultural aspects were less likely to be food secure. This was not according to expectation. It was expected that women empowered more in socio-cultural hindrances would be more food secure since they have overcome socio-cultural hindrances that create obstacles to women‘s agricultural production. However, according to Malhotra et al. (2002), interpersonal gender dynamics within the household, emanating from marriage systems, are responsible for much of women‘s social exclusion. Hence, married women, whose spouses are present or away, face more socio-cultural inhibitions. However, although they face more socio-cultural hindrances, such women/households draw on support from husbands and thus can actually be more food secure.

Many studies (e.g., Hussain et al., 2003; Lipton & Litchfield, 2003) have found that making water available for agricultural production (including livestock, fish, as well as crops) where rainfall is unreliable or insufficient can make a huge difference to peoples‘ lives, as the vast majority of rural poor depends on agriculture. However, the coefficient for the irrigation system (i.e., IRRIG_TYPE) was not statistically significant implying that there were no significant differences in food security between households in rain-fed agriculture in Machunwini and those practicing irrigation in Mooi River Irrigation Scheme. Moreover, the coefficient estimate for women‘s level of water-use security (WATER_USE_SEC) was not statistically significant indicating that improved access to sufficient water alone is not a panacea for agricultural production and food security.

5.5.3.5 Dimensions of women's civic empowerment influencing household food security

Women's level of legal resource empowerment, civic agency, knowledge of civic rights and political empowerment did not significantly influence the food security status of the sampled households. However, the coefficient estimate for the primary female head-of-household's psychological empowerment (PSYCHOLOG_EMP) was positive and statistically significant implying that households with women having higher levels of psychological resource empowerment were more likely to be food secure. This implies that women also need a higher level of psychological wellbeing to achieve household food security. High levels of psychological empowerment are crucial for women to achieve household food security as they determine one's _desire to control', _self-perception' and _self-efficacy', which reflects one's ability to interact and to have interpersonal skills needed to pursue independent livelihoods (Babaei, 2012; Zimmerman & Rappaport, 1988). The marginal effects of women's psychological empowerment are negative at lower levels of food security but positive at higher levels of food security. This implies that a unit increase in women's psychological empowerment reduces the probability of a household being severely food insecure but increases the probability of that household to be food secure.

5.6 Conclusions and policy recommendations

This study has been motivated by the need to understand the dimensions of women empowerment that influence household food security status. Rural women play important roles in the four pillars of food security, yet they form part of the most economically and socially disempowered groups. Moreover, in South Africa, food insecurity among rural households continues to be rampant despite efforts by the post-apartheid government to reduce it through various forms of women empowerment. The study showed that empowerment can be compartmentalised into several dimensions. However, some economic, social, civic and agricultural dimensions of women empowerment are critical for rural households to achieve food security. In addition, other household-level socio-economic factors also determine their food security status.

In general, a household becomes more food secure with more income. Incomes of males are the most significant determinant of food security among married women's households. Since income is the major determinant of food security in South Africa, improving income opportunities for

unmarried primary female head-of-households improves their household food security. In addition, older women's households tend to be more food secure. Such households are more likely to have adult children that can contribute labour to household own production, remittances or government transfers for buying food.

In the economic arena, the primary female head-of-households need a sense of economic agency and higher levels of physical capital empowerment if the food security status of their households is to be improved. A higher sense of agency enables women to define their own goals and act upon them. It is the most aspect of women empowerment as it gives them the _motivation' to utilise resources efficiently to ensure independent improved livelihoods. Higher levels of physical capital resources among primary female heads-of-households help reduce household food insecurity by ensuring more agricultural productivity and more off-farm income opportunities. They also allow households to diversify incomes, thereby, ensuring stability of access to food.

Improving the farm financial management skills of the primary female heads-of-households improves the food security status of their households. Farm financial management skills are necessary for running a successful farming enterprise. The ability to manage agricultural finances is necessary for improved agricultural productivity, increase adaptability to deal with change and crisis, and facilitate the diversification of livelihoods thereby ensuring household food security in rural areas. Pertaining to the civic arena, rural women also need to be psychologically empowered for improved food security of their household. Psychological empowerment of primary female heads-of-households enables them to interact and have interpersonal skills needed to pursue independent livelihoods. Lastly, it can be concluded that the contribution of women empowerment to the attainment of household food security is more significant among the food insecure households than secure ones.

5.6.1 Recommendations

Empowering women by improving the sense of agency and strengthening their control over a range of assets is critical for improving the food security status of their households. The study recommends the following:

- Stakeholders working on women empowerment (e.g., NGO‘s) should consider different strategies for empowering primary female heads-of-households from households with different characteristics by targeting and strengthening the specific capabilities they lack.
- Stakeholders working on women empowerment should improve women‘s sense of agency to give them the ‗inner drive‘ needed to pursue independent livelihoods and attain food security.
- Stakeholders working on women empowerment should deliver training designed to enable primary female heads-of-households, individually or in groups, to improve their farm financial management skills.
- Stakeholders working on women empowerment should target primary female and primary male heads-of-households from food insecure households to improve the effectiveness of interventions.

5.7 Summary

This chapter identifies the dominant dimensions of women empowerment that are critical for women‘s households to achieve food security using the MNL model. The dimensions of women empowerment had been identified through application of PCA and their household food security status had been establishing using the HFIAS. The dimensions of women empowerment, as well as other socio-economic factors critical for achieving household food security were identified.

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CHAPTER 6: THE IMPACT OF 'WOMEN'S EMPOWERMENT IN AGRICULTURE' ON HOUSEHOLD VULNERABILITY TO FOOD INSECURITY IN KWAZULU-NATAL PROVINCE

Abstract

It is argued that empowering women in smallholder agriculture is very crucial in reducing vulnerability to food insecurity among rural households. This study contributes to this literature by adapting the Vulnerability as Expected Poverty approach to determine which dimensions of _women's empowerment in agriculture' reduce household vulnerability to food insecurity, based on cross-section data collected from 300 randomly selected primary female heads-of-households in the Msinga rural areas of KwaZulu-Natal. It was found that empowering women in socio-cultural aspects that create hindrances in agriculture, reduces the probability of their households being vulnerable to food insecurity. Surprisingly, access to irrigation, and improved water-use security did not significantly influence household vulnerability to food insecurity. However, other forms of women's empowerment, including economic agency and physical capital empowerment, were found to reduce the likelihood of a household being vulnerable to food insecurity. Women with high levels of financial capital empowerment invested less in other capital assets and were more vulnerable to food insecurity in the future. In addition to women's empowerment, demographic characteristics of a household influence its vulnerability status. Household vulnerability to food insecurity reduces as the husband's income increases, but increases with an increased dependency ratio. It was concluded that empowerment in agriculture alone is not a panacea to reduce household vulnerability to food insecurity. Efforts should be made to improve physical assets that determine the off-farm income earning and agricultural production capacity of households.

Key words: Women empowerment; agriculture; vulnerability to food insecurity; South Africa

6.1 Introduction

An understanding of the extent to which women's empowerment interventions can reduce households' probability of being vulnerable to food insecurity could be of great value to government, non-governmental organisations and development agencies, in the design of effective food security strategies. In most rural areas where subsistence agriculture is a predominant source of livelihood, women play multiple roles throughout the processes of the production, handling and preparation of food (Bob, 2002; Galie, 2013). As a result, women's

empowerment has become a frequently cited goal of rural development aimed at reducing household vulnerability to poverty and food insecurity. It is considered an essential way to provide the most vulnerable households with the means to their livelihood strategies and food security (Galie, 2013).

In South Africa, post-apartheid governments have tried to empower rural people through intervention in agriculture. Although smallholder agriculture‘s contribution to household incomes and food availability remains very low in South Africa, it is argued that subsistence/smallholder agriculture plays an important role in reducing rural household vulnerability to food insecurity (Fanadzo, 2012; Baiphethi & Jacobs, 2009). While considerable attention has been given to the study of food insecurity, there are relatively few empirical studies on the effect of empowerment on the vulnerability of rural households to future food insecurity. Nevertheless, empowerment of rural women aims to ensure self-reliance and reduce vulnerability to shocks in the future (Lovendal & Knowles, 2005). In recent years, there has been increasing awareness that the analysis of food insecurity should not just consider its current incidence, but should also identify the individuals, households or the communities who are more at risk of suffering in the future (Scaramozzino, 2006).

There are gaps in the literature about which dimensions of women‘s empowerment in agriculture contribute to the reduction of household vulnerability to food insecurity. Various studies have failed to incorporate the various forms of women‘s empowerment into models to analyse rural household vulnerability to food security, yet women are the principal actors in ensuring rural household food security. Therefore, this paper identifies the dimensions of women‘s economic and agricultural empowerment that are crucial in reducing household vulnerability to food insecurity among irrigating and non-irrigating households in the Msinga rural area in the KwaZulu-Natal province of South Africa.

6.2 Women empowerment and household vulnerability to food insecurity

Since the late 1990s, strategies for tackling global poverty have begun to emphasize the importance of empowering marginalized people to advocate for their own change (Pandya, 2008). Empowering rural women to produce more food for local consumption and local markets is believed to be the best path to reduce household vulnerability to poverty and food insecurity

by increasing agricultural incomes and food availability (Baiphethi & Jacobs, 2009). This argument has been advanced because women play key roles in the achievement of all four pillars of food security in rural areas, as producers of food, income earners, and caretakers of household food and nutrition security (Bob, 2002; Galie, 2013). There is growing evidence that investments in women empowerment contribute to improved broader development outcomes related to health, education, poverty reduction, reducing vulnerability to food insecurity, and economic growth (Mayoux, 2006). By empowering women in agriculture, rural households can have sustainable ways of feeding themselves and get income from selling the surplus produced and thereby, becoming less vulnerable to both poverty and food insecurity (ActionAid International, 2011).

6.2.1 Household vulnerability to food insecurity

Food security has been defined as a situation when all people, at all times, have physical and economic access to sufficient, safe and nutritious food needed to maintain a healthy and active life (FAO, 2009). This definition introduces a stability dimension, which points to the need for understanding both the current and future status of household food security. Moreover, FAO (2009) has shown that access to adequate and sufficient food in many countries is unstable. Many households frequently move in and out of a state of food security, suggesting that the notion of food insecurity is best approached in a dynamic sense. Therefore, a framework for analysing food security must capture its temporal dynamics. Vulnerability Analysis (VA) offers a solution to this problem by providing a quantitative estimate of the probability that a given household will lose access to sufficient food in the near future (Babatunde et al., 2008).

The main advantages of the vulnerability approach are twofold. Firstly, it is explicitly dynamic and forward-looking as it considers both current outcomes and future incidents of food insecurity. Secondly, the analysis uses a stochastic framework and can therefore fully consider the uncertainties associated with future food insecurity, such as the role of external shocks and the strategies that households, communities or public institutions can adopt in order to reduce the likelihood of negative outcomes (Scaramozzino, 2006).The notion of vulnerability as risk of shortfall can be expressed as a probability statement regarding the failure to attain a certain well-being threshold in the future (Christiaensen & Boisvert, 2002). The probability of becoming food insecure in the future is determined by the present conditions, risks potentially occurring within a

defined period and the capacity to manage the risks. At the household level, the major types of risk include health (illness, disability, injuries), life cycle-related (old age, death, dowry), social (inequitable intra-household food distribution), economic risks (unemployment, harvest failure, price changes) and threats related to the natural environment (Babatunde et al., 2008). These risks cause food insecurity by lowering food production, reducing income, reducing asset holding, increasing indebtedness and reducing food consumption (Lovendal & Knowles, 2005).

6.2.2 Methods of measuring vulnerability to food security

Although several empirical methodologies of assessing vulnerability to food insecurity have been proposed in the literature, none of them has evolved into a unanimously accepted approach (Bogale, 2012).Three different methodologies are commonly used to assess vulnerability: vulnerability as uninsured exposure to risk (VER), vulnerability as low expected utility (VEU) and vulnerability as expected poverty (VEP) (Hoddinot & Quisumbing, 2003). All three methods construct a measure of welfare loss attributed to shocks, but differ in that VER and VEU measure the ex-ante probability of a household‘s consumption or utility falling below a given minimum level in the future due to current or past shocks, while VEP measures ex-post welfare loss due to shocks (Hoddinott & Quisumbing, 2003).Therefore, this study adopted the VEP approach to measure the ex-post probability of households becoming food insecure in the future.

According to the VEP approach, an individual‘s vulnerability is the prospect of that person becoming poor in the future if currently not poor, or the prospect of him/her continuing to be poor if currently poor (Christiaensen & Subbarao, 2004). Thus, vulnerability is seen as expected poverty, while consumption (income) is used as a proxy for well-being. This method estimates the probability of a given shock or set of shocks moving household consumption below a given minimum level (such as a consumption poverty line), or forcing the consumption level to stay below the minimum if it is already below the level (Chaudhuri et al., 2002). Even though lengthy panel data are preferred for the estimation of household vulnerability using VER and VEU, the VEP approach can be used to assess vulnerability of households based on cross-section data where there is no panel data, as is often the case in developing countries (Günther & Harttgen, 2009).

6.3 Research methodology

6.3.1 Conceptual framework

The sustainable livelihoods framework (Figure 6.1) provides a comprehensive, and complex, approach to understand how people make a living. It was adapted in this study as a guide to the analysis of how the dimensions of women's empowerment in agriculture affect their household vulnerability status. According to this framework, livelihood assets are the resources on which people draw in order to carry out their livelihood strategies (Chambers & Conway, 1992; Ellis & Allison, 2004). However, in the context of women's empowerment, this study argues that in addition to livelihood assets, people need a sense of agency to achieve their livelihood outcomes. Therefore, households use their empowerment capabilities (i.e. resources and agency), not only their capital assets, to pursue activities that will enable them to achieve the best possible livelihood for themselves. Thus, in place of the different types of capital resources identified in the DFID (1999)'s sustainable livelihood framework, this study argues that women's ability to reduce their household vulnerability to food insecurity depends on their empowerment capabilities. Therefore, each household's vulnerability status can be expressed as a function of these capabilities, reflecting women's agricultural and economic empowerment plus other household factors. It is hypothesised, in this study, that women with higher levels of empowerment in agriculture are less vulnerable to food insecurity.

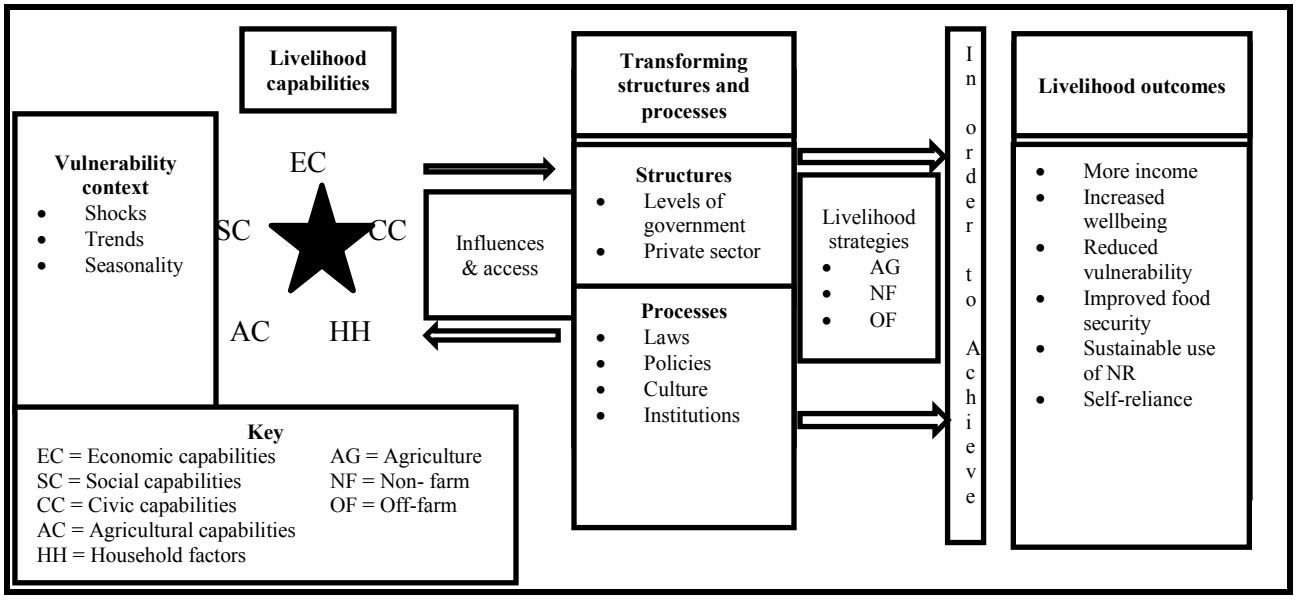

Figure 6. 1: Sustainable livelihood framework for analyzing vulnerability to food insecurity

6.3.2 Identification of agricultural and economic dimensions of women empowerment

Since household vulnerability to food insecurity is influenced by both farm and off-farm incomes, it was hypothesised that vulnerability to food insecurity is influenced by both dimensions of women's economic and agricultural empowerment. To identify and measure levels women's empowerment in agriculture, the study listed all dimensions of women's empowerment in agriculture and their indicators based on the Women's Empowerment in Agriculture Index (WEAI) by the US government's Feed the Future Initiative (IFPRI, 2012), that reflected women's capabilities (i.e., resources and agency). These included access to resources, agricultural skills training (e.g., crop management skills, animal husbandry skills e.t.c), socio-cultural aspects and water-use security. To identify and measure levels of women's economic empowerment, which include financial, human, physical and natural capital, were listed as forms of empowerment. Indicators of women's capabilities (i.e., resources and agency), under each of these sub-dimensions of empowerment, in the context of South African rural areas were identified. These were quantified as either continuous variables or ordinal variables on a five point likert scale. The lists of indicators were compiled following Uphoff (2003), Kabeer (1999; 2005), Alsop & Heinson (2005) and Alsop et al. (2006).

Principal Component Analysis was applied to all the indicators of agricultural and economic empowerment to generate indices representing the different dimensions under the two main dimensions. The dominant PCs (i.e., with eigen values greater than one using the Kaiser criterion) were retained in each dimension. Following other studies (e.g., Nieuwoudt, 1977), absolute PC loadings greater than 0.50 were considered dominating and indicated a strong association among the resources used to generate that particular PC.

6.3.3 Empirical approach to identify households' vulnerability status

Using the definition of vulnerability given by Chaudhuri et al. (2002), this study takes poverty as the state of a household being food insecure and uses food insecurity as a measure of welfare. This approach is divided into three basic steps, i.e., identifying the welfare indicator; identifying the vulnerability threshold; and measuring vulnerability.

Chaudhuri et al. (2002) uses consumption measures as a welfare indicator arguing that it provides a more adequate picture of wellbeing, especially in low or medium income countries.

Consumption measures also have the advantage that they are accurately measured. However, rather than using mere consumption expenditure as in Chaudhuri et al. (2002) and Bogale (2012), this study improves the measure by using the household consumption expenditure per adult equivalent (i.e., from both own production and purchases) as a measure of welfare. This approach was motivated by the fact that households in the three study communities depended on their own production and market purchases for household food consumption requirements.

The studied smallholder farmers in Msinga commonly produce a range of crops including green maize and maize grain, potatoes, cabbages, tomatoes, onions, beans, butternut, green pepper and spinach for consumption and for selling. The annual yields (i.e., both winter and summer), prices per kilogram, quantity sold and quantity consumed for each of these crops were obtained through the survey. The total value of own livestock products consumed annually were also estimated in the survey. The questionnaire also established the total annual expenditure on food for each household through market purchases. The total annual household consumption expenditure was calculated by adding the annual value of crops consumed, the total value of livestock consumed and the total consumption expenditure on food obtained from the market. The total number of persons and their age-groups were also obtained from the survey. These were used to calculate the annual consumption expenditure per adult equivalent for each household.

A household with high annual consumption expenditure per adult equivalent, is generally more likely to meet its consumption needs and be food secure. The daily energy requirement, as recommended by the South African Medical Research Council (MRC), is 2261 kilocalories per adult person. Using the 2000 Income and Expenditure Survey data, Statistics South Africa has estimated that when consuming the kinds of foodstuff commonly available to low-income South Africans, it costs R211 per person every month (in 2000 prices) to satisfy a daily energy requirement of 2261 kilocalories. In other words, R211 is the amount necessary to purchase enough food to meet the basic daily food-energy requirements for the average person over one month (Stats SA, 2007). Using the consumer price index (CPI) to adjust for inflation, the annual consumption expenditure per adult equivalent to meet the recommended 2261 kilocalories translated to R2400.00.

The approach developed by Chaudhuri et al. (2002) and adopted in this study identifies the vulnerability level at a given time as the probability that a household will find itself poor at the next time period, and estimates this probability. The choice of the vulnerability threshold involves generating a sample that is classified into two groups: those that are vulnerable and those that are not vulnerable to food insecurity. It entails establishing a vulnerability threshold ‗*v*', such that a household is said to be vulnerable if its vulnerability probability is greater or equal to *v, i.e.* $v_h \geq v$. According to Chaudhuri et al. (2002), the choice of vulnerability threshold is quite arbitrary. A common choice in literature is a threshold vulnerability probability of 0.5. Thus, a household was considered vulnerable to food insecurity if the probability was equal or greater than 0.5 and less vulnerable to food insecurity if the probability was less than 0.5.

Following Chaudhuri et al. (2002), the vulnerability level of a household *h*, in year *t* is defined as the probability that a household will find itself consumption poor, that is the annual per capita value of food consumed will not be adequate to meet the recommended 2261 kilocalories per person in year t+1. Therefore, the probability that a household will be food insecure in the future can be expressed as:

$$V_{ht} = Pr(C_{h,\,t+1} \leq Z) = \int_{-\infty}^{Z} f(C_{h,t+1}) \partial C \qquad (6.1)$$

Where $V_{ht,}$ is the vulnerability of household *h*, to be food insecure in year t; $C_{h,t+1}$, is the food consumption expenditure per adult equivalent for a household *h*, in year t+1 and Z, is the value of food appropriate to meet the recommended minimum daily calorie requirement of 2261 kilocalories per adult equivalent (i.e., the food security threshold).

To assess a household's vulnerability to food insecurity, there is a need to make inferences about its future consumption levels. In order to do that, a framework for thinking explicitly about both the inter-temporal aspects and cross-sectional determinants of food availability at the household level, is needed (Chaudhuri et al., 2002). The food security status (i.e., annual food consumption expenditure per adult equivalent) is dependent on the household's own production level and from food purchases from farm and off-farm incomes. Consumption from own food production, agricultural and non-agricultural incomes is influenced by a number of household socio-economic factors including women's empowerment in agriculture and women's economic empowerment. This suggests the following reduced form expression for the per capita annual value of food:

$$C_{ht} = C(X_h,) \quad (6.2)$$

Where X_h, represents a bundle of observable household characteristics including household size, age of the women, husband's income and employment status, women's marital status, dimensions of women's economic empowerment and, most importantly, dimensions of women's empowerment in agriculture, among other factors. Substituting (2) into (1) the expression for vulnerability level is rewritten as:

$$V_{ht} = Pr(C(X_h) \leq Z|X_h,) \quad (6.3)$$

The expression in equation (6.3) suggests that a household's vulnerability level is derived from the household observable characteristics and this is compared to the household consumption expenditure per adult equivalent adequate for meeting the recommended consumption requirements (Z) given the same household observable characteristics (Chaudhuri et al., 2002). Following Chaudhuri et al. (2002), Gaiha & Imai (2008) and Günther & Harttgen (2009) who derived empirically a variant of VEP from the food consumption expenditure function, equation (6.3) is specified as:

$$\ln C_h = X_h \beta + \varepsilon_h \quad (6.4)$$

Where:

C_h is consumption expenditure per adult equivalent for the household,

X_h represents a bundle of observable household characteristics, including capital forms of women's empowerment and other risk management instruments,

β is a vector of parameters to be estimated, and

ε_h is a mean-zero disturbance term that captures idiosyncratic factors (shocks) that contribute to different per-capita value of food available for consumption in each household that are otherwise observationally equivalent.

The consumption expenditure per adult equivalent for the household (C_h) is assumed to be log-normally distributed and as such the disturbance term, ε_h will be normally distributed. Furthermore, it is assumed that ε_h captures the idiosyncratic shocks that contribute to the difference in food consumption expenditure levels for households that share the same characteristics. However, it is unlikely that it captures covariate shocks which can affect all households at a given time and unexpected very large negative shocks such as economic crises.

Furthermore, it is assumed that the variance of the unexplained part of per adult equivalent value of food consumed ε_h depends on household h's observable characteristics:

$$\hat{\varepsilon}^2_{OLS,h} = X_h\theta + \eta_h \quad (6.5)$$

Where θ represents a vector of parameters to be estimated and η_h is the vector of residuals of this second estimation. Standard regression analysis based on OLS assumes homoscedasticity, and estimates of β and θ will be unbiased but inefficient if this assumption does not hold. To deal with this problem and obtain consistent estimate of parameters, it is necessary to allow heteroscedasticity, that is, variances of the disturbance term to vary across households depending on X_h. Thus, the estimates of β and θ could be obtained using three-step Feasible Generalized Least Squares (FGLS) (Bogale, 2012; Christiaensen & Subbarao 2004; Chaudhuri et al., 2002). In the FGLS, equation (4) is estimated using an Ordinary Least Square (OLS) procedure. Then the estimated residuals from equation (6.4) are used as dependent variables to estimate equation (6.5). The predictions from equation (6.5) are used to transform equation (6.5) as follows;

$$\frac{\hat{\varepsilon}^2_{\varepsilon,h}}{X_h\hat{\theta}_{OLS}} = \left[\frac{X_h}{X_h\hat{\theta}_{OLS}}\right]\theta + \frac{\eta_h}{X_h\hat{\theta}_{OLS}} \quad (6.6)$$

This transformed equation is estimated using OLS to obtain an asymptotically efficient FGLS estimate, $\hat{\theta}_{FGLS}$. Note that $X_h\hat{\theta}_{FGLS}$ is a consistent estimate of $\hat{\varepsilon}^2_{OLS,h}$, the variance of the idiosyncratic component of the household's food consumption expenditure per adult equivalent. The estimates

$$\hat{\sigma}^2_{\varepsilon,h} = \sqrt{X_h\hat{\theta}_{FGLS}} \quad (6.7)$$

are then used to transform equation (4) as follows:

$$\frac{\ln C_h}{\hat{\sigma}^2_{\varepsilon,h}} = \left[\frac{X_h}{\hat{\sigma}^2_{\varepsilon,h}}\right]\beta + \frac{\varepsilon_h}{\hat{\sigma}^2_{\varepsilon,h}} \quad (6.8)$$

OLS estimates of the equation (8) yields consistent and asymptotically efficient estimate of β. Using the estimated coefficients (i.e., $\hat{\beta}$ and $\hat{\theta}$), the expected log household's food consumption expenditure per adult equivalent is measured as:

$$\hat{E}\{\ln C_h | X_h\} = X_h\hat{\beta} \quad (6.9)$$

and the variance of log per capita value of food consumed

$$\widehat{V}\{\ln C_h | X_h\} = \widehat{\sigma}_{\varepsilon,h} = X_h\widehat{\theta} \quad (6.10)$$

for each household. Following Gaiha & Imai (2008) and Günther & Harttgen (2009) and assuming that per adult equivalent food consumption is log-normally distributed, and using the estimated parameters of the model, the probability that a household will be food insecure in the near future (say, at time t+1), is expressed as:

$$\widehat{V}_h = \widehat{P}r\{\ln C_h < In\ Z | X_h\} = \Phi\left[\frac{\text{In } Z - X_h\widehat{\beta}}{\sqrt{X_h\widehat{\sigma}}}\right] \quad (6.11)$$

Where Φ(.) is the cumulative density of the standard normal distribution function, $\widehat{\sigma}$ is the standard error of the regression; Z is the prescribed threshold per adult equivalent value of food consumed to meet the minimum energy requirement (i.e., the food poverty line). $\widehat{V}_h$ is a set of estimates one for each household and denotes the probability of falling below the minimum threshold in the future that each household faces. The value of $\widehat{V}_h$ lies between zero and one. When $\widehat{V}_h$ = 0, a household's per capita value of food consumed will be adequate to meet the minimum amount of calories required; and when $\widehat{V}_h$ = 1, the value of food consumed will be lower than the prescribed threshold.

6.3.4 Modelling household vulnerability to food insecurity

Various models including two-stage least squares regression analysis (Kakota et al., 2013) and Binomial Logit model (Bazezew & Bewket, 2013; Bogale, 2012) have been used for determining factors influencing household vulnerability to food insecurity. This study used the Binomial Logit model since household vulnerability status was a binary variable which takes a value of one (1) for vulnerable households and zero (0) for non-vulnerable households. The cumulative logistic probability model was specified by Pindyck & Rubinfeld (1981) as:

$$P_i = F(Z_i) = 1 + \frac{1}{1 + e^{-(\alpha + \sum \beta_i X_i)}} \quad (6.12)$$

where P_i is the probability that a household is vulnerable to being food insecure given X_i (the explanatory variables); and α and βi are parameters to be estimated. For ease of exposition, the probability that a given household is vulnerable to food insecurity is expressed as:

$$P_i = \frac{1}{1 + e^{-(Zi)}} \quad (6.13)$$

And the probability that a given household is not vulnerable to food insecurity is 1-Pi:

$$\text{Thus, } \left(\frac{P_i}{1 - P_i}\right) = \frac{1 + e^{(Zi)}}{1 + e^{-(Zi)}} \quad (6.14)$$

is the ratio of the probability that a household is vulnerable to food insecurity to the probability of that it is not vulnerable. The log odds of the probability that a household is vulnerable to being food secure in the future is given by:

$$\text{Log}\left(\frac{P_i}{1-P_i}\right) = Zi = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots \beta_k X_k \quad (6.15)$$

If the disturbance term u_i is taken into account the Logit model becomes:

$$Z_i = \alpha + \sum_{i=1}^{k} \beta_i X_i + u_i \quad (6.16)$$

6.3.4.1 Determinants of household's vulnerability to food insecurity

Descriptions of the variables hypothesised to influence vulnerability of households to food insecurity and included in the empirical model are given in Table 6.1. These variables include economic and agricultural forms of women's empowerment in addition to other household socio-economic characteristics. A household's socio-economic characteristics that influence food security include the gender of the household head, family size, dependency ratio and age of the head of household. Since age captures the experience accumulated in farming, it may, therefore, be associated with better opportunities to acquire food (Albert & Collado, 2004). Men have a better opportunity to access assets and, therefore, married women's households are expected to be less susceptible to food insecurity (Bigsten et al., 2002; Bogale et al., 2005). It is also hypothesised that households with a higher dependency ratio have a greater probability of being food insecure (Bogale, 2012).

Since women in rural areas are largely dependent on agriculture for their livelihoods (IFAD, 2011), household vulnerability to food insecurity is greatly influenced by their levels of empowerment in agriculture. The dimensions of women's empowerment in agriculture include their access to agricultural equipment and machinery, agricultural skills (i.e., crop management skills, animal husbandry skills, etc.), levels of water-use security and empowerment in socio-cultural aspects that affect agricultural production. All these dimensions of women's empowerment influence sustainable agricultural productivity and reduce vulnerability to food security (Quisumbing & Meinzen-dick, 2001).

Women's access and control over physical or material assets were hypothesised to be negatively associated with the likelihood of a household becoming vulnerable to food insecurity because

such assets are crucial for the pursuit of sustainable farm and off-farm livelihoods strategies. These assets include ownership and control over land, livestock and machinery as well as the goods and services produced from them (Uphoff, 2003). In addition, the assets include women's basic needs for housing, food and services required to build a livelihood (e.g., electrification, access to roads, transportation, potable water and various technologies). These assets reduce the likelihood of a household being vulnerable to food insecurity by ensuring economic production and providing security against difficult times (Quisumbing & Meinzen-dick, 2001). Likewise, more financially empowered women have the capacity to invest in agricultural productivity, which in-turn, increases food availability. Some studies have also shown that improvement in household welfare depends not only on the level of household income, but also on who earns that income. Such studies found that women, relative to men, tend to spend disproportionately more of their income on food for the family. Thus, women's financial empowerment was expected to be strongly associated with improvements in household food security in the future (Quisumbing et al., 1995).

Women are the principal actors in ensuring household food security in rural households, such that their human capital empowerment is a key determinant of household vulnerability to food in security. The human capital dimension refers to women's skills, knowledge, ability to labour; and good health and physical capability important for the successful pursuit of different livelihood strategies (Carney, 1998). Women's human capital also determines how employable a woman may be, in terms of her skills, knowledge, education and leadership (Lanjouw, 2001). Similarly, human capital in terms of agricultural training and good health is crucial for sustainable agricultural productivity (Corral & Reardon, 2001).

Table 6. 1: Description of variables used for estimating household vulnerability status

VARIABLE	DESCRIPTION
Dependent variable	
Log (per adult equivalent value of food available)	Natural log of household's food consumption expenditure per adult equivalent
Explanatory variables	
AGE	Continuous variable for primary female head-of-household
EMPLOMENT_STAT	Dichotomous; 1 if woman is employed and 0 otherwise
MARITAL_STAT	Dichotomous; 1 if woman is married and 0 otherwise
HUSB_INCOME	The total amount of annual income obtained by the husband
DEP_RATIO	The ration of dependents (i.e., children under 12, elderly above 65 and those with disabilities or chronic illness) to able bodied working members of the family.
CROP_MX_SKILLS	PCA index representing woman's empowerment in crop management skills
FARM_FINAN_SKILLS	PCA index representing the woman's empowerment in farm financial skills
WATER_USE_SEC	PCA index representing the level of water use security level
SOCIO_CULT_EMP	PCA index representing the woman's empowerment in socio-cultural aspects hindering agriculture
ANIMAL_HUS_SKILLS	PCA index representing the woman's level of animal production skills empowerment
WEED_PEST_MX_SKIL	PCA index representing woman's empowerment in weed and pest management skills
ECONOMIC_AGENCY	PCA index representing the woman's level of economic agency.
FINANCIAL_CAP_EMP	PCA index representing the woman's level of financial capital empowerment.
HUMAN_CAP_EMP	PCA index representing woman's level of human capital empowerment.
VOCATION_SKIL_EMP	PCA index representing woman's level of vocational skills empowerment.
PHYSICAL_CAP_EMP	PCA index representing woman's level of physical capital empowerment.
IRRIG_TYPE	Irrigation system dummy; 1 if women is using irrigation and 0 if in rain-fed agriculture
D1	Area dummy: 1 if household is from Tugela Ferry and 0 otherwise
D2	Area dummy: 1 if household is from Mooi River and 0 otherwise

6.3.5 Methods of data collection

6.3.5.1 Study area

Since access to irrigation is one of the essential opportunities to increased food production and a critical factor for sustainable agriculture and achieving self-reliance among rural women, the

availability of an irrigation scheme with a neighbouring rain-fed area was the main criterion for the selection of the study sites. This was to allow comparisons between women farming in rain-fed agriculture and those using irrigation with regards to household vulnerability to food insecurity. Thus, women practising irrigation were sampled from Tugela Ferry and Mooi River Irrigation Schemes, while those practising dry-land agriculture were taken from Machunwini communal area, which lies between the two irrigation schemes. Two irrigation schemes were used to increase the numbers as wells as the variability among respondents with respect to the explanatory variables. The three study areas all lie under the Msinga Municipality of the Umzinyathi District in KwaZulu_Natal.

6.3.5.2 Sampling procedures for the survey

This study considers a household as having two heads (i.e., a primary female and a primary male head-of-household) who head the household in pursuing different livelihood activities. Only women who were the primary female heads-of-households were selected for this study. Households in the three study sites were stratified into three main groups namely: gravity–fed irrigators, pump-fed irrigators and dry-land farmers (Table 6.2). The gravity-fed and pump-fed irrigators or farmers were obtained from the Tugela and Mooi River Irrigation Schemes. However, gravity-fed irrigators or farmers in Tugela Ferry were not included in the study because the irrigation scheme was undergoing a major revitalisation at the time of the survey. Moreover, the farmers had not been producing food for almost a year, which made it difficult to assess the impact of the irrigation scheme on household‘s livelihood outcomes. The dry-land farmers were sampled from the Machunwini area.

Proportional random sampling method was used to select the primary female heads-of-household used for the study to equally represent the three categories by which farmers‘ access water for agricultural purposes (i.e., gravity-fed, pump-fed and dry-land farmers). Households in the three study areas were divided into three different subgroups or strata (i.e., gravity-fed, pump-fed and dry-land farmers). Households were then randomly selected proportionally from the different strata such that each stratum contributes 100 primary female heads-of-households. Thus, the number of females sampled from each of the three areas was calculated based on the proportion of the total number of households in each area (e.g., 40 for Tugela Ferry = 270/(403+270)).

Every woman in the identified households who met the definition of a primary female-head-of household was included in the study.

Table 6. 2: Distribution of sampled women farmers in each study area

Irrigation method	**Total number of households in each scheme**			**Number of respondents sampled in each scheme**			**Total**
	Tugela Ferry	**Mooi river**	**Machunwini**	**Tugela Ferry**	**Mooi river**	**Machunwini**	
Gravity-fed	0	473	0	0	100	0	100
Pump-fed	270	403	0	40	60	0	100
Dry-land	0	0	1234	0	0	100	100
Total							**300**

6.4. Results

6.4.1 Socio-demographic characteristics of women's households

Table 6.3 summarises the socio-demographic characteristics of households according to their household vulnerability to food insecurity status. There were no significant differences between households that were vulnerable to food insecurity and those that were not with respect to household sizes and dependency ratio. The majority of women (93.5%) and their husbands (75.0%) among the vulnerable households were not employed. A large proportion of them (69.9%) and their husbands (50.0%) had no formal education. On the other hand, households that were not vulnerable to food insecurity had the largest proportion of women who were married. They also had the largest proportion of women and husbands with tertiary education and more husbands with formal employment than the vulnerable group. None of the households with a husband with tertiary education or formal employment was vulnerable to food insecurity. However, a few women with tertiary education were vulnerable to food insecurity. In addition, the largest proportion of food insecure households was in Tugela Ferry while the largest proportion of food secure households were in the Mooi River Scheme.

Table 6. 3: Salient socio-demographic characteristics of sample women's households

Characteristic	Household vulnerability status		p-level
	0 = Non-vulnerable	1 = Vulnerable	
Average age of women	50.8	51.8	0.729
Household size	7.0	7.6	0.458
Mean dependency ratio	0.7	1.4	0.019
Marital status (%)			**0.179**
· Married	45.3	35.5	
· Single	11.3	28.0	
· Widowed	39.6	33.3	
· Separated/Divorced	3.8	3.2	
Employment status (%)			0.109
· Unemployed	84.9	93.5	
· Informal employment	15.1	5.4	
. Formal employment	1.0	0.0	
Husband's employment status (%)			0.009
· Unemployed	40.0	75.0	
· Informal employment	40.0	25.0	
. Formal employment	20.0	0.0	
Women's level of education (%)			0.510
· No formal education	56.6	69.9	
· Primary education	22.6	14.0	
· Secondary education	18.9	15.1	
· Tertiary education	1.9	1.1	
Husbands level of education (%)			0.196
· No formal education	29.2	50.0	
· Primary education	25.0	15.6	
· Secondary education	37.5	34.4	
· Tertiary education	8.3	0.0	
Area (%)			0.526
· Mooi River	52.8	49.5	
· Tugela Ferry	9.4	65.6	
· Machunwini	37.7	34.4	

NB: p-level shows significance level of the independent t-test and χ^2 for continuous and categorical variables, respectively

6.4.2 Dominant dimensions of agricultural and economic empowerment among rural women in Msinga

Table 6.4 summarises the dominant dimensions of women empowerment that were obtained by applying PCA on primary female heads-of-household's level of economic and agricultural

capabilities (i.e., resources and agency) and were reported in Chapter 3. Economic agency, human capital empowerment, financial capital empowerment, empowerment in vocational skills and physical capital empowerment were identified as the dominant dimensions of economic empowerment. Crop management skills, farm financial management skills, water-use security, animal husbandry skills and weed and pest management skills were identified as the dominant dimensions of women's empowerment in agriculture (Table 6.4). Overall, the PCs for economic and agricultural empowerment dimension each explained 65.0% and 73.4% of the total variation in the variables used, respectively (See Chapter 3).

Table 6. 4: Dimensions of women empowerment identified in Msinga

Main dimension	**Sub-dimension**	**% of variation**	**Cumulative %**
Economic empowerment	Economic agency	16.2	16.2
	Human capital empowerment	7.4	23.6
	Financial capital empowerment	5.8	29.4
	Empowerment in vocational skills	5.4	34.8
	Physical capital empowerment	5.2	40.0
Empowerment in agriculture	Empowerment in crop management skills	18.1	18.1
	Farm financial management skills	12.2	30.3
	Water-use security	8.8	39.2
	Empowerment in socio-cultural aspects	7.8	47.0
	Animal husbandry skills	6.6	53.6
	Weed and pest management skill	5.9	59.4

Source: Adapted from Chapter 3, Tables 3.3 and 3.5

6.4.3 Binomial Logit model to estimate household vulnerability status

Table 6.5 presents the Binomial Logit model (BNL) empirical results generated to identify the dimensions of women's empowerment influencing their household vulnerability to food insecurity in Msinga. The highly significant likelihood ratio chi-square value suggests that the model was well-fitting. The high overall percentage classification accuracy of 96.6% indicates

that the model correctly classified households in the two categories (i.e., vulnerable and not vulnerable). The degree of multicollinearity among the variables used in the Binomial Logit models was minimal (i.e., mean VIF less than 10) confirming that there was no strong correlation among the independent variables. The estimated standard errors for the estimated parameter estimates were all below two, indicating that micronumerosity (small sample size) was not a problem (Pedhazur (1997) cited by Garson, 2009). The AIC and BIC values were the smallest indicating that the model was the best-fitting one.

6.4.4 Dimensions of women's empowerment influencing household vulnerability to food insecurity

Among the dimensions that reflect women's empowerment in agriculture, only the coefficient estimate for socio-cultural hindrances was negative and statistically significant (SOCIO_CULT~R). This implies that primary female-heads-of household who were empowered in their socio-cultural aspects that create hindrances to agriculture were less likely to be vulnerable to food insecurity. The marginal effects for women's socio-cultural empowerment indicate that a unit increase in women's socio-cultural empowerment decreases the probability of a household being vulnerable to food insecurity by 10%.

As far as economic dimensions of empowerment are concerned, women with higher levels of economic agency (ECONOMIC_A~Y) and physical capital empowerment (PHYSICAL_C~W) are less likely to be vulnerable to food insecurity. However, women with higher levels of financial capital empowerment (FINANCIAL_~W) were more vulnerable to being food insecure in the future. The marginal effects indicates that a unit increase in women's economic agency and physical capital empowerment decreases the probability of a household being vulnerable to food insecurity by 17% and 8%, respectively.

The negative and statistically significant coefficient for husband's income shows that higher levels of husband's income reduce the likelihood of a household becoming vulnerable to food insecurity in the future. The positive and statistically significant coefficient estimate for dependency ratio indicates that households with a larger dependency ratio were more likely to be vulnerable to food insecurity. Non-of the coefficients of the marginal effects were statistically significant. The estimates of marginal effects, computed as sample means, show that a unit change in the husband's income reduces the likelihood of a household becoming vulnerable to

food insecurity by 0.0006% while a unit increase in the dependency ratio increases the likelihood of a household being vulnerable to food insecurity by 7%.

Table 6. 5: Binomial Logit model results of the factors influencing households' vulnerability status (n= 300)

Variable	**Coeff.**	**Stand. Error**	**P>z**	Marginal effects (dy/dx)
AGE	-0.05	0.05	0.26	-0.01
EMPLOMENT_STAT	-1.02	2.17	0.64	-0.15
MARITAL_STAT	1.90	1.73	0.27	0.18
HUSB_INCOME	**-2.5E-04****	1.1E-04	0.02	0.0
DEP_RATIO	**2.12***	1.12	0.06	0.22
CROP_MX_SKILLS	-1.36	0.88	0.12	-0.14
FARM_FINAN_SKILLS	-1.52	1.42	0.29	-0.16
WATER_USE_SEC	-0.13	0.69	0.85	-0.01
SOCIO_CULT_EMP	**-3.26****	1.37	0.02	-0.34
ANIMAL_HUS_SKILLS	-1.36	0.87	0.12	-0.14
WEED_PEST_SKILLS	0.55	0.83	0.51	0.06
ECONOMIC_AGENCY	**-5.85****	2.40	0.02	-0.62
HUMAN_CAP_EMP	-1.09	0.86	0.21	-0.12
FINANCIAL_CAP_EMP	5.85*	3.33	0.08	0.62
VOCATION_SKIL_EMP	1.12	0.86	0.20	0.12
PHYSICAL_CAP_EMP	**-2.45****	0.99	0.01	-0.26
IRRIG_TYPE	0.39	0.54	0.47	0.04
D1	-3.66	2.37	0.12	-0.43
D2	-0.27	2.28	0.90	-0.03
_cons	5.13	3.47	0.14	
Number of obs = 246	Pearson Chi-square = 78.26			
LR chi^2 (18) = 160.70	Sensitivity = 96.77%			
Prob > chi^2 = 0.00	Specificity = 96.23%			
Pseudo R^2 = 0.8371	Percent correctly predicted (Count R2) = 96.58%			
AIC = 70.92	BIC = 130.59			

***Significant at less than 1% probability level; ** significant at less than 5% probability level; * significant at less than 10% probability level.

6.5 Discussions

Women empowered more in socio-cultural aspects were less likely to be vulnerable to food insecurity because they experienced less inhibitions imposed by socio-cultural rules and norms. Socio-cultural inhibitions (e.g., customary laws) are among the barriers that render women vulnerable to food insecurity (Galie, 2013; Bob, 2002; Quisumbing et al., 1995). For example,

although most women in the studied areas had their crops destroyed by livestock, which are managed by men, they were prohibited by customary laws to argue with male livestock owners or take them to court, in the event of crop damage. Moreover, despite having the customary laws dealing with reports of crop damages, it was established through focus group discussions (FGD) that women farmers were not in a position of reporting the cases due to fear of being victimised after reporting the matter. Thus, although the legal system was in place to ensure security of women's livelihood, women who observed the deep Zulu customs and traditions (i.e. *binga's*) were less empowered by the socio-cultural laws and were vulnerable to food insecurity unlike those who do not follow the 'deep' traditions of the Zulu culture*(i.e. amakholwa)*.

Women who are also disempowered in socio-cultural aspects are more likely to be vulnerable to food insecurity because they are disadvantaged by both statutory and customary tenure systems, resulting in weak property and contractual rights to land, water, and other natural resources. Even if civil law gives women the right to own property (e.g. to inherit land) local customs may rule otherwise (Bob, 2002). Customs or traditions also contribute to vulnerability to food insecurity among women since some women are subjected to the customary assumption that only men can own property (SAHO, 2012). Whilst South African law ratifies that women should be given equal access to important natural resources, especially land, this is not always socially practised and may be blocked through broader social discourses, structures and processes, which tend to be in favour of patriarchal organisation. The study communities in Msinga are well known for being adamantly traditionalist, and widely acknowledged as staunch preservers of "the old Zulu ways" (Fowler 2011; 177). Curran & Bonthuys (2004) argue that, while there are statutes that seek to empower women married according to customary law; 'living' customary law continues to oppress them. Customary law treats women as minors under the guardianship of a male figure who retains control of all assets (Curran & Bonthuys, 2004). As a result, women less empowered in socio-cultural aspects are more likely to be food insecure because they have less access and control over assets.

Women with high levels of economic agency are less likely to be vulnerable to food insecurity because they have the 'inner drive' to act independently and to make their own free choices and utilise economic resources to achieve food security in the future (Kabeer1999). According to Kabeer (2005), individuals require the resources and their agency to develop the capacity needed

to achieve their desired outcomes on a sustained basis. Thus, as long as women continue to have a high sense of agency, they are less likely to be vulnerable to food insecurity. High levels of own aspirations, bargaining, negotiating, and analytical power, which constitute the agency among women, influence their motivation to control and utilise resources and achieve food security in the future. Although Sen‘s (1989) influential entitlement approach links vulnerability to inadequate access to assets, including intangible ones, such as social capital, the findings of this study suggest that, in addition to their entitlements, women/individuals need a higher sense of agency to recover from shocks threatening household food security in the future. As far as the marginal effects are concerned, it can be noted that women‘s economic agency has the largest marginal effects, implying that the largest reduction in the probability of a household becoming vulnerable to food insecurity is achieved by increasing women‘s level of agency than any other forms of empowerment. This supports argument from other authors (e.g. Alsop et al., 2006; Malhotra et al., 2002; Kabeer, 2001) who have noted that access to assets alone (i.e., resource forms of empowerment) offers no guarantee that they will be used in an effective fashion to reduce vulnerability to food insecurity.

Higher levels of physical capital among women reduce the likelihood of their households becoming vulnerable to food insecurity. Women with higher levels of physical capital empowerment have the capacity to recover after risky events since they have the assets to engage in alternative economic activities. Physical assets increase household resilience to shocks or help arrest a decline in the availability of resources. Moreover, the physical assets can also be sold to mitigate a crisis that may befall a household and thus are often a source of income in the future (Prowse, 2003).The sustainable livelihoods approach recognises that households need to possess assets in order to undertake sustainable livelihood strategies (Chambers & Conway, 1992; Ellis & Allison, 2004).High levels of physical capital empowerment ensure sustainability of livelihoods by giving women the ability to adjust to threats and survive shocks to their livelihoods, thereby ensuring stability of access to food in the future (Matshe, 2009).The statistically significant parameter estimate for women‘s physical capital empowerment shows that households need adequate ownership of livelihood physical assets for pursuing a range of livelihood opportunities, and for reducing household vulnerability to food insecurity in the face of risks (e.g. seasonal climatic and market).

Although asset endowment is known to reduce household vulnerability to food insecurity, women with higher levels of financial capital empowerment, in the study areas, were more vulnerable to food insecurity in the face of a changing environment. This is possibly because vulnerability is a ‗forward looking' concept and a household is said to be vulnerable to future loss of welfare if any risky event reduces household welfare below socially accepted norms. The degree of vulnerability depends on the characteristics of the risk and the household's ability to respond which, in turn, depends on household characteristics, notably their asset-base (Alwang et al., 2001; Dilley & Boudreau, 2001).Since most of the women in the study areas had high levels of financial capital empowerment through access and control of social grants and remittances, they had low levels of household assets, possibly because of the dependency syndrome of relying on the state and relatives for income. As a result, they were prone to being unable to cope with uncertain adverse events, such as prolonged lack of rainfall, or other difficulties, since they had little assets to cushion such adverse conditions. The marginal effects also indicate that a small increase in women's financial empowerment had the largest effect in increasing the probability of a household becoming vulnerable to food insecurity. This possibly reflects that social grants and remittances create a ‗dependency syndrome' and disinvestments in livelihood assets.

According to Bogale & Shimelis (2009), in general, households that have access to better income opportunities are less likely to become food insecure than households with less access. A number of studies including Bigsten et al. (2002) and Bogale et al. (2005) have also found that men have better opportunity to access assets than women. Therefore, more husbands' income possibly means investment in assets (e.g., livestock and agricultural tools and equipment) that reduce household vulnerability to food security. Husbands' income indirectly influences women's capacity to produce their own food in the future. The availability of non-farm sources of income, e.g. informal employment, reduces the vulnerability of rural households. In a study done by Famine Early Warning Systems (FEWS) (1995) cited by Omamo (1998), the vulnerability of subsistence farmers in the Kenyan districts of Kitui and Makueni was reduced by the high share of non-agricultural income in those districts. Considering that the majority (i.e. above 80%) of women's husbands were involved in off-farm incomes, they offered an excellent way of diversifying households' livelihood strategies, thereby, reducing the risk of being food insecure in the future. Besides being used directly for buying food, husbands' income could therefore, be

used to buy inputs such as improved seed varieties and fertilizer that increase production levels of the household after experiencing shocks (Fankhauser et al., 1997; Bogale & Shimelis, 2009).

Households with a larger dependency ratio are more likely to be vulnerable to food insecurity because they have more non-working people being fed by a few able-bodied and working household members. Higher dependency ratios tend to aggravate household vulnerability to food insecurity, as more mouths rely on the meager income to survive, resulting in low investment in assets to cushion shocks in the future (Tawodzera, 2011).Moreover, more dependents mean lower household savings. This results in a lack of income to initiate other income-generating activities that could assist households in the future (Tawodzera, 2011).

Although most studies, including Bacha et al. (2011), have found that access to irrigation reduces vulnerability to food insecurity by enabling rural households to produce more than one crop per year, increase their income, diversify their cropping systems and curb shocks due to weather and climatic changes, the coefficient estimates for irrigating or dry-land farming areas were not statistically significant. Thus, irrigation alone cannot be considered as a panacea for curbing household vulnerability to food insecurity (Bacha et al., 2011). Some households may remain food insecure irrespective of their access to irrigation because there are other correlates of household vulnerability to food insecurity including family size, lack of education, training and improved inputs. These must also be addressed in order to have a deep and lasting impact on food insecurity.

6.6. Conclusions and policy recommendations

This study has been motivated by the fact that women who are the principal actors in ensuring household food security in rural areas, rely on agriculture, yet, they face low levels of empowerment in agriculture. With the aim to inform policy, this paper identifies the dimensions of women empowerment in agriculture that impact on their household vulnerability to food insecurity. In agriculture, women can be empowered through crop management skills, farm financial management skills, improved levels of water use security, animal husbandry skills and weed and pest management skills. In the economic arenas, women can be empowered in economic agency, financial capital, human capital, vocational skills and physical capital forms of

empowerment. The socio-cultural inhibitions affect women‘s participation in agriculture and make their households vulnerable to food insecurity. Therefore, empowering women in these socio-cultural aspects that create hindrances to improved agricultural production among women is crucial for reducing their household vulnerability to food insecurity.

Apart from agricultural forms of empowerment, households‘ ability to survive shocks affecting food security can also be improved by enhancing women‘s economic forms of empowerment. In this category, improving women‘s sense of agency appears to be the guaranteed way of reducing their vulnerability to food insecurity in the future. Having a higher sense of agency gives individuals higher motivation levels needed to utilise resources and pursue own livelihood goals that reduce household vulnerability to food insecurity in the future. Thus, although capital assets are central to all livelihood strategies, they are not sufficient on their own to ensure progress towards a sustainable livelihood. Women need both a sense of agency and resources to reduce household vulnerability to food insecurity. Among the capital forms of women‘s empowerment, the level of women‘s physical capital empowerment is the major determinant of household vulnerability to food insecurity. It is the physical assets that determine a household‘s ability to cope with risks to food security in the future. They also allow a household to diversify and pursue alternative livelihood strategies in the event of shocks that threaten food consumption in the future.

Although households‘ access to income is the most significant indicator of household vulnerability to food insecurity, the source of the income more than anything else determines whether a household will be able to cope with shocks in the future. Husbands‘ income, especially from off-farm sources provides an excellent form of livelihood diversification that curbs household vulnerability to food insecurity. On the other hand, social grants and remittances tend to create a dependency syndrome that influence negatively households‘ investment in capital assets needed to resist risks to food insecurity in the future. Households with more mouths to feed in the future are more vulnerable to food insecurity.

Based on the above conclusions, this study recommends that:

- Since empowerment is multidimensional, a diversified approach to empowerment interventions is required to reduce vulnerability to food insecurity.

- There is, therefore, a need to bring together stakeholders to discuss collaborative efforts to empower women so that they can reduce their household vulnerability to food insecurity.
- The government should put in place institutions that address the socio-cultural and customary aspects that create hindrances to improved agricultural production among women.
- Empowerment agencies should target improving women‘s sense of agency to reduce vulnerability to food insecurity.
- Women farmers should be assisted in accessing the physical capital resources to reduce household vulnerability to food insecurity.
- Health education and child planning awareness are recommended among the poor to reduce the size of their household and their dependency ratio.
- Rural employment opportunities of both women and their husbands need strengthening.

6.7 Summary

This chapter identified the dimensions of women empowerment in agriculture that are critical to reduce their household‘s vulnerability to food insecurity. The dominant dimensions of women empowerment had been identified using principal component analysis. Their household‘s vulnerability to food insecurity status had been identified using the VEP approach. Women‘s empowerment in socio-cultural inhibitions that hinder agricultural production was identified as the major dimension of women‘s empowerment needing to be addressed for women‘s households to reduce vulnerability to food insecurity. Other dimensions of economic empowerment and addressing certain household‘s characteristics were identified as crucial measures to reduce women‘s vulnerability to food insecurity.

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CHAPER 7: GENERAL CONCLUSIONS & RECOMMENDATIONS

7.1 Conclusions

This study sought to bring more understanding on the effect of the various dimensions of women empowerment on their livelihood outcomes. Since several studies have indicated that women may be empowered in one area of life, while not in others, the study uses a multidimensional approach to identify the various forms of women empowerment that improves livelihoods among rural women and their households. The three main livelihood outcomes assessed in this study include self-reliance, food security and vulnerability to food insecurity. A number of conclusions were drawn from the last four chapters of the study.

Firstly, it was concluded that women empowerment is a multi-dimensional and complex process and women exhibit different levels of empowerment across these various sub-dimensions. In economic arenas, the economic agency, financial capital, human capital, physical capital and vocational skills training are the dominant dimensions in which rural women rural women in KwaZulu-Natal were empowered. In the social arenas, the social agency, social capital and informational assets are the dominant dimensions women were empowered. The dominant dimensions of women's empowerment in agriculture include _crop management skills', _empowerment in farm financial management', _empowerment through water-use security', empowerment in socio-cultural circumstances that create hindrances in agriculture, _empowerment in animal production skills' and _empowerment in pest management skills'. In civic arenas, the dominant sub-dimensions include _women's legal empowerment', civic agency, empowerment in knowledge of legal rights, psychological empowerment' and political empowerment. Women's agency is significantly the most dominant sub-dimension of empowerment in economic, social, civic and agricultural arenas. Hence, it is a prerequisite for women to achieve better livelihood outcomes.

It was also concluded that empowerment of rural women, through the various sub-dimensions of empowerment, can help to improve rural people's livelihood outcomes in developing countries like South Africa. Capital resource forms of empowerment are pre-requisites for women to pursue relatively independent livelihoods. Since the household institutional settings are the major source of their powerlessness, women need more access and control of capital resources.

However, resources alone are inadequate for women to pursue independent livelihoods. Women need a sense of agency to be able to utilize resources and pursue independent livelihoods. They also need a higher sense of agency to be more pro-active and be adaptable to the market forces that threaten their survival since they face changing global and local circumstances. Although agency can be exercised in many arenas, agency exercised in economic spheres is more important for achieving livelihood outcomes as it gives women _the power from within' which is needed to independently utilize the means of production and achieve desired livelihood outcomes.

Some dimensions of empowerment are critical for women to achieve specific livelihood outcomes. Financial and human capital forms of empowerment are critical for women to achieve self-reliance as they facilitate the attainment of most, if not all the other forms of capital empowerment. Although most studies have found physical capital resources to be the most significant determinants of individuals' self-reliance, this study revealed that women owning and controlling more physical capital resources were not significantly more self-reliant than those owning less. This may be partly explained by the fact that women, in the study areas, who do not own machinery, can hire it through the government's Comprehensive Agricultural Support Programme (CASP). As a result of this programme, smallholder farmers can access most of the physical capital assets (e.g., ploughs, tractors e.t.c) and achieve self-reliance without necessarily having to own them. In agriculture, women need to be freed from customary and cultural bondages that hinder their full participation in agricultural production to achieve self-reliance. Women also need higher levels of informational resources to pursue independent livelihoods. Access to information enables the acquisition of knowledge and other factors of production needed for both agricultural production and off-farm investments. However, in the study areas, access to irrigation alone is not a panacea for women to achieve self-reliance through agriculture. Women need, most importantly, secure access to the right quantity and quality of water for productive purposes (i.e. water-use security) to pursue independent livelihoods through agriculture.

To achieve food security for their households, women need a higher sense of economic agency and higher levels of physical capital empowerment. A higher sense of agency enables women to define their own goals and act upon them. Higher levels of physical capital resources among

primary female heads-of-households help improve household food security by ensuring more agricultural production and more off-farm incomes. They also allow households to diversify incomes, thereby, ensuring stability of access to food. Improving the farm financial management skills of the primary female heads-of-households improves the food security status of their households. Farm financial management skills are necessary for running successful farming enterprises.

To reduce vulnerability to food insecurity among rural households through agriculture, the socio-cultural inhibitions that affect women's participation in agricultural production have to be addressed. Although it is believed that women's empowerment in agriculture is crucial to reduce rural household vulnerability to food insecurity, it should be realised that it is not a panacea to reduce it. Households need diversified sources of income especially off-farm income sources to ensure consistence food access. Households' ability to survive shocks affecting food security can also be improved by increasing women's sense of economic agency and physical capital empowerment to ensure stable off-farm incomes. Physical assets are by far the most important resources needed to ensure household's ability to cope with risks to food security in the future. They also allow a household to diversify and pursue alternative livelihood strategies, thereby minimizing risks that threaten food consumption in the future. In addition to the physical assets, improving women's sense of agency appears to be the guaranteed way of reducing their vulnerability to food insecurity as it gives individuals higher _inner power' needed to utilize resources and pursue own livelihood goals in the future.

Lastly, women empowerment is a necessary but not a sufficient condition to improve rural livelihood outcomes and for a sustainable development process. The ability to achieve self-reliance, household food security and reduce vulnerability to food security also depends on other household socio-economic characteristics other than women empowerment. The stereotype perceptions among primary female head-of-households who are young, educated, with vocational skills as well as those who are psychologically empowered are a major hindrance to the attainment of self-reliance through agriculture and other manual off-farm activities in rural South Africa. Socio-economic interventions including increasing husband's income earning opportunities and reducing households' dependency ratios are also necessary for rural households to be food secure. The most significant determinant of household food security is

husband‘s income. Husbands‘ incomes, especially from off-income sources, are usually invested in livelihood assets that allow women to diversify their livelihoods, thereby, reducing vulnerability to food insecurity. Hence, for couples, improving income opportunities for both women and their husbands appears to be a more favorable strategy to improve rural livelihoods.

7.2 Recommendations

- It is recommended that analysis of women empowerment aimed for monitoring and evaluation of government and NGO interventions should follow the multidimensional approach.
- Since empowerment is multidimensional, a diversified approach of empowerment interventions is required to reduce vulnerability to food insecurity.
- Women‘s sense of agency need to be improved first before assisting them with resources since it is this ‗inner transformation‘ that gives them the ‗power from within‘ to pursue livelihood goals.
- The government should put institutions that address the socio-cultural and customary aspects that hinder agricultural production among women.
- Health education and family planning awareness are recommended among the poor to reduce their household‘s sizes and dependency ratios.
- Government has to create an enabling environment for more business and employment opportunities for women empowered though education, vocational training and psychological empowerment to realize their full economic potential and achieve self-reliance.
- Women‘s vocational skills should be re-evaluated such that they allow integration of women into the mainstream economy.
- Empowerment agencies should target women‘s financial and human capital forms empowerment since they allow attainment of other forms of empowerment.
- The South African government should continue to invest in irrigation agriculture, revitalize old schemes, control and supervise the management and distribution of irrigation water to ensure high water-use security levels necessary for women to achieve independence.

- There is a need to invest on labour-saving technologies, including ―no-dig" systems and vertical gardening systems since these approaches significantly reduce the amount of physical exertion in production so that the young and educated people can be attracted into agriculture.
- There is need to instil a more positive image towards agriculture and eliminate negative stereotypes among young and educated rural South Africans.
- Empowerment agencies should deliver training designed to enable primary female heads of-households, individually or in groups, to improve their farm financial management skills.

7.3 Recommendations for further studies

- This study only considers rural women empowerment at individual and household levels and not in broader arenas. There is, therefore, a need for further investigation on how women's empowerment in broader spheres of life helps them to improve their livelihood outcomes,
- This study analyses the impact of women's empowerment capabilities (i.e., comprising of agency and resources) on livelihood outcomes. Future studies can also consider the significance of transforming structures (e.g., levels of government, private sector interventions) and processes (e.g., laws, policies, culture, institutions) on livelihood outcomes,
- This study follows the resource-agency-outcome approach arguing that it supports the sustainable livelihood framework. Future studies can bring more insights by conceptualizing empowerment as control over resources and agency; agency and opportunity structure; agency, structures and relations; assets, knowledge, will and capacity, and compare results with this study,
- It is also crucial to compare levels of empowerment between man and women in rural areas. Thus, future studies should include men and women in the sample to allow comparisons across gender. It is also important to assess whether the same dimensions of empowerment significantly improve men's livelihood outcomes as they did with women's livelihood outcomes.

APPENDICES

Appendix 1: Questionnaire used for data collection

The Water Research Commission in conjunction with the University of KwaZulu-Natal is conducting a research on, _Empowerment of women in rural areas through water use security and agricultural skills training for gender equity and poverty reduction in KwaZulu-Natal Province'. They wish to investigate issues on women empowerment, livelihoods diversification strategies and food security among irrigating and non-irrigating women in KwaZulu-Natal.

Please be informed that your participation in this study is strictly voluntary, and if you do not wish to answer any particular question, please feel free to say so. You are also assured that the information obtained from this study will be kept confidential and will only be used by Stanley Sharaunga, for the purposes of his PhD study, under the Water Research Commision in conjunction with the University of KwaZulu-Natal. Thank you for your participation in this study.

RESPONDENT IDENTIFICATION

Enumerators Name	
Respondent No.	
Date	
Area	
Gender of respondent	

1: RESPONDENT'S SOCIO-ECONOMIC AND DEMOGRAPHIC DETAILS

1.1 Can you please tell me your age/ year of birth?

1.2 What is your employment status?

1. Unemployed
2. Informal / non-permanent employment
3. Formal/permanent employment

1.3 If you are employed, what is your monthly income range?

1. Less than R2000
2. more than R2000 but less R5000
3. More than R5000 but less than R10000
4. More than R10000

1.4 What is the highest educational level that you attained so far?

1. No formal education
2. Primary education
3. Secondary education
4. College/University

1.5 What is the highest level of education for the most educated member of your household?

1. No formal education
2. Primary education
3. Secondary education
4. College/University

1.6 How many people live in your household? (……)

1.7 How many people in your household are?

1. Below 14 (……)
2. Have disabilities or chronic illnesses (……)
3. Above 65 (……)

1.8 How many people in your household contribute to the household income? (……)

1.9 Are any of your household members receiving a government grant?

0. No
1. Yes

1.10 If yes in 1.9, how many are on the following:

Type of grant	**No of people receiving it**	**Amount per person/month**
Old Age grant		
Child grant		
Disability grant		

1.11 What religion does your household follow?

1. Christianity
2. Muslim
3. African Traditions
4. Shembe

1.12 What is your marital status?

1. Married
2. Single
3. Separated/Divorced
4. Widowed

1.13 If you are a married woman, does your husband reside at home for at least 4 days in a week?

0. No
1. Yes

1.14 How many wives does your husband have?

0 = one wife
1 = more than one wives

1.15 How were you married?

0 = traditional, ‗proper', sense (known as Ugidile)
1 = traditional, (known as Uganile)
2 = white wedding
3 = others specify (……

1.16 *[Enumerator could you possibly check if the respondent is a Binca or Amakholwa]*

0 = Binca
1 = *Amakholwa*

1.17 If married, how old is your husband? (……)

1.18 What is the highest educational level that your husband has reached so far?

1 = Never been to school
2 = Primary education
3 = Secondary education
4 = College/University

1.19 What is your husband's employment status?

1. Unemployed
2. Informal / non-permanent employment
3. Formal/permanent employment

1.20 What is your husband's monthly income range?

0. Less than R2000
1. more than R2000 but less R5000
2. More than R5000 but less than R10000
3. More than R10000

WOMEN'S SOCIAL EMPOWERMENT

1.18 Social participation (networks)

1.18.1 Indicate which of the following cultural, leisure and social groups you belong to?

Group	**Y/N**	**Group**	**Y/N**	**Group**	**Y/N**
Farmers association		Trade/labor union		Cultural association	
Farmers' cooperative		Village committee		Burial society	
Other production group		Religious group		Credit/savings group	
Traders/Business Assoc.		NGOs /civic group		Professional Assoc. (doctors, teachers, veterans).	
Water users' Assoc.		Political/party/movement		Other…….	

1.18.2 To what extend do the following statements apply to you? (Where 0 = Not at all; 1= To a limited extend; 2 = To a moderate extend; 3= to a large extend; 4 = Fully).

Indicators of social participation (networks)	**Responses**				
	0	1	2	3	4
a. I frequently and intensively involved in social groups?					
b. I frequently and intensively involved in voluntary activities? (e.g., canal cleaning; health-related programs)					

1.19 Social networks and social support (networks)

1.19.1 Indicate whether you agree or disagree with the following statement measuring your social networks and social support systems? (Where; 0 = strongly disagree; 1 = disagree; 2 = neutral; 3 = Agree; 4 = strongly agree).

Indicators	**Responses**				
	0	1	2	3	4
a. When emergency arises, and I need **money**, my **family** assists me.					
b. When emergency arises, and I need **money**, my **friends** assist me.					
c. When emergency arises, and I need **money**, my **neighbors** assist me.					
d. When emergency arises, and I need **money**, the **group I am a member of** (specify……) assist me.					
e. When emergency arises, and I need **food**, my **family** assists me.					
f. When emergency arises, and I need **food**, my **friends** assist me.					
g. When emergency arises, and I need **food**, my **neighbors** assist me.					
h. When emergency arises, and I need **food**, the **group I am a member of** (specify……) assist me.					
i. When emergency arises, and I need **extra labor**, my family assists me.					
j. When emergency arises, and I need **extra labor**, my friends assist me.					
k. When emergency arises, and I need **extra labor**, my neighbors assist me.					
l. When emergency arises, and I need extra labor, **the group I am a member of** (specify……) assist me.					

1.20 Reciprocity and trust (shared norms and values)

1.20.1 To what extend do the following statements apply to you? (Where 0 = Not at all; 1= To a limited extend; 2 = To a moderate extend; 3= to a large extend; 4 = Fully).

Indicators	**Responses**				
	0	1	2	3	4
a. I trust in other people who are within my social organizations?					
b. I trust in other people who are not within my social organizations?					
c. I trust in other people who do favours to me?					
d. I regularly/frequently do favors to other people					

1.21 Civic participation (co-operation)

1.21.1 To what extend do the following statements apply to you? (Where 0 = Not at all; 1= To a limited extend; 2 = To a moderate extend; 3= to a large extend; 4 = Fully).

Indicator	Score				
	1	2	3	4	5
a. I am confident to approach institutions (e.g., banks, police) at any given time					
b. I have the ability to influence events/others					
c. I am well informed about local & or national affairs/events					
d. I regularly meet with public officials or political representatives & and also get involved in local developmental meetings;					
e. I always vote to elect my leaders					

1.22 Views of the local area (shared norms and values)

1.22.1 To what extend do the following statements apply to you? (Where 0 = Not at all; 1= To a limited extend; 2 = To a moderate extend; 3= to a large extend; 4 = Fully).

Indicator	Score				
	1	2	3	4	5
a. I am happy with the social customs/norms in this area I live in					
b. I am happy with service delivery in this area					
c. I enjoy living in this area					
d. I am happy with the level of crime in this area					

1.23 Informational assets

1.23.1 How often do you listen to the radio?

1. Never
2. Very rarely
3. Rarely
4. Often
5. Very often

1.23.2 How often do you watch television?

1. Never
2. Very rarely
3. Rarely
4. Often
5. Very often

1.24 WOMEN'S FAMILIAL EMPOWERMENT

1.24.1 To what extend do the following statements apply to you? (Where 0 = Not at all; 1= To a limited extend; 2 = To a moderate extend; 3= to a large extend; 4 = Fully).

Indicator	Score				
Household level	1	2	3	4	5
a. I participate in making decisions in my household					
b. I also make decisions on child-bearing & use contraception/family planning					
c. I had all the freedom to choose my husband					
d. I am free from domestic violence					

1.25 WOMEN'S POLITICAL EMPOWERMENT

1.25.1 To what extend do the following statements apply to you? (Where 0 = Not at all; 1= To a limited extend; 2 = To a moderate extend; 3= to a large extend; 4 = Fully).

Indicator			**Score**		
	1	2	3	4	5
a. I have knowledge of political system (those in power)					
b. I have freedom to exercising the right to vote					
c. I have interest to participate in voting					
d. I am involved in the political activities (campaigns; pol. post)					
e. I think the electoral process is fair					
f. I know the people with political posts in this community					
g. I think there is freedom of participation in politics					

1.26 WOMEN'S LEVEL OF PSYCHOLOGICAL EMPOWERMENT

1.26.1 To what extend do the following statements apply to you? (Where 0 = Not at all; 1= To a limited extend; 2 = To a moderate extend; 3= to a large extend; 4 = Fully).

Indicator			**Score**		
Household level	1	2	3	4	5
a. I have high self-esteem/ I always feel that I am worth when I am with others					
b. I always believe that I can accomplish specific goals I have set (i.e., self-efficacy)					
c. Generally, I am happy and well					
d. I don't feel isolated or lonely in my life					
e. I participate in meetings					
f. I think I am not excluded from community activities					
g. I interact & socialize well with people from different social groups					
h. I am hopeful about a better life in future					
i. I always desire/long for peace					
j. I believe that I can control events that affect my life/ carry out his or her intentions (personal control).					

1.27 LEVEL OF WOMAN'S LEGAL EMPOWERMENT

1.27.1 To what extend do the following statements apply to you? (Where 0 = Not at all; 1= To a limited extend; 2 = To a moderate extend; 3= to a large extend; 4 = Fully).

Indicator			**Score**		
	1	2	3	4	5
a. I know my legal rights (i.e., guaranteed power/claims)					
b. My rights to use, alienate, or exclude others from my land are quite secure					
c. I am able to exercise my rights over land (i.e., the rights to use, alienate, or exclude others from land)					
d. There are no threats of eviction from my land					
e. I always find it easy to approach the police					
f. I always find it easy to approach the courts					
g. I will be treated fairly by the police at any given moment					
h. I will be treated fairly by the courts in any given court case					

1.28 LEVEL OF WOMEN'S EMPOWERMENT IN AGRICULTURE

1.28.1 To what extend do the following statements apply to you? (Where 0 = Not at all; 1= To a limited extend; 2 = To a moderate extend; 3= to a large extend; 4 = Fully).

Domains	**Indicators**	Score				
		1	2	3	4	5
Production	I make decisions concerning crop production					
	I am free to choose what to produce on my plot					
Resources	I am involved in purchasing, sale and transfer of agricultural assets					
	I have access to and make my own decision on credit					
Income	I have control over use of household income					
Leadership	I am confident to speak in public					
Time	I am satisfied with the time available for leisure activities					
	My agricultural work is not affected by the workload in my domestic tasks					
Legal	Customary laws do not govern my ability to acquire and use agricultural resources					
	I am satisfied with the laws and institutions governing acquisition and security of use of agricultural resources					
Agency	I am motived to pursue agricultural activities					

1.29 LEVEL OF WOMEN'S AGENCY

1.29.1 To what extend do the following statements apply to you? (Where 0 = Not at all; 1= To a limited extend; 2 = To a moderate extend; 3= to a large extend; 4 = Fully).

Domains	**Indicators**	Score				
		1	2	3	4	5
Power to aspire	I aspire/aim for better things in life.					
Bargaining/ negotiating power	I always find myself bargaining/making a deal to achieve livelihood outcomes					
Manipulation power	I sometimes manipulate/influence/exploit other people in order to achieve livelihood outcomes?					
Subversion power	I become rebellious when people try to sabotage my livelihood strategies?					
Resistance power	I resist moves by other people who try to sabotage my livelihood strategies					
Reflection power	I always reflect/redirect my thoughts on how best to meet my survival needs (i.e., i.e., serious thought or consideration).					
Analysis power	I always analyze/scrutinize/explore better ways to meet my survival needs?					
Level of motivation	I am motivated to work and feed my family					
Level of determination	I am so determined to succeed in life, in general					
Level of resilience	I have the capacity/spirit of working hard to pursue my livelihood goals					

2 CROP PRODUCTIONS

2.1 Does your household engage in any crop production?

0. No
1. Yes

2.2 If yes to 1.14, how do you perceive the profitability of your crop production enterprise?

0. Very unprofitable
1. Unprofitable
2. Break-even
3. Profitable
4. Very profitable

2.3 Indicate the crops grown, output/yields, quantity sold and the selling price of each crop in the past summer (rainy) season.

Type of Crop	Quantity harvested *(kg, tons, buckets etc.)*	Quantity sold *(kg, tons, buckets etc.)*	Price per unit
a. maize			
b. potatoes			
c. onions			
d. cabbage			
e. tomatoes			
f.			
g.			
h.			

2.4 Indicate the crops grown, output/yields, quantity sold and the selling price of each crop in the past winter (dry) season.

Type of Crop	Quantity harvested *(kg, tons, buckets etc.)*	Quantity sold *(kg, tons, buckets etc.)*	Price per unit
a. maize			
b. potatoes			
c. onions			
d. cabbage			
e. tomatoes			
f.			
g.			
h.			

3 PHYSICAL/MATERIAL ASSET EMPOWERMENT

3.1 Land ownership

3.1.1 How much land under the various ownership statuses does your household have?

Land	**Total household quantity**	**Quantity or level of control**
Dry		
a. Arable dry land (Ha) (Owned)		
b. Arable dry land (Ha) (Rented)		
c. Arable dry land (Ha) (no formal lease agreement)		
Irrigated		
d. Arable irrigation land (Ha) (Owned)		
e. Arable irrigation land (Ha)		
f. Arable irrigation land (Ha) (no lease formal agreement)		

3.1.2 How much decision-making power do you have over use of household agricultural land in general?

0 = no power
1 = little power
2 = moderate power;
3 = much power;
4 = full power.

3.1.3 How much power to transfer land (i.e., selling, renting, and giving it to other people) do you have?

0 = no power
1 = little power
2 = moderate power;
3 = much power;
4 = full power.

3.1.4 Overall, indicate the quality of land you are using for agricultural production? (Where; 0 = very poor quality; 1 = poor; 2 = average; 3 = good quality; 4 = very good quality). (……)

3.2 Livestock Ownership

3.2.1 How much of the following livestock does your household have? Indicate on a five point scale, the amount of control you have on these types of livestock. (Where; 0 = no control; 1 = little control; 2 = moderate control; 3 = much control; 4 = full control).

Livestock type	**Number currently owned**	**Woman's level of control**	**Number sold in the past 12 months**	**Price per unit**	**Number slaughtered for family purpose in the past 12 months**
1. Cattle					
2. Goats					
3. Sheep					
4. Pigs					
5. Chickens					
6. Other (specify)					

3.3 Agricultural machinery

3.3.1 How many of the following agricultural machinery does your household have?

3.3.2 *Also indicate the price you would buy it*.

3.3.3 Rate on a five point scale, the amount of control you have on these types of machinery. (Where; 0 = no control; 1 = little control; 2 = moderate control; 3 = much control; 4 = full control).

Types agricultural machinery	**2.4.1 No.**	**2.4.2 Asset price**	**2.4.3 Level of women's control**
a. Trucks			
b. Animal-drawn Ploughs			
c. Tractors			
d. Hoes			
e. Wheelbarrow			
f. Garden fork			
g. Knapsack sprayer			
g. Spades			
h. Tractor-drawn plough			
i. Animal drawn cart			
j. Rake			

3.4 Household Asset Ownership

3.4.1 Do you own the following assets? (*Indicate number owned in the appropriate box, zero if not owned. Also indicate the price you would charge if you were to sell the asset*).

Asset	No.	Asset value	Asset	No.	Asset value
a. Block, tile house			j. Cell phone		
b. Block, zinc house			k. TV		
c Round, thatch house			l. Radio		
d. Round pole and mud or shack house			m. Telephone		
e. Tap			n. Bicycle		
f. borehole			o. Car		
g. Protected well			q. Motor- cycle		

h. Water tank			r. Other (specify)		
i. Other Specify……			……		
……			……		
……			……		

3.5 Infrastructural support

3.7.1 Please rate the extent to which you agree with the following statements (*Tick appropriate box*).

Indicator	**Responses**				
	0	1	2	3	4
a)					
b) Road access is good					
c) Communication infrastructure is good					
d) Electricity is reliable					
e) Storage dams are well maintained					
f) Domestic water supply is reliable					

3.6 Water-use security for household uses

3.6.1 Indicate whether you agree or disagree with the following statement measuring your household water-use security levels? (Where; 0 = strongly disagree; 1 = disagree; 2 = neutral; 3 = Agree; 4 = strongly agree).

Indicator	**Responses**				
	0	1	2	3	4
1. I am satisfied with the consistency of water availability for my household uses					
2. I am satisfied with the quality of water for my household uses					
3. I am satisfied with the amount I pay for water for my household uses					
4. I am satisfied with the distance covered to walk to source water for my household uses					

(NB: IF THE RESPONDENT IS A DRY-LAND FARMER IN MACHUNWINI JUMB TO QUESTIONS 4.1)

3.7 Water-use security for agricultural purposes

3.7.1 Indicate whether you agree or disagree with the following statement measuring your water-use security levels? (Where; 0 = strongly disagree; 1 = disagree; 2 = neutral; 3 = Agree; 4 = strongly agree).

Indicator	**Responses**				
	0	1	2	3	4
1. I am satisfied with the consistence of water supply					
2. I am satisfied with the maintenance of the canal					
3. I am satisfied with the sufficiency of water supply					
4. I am satisfied with the quality of water supplied					
5. I am confident with my capacity to pay for water					
6. I am satisfied with my plot‘s position along the canal (lower/upper end)					
7. I would be happy if there were improvements in the current water supply and water related services					
8. My right or claim to water is secure					

4. Human capital empowerment

4.1 Health status

4.1.1 How do you rate your state of health over the past year on a five point scale (where; 0 = very poor; 1 = poor; 2 = moderate; 3 = fine; 4 = very fine).

4.1.2 How far is your household to the nearest health institution?

4.2 Vocational skills

4.2.1 Have you ever attended any vocational skills training courses?

0. No
1. Yes

4.2.2 If yes, in what field did you take your vocational skills training in?

1. Agriculture
2. Business/Enterprise management
3. Craftwork
4. Construction industry

Any other specify: a……..

5. b. ……..
6. c. ……..
7. d ……..

4.3 Vocational work skills

Rate your knowledge and skills on the following vocational work skills on a five-point scale. (Where; 0 = very poor; 1= poor; 2 = moderate; 3 = good; 4 = excellent/very good)

Vocational work skills	Responses				
	0	1	2	3	4
a. Crop production skills					
b. Animal production skills					
c. Business management skills					
d. Craftwork skills					
e. Construction industry skills					
f. Barber/Saloon skills					
g. Garment making/ sewing					
h. Cooking/baking skills					
i. Any other……					
j. ……..					

4.4 Business management skills

4.4.1 Have you received any business management skills training?

0. No
1. Yes

4.4.2 Whether yes or no, rate your business management knowledge and skills on the following aspects on a five point scale. (Where; 0 = very poor; 1= poor; 2 = moderate; 3 = good; 4 = excellent/very good)

Business management skill	**Responses**				
	0	1	2	3	4
a. Level of numeracy					
b. Level of literacy					
c. Business management skills					
d. Financial knowledge					
e. Trading/marketing/merchandising skills					

4.5 Agricultural skills training

4.5.1 Have you attended any agricultural skills training courses?

0. No
1. Yes

4.5.2 If yes, what agricultural skills training have you acquired so far?

1. Mushroom production
2. Pig production
3. Poultry production
4. Crop production
5. Any other, specify……
6. a. ……..
7. b. …….

4.5.3 How many times have you engaged an extension officer(s) in the past 12 months?

……..

4.6 Crop production skills/ Farmer competence

4.6.1 Rate your competence on the following crop production aspects on a five point scale. (Where; 0 = very poor; 1= poor; 2 = moderate; 3 = good; 4 = excellent/very good).

Crop production skills	**Responses**				
	0	1	2	3	4
Crop management					
a. Determining seed depth					
b. Selecting appropriate planting methods for various crops					
c. Determining inter and intra row spacing					
d. Soil and water conservation measures for specific farm lands					
Fertility management					
a. Determining the amount of fertilizer to apply for various crops					
b. Determine nutrient deficiency symptoms in crops					
Weed & pest control techniques					
a. Application of herbicide and fungicide					
b. Calibration and use of sprayer					
Post-harvesting techniques					
a. Planning and carrying out harvesting					

appropriately for various crops					
b. Packaging of produce					
c. Storage of produce					
Farm management skills					
a. Farm record keeping					
b. Financial management					
c. Knowledge of marketing contracts					
d. Price determination for your produce					
e. Knowledge of the market for your produce					
f. Maintenance of a water pump					

4.7 Animal husbandry skills

4.7.1 Rate your knowledge and skills of animal husbandry on a five point likert scale. (Where; 0 = very poor; 1= poor; 2 = moderate; 3 = good; 4 = excellent/very good).

Animal husbandry skills	**Responses**				
	0	1	2	3	4
a. Animal health (e.g., vac, disease prevention)					
b. Animal feeding & nutrition					
c. Animal welfare requirements					
d. Meat processing skills					

4.8 Livelihood diversification and control over financial capital

4.8.1 What is the main reason for engaging in any of the following livelihood activities? Where; (1 = main source of food; 2 = additional source of food; 3= main source of income; 4 = source of additional income).

4.8.2 How much income does your household receive from these activities in a past year?

4.8.3 In a chronological order, rate which activities take much of your time, starting with the one that u spent much of your time?

4.8.4 How much or what fraction of that money is under your control? Where (0 = no control at all, 1 = very little control; 2 = moderate control; 3 = much control; 4 = full control).

Activity	**Main reason for engaging in the following**	**Order of time spent in such activity**	**Income per given time (R)**	**Frequency in a year (e.g., 4 times; 5 times etc.) per month**	**Number of times in the past 12 months**	**Amount of woman's control of that income**
Agricultural activities						
a. Crop production						
• Irrigation farming						
• Dry-land farming						
b. Livestock production						
c. Agricultural wage labor						

d. Vending of agricultural products						
e. Hiring agricultural equipment						
f. Any other (*specify*…						
g. ……..						
h. ……..						
Non-agricultural activities						
i. Formal employment						
j. Wage employment						
k. Dress-making						
l. Own business						
m. Petty trade/hawking						
n. Vending/marketing						
o. Forestry product sales						
p. Craft-work/Arts						
q. Construction related job						
r. Any other (*specify*…						
s. ……..						
Donations						
t. Government grants						
u. Pensions						
v. Remittances						
w. Aid						
x. Any other (*specify*...						
y. ……						

4.8.5 Have you received credit or loan facility in the past 12 months?

0 = No

1 = Yes

4.8.6 If yes, can you name the institutions/organizations that have provided you with some credit in the past twelve months and indicate how much they lent to you?

0 = Relative/friend (……)

1 = Savings club/stokvel (……)

2 = Money lender (……)

3 = Input supplier (……)

4 = Financial institution (……)

5 = Other, specify……...)

4.9 Household consumption status

4.9.1 List all the foodstuffs that you buy in a typical month and how much you spent on every item.

Commodity	**Quantity**	**Price**
a. Maize meal		
b. Rice		
c. Chicken		
d. Beef		
e. Pork		
f. Cooking oil		
g. Vegetables		
h. Other, specify		
i. ……..		
j. ……..		
k. ……..		
l. ……..		
m. ……..		

4.9.2 How much does your household spent on the following commodities and services in a month? Rate how much you (as the primary woman) contribute to these expenditures. (Where; 0 = nothing; 1 = very little; 3 = modearate contribution; 4 = most of the contribution; 5 = all the contribution).

Commodity/services	**Monthly expenditure**	**Contribution score**
Electricity		
Water		
Rent		
Health		
Education		
Transport		
Clothes		
Entertainment		
Any other (*specify*…		

5. HOUSEHOLD'S FOOD SECURITY STATUS

5.1 The HFIAS to measure the food security status of households

Example

1. In the past year, did you worry that your household would not have enough food?
   0 = No (skip to Q2)
   1 = Yes

1.a. How often did this happen? Also name the months when that happened.
   0 = Never
   1 = Rarely (one to three months in the past year)
   2 = Sometimes (four to eight months in the past year

3 = Often= more than eight months in the past year
4 = Throughout the year

No.		Yes	No
1	In the past year, did you worry that your household would not have enough food? If yes, in which months?.....		
2	In the past year, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources? If yes, in which months?.....		
3	In the past year, did you or any household member have to eat a limited variety of foods due to a lack of resources? If yes, in which months?.....……		
4	In the past year, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food? If yes, in which months?		
5	In the past year, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food? If yes, in which months? …....		
6	In the past year, did you or any household member have to eat fewer meals in a day because there was not enough food? If yes, in which months?.....		
7	In the past year, was there ever no food to eat of any kind in your household because of lack of resources to get food? If yes, in which months?.....		
8	In the past year, did you or any household member go to sleep at night hungry because there was not enough food? If yes, in which months?.....		
9	In the past year, did you or any household member go for a whole day and night without eating anything because there was not enough food? If yes, in which months?		

Appendix 2: Dimensions and indicators of women‘s economic empowerment

Main dimensions	Sub-dimensions	Indicators	Measurement score
Economic empowerment	Physical capital empowerment	Land under women control	Continuous
		Tropical livestock units	Continuous
		Value of machinery women control	Continuous
		Road access	5-point Likert scale
		Communication infrastructure	5-point Likert scale
		Electricity reliability	5-point Likert scale
		Reliability of domestic water supply	5-point Likert scale
	Human capital empowerment	Education level	Continuous
		Numeracy level	5-point Likert scale
		Health status	5-point Likert scale
		Employment status	5-point Likert scale
		Literacy level	5-point Likert scale
		Crop production skills	5-point Likert scale
		Animal production skills	5-point Likert scale
		Business management skills	5-point Likert scale
		Craftwork skills	5-point Likert scale
		Construction skills	5-point Likert scale
		Saloon skills	5-point Likert scale
		Sewing skills	5-point Likert scale
		Cooking skills	5-point Likert scale
	Financial capital empowerment	Total credit value	Continuous
		Farm income	Continuous
		Non-farm income	Continuous
		Old-age-grant income	Continuous
		Child-grant income	Continuous
		Disability-grant income	Continuous
	Economic agency	Power to aspire ‗in economic arena‘	5-point Likert scale
		Bargain power "	5-point Likert scale
		Manipulation power "	5-point Likert scale
		Subversion power "	5-point Likert scale
		Resist power "	5-point Likert scale
		Reflect power "	5-point Likert scale
		Analysis power "	5-point Likert scale
		Level of motivation "	5-point Likert scale
		Level of determination "	5-point Likert scale
		Level of resilience "	5-point Likert scale

Appendix 3: Dimensions and indicators of women's social empowerment

Main dimensions	Sub-dimensions	Indicators of social empowerment	Measurement score
Social capital empowerment	Social capital empowerment	Social participation	5-point Likert scale
		Social support	5-point Likert scale
		Reciprocity and trust	5-point Likert scale
		Cooperation	5-point Likert scale
		Shared norms	5-point Likert scale
		Number of organisation	5-point Likert scale
		Involvement in social groups	5-point Likert scale
	Informational resource empowerment	Radio listening	5-point Likert scale
		Television watch	5-point Likert scale
		Communication infrastructure	5-point Likert scale
		Literacy level	5-point Likert scale
	Familial empowerment	Participation in decision making	5-point Likert scale
		Partition in family planning	5-point Likert scale
		Freedom of choosing spouse	5-point Likert scale
		Freedom of domestic violence	5-point Likert scale
	Social agency	Power to aspire _in social arena'	5-point Likert scale
		Bargaining power "	5-point Likert scale
		Manipulation power "	5-point Likert scale
		Subversion power "	5-point Likert scale
		Resist power "	5-point Likert scale
		Reflect power "	5-point Likert scale
		Analysis power "	5-point Likert scale
		Level of motivation "	5-point Likert scale
		Level of determination"	5-point Likert scale
		Level of resilience "	5-point Likert scale

Appendix 4: Dimensions and indicators of women's empowerment in agriculture

Main dimension	Sub-dimensions	Indicators of social empowerment	Measurement score
Empowerment in agriculture	Socio-cultural hindrances to agriculture	Decisions on crop production	5-point Likert scale
		Freed on what to produce	5-point Likert scale
		Access and control of land	5-point Likert scale
		Decisions on credit	5-point Likert scale
		Control of income	5-point Likert scale
		Confidence to speak	5-point Likert scale
		Satisfaction with leisure time	5-point Likert scale
		Domestic with workload	5-point Likert scale
		Hindrance by customary law	5-point Likert scale
		Satisfaction with institution	5-point Likert scale
	Water use security	Satisfaction with water consistency	5-point Likert scale
		Satisfaction with water sufficiency	5-point Likert scale
		Satisfaction with water quality	5-point Likert scale
		Satisfaction with capacity to pay	5-point Likert scale
		Satisfaction with claim to water	5-point Likert scale
	Crop Management skills empowerment	Determining seed depth	5-point Likert scale
		Select appropriate planting method	5-point Likert scale
		Determining spacing	5-point Likert scale
		Water conservation methods	5-point Likert scale
		Fertiliser application	5-point Likert scale
		Determining nutrient deficiency	5-point Likert scale
	Herbicide application skills empowerment	Herbicide/pesticide application	5-point Likert scale
		Use of snapsack	5-point Likert scale
	Post harvesting skills empowerment	Harvesting methods	5-point Likert scale
		Packaging produce	5-point Likert scale
		Storage or produce	5-point Likert scale
	Farm financial skills empowerment	Record keeping	5-point Likert scale
		Financial management	5-point Likert scale
		Knowledge of marketing contracts	5-point Likert scale
		Price determination	5-point Likert scale
		Knowledge of product market	5-point Likert scale
	Animal husbandry skills empowerment	Knowledge of animal health	5-point Likert scale
		Animal nutrition	5-point Likert scale
		Welfare requirements	5-point Likert scale
		Meat processing skills	5-point Likert scale

Appendix 5: Dimensions and indicators of women's civic empowerment

Main dimensions	Sub-dimensions	Indicators of social empowerment	Measurement score
Civic forms of empowerment	Political resource empowerment	Knowledge political system	5-point Likert scale
		Freedom to exercise voting rights	5-point Likert scale
		Interest to participate in voting	5-point Likert scale
		Involvement in the political process	5-point Likert scale
		Fairness of electoral process	5-point Likert scale
		Community awareness of political system	5-point Likert scale
		Freedom of participation in politics	5-point Likert scale
	Legal resource empowerment	Knowledge of legal right	5-point Likert scale
		Security of right	5-point Likert scale
		Ability to exclude other	5-point Likert scale
		Threats of eviction	5-point Likert scale
		Easy to approach police	5-point Likert scale
		Easy to approach court	5-point Likert scale
		Fairness of police	5-point Likert scale
		Fairness of courts	5-point Likert scale
	Psychological empowerment	Self esteem	5-point Likert scale
		Self-efficacy	5-point Likert scale
		Overall wellbeing	5-point Likert scale
		Level of loneliness	5-point Likert scale
		Participation in meeting	5-point Likert scale
		Exclusion from community	5-point Likert scale
		level of interaction/sociability	5-point Likert scale
		Hopeful for a better future	5-point Likert scale
		Longing for piece	5-point Likert scale
		Personal control	5-point Likert scale
	Civic agency	Power to aspire _in civic arenas'	5-point Likert scale
		Bargain power "	5-point Likert scale
		Manipulation power "	5-point Likert scale
		Subversion power "	5-point Likert scale
		Resist power "	5-point Likert scale
		Reflect power "	5-point Likert scale
		Analysis power "	5-point Likert scale
		Level of motivation "	5-point Likert scale
		Level of determination "	5-point Likert scale
		Level of resilience "	5-point Likert scale

Appendix 6: Dominant dimensions of economic empowerment among women in Msinga

Rotated Component Matrix[a]												
	Component											
	1	2	3	4	5	6	7	8	9	10	11	12
WOMEN_LAND_POWER	0.018	0.03	0.091	-0.037	-0.005	-0.114	0.682	0.036	0.15	-0.068	-0.059	0.064
TROPICAL_LIVSTOCK_UNITS2	0.056	0.069	0.017	-0.1	-0.022	-0.073	0.002	-0.05	0.022	0.096	-0.07	0.835
WOMAN_MACHN_VALUE	0.078	0.37	0.327	0.29	-0.078	-0.063	0.163	0.195	-0.352	0.18	0.097	-0.182
ROAD_ACCESS	-0.03	-0.112	-0.081	-0.101	0.364	-0.012	-0.085	0.535	-0.429	-0.103	-0.006	0.231
COMMUNCATN_INFRAST	0.118	0.113	0.127	-0.045	0.738	-0.117	-0.043	0.074	-0.02	0.131	-0.167	-0.128
ELECT_RELIABILITY	0.065	0.073	-0.045	0.065	0.096	-0.094	0.105	0.179	0.75	0.075	0.083	0.054
DOM_WATER_SUP_RELIAB	-0.094	-0.123	-0.098	0.198	0.594	0.053	0.197	-0.015	0.181	-0.127	0.097	0.168
EDU_1_4_LEVEL	0.071	0.597	0.207	-0.077	0.092	0.076	0.129	-0.095	0.129	-0.029	0.354	-0.203
NUMERACY_LEV	0.246	0.782	-0.035	0.126	0.007	-0.018	-0.101	0.003	-0.041	0.103	0.05	0.124
HEALTH_4_1_STATUS	0.152	0.275	0.038	-0.407	0.461	0.039	-0.204	-0.227	0.025	-0.129	0.032	-0.028
EMP_1_2_STAT	0.038	0.187	-0.095	-0.073	-0.101	-0.019	-0.021	0.056	-0.059	0.068	0.608	-0.126
LITERACY_LEV	0.178	0.826	-0.041	-0.132	-0.001	0.183	-0.044	0.04	0.082	-0.122	0.002	0.114
CROP_PRODCTN_SKILS	0.224	0.218	0.032	0.073	0.046	0.189	-0.235	0.333	0.016	0.392	-0.376	-0.088
ANIM_PROD_SKILLS	0.013	-0.032	-0.066	-0.016	-0.026	0.086	-0.019	-0.103	0.056	0.857	0.003	0.133
BUSNES MANGMNT SKLLS	0.141	0.213	0.183	0.044	0.275	0.442	-0.08	0.094	0.216	0.194	0.049	0.319
CRAFTWORK_SKILLS	0.156	0.094	-0.123	0.752	-0.017	0.12	-0.024	-0.118	-0.095	-0.005	-0.199	-0.013
CONTRUCTN_SKILLS	0.072	-0.034	0.014	0.627	0.105	0.014	-0.19	-0.068	0.341	0.07	-0.09	-0.181
SALOON_SKILLS	-0.095	0.166	0.127	0.241	-0.1	0.656	-0.034	-0.046	-0.196	0.091	0.012	-0.077
SEWING_SKILLS	-0.093	-0.028	0.015	-0.105	-0.033	0.795	-0.022	0.011	0.013	-0.041	0.022	-0.039
COOKING_SKILS	0.25	0.324	0.053	-0.513	-0.076	0.417	0.061	-0.084	0.003	0.149	-0.118	-0.087
TOT_CREDT_VAL	-0.024	-0.006	0.027	0.186	0.307	-0.153	-0.033	0.093	0.044	0.328	0.306	-0.041
FARM_INCOME	0.057	0.019	0.972	-0.063	0.028	0.08	0.04	-0.001	-0.016	-0.031	-0.005	0.018
NON_FARM_INCOME	0.057	0.019	0.972	-0.063	0.028	0.08	0.04	-0.001	-0.016	-0.031	-0.005	0.018
OLDAGE_GRANT_INCME	-0.051	0.002	-0.147	0.227	-0.059	-0.147	0.22	-0.004	-0.212	0.093	-0.546	-0.124
CHILD_GRANT_INCME	-0.049	-0.006	-0.032	0.06	0.037	0.023	-0.052	-0.77	-0.199	0.037	-0.066	0.099
DISABILITY_GRANT_INCME	-0.145	-0.063	-0.002	-0.068	0.041	0.068	0.776	-0.028	-0.071	0.019	-0.039	-0.075
POW_TO_ASPIRE	0.601	0.099	0.038	-0.074	0.178	-0.252	0.046	-0.273	0.165	0.231	0.079	-0.12
BARGAIN_POWER	0.668	-0.067	0.056	-0.087	0.103	0.14	-0.171	-0.057	-0.052	0.089	0.069	-0.132
MANUP_POWER	0.656	0.383	0.069	-0.057	0.204	-0.076	0.049	-0.164	-0.05	0.162	-0.076	-0.079
SUBVERSN_POWER	0.771	0.021	-0.01	0.07	-0.025	0.09	-0.02	0.04	-0.063	-0.079	0.208	0.15
RESIST_POWER	0.686	-0.144	-0.068	0.136	-0.189	0.04	0.108	-0.033	-0.138	-0.076	0.177	0.24
REFLECT_POWER	0.707	0.168	0.086	0.126	-0.383	0.016	-0.164	0.137	0.057	-0.048	0.018	0.086
ANALYSIS_POWER	0.625	0.227	0.021	-0.111	-0.214	0.034	-0.144	0.26	0.078	0.058	-0.132	0.075
LEV_OF_MOTIV	0.736	0.08	-0.003	0.037	0.101	-0.027	0.007	0.069	-0.051	-0.019	-0.114	-0.14
LEV_OF_DETMNATN	0.649	0.222	0.026	0.053	0.145	-0.132	0.118	0.047	0.166	0.054	-0.012	-0.001
LEV_OF_RESILIENCE	0.663	0.156	0.076	-0.014	0.028	-0.161	-0.155	-0.019	0.19	-0.07	-0.156	0.121

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 11 iterations.

Appendix 7: Dimensions of social empowerment among women in Msinga

Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
SOCIAL_PART	0.242	0.788	0.243	0.114	0.085	0.147	-0.007
SOCIAL_SUPPORT	0.055	0.139	-0.043	0.672	0.034	-0.084	0.09
RECIPROCITY_AND_TRUST	0.128	0.753	-0.046	0.207	-0.062	-0.097	-0.017
COOPERATION	0.394	0.312	0.612	0.204	-0.059	0.15	0.013
SHARED_NORMS	-0.053	0.386	-0.465	-0.151	-0.332	-0.152	0.26
RADIO_LISTENING	-0.127	0.18	0.742	0.065	-0.262	-0.014	-0.042
TELEVISON_WATCH	0.006	0.022	0.662	0.002	0.039	-0.24	-0.065
COMMUNCATN_INFRAST	-0.09	0.103	0.297	0.334	-0.61	0.06	0.023
LITERACY_LEV	0.231	0.003	0.644	-0.126	0.062	0.098	0.118
PART_DEC_MAKING	0	0.089	-0.25	-0.22	0.008	0.81	-0.003
PART_FAM_PLANING	0.086	0.012	0.439	0.293	-0.286	0.625	-0.01
FREDOM_CHOSE_SPOUS	0.206	0.399	-0.009	-0.322	0.147	0.056	0.09
FREDOM_DOM_VIOLENC	0.064	-0.064	-0.025	0.089	0.01	0.022	0.879
NO_ORGANZTN	-0.202	0.15	0.009	0.133	0.68	-0.094	0.008
INVOLV_SOC_GRP	0.245	0.819	0.195	0.116	0.106	0.107	-0.106
POW_TO_ASPIRE	0.56	0.043	0.051	0.418	-0.17	0.085	-0.342
BARGAIN_POWER	0.711	0.052	-0.02	0.024	-0.174	0.034	-0.132
MANUP_POWER	0.615	0.101	0.359	0.337	-0.195	0.024	-0.124
SUBVERSN_POWER	0.769	0.201	0.072	-0.035	0.048	-0.004	0.146
RESIST_POWER	0.654	0.31	-0.084	-0.151	0.25	-0.058	0.069
REFLECT_POWER	0.624	0.215	0.105	-0.008	0.483	0.178	0.133
ANALYSIS_POWER	0.43	0.181	0.233	0.172	0.384	0.382	0.115
LEV_OF_MOTIV	0.43	0.428	-0.014	0.386	0.042	0.171	-0.083
LEV_OF_DETMNATN	0.463	0.188	0.18	0.538	0.058	0.052	0.06
LEV_OF_RESILIENCE	0.555	0.193	0.161	0.276	-0.089	-0.005	0.199

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 10 iterations.

Appendix 8: Dimensions of ‗empowerment in agriculture' among women households in Msinga

Rotated Component Matrix[a]

	Raw									
	Component									
	1	2	3	4	5	6	7	8	9	10
DECISIONS_ON_CRP_PRD	0.051	-0.097	0.018	0.054	-0.029	0.498	0.201	-0.083	-0.009	0.024
FREED_ON_WAT_TO_PDCE	0.065	-0.091	0.017	0.056	-0.061	0.491	0.214	-0.046	0.006	0.041
INV_LAND_TRANS	0.156	-0.075	0.01	0.014	-0.104	0.143	0.896	-0.125	0.048	0.055
DECISIONS_ON_CRED	0.118	-0.077	-0.134	0.102	0.126	0.073	0.895	0.186	-0.082	-0.057
CONTROL_OF_INC	-0.082	0.137	-0.104	0.165	0.027	0.297	0.491	0.239	-0.079	0.068
CONFID_TO_SPEAK	-0.012	0.433	0.039	0.388	0.162	0.334	0.325	0.739	-0.055	0.174
SAT_WIT_LEIS_TIM	0.182	-0.003	-0.018	0.721	-0.053	0.147	0.133	0.004	0.023	0.021
DOMESTIC_WORKLD	0.185	-0.173	0.109	0.758	0.058	-0.048	0.011	-0.159	-0.047	-0.03
HIND_BY_CUST_LAW	0.038	-0.106	0.093	0.838	0.029	0.087	-0.075	-0.064	-0.022	0.017
SAT_WITH_INST	-0.157	-0.04	0.012	0.845	-0.104	0.088	0.157	0.171	0.064	0.049
SAT_WIT_CONSISTENCY	-0.007	0.135	1.021	0.136	0.012	-0.13	-0.136	-0.064	0.113	0.074
SAT_WITH_SUFFICIENCY	-0.007	0.176	0.878	0.185	-0.034	-0.079	-0.07	-0.005	0.059	0.159
SAT_WIT_QUALITY	-0.076	-0.034	1.075	0.047	-0.011	0.131	-0.082	0.1	0.027	-0.084
SAT_WIT_CAP_TO_PAY	-0.122	-0.343	0.859	-0.031	0.103	-0.024	-0.647	0.968	-0.117	-0.113
SAT_WIT_CLAIM_TO_WAT	0.029	0.208	1.062	-0.325	-0.064	0.556	0.317	0.198	0.042	-0.211
DETRM_SEED_DEPTH	0.773	0.13	-0.043	0.017	0.024	0.011	0.154	0.015	0.007	0.03
SEL_APROP_PLANT_MET	0.818	0.111	-0.006	0.091	0.004	-0.026	0.052	0.04	0.107	0.042
DET_SPACING	0.771	0.029	-0.033	0.024	0.006	0.032	0.092	0.086	0.014	0.033
WAT_CONS_METHODS	0.839	0.072	-0.049	0.121	0.122	0.292	0.024	-0.083	-0.025	0.093
FERT_APLICATN	0.586	0.064	0.086	0.099	0.027	0.267	0.108	-0.024	-0.045	2.097
DET_NUTRIENT_DEFIC	0.599	0.179	0.004	-0.01	0.103	0.29	-0.066	0.14	0.078	0.131
HERB_PESTCIDE_APLIC	0.816	0.121	0.065	0.22	0.05	0.936	-0.204	0.18	0.071	-0.001
USE_OF_SNAPSACK	0.735	0.227	0.111	0.227	0.007	0.921	-0.255	0.131	0.151	0.132
HARVERSTING_METHODS	0.374	0.107	0.383	0.068	-0.019	0.159	-0.182	0.336	2.294	-0.037
PACKAGING_PRODUCE	0.483	0.363	0.047	-0.258	-0.086	-0.156	0.192	0.853	0.419	-0.091
STORAGE_OR_PRODUCE	0.525	0.397	0.097	-0.219	-0.043	-0.293	0.176	0.836	0.296	-0.062
RECORD_KEEPING	0.255	0.47	0.136	-0.067	0.167	-0.011	0.002	0.014	-0.082	-0.074
FINANC_MANGMENT	0.159	0.638	0.058	-0.05	0.137	-0.068	-0.035	0.05	0	-0.012
KNWLDGE_OF_MRKT_CNT	0.135	0.681	0.031	0.015	0.047	-0.008	-0.08	-0.043	-0.018	-0.009
PRICE_DETMNATION	0.006	1.022	-0.075	-0.135	0.039	-0.088	0.087	0.399	0.167	0.163
KNWLDGE_OF_PRDC_MRKT	0.016	0.88	0.112	-0.138	0.027	0.06	0.017	0.099	0.074	0.029
ANIMAL_HEALTH	0.253	-0.1	-0.153	0.016	1.03	-0.026	0.032	-0.201	-0.077	-0.073
ANIMAL_NUTRITION	0.118	0.063	-0.048	-0.022	1.06	-0.071	0.063	0.062	0.009	0.02
WELFARE_REQMNTS	-0.055	0.191	-0.01	0.031	0.912	-0.007	-0.039	0.213	0.038	0.045
MEAT_PROC_SKILLS	-0.022	0.136	0.062	-0.035	0.265	0.005	-0.015	-0.028	-0.001	0.007

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]
a. Rotation converged in 10 iterations.

Appendix 9: Dimensions of civic empowerment among women in Msinga

Rotated Component Matrix[a]

	Raw								
	Component								
	1	2	3	4	5	6	7	8	9
POW_TO_ASPIRE	.300	.327	.030	.019	.200	.000	-.038	-.022	-.062
BARGAIN_POWER	.063	.678	.091	.079	.203	.044	.151	.019	.141
MANUP_POWER	.641	.636	.288	.456	.593	-.052	-.053	.036	-.054
SUBVERSN_POWER	.206	.842	.074	.144	.076	.242	-.029	-.072	.092
RESIST_POWER	.108	.665	.154	.052	-.196	.282	.012	.009	-.072
REFLECT_POWER	.071	.642	.320	.071	-.043	-.008	.277	-.131	-.173
ANALYSIS_POWER	.052	.403	.191	.272	.059	-.080	.267	-.091	.002
LEV_OF_MOTIV	.151	.368	.074	.175	.196	-.038	.162	.164	-.043
LEV_OF_DETMNATN	.229	.316	.035	.079	.300	-.078	.026	.026	-.038
LEV_OF_RESILIENCE	.181	.575	.125	.164	.312	-.052	.032	.029	-.105
KNOW_POL_SYSTEM	.209	.037	.202	-.199	.937	.061	.131	.081	.563
FRED_EXERC_VOT_RIGHTS	-.057	.106	.245	-.044	.096	.409	.194	.161	.130
INTRST_TO_PART_IN_VOTING	-.096	.161	.320	.052	.007	.284	.148	-.055	.040
INV_IN_POLIT_ACTIVITY	.070	-.111	.016	.231	-.008	.019	-.062	-.003	.907
FAIRNES_OF_ELCTOR_PROC	.177	.165	-.111	.038	.453	.224	.169	.096	-.098
KNWLDGE_PLE_W_POL_POST	.417	-.025	.115	.329	.915	.144	-.259	-.027	-.187
PRCIVD_FREED_PART_POL	.018	.170	.089	-.034	.354	.397	-.072	-.323	.139
SELF_ESTEM	.178	.259	-.034	.851	.060	.025	.282	.105	-.063
SELF_EFFICACY	.154	.232	.092	.647	.089	.155	.222	-.026	.175
OVERALL_WELLBEING	.215	.126	.218	.661	.097	.130	-.045	-.050	.216
LEVEL_OF_LONILINES	.027	-.036	.010	.305	.020	.681	-.140	.172	-.128
PART_IN_MEET	.078	.128	.137	.367	.036	.190	.995	.107	-.070
EXCLU_FROM_COMM	-.016	.048	.077	.011	.134	.679	.232	.027	.015
LEV_OF_SOCIAB	.162	.358	.263	.137	.074	.341	.616	-.076	-.002
HOPEFUL_FO_BETA_FUTURE	-.178	.191	.093	.203	-.019	.251	.135	-.106	.112
LONGING_FOR_PIECE	.010	.074	.012	.108	.133	.055	.070	-.013	.008
PERSONA_CONTROL	.015	.536	.305	.319	-.047	.337	.090	-.031	-.064
KNOW_OF_LEG_RIGHT	.472	.154	1.233	.478	.343	-.039	.064	-.033	-.217
SECURITY_OF_RIGHT	.234	.299	1.045	-.055	.111	.218	.061	.150	.037
ABILITY_TO_EXCLDE	.064	.352	.885	.126	-.084	.156	.167	.204	.159
THREATS_OF_EVIC	.055	-.041	.212	-.011	.078	.195	.011	1.054	.030
EASY_TO_APPR_POL	1.244	.124	.265	.049	.167	.083	.159	-.062	.033
EASY_TO_APPR_COURT	1.249	.224	.283	.068	.183	.122	.088	-.085	-.049
FARNES_OF_POL	1.199	.225	-.036	.256	.172	-.131	.031	.111	.120
FAIRNES_OF_COURTS	1.221	.251	-.009	.285	.196	-.161	.025	.157	.126

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]
a. Rotation converged in 10 iterations.

Appendix 10: Marginal effects of the dimensions of empowerment influencing primary female head-of-household's self-reliance

```
. mfx compute, predict(outcome(1))

Marginal effects after mlogit
      y  = Pr(CLUSTERS==1) (predict, outcome(1))
         =  .79028283
```

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
AGE	-.006992	.00349	-2.01	0.045	-.013826	-.000158	52.0726
EMPLOM~S*	.0336468	.15795	0.21	0.831	-.275927	.343221	.104839
EDUC_L~L	.0247131	.08198	0.30	0.763	-.135959	.185385	1.54032
DEPEND~O	-.1639579	.05754	-2.85	0.004	-.276732	-.051184	1.01867
ECONOM~Y	-.1931443	.16212	-1.19	0.234	-.510887	.124599	.05074
HUMAN_~W	-.0304062	.09096	-0.33	0.738	-.208686	.147874	.015995
FINANC~W	.4480958	.16536	2.71	0.007	.123998	.772194	.00957
VOCATI~W	-.0752827	.0597	-1.26	0.207	-.192284	.041718	-.024431
PHYSIC~W	-.0392821	.05338	-0.74	0.462	-.143911	.065346	.075929
SOCIAL~Y	.1967512	.13497	1.46	0.145	-.067794	.461296	.033192
SOCIAL~T	.0826296	.07237	1.14	0.254	-.059206	.224465	.180698
INFORM~T	-.0235048	.07476	-0.31	0.753	-.170038	.123028	.073651
WATER_~C	.0672345	.05207	1.29	0.197	-.03483	.169299	-.030096
EMPOWE~L	-.0500302	.06343	-0.79	0.430	-.174344	.074283	.033155
ANIMAL~S	-.0048065	.05909	-0.08	0.935	-.12062	.111007	.030643
LEGAL_~T	-.0346889	.04995	-0.69	0.487	-.132587	.06321	.04952
RIGHTS~E	.0394138	.0535	0.74	0.461	-.065436	.144264	.019412
PSYCHO~T	.0317278	.06107	0.52	0.603	-.087975	.151431	.106813
D1*	.0418193	.12171	0.34	0.731	-.196736	.280375	.483871
D2*	-.0881034	.16137	-0.55	0.585	-.404387	.22818	.153226

```
(*) dy/dx is for discrete change of dummy variable from 0 to 1
```

```
. mfx compute, predict(outcome(5))

Marginal effects after mlogit
      y  = Pr(CLUSTERS==5) (predict, outcome(5))
         =  .20951714
```

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
AGE	.0069652	.00349	2.00	0.046	.00013	.0138	52.0726
EMPLOM~S*	-.0619832	.13633	-0.45	0.649	-.329183	.205216	.104839
EDUC_L~L	-.0239013	.08193	-0.29	0.770	-.184479	.136677	1.54032
DEPEND~O	.1635423	.05754	2.84	0.004	.050759	.276325	1.01867
ECONOM~Y	.1931664	.16209	1.19	0.233	-.124519	.510852	.05074
HUMAN_~W	.029634	.09089	0.33	0.744	-.148508	.207776	.015995
FINANC~W	-.4502647	.16509	-2.73	0.006	-.77384	-.126689	.00957
VOCATI~W	.07584	.05963	1.27	0.203	-.041025	.192705	-.024431
PHYSIC~W	.0390514	.05333	0.73	0.464	-.065483	.143586	.075929
SOCIAL~Y	-.1966271	.13497	-1.46	0.145	-.461157	.067903	.033192
SOCIAL~T	-.0825692	.07236	-1.14	0.254	-.224385	.059246	.180698
INFORM~T	.0228804	.07474	0.31	0.760	-.123607	.169368	.073651
WATER_~C	-.0676714	.05201	-1.30	0.193	-.169612	.03427	-.030096
EMPOWE~L	.0494214	.06339	0.78	0.436	-.074827	.173669	.033155
ANIMAL~S	.0044893	.05908	0.08	0.939	-.111302	.120281	.030643
LEGAL_~T	.0344089	.04997	0.69	0.491	-.063531	.132349	.04952
RIGHTS~E	-.0391014	.05346	-0.73	0.464	-.143874	.065671	.019412
PSYCHO~T	-.0311934	.06108	-0.51	0.610	-.150912	.088525	.106813
D1*	-.0426126	.12167	-0.35	0.726	-.281088	.195863	.483871
D2*	.087453	.16142	0.54	0.588	-.228916	.403822	.153226

```
(*) dy/dx is for discrete change of dummy variable from 0 to 1
```

Appendix 11: Marginal effects after ordered logit model

```
. mfx, predict(outcome(1))

Marginal effects after ologit
      y  = Pr(HH_SEC_STATUS==1) (predict, outcome(1))
         =  .45477393
------------------------------------------------------------------------------
variable |      dy/dx    Std. Err.      z    P>|z|  [    95% C.I.   ]      X
---------+--------------------------------------------------------------------
 AGE_1_1 |   -.008955      .00388   -2.31   0.021  -.016561 -.001348   52.0887
HHD_1_~E |    .0028377     .01237    0.23   0.819    -.0214  .027075    7.6371
HUS_1~ME |  -8.17e-06      .00000   -2.99   0.003  -.000014 -2.8e-06   7904.84
DEPEND~O |    .0261575     .04069    0.64   0.520  -.053592  .105907   1.01665
ECONOM~Y |   -.5314009     .24723   -2.15   0.032  -1.01597 -.046831   .022843
HUMAN_~W |   -.0897224     .09218   -0.97   0.330  -.270386  .090941   .019894
FINANC~W |   -.0261713     .03647   -0.72   0.473  -.097661  .045318    .01512
VOCATI~W |   -.0324247     .07347   -0.44   0.659  -.176424  .111575  -.013602
PHYSIC~W |   -.2067178      .0726   -2.85   0.004  -.349013 -.064423   .088037
SOCIAL~Y |    .2253158     .17521    1.29   0.198  -.118082  .568714   .034831
SOCIAL~T |    .2416609     .09842    2.46   0.014   .048752   .43457   .118422
INFORM~T |   -.039303      .08972   -0.44   0.661  -.215152  .136546   .080696
CROP_M~S |    .0759044     .07739    0.98   0.327  -.075783  .227592   .002299
FARM_F~S |   -.1214737     .06923   -1.75   0.079  -.257162  .014214    .05021
WATER_~W |   -.0162353     .06316   -0.26   0.797  -.140029  .107559  -.027917
SOCIO_~S |    .1657301     .07732    2.14   0.032   .014185  .317275   .018138
ANIMAL~T |   -.0260284     .06642   -0.39   0.695  -.156205  .104148   .024364
LEGAL_~T |     .029903     .09269    0.32   0.747  -.151766  .211572   .051655
CIVIC_~Y |    .0619932     .19445    0.32   0.750  -.319123  .443109  -.031671
RIGHTS~E |   -.0931523      .0823   -1.13   0.258  -.254463  .068159   .002389
PSYCHO~T |   -.1920289     .08154   -2.36   0.019  -.351838  -.03222   .077802
POLITI~T |    .0075923     .07883    0.10   0.923  -.146905   .16209  -.074327
      D1*|    .1194989     .15704    0.76   0.447  -.188301  .427299   .483871
      D3*|   -.0666397     .16847   -0.40   0.692  -.396829   .26355   .362903
------------------------------------------------------------------------------
(*) dy/dx is for discrete change of dummy variable from 0 to 1
```

```
. mfx, predict(outcome(2))

Marginal effects after ologit
      y  = Pr(HH_SEC_STATUS==2) (predict, outcome(2))
         =  .18360969
------------------------------------------------------------------------------
variable |      dy/dx    Std. Err.      z    P>|z|  [    95% C.I.   ]      X
---------+--------------------------------------------------------------------
 AGE_1_1 |    .0006177     .00074    0.83   0.405  -.000838  .002073   52.0887
HHD_1_~E |   -.0001958     .00088   -0.22   0.824  -.001925  .001534    7.6371
HUS_1~ME |    5.64e-07     .00000    0.86   0.387  -7.1e-07  1.8e-06   7904.84
DEPEND~O |   -.0018044     .00335   -0.54   0.590  -.008376  .004767   1.01665
ECONOM~Y |    .0366576     .04494    0.82   0.415  -.051423  .124738   .022843
HUMAN_~W |    .0061893     .00981    0.63   0.528  -.013042   .02542   .019894
FINANC~W |    .0018054     .00326    0.55   0.580  -.004586  .008197    .01512
VOCATI~W |    .0022367      .0055    0.41   0.684  -.008547  .013021  -.013602
PHYSIC~W |      .01426     .01706    0.84   0.403  -.019179  .047699   .088037
SOCIAL~Y |   -.0155429     .02205   -0.70   0.481  -.058756   .02767   .034831
SOCIAL~T |   -.0166705     .02046   -0.81   0.415  -.056762  .023421   .118422
INFORM~T |    .0027112     .00673    0.40   0.687  -.010471  .015894   .080696
CROP_M~S |   -.0052361     .00824   -0.64   0.525   -.02139  .010918   .002299
FARM_F~S |    .0083796     .01004    0.83   0.404  -.011304  .028063    .05021
WATER_~W |     .00112      .00441    0.25   0.799  -.007517  .009757  -.027917
SOCIO_~S |   -.0114325     .01404   -0.81   0.416  -.038956  .016091   .018138
ANIMAL~T |    .0017955     .00491    0.37   0.714  -.007822  .011414   .024364
LEGAL_~T |   -.0020628     .00664   -0.31   0.756  -.015076   .01095   .051655
CIVIC_~Y |   -.0042765     .01404   -0.30   0.761  -.031803   .02325  -.031671
RIGHTS~E |    .0064259     .00953    0.67   0.500  -.012255  .025107   .002389
PSYCHO~T |    .0132467      .0162    0.82   0.414  -.018508  .045001   .077802
POLITI~T |   -.0005237     .00539   -0.10   0.923  -.011095  .010048  -.074327
      D1*|   -.0084472     .01475   -0.57   0.567   -.03736  .020466   .483871
      D3*|    .0037302     .00843    0.44   0.658    -.0128   .02026   .362903
------------------------------------------------------------------------------
(*) dy/dx is for discrete change of dummy variable from 0 to 1
```

```
. mfx, predict(outcome(3))

Marginal effects after ologit
      y  = Pr(HH_SEC_STATUS==3) (predict, outcome(3))
         =      .2567
```

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
AGE_1_1	.0049457	.00233	2.12	0.034	.000383	.009509	52.0887
HHD_1_~E	-.0015672	.00683	-0.23	0.819	-.014958	.011824	7.6371
HUS_1~ME	4.51e-06	.00000	2.61	0.009	1.1e-06	7.9e-06	7904.84
DEPEND~O	-.0144463	.02263	-0.64	0.523	-.058806	.029913	1.01665
ECONOM~Y	.2934835	.14707	2.00	0.046	.005227	.58174	.022843
HUMAN_~W	.0495521	.05157	0.96	0.337	-.051531	.150636	.019894
FINANC~W	.014454	.02034	0.71	0.477	-.025407	.054315	.01512
VOCATI~W	.0179076	.04076	0.44	0.660	-.061973	.097788	-.013602
PHYSIC~W	.1141667	.04515	2.53	0.011	.02567	.202663	.088037
SOCIAL~Y	-.124438	.09882	-1.26	0.208	-.318118	.069242	.034831
SOCIAL~T	-.1334651	.05918	-2.26	0.024	-.249455	-.017475	.118422
INFORM~T	.0217064	.04975	0.44	0.663	-.075811	.119224	.080696
CROP_M~S	-.0419207	.04323	-0.97	0.332	-.126648	.042807	.002299
FARM_F~S	.0670878	.04059	1.65	0.098	-.012476	.146651	.05021
WATER_~W	.0089665	.03493	0.26	0.797	-.059505	.077438	-.027917
SOCIO_~S	-.0915299	.04611	-1.98	0.047	-.18191	-.00115	.018138
ANIMAL~T	.0143751	.03681	0.39	0.696	-.057763	.086513	.024364
LEGAL_~T	-.0165149	.05138	-0.32	0.748	-.117225	.084195	.051655
CIVIC_~Y	-.0342378	.10774	-0.32	0.751	-.245404	.176929	-.031671
RIGHTS~E	.0514464	.04631	1.11	0.267	-.039322	.142214	.002389
PSYCHO~T	.1060542	.04881	2.17	0.030	.010384	.201724	.077802
POLITI~T	-.0041931	.04358	-0.10	0.923	-.089613	.081227	-.074327
D1*	-.0656958	.08664	-0.76	0.448	-.235516	.104125	.483871
D3*	.0367571	.09282	0.40	0.692	-.14517	.218685	.362903

(*) dy/dx is for discrete change of dummy variable from 0 to 1

```
. mfx, predict(outcome(4))

Marginal effects after ologit
      y  = Pr(HH_SEC_STATUS==4) (predict, outcome(4))
         =  .10491637
```

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
AGE_1_1	.0033916	.00157	2.16	0.031	.000309	.006474	52.0887
HHD_1_~E	-.0010747	.00469	-0.23	0.819	-.010265	.008115	7.6371
HUS_1~ME	3.09e-06	.00000	2.65	0.008	8.1e-07	5.4e-06	7904.84
DEPEND~O	-.0099067	.01562	-0.63	0.526	-.040523	.020709	1.01665
ECONOM~Y	.2012598	.09798	2.05	0.040	.009227	.393293	.022843
HUMAN_~W	.033981	.0349	0.97	0.330	-.034421	.102383	.019894
FINANC~W	.009912	.01385	0.72	0.474	-.017235	.037059	.01512
VOCATI~W	.0122803	.02802	0.44	0.661	-.042639	.067199	-.013602
PHYSIC~W	.0782911	.02953	2.65	0.008	.020411	.136171	.088037
SOCIAL~Y	-.0853348	.06697	-1.27	0.203	-.21659	.045921	.034831
SOCIAL~T	-.0915253	.03909	-2.34	0.019	-.168149	-.014901	.118422
INFORM~T	.0148854	.03421	0.44	0.663	-.052168	.081939	.080696
CROP_M~S	-.0287476	.02944	-0.98	0.329	-.086439	.028944	.002299
FARM_F~S	.0460063	.02789	1.65	0.099	-.008656	.100669	.05021
WATER_~W	.0061489	.02406	0.26	0.798	-.041008	.053306	-.027917
SOCIO_~S	-.0627677	.03044	-2.06	0.039	-.12243	-.003106	.018138
ANIMAL~T	.0098579	.02528	0.39	0.697	-.039695	.059411	.024364
LEGAL_~T	-.0113253	.03522	-0.32	0.748	-.080354	.057704	.051655
CIVIC_~Y	-.0234789	.07379	-0.32	0.750	-.168111	.121153	-.031671
RIGHTS~E	.03528	.03124	1.13	0.259	-.025954	.096514	.002389
PSYCHO~T	.0727279	.03253	2.24	0.025	.008967	.136489	.077802
POLITI~T	-.0028755	.02989	-0.10	0.923	-.061465	.055714	-.074327
D1*	-.0453558	.0601	-0.75	0.450	-.163148	.072437	.483871
D3*	.0261525	.06931	0.38	0.706	-.109696	.162001	.362903

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Appendix 12: Marginal effects after logit model

Marginal effects after logit
y = Pr(var68) (predict)
= .88735868

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
AGE_1_1	-.0044615	.00576	-0.77	0.439	-.015759	.006836	51.4589
EMPLOM~S*	-.061638	.26321	-0.23	0.815	-.577512	.454236	.09589
MARITA~S*	.1647636	.15752	1.05	0.296	-.143961	.473488	.383562
HUS_1~ME	-.000022	.00002	-1.40	0.161	-.000053	8.8e-06	7289.04
DEPEND~O	.2122317	.13402	1.58	0.113	-.050438	.474901	1.13996
CROP_M~S	-.1427974	.09676	-1.48	0.140	-.332443	.046848	.048011
FARM_F~S	-.1336653	.16155	-0.83	0.408	-.450306	.182976	.035502
WATER_~W	-.016749	.06915	-0.24	0.809	-.152281	.118783	.050695
SOCIO_~R	-.3010132	.20632	-1.46	0.145	-.705402	.103376	-.00296
ANIMAL~S	-.1273328	.10385	-1.23	0.220	-.330865	.0762	.00446
WEED_P~S	.0449875	.09043	0.50	0.619	-.132251	.222226	.04122
ECONOM~Y	-.5398927	.38527	-1.40	0.161	-1.29501	.215222	.054086
HUMAN_~W	-.1089257	.11035	-0.99	0.324	-.325217	.107366	.050564
FINANC~W	.5625183	.36233	1.55	0.121	-.14763	1.27267	.024357
VOCATI~W	.1066728	.11505	0.93	0.354	-.118828	.332173	-.033534
PHYSIC~W	-.2384802	.15938	-1.50	0.135	-.550866	.073905	.047209
D1*	-.360678	.26231	-1.38	0.169	-.874792	.153436	.506849
D3*	.0050847	.22338	0.02	0.982	-.432733	.442903	.356164

(*) dy/dx is for discrete change of dummy variable from 0 to 1