

Agricultural extension, sustainable livelihoods and self-reliance: The case of Illovo's small-scale sugarcane farmer development programme (Noodsberg, South Africa)

by

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Abstract

Small-scale Sugarcane Grower Development Programmes implemented in rural communities have become very popular in South Africa because sugarcane contributes substantially to both local and national economies. Illovo Sugar has adopted such development programmes with an aim of improving rural livelihood and option and also improving the South African sugar industry. In most cases, however, it appears that sugarcane development programmes are primarily driven by the pressure to meet the demand for sugar which has focused the programmes on developing sugar through small-scale farmers. This study then seeks to investigate and unravel the role that extension could and should play in sugarcane development programmes to refocus such programmes on the farmers (rather than on the commodity), to build their capacity, and to make their livelihoods more sustainable in the face of change and opportunities for improvement.

This investigation was conducted with three groups of participants; small-scale sugarcane farmers, extension worker and enablers. Enablers, in the context of this study, refers to stakeholder/s or structure/s involve in making, suggestion of changes and alteration of policies, law and processes that shapes the impact of the Small-scale Sugarcane Grower Development Programme on the programme's target farmers. In the case of this programme, the enablers are the Illovo development manager and SASRI extension specialist who were selected purposively as key informants of the study. The other participants (including farmers and extension providers) were selected using a Snowball Sampling. Thirty-five farmers participated in this study, sampled on the principle of saturation. The investigation with farmers was carried out using semi-structured interviews as basis for developing themes and focus group discussion for surfacing in-depth data. Semi-structured interview was also employed to gather data from extension workers and enablers.

From the perceptions of small-scale sugarcane farmers the study discovered that extension is primarily involved in technology transfer, particularly in the production aspect of the programme. From the perceptions of farmers, extension workers and enablers the study found that the programme is intensively focusing on ensuring that all small-scale farmers supply sugarcane to Illovo at the end of each season. The study determined that the role of extension assumes that, through transferring technology and ensuring technical support, the livelihoods of small-scale farmers will be enhanced and sustained and self-reliance will be achieved.

The study also found that the development programme focuses on building farmer knowledge to run the farm and ensure sustainability, but does not facilitate the acquisition of skills by farmers to engage with scientific enquiry. Farmers are given a limited opportunity to participate in all the activities of the programme which jeopardise their chances of being self-reliant in their farming operations. This also has adversely impacted on farmers' ability to own their development and be accountable for what they achieve. The study essentially found that the programme focuses more on developing the enterprise (sugarcane) through farmers than on building farmer capacity to improve the enterprise while sustaining their livelihoods – which is the antithesis of both theory and intention of development and extension.

In the light of this, the study suggest that in the production, finances and marketing aspects of the programme, the role of extension should be extended to engaging farmers in an extension conversation with the aim of building their capacity to engage with scientific enquiry. The agenda for improving farmer capacity can be developed around the idea of advancing farmer skills and knowledge, and creating opportunities within the programme to enhance farmer aptitude. The study further recommends a shift in the programme from technology-oriented toward more farmer-centred development that places farmers in the centre of the programme and encourages farmer participation in all the processes of the development programme. This will include adoption of a learning-based approach that suggests a learning process of investigation, assimilation and sharing to be used by all the role-players (farmers, extension and enablers) in facilitating an intervention relevant to farmers' livelihood.

Declaration

Submitted in fulfilment of the requirements for the Master's Degree in
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South Africa.

I declare that this dissertation is my own work. All citations, references and borrowed ideas have been duly acknowledged. None of the present work has been submitted previously for any degree or examination in any other University.

Sithembiso Ndlela (Candidate)

Date

Dr Steven Worth (Supervisor)

Date

Dedication

I dedicate this thesis to my lord

JESUS CHRIST

who sacrificed his life for me to live

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

Acknowledgement

My first unquantifiable appreciation goes to my ALMIGHTY GOD JEHOVA and his dearest son JESUS whom their GRACE and LOVE has strengthened me in pursuing this study.

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List of Abbreviations

DAEA	Department of Agriculture and Environmental Affairs
DRDLR	Department of Rural Development and Land Reform
FGD	Focus Group Discussion
GDP	Grower Development Programme
IAS	Investigation, Assimilation and Sharing
KDA	KwaZulu Department of Agriculture
KZN	KwaZulu-Natal
NGO	Non-Government Organisation
PD&VCC	Pest and Disease and Variety Control Committee
SA	South Africa
SACGA	South African Cane Growers Association
SASA	South African Sugar Association
SASRI	South African Sugarcane Research Institute
SGDP	Small-scale Grower Development Programme
SGDT	Small Grower Development Trust
SL	Sustainable Livelihood
SLA	Sustainable Livelihood Approach
UFA	Umthombo Agricultural Finance
WWF	World Wildlife Foundation

Chapter One: Introduction and overview

1.1. Background of the study

The sugarcane industry has recently become a significant contributor to the global economy given the substantial increase in demand for sugar in the world. Countries like Brazil, the United States and countries in Europe have experienced the pressure of having to acquire more land for the purpose of increasing the production of sugarcane. The expansion of sugarcane fields has fostered the replacement of food production land which has resulted to rising food prices. Efforts to meet the global demand for sugar has also led to the exploitation of sugarcane workers, making them agents of the interests of the sugar industry in the guise of improving the farmers' livelihoods (Mendonca *et al.*, 2013).

Africa's sugar industry faces the same pressure and had similar responses in terms of expanding production to meet the growing demand for sugar. And it has also seen an increase in the cost of food due to conversion of food lands to sugarcane. Thus the question arises as to how the growing demand for sugar, which facilitates market opportunities, can benefit the rural farmers? Given the fact that the largest producers of sugarcane, which are Brazil and India, negotiated a free trade with the EU market, African countries, with limited land and other resources related to sugarcane production, want to ensure that the poor farmers benefit from this opportunities (Richardson, 2010; Neves and Chaddad, 2012).

Illovo, being the dominant sugar industry in Africa, is in the process of encouraging and supporting the sugarcane out-growers in rural communities to produce more sugarcane so as to improve their livelihoods options and enhance social cohesion. This opportunity is intended specifically to improve rural livelihoods through creating employment and strengthening entrepreneurship. In seizing the opportunity, the government is expected to play a role in subsidizing the out-growers in rural communities with necessary infrastructure, equipment and training about producing sugarcane for a formal market (Richardson, 2010). Sugarcane development programmes target rural farmers/communities that are located near the sugar mills in South Africa and encourage them to form farming associations or co-operatives (Neves and Chaddad, 2012).

The issues regarding the contribution of sugarcane development programmes on rural livelihood being painted in the global context are slightly different when considered in the

South African context. The issues that are dominant in South Africa regarding the topic are mainly associated with the declining sugarcane production on rural out-growers, which is caused by a lack of skills and knowledge, organizational capacity, inspiration and cohesiveness and integration across the agro-processing phase (Hurly and Sibiya 2011).

In response to these production issues, the South African sugar industry has committed to assisting rural farmers overcome all these challenges related to declining production. The South African government has invested substantially in the sugar industry, primarily to assist rural communities to improve their livelihoods, and also for the broader aim of improving the nation's economy (Tongaat Hulett, 2013; South African Sugar Association, 2013).

The pressure that the sugar industry is exerting and its focus in response to that pressure, raises the question of whether the out-growers are viewed as economic assets or as people who are working toward improving their livelihoods. As extension is the vehicle through which sugarcane programmes are implemented, this study investigates the role of extension in improving and sustaining livelihoods of the sugarcane farmers while maintaining the steady supply of sugarcane to the mill.

1.2. Research question

The research discussed in this dissertation was driven by the following question: To what extent does/can extension promote sustainable livelihoods among small-scale farmer and ensure a steady supply of sugarcane to Illovo sugar mill? This central research question has given rise to the following sub-questions:

- a) What are the characteristics of the livelihoods of small-scale sugarcane farmers from a sustainable livelihood perspective?
- b) To what extent is private and public extension contextualized in farmers' livelihoods?
- c) To what extent is Illovo's Small-scale Grower Development Programme contextualized in in farmers' livelihoods?

1.3. Methodology

This study employed a qualitative approach. Patton and Cochran (2002) and MacDonald and Headlam (2009) define the qualitative research method as a study which seeks to understand

the social dimensions of the respondents and the problem. Goddard and Melville (2004) and KL University (2015) refer to the qualitative approach as motivation-based research and define it as a study that is interested in inquiring about the reason for human behaviour. This research approach allows the study to be flexible in all the research processes, as it seeks to explore the in-depth nature of the problem, issue or phenomenon. The main objective of the approach is to describe the variation in the phenomenon, situation or attitude from what has been observed in a situation, historical events and through different perceptions of different people relevant to the issue (Syed, 2012; Langen, 2009).

The purpose of this research is to understand the social and psychological phenomena of the people involved in the Small-scale Grower Development Programme. In this study the researcher had to live within the community in which the study was based, in an attempt to experience these phenomena personally. This study is primarily concerned with the participants' experience of the phenomena as opposed to the description of the phenomena. The research design is therefore governed by the fulfilment of this purpose. The data collection procedures were made flexible in order to ensure the richness and diversity of data gathered during the research process (Welman *et al*, 2005).

Within the scope of the qualitative research approach, a case study research method was employed. As defined by KL University (2015), case study research is a method of exploring and analysing the variation of the phenomenon within a single case. This study seeks to understand the uniqueness and idiosyncrasy of the particular case in all its complexity (Welman *et al*, 2005). In a case study a small number of units of analysis is studied intensively; the 'case' being studied could be a family, a community, an institution or a firm (KL University, 2015; Welman *et al*, 2005). This study in particular, wanted to understand the role of extension in promoting sustainable rural livelihoods and self-reliance among small-scale sugarcane farmers in the context of the Illovo Small-scale Grower Development Programme. This study was conducted for the purpose of tracing the history of the programme in order to understand the complexity of the factors functioning within the social setting in which the programme ran. The case study involved a multi-dimension analysis of the phenomenon, where the views of all relevant stakeholders and their relationship to one another were examined (KL University, 2015; Nieuwenhuis, 2007).

1.4. Research area and sampling

This study was conducted in the Noodsberg area in KwaZulu Natal, South Africa. The study targeted major stakeholders involved in the Small-scale Grower Development Programme which was put into operation by the Illovo Sugar mill. The stakeholders that participated in this study consisted of small-scale sugarcane farmers who were members of two cooperatives within the Swayimane community (Siphapheme and Nzwakele Co-op), the local government extension officer, Illovo extension officers, Illovo development manager, and extension specialist from SASRI.

Sampling is defined as a process of selecting a representative part of the population for the purpose of exploring the characteristics of the whole population selected. Sampling techniques are used in our daily life e.g. a chef tastes the small quantity of rice in a pot to see if it is well cooked and makes a generalised conclusion about the rest of the rice in the pot (KL University, 2015 and Sindhu, 2012). In this study, the whole rice in the pot represents all the people that are involved in the Small-scale Grower Development Programme and the tasted rice represents the people that participated in this study.

The study purposively selected three groups of people to participate in this study. They were selected from small-scale farmers under the Grower Development Programme within the Swayimane community, extension officers serving small-scale sugarcane farmers, and Illovo officials involved in the programme. Purposive sampling, as described by Patton and Cochran (2002) is a non-probability sampling method which selects participants because they are likely to yield useful data for the study.

The snowball sampling technique was used to identify other relevant stakeholders and institutions to participate in this study. Snowball sampling occurs when a few members of the relevant population are approached and those members identify other members within their population with similar characteristics. The latter will then identify further members that fall under the required study population (Welman *et al*, 2005).

Using snowball sampling, the researcher approached the Illovo Development Manager as a key informant to help identify cooperatives that are under the Small-scale Grower Development programme within the Swayimane community. The Illovo Development Manager then identified a public sector extension officer that is working with the small-scale sugarcane farmers to liaise between the researcher and the cooperatives. Trust was

established with two executive members of the two cooperatives that were selected by extension officers. The snowball sampling technique was also used to identify and locate members of the cooperative respectively within the community.

Using snowball sampling, another relevant stakeholder involved in designing the extension programme was identified. This stakeholder was from SASRI and filled the position of extension specialist. Other stakeholders identified by the key informant, such as Pest and Disease and Variety Control Committee (PD&VC) and the World Wildlife Fund (WWF) were not included as they were not relevant to the study.

This study did not have a specific or fixed sample size because it adopted the principle of saturation. This, in accordance Glasser and Strauss (1967), means that the size of the research sample was determined by the state where the saturation has been reached and no new information and insight was forthcoming.

1.5. Research methods

1.5.1. Literature review

A literature survey can be defined as the critical exploration of a collection of research publications, books, journals and other documents related to the proposed study (Rajasekar *et al*, 2013). A literature review can also be defined as an evaluative report of studies related to the selected area of enquiry written and published by other researchers. Additionally, a literature review can be used to check whether a similar study has been conducted before and to know whether the problem has already been solved (Rajasekar *et al*, 2013).

The literature review for this study comprised describing, summarizing evaluating and clarifying the literature to create a theoretical framework for the study. It was also used to understand the nature of the research in this study and to create a theoretical framework to guide the research design (Boote and Beile, 2005).

1.5.2. Document analysis

Document analysis was employed in this study in-order to provide insight and understanding on the problem studied. The National Science Foundation (2002) defines a document as a written piece of material that is not produced for the purpose of research studies. Analysis is then significant as it allows the researcher to select data that is relevant to the study. This

study reviewed and analysed the SASRI document which is the primary guideline to implementing the Small-scale sugarcane Grower Development Programme (SCGDP) in-order to get an immersive understanding of the study context.

1.5.3. Interviews

This study employed semi-structured interviews defined by Patton and Cochran (2002) as a loosely structured conversation between the researcher and respondent which is made up of open-ended questions to define the area to be explored. The semi-structured interview method was central to the primary data collection process. It was used independently during one-on-one interviews in-order to acquire in-depth data relevant to investigation. It was also used in conjunction with focus group discussions and a rich picture to surface deep information about the subject matter.

1.5.4. Focus Group Discussion

A focus group discussion (FGD), as the name suggests, is an organised informal discussion with the intent of acquiring in-depth data on a particular topic. FGDs were held with six respondents as means to achieve full participation and control (Patton and Cochran, 2002). The parameters for the FGD were set by the semi-structured interviews (conducted prior to FGD) to ensure that participants are knowledgeable or have experience regarding the role of extension amongst Small-scale sugarcane growers. The usefulness of the FGD in this study, as Gibbs (1997) describes it, was to draw upon the respondents' attitudes, feelings, beliefs, experiences and reactions about the matter under investigation.

1.5.5. Participant Observation

Observation can be defined as a visual assessment of nearly any subject matter such as the world around the researcher, people and other measurable events. There are two types of observations mostly used in research studies: Participant observation; and unobtrusive observation (Driscoll, 2011). This study employed participant observation, which was relevant as this was a phenomena-based study which required the researcher to interact with the respondents. Participant observation is defined as a visual assessment that requires the researcher to interact with the participants and become part of the community. Data collected from this method was descriptive and makes the reader understand what happened and how it happened (Driscoll, 2011; Patton and Cochran, 2002).

1.5.6. Rich Picture

A Rich Picture was developed and used to understand the interaction and function of all the involved/relevant stakeholders within the small-scale grower development programme that contributes toward achieving the goal and objective of the programme. It was used in interacting with the extension specialist from SASRI. A Rich Picture is defined as a graphical technique used to represent a situation, a problem or concept. This method was useful in this study because it is one of the most flexible and universal communication tools which did not require participants to be experts in drawing. The rich picture also provided the basis for further communication since the researcher used it in conjunction with the semi-structured interview to surface more descriptive data (Horan, 2000).

1.5.7. Venn diagram

A Venn diagram was used in this study to summarise the results from the FGD and, in accordance with Cavestro (2003), to surface deeper insight about the contribution of the Small-scale Grower Development Programme to the livelihoods of sugarcane farmers. This method was then used to visualize the issues that were discussed during the FGD and to show relationships and connections between those issues and the Small-scale Grower Development Programme's extension programme.

1.5.8. Reasons for combining methods

This study has collectively used a variety of research methods for the purpose of achieving triangulation, which refers to the use of more than one approach in a research study for the purpose of enhancing credibility and reliability of the findings. This study, in particular, used a methodological triangulation by employing more than one research method in investigating the same research question (Bryman, 2004). Triangulation was also used to make the findings and conclusion of this study valid and trustworthy.

1.5.9. Data analysis

Data analysis is defined as a systematic method of reducing and organising data to produce findings that a researcher can interpret (Langen, 2009). De Vos (2002:339) cited in Langen (2009) states that data analysis is a challenging process and requires creativity, as a researcher has to establish an intimate relationship with the participants and the data gathered in the process. This study employed the content data analysis technique defined as a means of

analysing raw primary data in order to identify the main themes emerging from responses given by participants (Syed, 2012).

This study followed the following steps in analysing data using content analysis technique (adapted from Syed (2012):

Step 1: Identify the main themes

Step 2: Classify responses under the main themes

Step 3: Integrate themes and responses into the text of a report

1.6. Importance of the study

Sugarcane development programmes in rural communities have become very popular in South Africa because sugarcane contributes substantially to both local and national economies. Small-scale Development Programmes were initiated ostensibly for the primary purpose of improving rural livelihood strategies and options, and with the additional aim of improving the South African sugar industry. Illovo sugar adopted and implemented one such programme. In most cases, however, it appears that sugarcane development programmes are, in reality driven primarily by the pressure to meet demands for sugar and by the need to improve the national economy (Richardson, 2010; Neves and Chaddad, 2012). This shifts the focus from developing rural farmers and helping them improve their livelihoods to maximising production through these farmers.

This study then sought to investigate the role that extension could and should play in sugarcane development programmes. Extension has the opportunity to facilitate a move beyond the focus on the commodity to an agenda that builds farmers' capacity and makes livelihoods more sustainable in the face of change – which is the original intent of the programmes.

This study will provide Illovo, and other stakeholders relevant to the Small-scale Grower Development Programme, with a theoretical framework for assessing the role of agricultural extension in promoting sustainable rural livelihoods amongst small-scale farmers, in the light of building farmer capacity to be self-reliant in their operation in the context of their development programmes. This study will also provide recommendations on how the Small-

scale Grower Development Programme improves their extension services to ensure that the outputs of the programme are in line with the goals and objectives.

1.7. Study limitations

1.7.1. Generalisation of the study's findings

This study employed a case study research method to understand the phenomenon of sugarcane development programme from the perceptions of people involved in the Small-scale Grower Development Programme in a specific area of Noodsberg, KwaZulu-Natal, South Africa. This then implies that the results and conclusion drawn from this study cannot be generalized because perception of people from a different location may be different from of this study, thus making the output of this study only relevant to Noodsberg. Nevertheless, the findings of the study will contribute to the growing understanding of the role of extension in agricultural development programmes – particularly those involving vulnerable small-scale farmers.

1.7.2. Size of the sample

In selecting the participants for this study, a snowball sampling technique was used and the size of the sample was determined by the principle of saturation, which stops the investigating when no new information and insight was forthcoming.

1.8. Dissertation presentation

This dissertation comprises seven chapters in addition to the introduction chapter. Chapters 2-6 are presented a journal articles in preparation for submission for publication. There is, therefore, some unavoidable repetition of information and overlap of themes in some of the chapters of this dissertation. Because of the paper format used, each chapter has its own reference list.

The chapter are presented as follows:

Chapter 2: Entitled, 'Creating Self-Reliance and Sustainable Rural Livelihoods amongst Small-Scale Sugarcane Farmers', this chapter investigates the characteristics of self-reliance and sustainable livelihoods and ways in which they can be achieved or created.

Chapter 3: Entitled, 'Understanding Grower Development Programmes in KZN', this chapter investigates the history of developing small-scale sugarcane farmers and how the programme is currently implemented.

Chapter 4: Entitled, 'A Framework for Assessing Agricultural Extension for Small-Scale Sugarcane Famers', this chapter explores agricultural extension approaches and methods relevant to achieving sustainable livelihoods amongst small-scale sugarcane farmers.

Chapter 5: Entitled, 'Perceptions of Small-Scale Sugarcane Famers about Agricultural Extension for Small-Scale Sugarcane Famers', this chapter explores the role that development programmes and their extension components play in improving and sustaining livelihoods of the farmers from farmers' perspective.

Chapter 6: Entitled, 'Perceptions of Extension Provider about Agricultural Extension for Small-scale Sugarcane Farmers', this chapter explores the role that development programme and its extension play in improving and sustaining livelihoods of the farmers from the programme's implementers' (enablers') perspective.

Chapter 7: Entitled, 'The Role of Agricultural Extension in Promoting Sustainable Livelihoods amongst Small-Scale Sugarcane Farmers', this chapter provides a general discussion, conclusion and recommendations for improvement of the situation based on the findings of the study.

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Chapter Two: Creating self-reliance and sustainable rural livelihoods amongst small-scale sugarcane farmers

2.1. Introduction

Developing small-scale sugarcane farmers in South Africa has been a success in terms of improving financial stability of farmers, however, little attention is placed on creating self-reliance and sustainable rural livelihoods. This paper explores how self-reliance and sustainable rural livelihoods can be improved among small-scale sugarcane farmers.

The paper first defines small-scale farmers and provides characteristics that describe them. It then defines the concept of self-reliance, and provides indicators and means to measure self-reliance. Next, the paper defines the concept of sustainable rural livelihoods and provides indicators and means to measure sustainability of livelihoods. Finally, this paper presents a conceptual model embracing the two concepts of self-reliance and sustainable rural livelihoods.

2.2. Small-scale sugarcane farmers in SA

2.2.1. Defining small-scale farmers

Mugera and Karfakis (2013) and Kirsten (1998) state that the term ‘small-scale farmer’ does not have a singular distinctive definition as people define it differently by its indicators or characteristics. Hildebrand (1986) and Kirsten (1998) also state that ‘small-scale’ is a relative term and it creates confusion when this term is used in isolation to identify or define a farmer. There is also an understanding that the term small-scale cannot be equated simplistically to land size, given that in some countries a few hectares of land can be regarded as ‘large’ depending on the enterprise farmed and the level of intensity (Kirsten, 1998). Conversely, Hildebrand (1986) argues that, in other countries, a farm comprised of many hectares of land can be regarded as ‘small’ considering factors such productivity, economic viability and efficiency. Nevertheless, the most common indicator used to define the term small-scale farmer is associated with land access and size. In this context a typical description for small-scale as it applies in South and Southern Africa is that small-scale farmers reside in remote

environments under communal tenure with limited access to tribal land which results in individual farmers farming on less than 2 hectares of land (ha) (Mugera and Karfakis 2013).

Lenin (1967) refers to small-scale farmers as ‘peasants’, a term used to define farmers who own or rent a small piece of land for the purpose of growing crops and keeping livestock (Cambridge Advanced learner’s Dictionary, 2014). Peasants are described as people who are able to meet the livelihood demand of simple production from their personal efforts and resources. The survival of the peasant is described as being based on utilising their limited capital or labour power and/or becoming unskilled labour for large-scale farmer. Peasants that are financially stable are able to expand their production, through increasing the scale and size of production, and can then reach the level of capitalist farming over time (Lenin, 1976; Cousins, 2013).

Kirsten (1998) states that the term ‘small-scale’ in South Africa is associated with the opposite characteristic of a large-scale farmer and, in a sense, that it is defined in a negative light. Kirsten adds that in South Africa small-scale farmers are characterised as being non-productive, non-commercial and operating at subsistence levels, and being located in former homelands. Whilst large-scale farmers are referred to as being ‘more productive, efficient and using advanced technology’, this creates a negative impression about small-scale farmers as it perpetuates the assumption that they will always remain at a subsistence level of farming. The common interpretation of the term ‘small-scale farmer’ equates it with black homeland farmers who only farm to feed their families and sell the surplus produce (Hilderbrand, 1986; Kirsten, 1998).

This paper defines small-scale farmers as farmers/ whose scale of operation is too small to attract the support services (e.g. credit services, input suppliers and formal markets) they require to increase their farm’s productivity and their competitiveness. In this paper, with particular regard to South African sugarcane farming, small-scale refers to those farmers that grow sugarcane on land that is less than 30 hectares in size. Farmers in this context are not necessarily resource poor with regard to the commodity of focus (sugarcane), but the most dominant challenge is land access and size (Hilderbrand, 1986; Kirsten, 1998; Eweg 2005) and their scale of operation does not readily attract support services. More specific characteristics that define small-scale sugarcane farmers will be discussed further in the following section.

2.2.2. Characteristics of small-scale sugarcane farmers

Small-scale sugarcane farmers have unique characteristics that distinguish them from large-scale farmers. Understanding these characteristics helps frame support for them that is relevant to their circumstances. One aspect is general characteristics; another is their dominant functional characteristics.

2.2.3. General characteristics

South Africa has approximately 50000 sugarcane producers. This includes the 2000 large-scale producers who own/operate on more land than is collectively owned/operated by the 48000 small-scale producers. The large-scale farmers tend to own their land; the small-scale farmers generally operate on tribally held land. Further, large-scale South African sugarcane producers produce approximately 80% and small-scale farmers produce the remaining 20% of the sugarcane milled in South Africa. Amongst the large number of small-scale farmers producing sugarcane on tribal land, more than half are women above the age of 40 (Dubb, 2013).

Nothard *et al* (2006) draw a distinction between large-scale and small-scale sugarcane farmers based on the type of contact a farmer has with the Mill Cane Committee (MCC) which represents the interest of the local cane farmers. Figure 1 shows the differences in access. Large-scale farmers access the MCC through the local farmer's council which was put in place by the local sugar mill to represent the interests of the local farmers. Small-scale farmers operate in a business environment that has various channels. Small-scale farmers access the MCC first through a sub-committee which was put in place by South African Cane Farmers Association (SACGA) and which is responsible for the addressing the needs of the local small-scale farmers in the sub-location of the milling area. Small-scale farmers have another channel, called the Local Association, which was put in place by South African Sugar Association (SASA) as the board with which small-scale farmers and contractors are registered as partners of the sugar mill. Figure 1 also shows that the local association often set the tariffs rate for the services provided by contractor. Sub-committee is shown to control the allocation of contractors to small-scale farmers (Nothard *et al*, 2006).

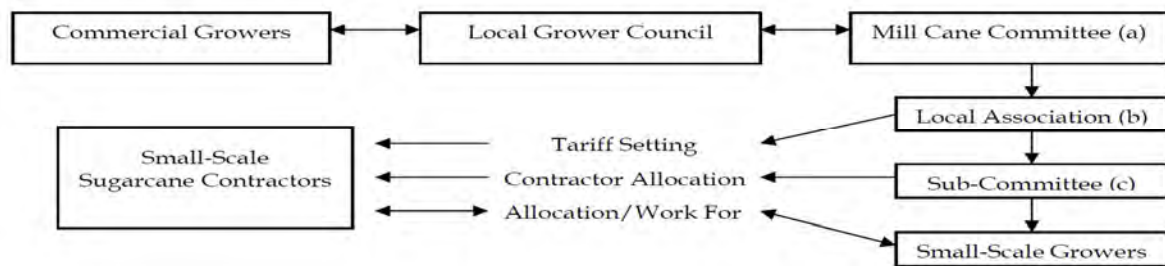


Figure 1: Organisation of sugarcane farmers and contractors

2.2.4. Dominant functional characteristics of small-scale sugarcane farmers

The dominant functional characteristics of small-scale sugarcane farmers cover eight factors. These are land, capital, management level, labour, age, gender and education, technology and infrastructure, and production framework.

Land: Land has three potential dimensions: the area available to the farmer; the attitude toward that land; and land quality. Small-scale sugarcane farmers, particularly in the South African context, have small tracts of land when compared to large-scale farmers.

Kirsten (1998) suggests that small-scale in terms of land size refers to agricultural production taking place in one hectare or less. Tshuma (2014) extends this noting that some small-scale farmers have access to more than one hectare but due to limited inputs at their disposal they produce on a small piece of land. On the other hand, Hildebrand (1986) states that a small-scale farmer in the context of sugar-cane production is defined as a farmer that produces sugarcane on 30 hectares of land or less (Eweg, 2005; Hildebrand, 1986).

Although it is often argued that land available to small-scale (black) sugarcane farmers is poorer than land available to large-scale farmers, land quality varies too much to be very viable as a descriptor of small-scale sugar cane farmers (Eweg, 2005; Hildebrand, 1986).

Capital: While all farmers have limited capital, small-scale farmers have substantially less capital and less access to credit than large-scale farmers. It is often the case that the small-scale farmer is characterised by low levels of fixed capital (mostly influenced by the size and tenure of land) and by low levels of operating capital. While they aspire to acquire more land through obtaining loans, the loan itself tends to severely limit operating capital (Eweg, 2005

and Dubb, 2013). These factors conspire to inhibit expansion. It is thus argued that the indicator for measuring the capital/finance characteristics is access to funding, which includes the farmer's ability and/or opportunity to earn money through employment and eligibility of the farmers to acquire loans (Tshuma, 2014; Eweg, 2005).

Management level: In the case of large-scale sugarcane farmers, there is most often an operational manager for all the various facets of the farm (e.g. production, marketing, financial) who oversees and manages these aspects. Conversely, small-scale sugarcane farmers do everything for themselves because they cannot afford (financially) to employ labour from outside. In most circumstances, however, small-scale farmers are not conscious of their profit/loss because they do not have sufficient management capacity such as keeping records of financial, production and marketing aspects (Eweg, 2005; Dubb, 2013).

Labour in both large-scale and small-scale farming is a limiting factor because of the laws governing farm workers' salaries. However, small-scale farmers suffer a greater impact. Most large-scale farmers have access to sophisticated mechanical technologies that can be more cost efficient than manual labour. However, small-scale farmers either use family labour or have to hire contract workers to complete various operations. The latter is particularly common because the majority of small-scale farmers are women who are old and not fit enough to engage in physical labour. Further, most contractors consist of people from outside the community or area (foreigners), which drives up the cost of hiring contractors, which results in higher input costs (Eweg, 2005 and Dubb, 2013). Kirsten (1998) and Tshuma (2014) clarify that a 'labour' indicator for a small-scale farmer is that they employ family members as labour force because they lack access to adequate labour-saving technologies.

Age, gender and education are indicative characteristics of small-scale farmers (Tshuma 2014). The majority are over the age of 40 and at least 60% are women (Eweg *et al*, 2009)..., and are generally characterised by low levels of education and high rates of illiteracy (Tshuma, 2014; Cousins, 2013). Thus one can argue that characteristically, small-scale sugarcane farmers in South Africa are semi-literate, middle-aged to elderly women. Given the general lower social status of women in South Africa, these characteristics translate into limiting their ability to obtain formal agricultural training or to take advantage of opportunities such as adopting newer technology, negotiating market prices, using relevant information and telecommunication systems (Tshuma, 2014; Cousins, 2013).

Technology and infrastructure: Small-scale farmers possess limited knowledge and skills to use modern farming technologies which is partly influenced by their lack of basic education which limits their ability to acquire new skills. As a result, they adopt few of the new technologies availed to them. Similarly, small-scale farmers are characterised by lack of adequate basic farming infrastructure such as transport, communication links, storage facilities and roads which limits them from being more efficient and profitable farmers (Tshuma, 2014; Kirsten, 1998; Eweg, 2005).

These functional characteristics, coupled with their limited land and expansion options, weak management systems and lower status in terms of access to institutionalised support within the sugar industry, clearly highlight the vulnerability of the livelihoods of small-scale sugarcane farmers. Their options are limited; their livelihoods stagnant.

2.3. Self-reliance in the context of small-scale sugarcane famers

Self-reliance is defined as a state of being independent in a manner that an individual possesses the ability and capacity to make sound decisions and do things on their own. Farmers' ability and capacity to be self-reliant also entails that they are able to improve and strengthen their livelihoods by consciously using existing knowledge and available resources (Kim and Isma'il, 2013; Fonchingong and Fonjong, 2013).

Ojameruaye (1992) adds that self-reliance, in the context of development, is the state where any initiative or undertaking relies primarily on internal (human and material) resources as opposed to external resources. Similarly, Sandbrook (1985) defined self-reliance as a state of mind one views the mental and material resources one has at one's disposal as the primary stock to be used to pursue objectives. The UNHCR (2005) further suggests that being self-reliant implies that a farmer has social and economic abilities to meet his/her essential needs in a sustainable manner. Self-reliance, thus, has an element of emotional accomplishment in achieving one's goals using one's own resources. Poosiri (2007:359) suggests that self-reliance has three components: "a strong mind, step-by-step development, and good management" which he equates, respectively, with self-confidence grounded in values and wisdom, the readiness to learn and progress incrementally, and the ability to manage and utilise available resources.

On a collective scale in a (agricultural) development context, self-reliance is a development approach which resonates people-centeredness and entails participation in all levels of the development initiative (Anyanwu, 1992) which seeks to develop and strengthen one's livelihood by reducing the vulnerability of assets and increasing their asset base (UNHCR, 2005; Fonchingong and Fonjong, 2002). Kim and Isma'il (2013) stress the importance of understanding that self-reliance does not imply that farmers should use only their own resources and capacity, but to be able use external support and resources to sustain and augment internal resources. Self-reliance, as a development approach, emphasises the involvement of farmers in planning and decision-making, whilst also regarding and treating farmers as active partners of the initiative rather than as passive beneficiaries (UNHCR, 2005).

Self-reliance, literature suggests, is a state of being that has both material and emotional aspects. Thus developing self-reliance amongst small-scale sugarcane farmers requires interventions that go beyond welfare such as issuing food parcels, start-up inputs or other relief-based initiatives often embedded in self-help development approaches. Interventions should rather be aimed at broadening the opportunities to acquire the characteristics of self-reliance themselves as integral and intentional outcome of the intervention.

2.3.1. Characteristics of self-reliance: indicators and means of measurement

Literature suggests six key characteristics of self-reliance. These include persistence, weaned, draw on own resources, active participation/energetic, involved in decision-making, and taking responsibility for one's actions.

▪ Persistence

Persistence refers to the ability to continue progressing and advancing in the absence of external help. In the case of agricultural development, persistence refers to the farmer's ability to sustain or continue with the development process even when the project/programme is phased out. The greater the level of persistence in the farmer, the more self-reliant the farmer is. The means of measuring the persistence in farmers will include observing if farmers are practically continuing, on their own, with the changes implemented and/or skills acquired (Kim and Isma'il, 2013; Ojameruaye, 2004).

Weaned

In the context of small-farmer development, weaned – being accustomed to managing without something on which one was previously dependent – refers to the condition where farmers understand that the sustainability of their livelihoods is dependent on their own efforts and that continued reliance on external support diminishes their state of self-reliance (Anyanwu, 1992) and act accordingly with increasing confidence. The indicators for weaned farmers include their ability and willingness to use their own/local resources in improving and sustaining their livelihoods and reducing dependence on external support and resources (Anyanwu, 1992; Ojameruaye, 2004) but drawing on such support and resources with wisdom and as means of increasing capacity.

Inclusive participation

Inclusive participation refers to farmers' involvement in all the processes of improving and sustaining their livelihoods in an intervention. This kind of participation stresses that farmers inclusively engage in determining their own development, derived from an understanding that farmers define their development according to their needs, values and aspirations.

Participation as an indicator for self-reliance stresses that the development be relevant to the situation and livelihoods and gives farmers freedom to intervene and own the process and outcomes of their development (Preiswerk, 1980; Fonchingong and Fonjong, 2013).

Draw on own resources

Another significant feature that reflects farmers' self-reliance is the ability to utilize local resources. Effective and efficient utilization of local resources does not occur automatically but it requires farmers to have capacity and freedom to draw from them (Ojameruaye, 2004). On the other hand, Kim and Isma'il (2013) add that it might be necessary that farmers draw on external in some circumstances which will require farmers to also have the capacity to access external resources as means of supplementing the local resources and the capacity to know when this is needed. Self-reliance suggests the ability to balance the use of own and external resources without becoming dependent on external resources.

Involved in decision-making

Involvement of famers in decision-making about the intervention is influenced by two factors; capacity and freedom. For farmers to be able to make wise and good decisions in

their operations, their capacity needs to be enhanced. However, while a farmer may have the capacity to make wise decisions, if he is not granted the opportunity to exercise his decision-making skills, then he effectively remains dependant on others who make decisions on his behalf. A farmer's freedom to participate in decision-making processes is dependent on the policies, institutions and processes that impact on his livelihood. Promoting involvement of farmers in decision making-during an intervention builds capacity and fosters development according to the farmer's needs, values and aspiration (Preiswerk, 1980; Kim and Isma'il, 2013). This must be a genuine element of development programmes; not merely in word, but in practice.

Taking responsibility for one's actions

'Taking responsibility for one's action' in the light of self-reliance takes in to account farmers ability and willingness to be accountable for all the outcomes of their development activities. This also include farmers understanding that external support should only come as a supplement to their operation as opposed to a replacement of local initiative and efforts. 'Taking responsibility for one's actions' as an indicator for self-reliance gives priority to what farmers can do for themselves, given understanding that farmers know what they want and that they are masters in their own operations (Anyanwu, 1992; Fonchingong and Fonjong, 2013).

While these characteristics are presented separately, it is immediately the true self-reliance lies in the integration and convergence of these characteristics. Being weaned, for example, is closely related to being involved in decision-making and taking responsibility for the outcome of decisions. Such self-accountability will require persistence (when decisions return unfavourable results) and the ability to know when to draw on external resources. This suggests that fostering self-reliance amongst farmers is an iterative process that will see incremental progress, further suggesting that it will require time, patience and dedicated persistence on the part of those implementing, monitoring and evaluating development programmes.

2.3.2. Sustainable livelihoods in the context of small-scale sugarcane famers

Sustainable livelihoods can be looked at from two perspectives. First is the concept of livelihoods – what they are and how they are made sustainable. Second is the sustainable

livelihoods approach (SLA) and how it would be applied in the advancement of small-scale sugarcane farmers.

2.3.3.1. The concept of livelihoods and their sustainability

There are three words that tie the concept of sustainable livelihood together: capability; equity; and sustainability. A livelihood can be defined as one's means of making a living using the assets and capabilities available. A livelihood is sustainable when it can endure for a long time and can rebound from setbacks or disruptions (Chambers and Conway, 1991). Thus, livelihoods that are sustainable derive from people's capabilities to make a living using their various assets and to cope with, recover from and adapt to stresses and shocks. An added dimension is that a livelihood is only sustainable if it does not deprive others of livelihood options and demonstrates equity (Hoon *et al*, 1997).

Capability is generally defined as one's ability to perform a certain basic function. However, in the context of Sustainable Livelihoods (SL) it is defined as one's ability to make use of the available livelihood opportunities and to cope with stress and shocks which one's livelihood strategies may encounter (Chambers and Conway, 1991).

Equity is generally defined and measured in terms of financial resources. In the context of SL it is broadly defined as a system or method of ensuring fair distribution of assets, capabilities, opportunities and enhancement of one's economic state (Chambers and Conway, 1991).

The concept of sustainability is defined to include three basic components: economic; social; and environmental. Economic sustainability captures the idea that the livelihood can sustain a steady and predictable flow of income in excess of expenses. Social sustainability refers to the notion of social equity, which entails ensuring all people have equitable access to basic needs such as health, education, security and human rights and that the livelihood maintains human dignity. Environmental sustainability refers to the management and conservation of natural resources to ensure the long-term productivity of the natural resource base (Ahmed and Lipton, 1997).

2.3.3.2. Sustainable livelihoods as a development approach

Sustainable livelihood as a development approach suggests a shift from technology/material-orientated approach toward a more people-centred approach to development. Rather than

predetermining outcomes, the SL approach defines the development in terms of people and what they can contribute to their own and to other's livelihoods. It also stresses enabling people to think about the objectives, scope and priorities for their development in order to improve progress out of poverty to wealth creation (Caroline and Carney, 1999; SWVR, 2011).

In the context of small-scale farmers the sustainable livelihoods approach would place farmers at the centre of the process, would focus on the farmers' livelihoods, and would support and empower small-scale farmers, embracing the variety of strategies and activities aimed at sustaining their livelihoods. Further, this approach would adopt a holistic approach that considers all the aspects of cane farmers livelihoods and related activities both on and off farm (SASA, 2003; SWVR, 2011).

2.3.3.3.Sustainable livelihoods indicators and means of measurement

Ahmed and Lipton (1997) state that the most common method of evaluating and assessing sustainable livelihoods will be through using the 'five capital approach', commonly known as the Sustainable Livelihoods Framework. This framework serves as a tool to assess the capital basis and status of a household's livelihood.

The sustainability of livelihoods can be can also be measured by analysing or examining the strategies that farmers use to cope and adapt to stress and shocks. Coping most commonly refers a short change or response to an immediate event, e.g. a response to a drought or hail storm (Hoon *et al*, 1997). Adapting, on the other hand, is a long-term change which particularly entails a change in ones behaviour over time, e.g. a gradual change in farming system to adapt to changing climatic conditions (Scoones, 1998).

Literature suggests four characteristics to be considered as indicators to measure progress towards fostering sustainable livelihoods among farmers. These are: resilience; nested relationships between farmers, national and global levels (having common goals); creating of livelihood opportunities; and sustained natural resources base.

Resilience

Resilience is about vulnerability. The more vulnerable a livelihood is, the less sustainable it is. A livelihood that is sustainable should be able to cope and recover from stresses and

shocks as an indication of its resilience (Scoones, 1998). This kind of resilience is key to both livelihood adaptation and coping. However, it is crucial that rural farmers learn to determine which adaptation strategies will increase or decrease the vulnerability of their livelihoods. This indicator is driven by the concept of 'learning to learn' in the face of change which entails that farmers should be equipped to solve any problem they might encounter, and not only a particular problem present at a certain period of time or for a specific area (Hoon *et al*, 1997). This indicator can be assessed by analysing a range of factors, but the most common measure is an evaluation of the farmer's historical responses to shocks and stresses (Scoones, 1998).

Creating livelihood opportunities

An effective livelihoods-based development programme expands livelihood strategies. This is one of the approach's key features. Expanded opportunities can be in the form of an on or off-farm, part-time, part of wage labour and subsistence production that translate to measurable working days for a certain period/portion of the year (Scoones, 1998). Sen (1975) identified three aspects of creating opportunities in the context of livelihoods: 'employment' as a source of income; 'production' as a source of consumable outputs; and 'recognition' for being involved in something useful (Scoones, 1998).

Sustained natural resources base

Given that most rural livelihoods depend on natural resources, it is essential that these resources are able to maintain their productivity so that future generations will find them in a good state (Conway, 1985; Holing, 1993). Scoones (1998) added that sustaining natural resources implies ensuring that they should be utilised in way that their stock does not deplete and can still yield useful products for other current and future livelihoods. The means of measuring the sustained natural resources includes assessing rural people's capacity to sustain, analyse historical practices of natural resource management and comparing the condition of the natural resource against its previous condition (Scoones, 1998).

2.4. Conceptualising a framework for creating self-reliance and sustainable livelihoods

Figure 2 draws together in conceptual form the key elements of a framework for creating self-reliance and sustainable livelihoods among small-scale sugarcane farmers.

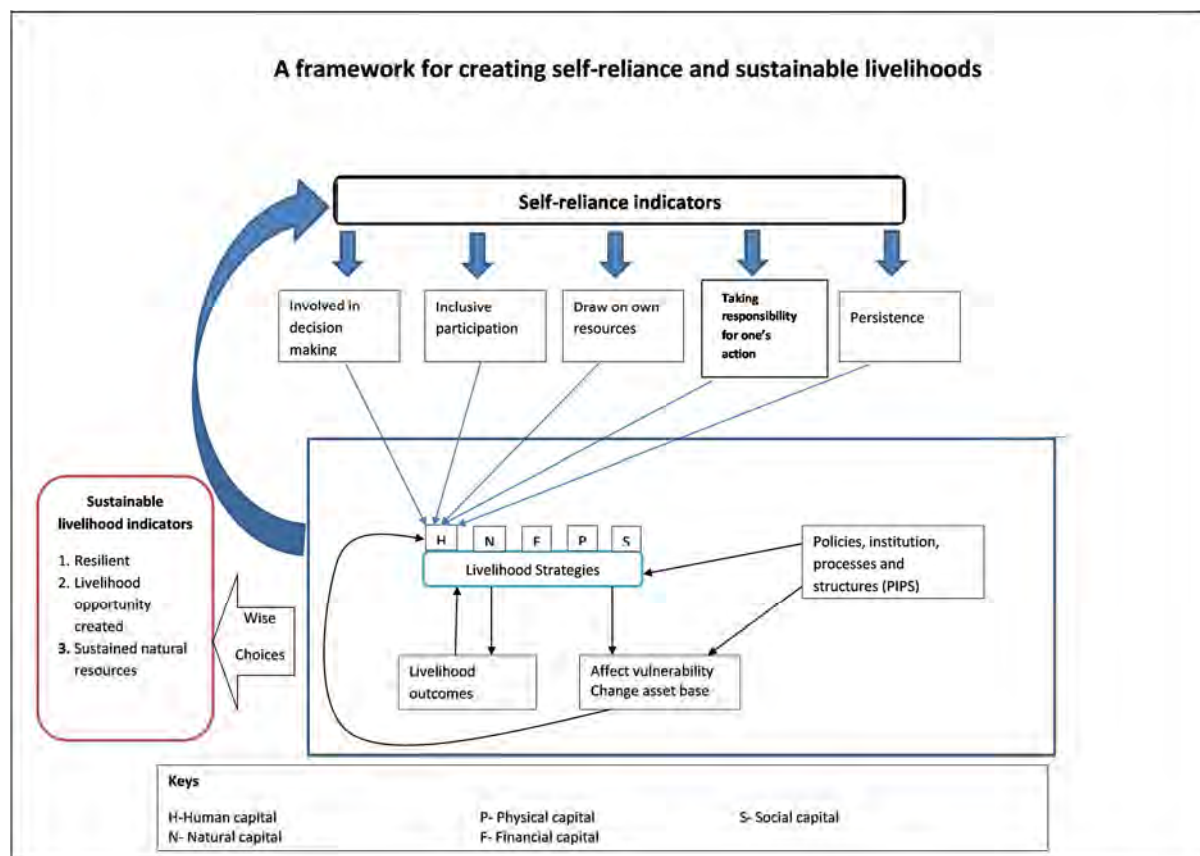


Figure 2: Framework for creating self-reliance and sustainable rural livelihoods

Figure 2 shows the link between the indicators for creating self-reliance and the principles of creating sustainable livelihoods. The diagram presents the five indicators for measuring self-reliance in the context of small-scale farmers and shows how these indicators link with the sustainable livelihood framework. The framework suggests that there is a recursive relationship between fostering self-reliance and achieving more sustainable livelihoods.

2.4.1. Creating Self- reliance

The fundamental principle behind creating self-reliant small-scale farmers entails that an intervention should seek to build capacity among farmers in five key areas to cope and overcome challenges to their livelihoods. It is noted that all of these fall into the ‘human asset’ category of the SL framework. This is consistent with the growing understanding that the key to sustainability rest primarily in the farmer – leading to the farmer/people-centred and learning-based approaches to agricultural development and extension.

2.4.2. Creating sustainable livelihoods

The logic behind achieving sustainable livelihoods using a SLA entails that a farmer has a range of assets that he uses to develop his livelihood strategies. These strategies have two results: effect on livelihood outcomes (income, food security, well-being, resilience and natural resource base) and impact on assets (change asset base and effect vulnerability). Figure 2 shows two loops that exist in SLA. One loop (between livelihood strategies and livelihood outcomes) shows the reciprocal influence of strategies on outcomes which, in turn influence strategies. A second loop shows the ‘impact on assets’ affects the assets which, again, influences livelihood strategy options. Figure 2 further shows an additional loop that joins the first two loops. This loop indicates that PIPS influence livelihood strategies and assets. PIPs are described as institutional structures, policies, laws cultures and processes that influence interventions (internal and/or external) to help enhance livelihood strategies.

2.4.3. Creating self-reliance and sustainable rural livelihoods

The collective loops demonstrated in figure 2 have two results: they influence the self-reliance status (which feeds back into the livelihood loops); and they also influence the sustainability of farmers’ livelihoods. However, the farmer can only achieve the five indicators of self-reliance and three SL indicators if he makes wise choices (i.e. if the farmer makes poor choices, the factors will be negatively influenced and he will have less sustainability). From the understanding of the framework for achieving self-reliance and sustainable livelihoods, this paper concludes that the key factor to fostering self-reliance and achieving sustainable livelihoods is a development of human capital which, in accordance with learning-based extension approaches, stresses building farmer capacity to run their farming operations, ensure sustainability and continuously learn (and thereby continually advance).

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Chapter Three: Understanding Small-scale Grower Development programmes in KZN

3.1. Introduction

A recent occurring phenomenon is that many rural farmers are converting the use of their tribal land from subsistence crop farming to sugarcane farming with the purpose of improving their economic status and, thereby, their wellbeing. This paper explores the concept of Small-scale Grower Development with the intent of clarifying how it emerged, evolved and is currently being implemented.

This paper first traces the history of the emergence of the Small-scale Grower Development Programme (SGDP) including, how it has evolved and why it is in its current state. The paper will then unfold the aim and objective of the programme from the perspective of the key stakeholders. Third, the paper will show how the programme is currently being implemented, identify the roles of the stakeholders in-depth, respectively. Lastly, the paper will draw conclusions based on the history and the current state of SGDP.

3.2. History and reform of Sugar industry and SSF development programmes

The proper existence of grower development programmes in South Africa emerged in 1970 when the sugar industry realized a need to expand sugar production. At the time, the main large-scale growers were mainly white. Black farmers mainly comprised subsistence growers of edible crops; a phenomenon mostly caused by a lack of infrastructure and modern skills required for the commercial farming of sugarcane due to the prevailing social order. The sugar industry had the power to influence the apartheid government to acquire more land from black people through the homeland policy. However, the sugar industry decided to initiate an experiment that involved the substantial extension of sugarcane production to black farmers that resided in homelands (Dubb, 2013; Dubb, 2012).

Dubb (2013) states that in the 1950s, a similar intervention had been initiated for the purpose of developing small-scale farmers that were independent and self-sufficient in sugarcane production. However, this intervention provided Small-scale farmers with limited support with regards to financial capital in the form of a subsidy for the procurement of fertiliser, cane seed and ploughing. The grower programme was developed and facilitated by the Native

Affairs Department and thereafter handed to the local authorities for further management to prevent farmers from relying on external support. The existence of that SGDP attracted numerous black farmers into sugarcane farming. Unfortunately, this programme came to end after the support funds were depleted (Bates and Sokhela, 2003; Vaughan, 1992).

During the 1970s the sugar industry used their Financial Aid Fund (FAF) scheme for the inception of a programme mainly focussed on developing Small-scale farmers through structured support. At the time, black farmers were not allowed to access farming loans by offering their crops as collateral. This led to the sugar industry's decision to prioritise black farmers' access to financial capital. The first step of this programme was to enable the black Small-scale farmers to use their sugarcane as collateral (using FAF Scheme) for loans which they were able to repay it over a period of ten years. There were other intervention measures found within the programme which were mostly subsidized by the sugar industry. These included the improvement of access to relevant infrastructure, mentorship by existing experienced white growers, and structured training courses provided by the sugar industry. The skills development intervention and industry exposure for black farmers was put in place to pass on knowledge about the latest scientific sugarcane farming practices to farmers (Dubb, 2013).

The existence of this grower development programme in 1970 attracted many rural black farmers into sugarcane farming over the period of 10 years. This substantially improved many lives of rural farmers and the economy of the sugar industry. During the period 1970-1980, FAF was essentially working as a development agency which partnered with local mills and the sugar industry to provide assistance to small-scale black farmers who were receiving intervention from the grower development programme. After FAF realized the importance of improving the small-scale grower's infrastructure, they sought a cooperative action with the Bantu Investment Corporation (BIC) which was involved in funding the sugar initiative. A few years later, the BIC was replaced by the Corporation for Economic Development (CED) and was thereafter replaced by individual Bantustan development agencies. The KwaZulu Development Corporation first existed as a Bantustan development agency (1978); six years later it was replaced by the KwaZulu Finance Corporation (KFC) (Lewis, 1990 and Dubb, 2013).

The joint venture development programme went on to include the KwaZulu Department of Agriculture (KDA). Millers (including the miller development agency) and KDA worked to

provide all infrastructure and extension services for the development of sugarcane in KwaZulu. Between 1980 and 1981, two severe droughts occurred which tremendously affected both black and white sugarcane growers resulting in the sugar industry failing to meet their peak in export prices. Above all, the drought caused the sugar industry's costs/expenses to exceed the total proceeds. After the drought incident and the sugar industry's suffering, the Rorich Commission realised a need to rationalise the sugar industry. Their first recommendation was to remove the transport costs provided by sugar millers to sugarcane farmers (Dubb, 2013 and Rorich, 1982).

The transport subsidy removal recommendation resulted in a decline in the number of white sugarcane farmers, as the large-scale farmers located at uneconomical distances from the millers exited. The decline in white growers promoted an increase in the number small-scale farmers. They were favoured due to being less-capital intensive (e.g. less overall costs) and thus helping the industry profitably meet its demand. The notion of increasing and supporting the small-scale farmers continued as a development initiative (justified by the KwaZulu government). FAF at the time offered loans to small-scale farmers as a means of improving production. However, the initiative of having the millers govern the use of the loan money in the small-scale farm production negatively impacted FAF. The millers utilised the small-scale farmer's loan money to provide most of the production services which left the farmers with the weeding task only. Since the production services are being outsourced, this means that farmers were not getting enough opportunities to earn income during the process of sugarcane production. By the time that the sugarcane was harvested the farmers have already accrued living expenses in the period between planting and harvesting contributing to the farmers' difficulty to repay the loans (Dubb, 2013; Dubb, 2012).

The KwaZulu government and FAF expanded loans to Small-scale farmers for the procurement of tractors and other production equipment to incubate small-scale black contractors to service Small-scale farmers. This initiative was put in place as a means of improving employment opportunities for Small-scale farmers in order for them to be able to repay the FAF loan and become efficient growers. This initiation also failed due to difficulty in sourcing and managing labour, equipment failure and disorganisation of the initiative. However, a steady growth in the number of small-scale farmers continued until early 1990s. After a period of time the entry/registration requirement was lifted because of a large number

of unregistered small-scale farmers were sending their cane through neighbouring registered farmers (Dubb, 2013).

After apartheid rule came to an end in 1994, policies of democracy fostered reform and change in the sugar industry's structural framework. One of the significant changes that affected the intervention was the amendment of the Division of Proceeds policy (DoP). This amendment was influenced by the government's Board of Trade Industries (BTI) and resulted in the elimination of government subsidies to the sugar industry. The elimination of subsidies in the sugar industry forced the local millers to withdraw their direct oversight and sub-contract support for Small-scale farmers. Despite the absence of support for small-scale sugarcane farmers, the number of registered smaller scale farmers continued to escalate (Dubb, 2012).

After the support has been eliminated from Small-scale farmers, South African Sugar Association (SASA) sought remedial measures to help small-scale farmers that were under-capitalised and have limited land size. One of the measures was the development of Small-scale Grower Development Trust (SGDT) for the purpose of facilitating small-scale farmers' access to start-up capital. SASA also facilitated a merge between Kwazulu Cane Growers Association (KCGA) (representing the needs of small-scale farmers) and South African Cane Growers Association (SACGA) (representing the needs of white large scale farmers) for the purpose of putting small-scale farmers in the same position of power as large-scale farmers to SASA and millers (Dubb, 2012).

The SGDT was created for the direct purpose of training small-scale cane farmers' representatives and covering the operational costs of the structure. SACGA also deployed Grower Support Officers to facilitate the functioning representative organisations, co-ordinate cane supply logistics in rural areas, and provide training on cane husbandry to small-scale farmers. In 1996, a new partnership emerged between the National Department of Agriculture and Environmental Affairs to prioritise replacing the extension services that were earlier provided by KwaZulu government and millers. From the partnership forged by the joint venture came the re-launch of FAF, in 2001, as an independent credit structure for small-scale farmers under the new name 'Umthombo Agricultural Finance' (UAF) (Dubb, 2012; Dubb 2013).

3.2.1. Aims and Objectives of SGDPs

The aim of grower development programmes, according to SACGA, is to improve the technical and business skills of smallholder black farmers and contractors to improve productivity and efficiency (Moloa, 2001). Madhanpall (2012) states that the aim of the Department of Rural Development (strategic partner) for grower development programme was to establish small-scale farmers projects that would contribute toward improving food security, creating employment, and economic growth in rural areas. SASA added that the aim for the grower development programmes was to maintain and build sustainable communities (SASA, 2012; SASA, 2014).

SASA broadly describes the objective of the grower development programme by referring to it as a facilitation of strategic distribution of the sugar industry's resources toward the development and empowerment of small-scale farmers in the growing region (SASA, 2013). The World Business Council for Sustainable Development (WBCSD, 2004) indicates that the specific objective of the grower development programme is to nurture and facilitate sustainable small-scale sugarcane farming communities. In achieving the objective, SASRI adopted the sustainable livelihood approach (SLA) as a means of facilitating rural development, poverty alleviation and improving the quality of life with the purpose of sustaining the livelihoods of small-scale farmers.

3.2.2. How small-scale grower development projects are carried out

Gillespie and Mitchel (2014) explain how SGDP projects are carried out in rural communities in their publication entitled "Manual for the Successful Implementation of Small-Scale Grower Development Projects." SGDPs were implemented in 4 phases:

Phase One: Preliminary planning for the project;

Phase Two: Establishment of the seedcane nursery demonstration plot;

Phase Three: Expansion of sugarcane to surrounding areas; and

Phase Four: Technologies transfer

3.2.2.1. Preliminary planning for the project

The planning phase for the SGDP began in one of two ways: after the government extension officers were approached by local farmers to acquire assistance in starting/joining the sugar project within their communal lands: after the idea of a sugarcane project is introduced by an extension officer (Public) and the farmers will then decide to start the project. The first planning step that the extension officers take, would be to identify and create linkages between key-role players required to support the project. Some of the key stakeholders involved are: Millers; SASRI; Large-scale growers, Pest, Diseases, and Variety Control Committees (PD&VCC); Local and International NGOs, foreign donors and companies, co-operatives, SACGA, representatives from Agric Chemicals & Fertilisers, the local municipality and the KZN Department of Agriculture and Rural Development. The role of each stakeholder is shown in Table 1 (Gillespie and Mitchel, 2014).

Table 1: Stakeholder involvement and responsibilities in SCGDP

Stakeholders	Roles and responsibilities
Miller	Miller is the market for small-scale and large sugarcane growers. The Mill is responsible for providing resources, finance and staff for the grower's development and keeping records of cane supply in the area
SASRI	Conducts research for the development of sugarcane technologies, provides extension officers in order to transfer the new technologies and offers analytical services for the growers
Commercial grower	Provides mentorship and management support to Small-scale farmers for the duration of the programme
Pest Diseases and Variety Control Committees (PD&VCC)	Provide various services such as ensuring that the seedcane planted by Small-scale farmers are disease free. They also assist farmers to select the appropriate seedcane varieties suited for their area
KZN Department of Agriculture and Environmental Affairs	Provide services such as extension, research and technology support and, analytical services. They also provide financial and equipment subsidies.
Non-Governmental organisation (NGO)	Involved in specific projects and offers financial and skills development support
Co-operatives	Involved in negotiating better costs of fertilisers, herbicides, equipment and implements on behalf of the emerging small-scale grower.
SA Cane Growers Association (SACGA)	Assists in the process of obtaining funds for projects, establishment of project proposal, and the business plan. Small-scale farmers become members of the SACGA since it is an association representing all the sugarcane growers in SA.
Agricultural chemical and fertilizer representatives	Provide technical knowledge and advice about use and the different types of inputs to Small-scale farmers
Local Municipality	Supplies infrastructure, roads, electricity, and water for the community
Other Government departments	Supply funding, and ensure legislative compliance e.g. Local Government and Tradition Affairs

After establishing linkages between key stakeholders, an extension specialist from SASRI conducts a preliminary land resource assessment to determine whether the land is suitable for planting sugarcane. The extension specialist uses the criteria set out in Table 2 to assess the land on which the project is to be implemented. If the land is found to be suitable, the assessment report is disseminated and presented to key stakeholders to promote suitability of the project area and to obtain support for the proposed project (Gillespie and Mitchel, 2014).

Table 2: Land Assessment criteria

Assessment criteria	Description
Natural resource information	Use of Bio Resource unit Programmes developed by DAEA to find estimate information on Yield potential, production facilities, and calculate economic viability of the proposed project.
Terrain and slope	Terrain and slope is assessed to identify needs for soil conservation measures as well as oversee compliance with legislation
Soils	Include an assessment of soil depth, clay % and water holding capacity to predict yield and income opportunity
Climate	This assessment explores suitability of the crop against rainfall, heat unity (need for irrigation), frost and disease opportunity
Area	This aspect ascertains the land sufficiency (size) of the project, Distance from the local mill, impact on other land uses and community response to the proposal
Number of interested growers	Survey conducted to get an estimate number of community members that can be sustained by this project

(Source: Gillespie and Mitchel, 2014)

After the extension specialist has conducted the resource assessment of the proposed project area, the extension officer prepares a business plan with the assistance of the SACGA in order to acquire funds for implementing the project. Criteria for funding are based on whether rural farmers lack financial capital and capacity to expand and modernise their farming businesses. The business plan for this project is accompanied by the resource assessment report. The finance required for this project is for land preparation and the procurement of inputs such as seedcane, weedicide, fertiliser, labour and equipment. Depending on the size of the project, the finances are acquired from various sources such as the mill, government departments, banks, foreign donors, municipalities, and non-government organisations (Gillespie and Mitchel, 2014).

3.2.2.2. Establishment of the seedcane nursery demonstration plot

After the planning phase has been completed, implementation begins with the establishment of the demonstration plot. The demonstration plot is employed as a robust mechanism to generate interest in a new enterprise and provide support for the project. The demonstration

plot method yields three outcomes: It serves as local seedcane nursery and source of income to the land owner (merchant); it serves as the ideal opportunity for transferring technology to new Small-scale farmers and skills development; and it serves an excellent opportunity to improve the credibility and effectiveness of extension services in the community (Gillespie and Mitchel, 2014).

The first step of the implementation phase of the small-scale development project is locating the suitable land site where the demonstration sugarcane will be planted. Working with the community, the extension officer will first consult and involve the role players in choosing the site and then select the co-operator who will look after the demonstration plot. The co-operator to be chosen should have the following features: access to at least 1 ha of land; and must be an agreeable, cooperative and willing individual – the plot will be used for field training days. The specific site for the demonstration plot needs to have the same soil type, and be representative of, the majority of soils in the community. The individual co-operators are obliged to sign a contract which will enforce them to comply with all the management conditions of the demonstration plot (Gillespie and Mitchel, 2014).

After the funding has been secured, in phase 1, all the necessary inputs and equipment are procured prior to or during land the preparation stage. In the procurement of the seedcane, the extension officers liaise with PD&VCC officers in order to identify the suitable variety for the specific area of the demonstration plot. Usually both N12 and N48 varieties are planted to show the farmers the advantages and disadvantages of each type. The seedcane, fertiliser and chemicals are purchased in advance but delivered only on the due date for use to prevent compromising their effectiveness and value. The equipment for planting and application of fertilisers and chemicals are purchased prior to the land preparation stage to ensure that the project proceeds accordingly (Gillespie and Mitchel, 2014).

After all the necessary inputs and equipment have been obtained, the land preparation stage begins. If the land has never been planted with sugarcane before, in the selection stage/process, the extension officer will conduct a soil analysis of the demonstration plot through taking soil samples to the laboratory and conducting an analysis of the soil profile. The extension officer includes the local farmers in the process of analysing the fertility of the soil in order to enhance their skills of assessing their individual plots. The extension officer also engages farmers in practical lessons of how and when to plough the land, and how and when to apply fertiliser and pest and weed control chemicals. In the planting stage, the role of

the extension officers is to demonstrate the correct method of planting sugarcane to the farmers. As a part of the learning process, farmers are given an opportunity to plant. Incorporated in the process of land preparation and planting, is a conservation field day focussed on training farmers on the significance and various aspects of soil conservation (Gillespie and Mitchel, 2014).

3.2.2.3.Planning and facilitation of field training days

Planning field training days is normally carried out before the stage of land preparation. Planning is conducted by the extension officers' supervisor, extension officers, farmers and other key role-players involved in the project. The field days are planned to synchronise with the demonstration plot implementation plan to ensure that skills development and technology transfer occur with each step of the plot's development. Implementation of field training days is facilitated by extension officers, role-players from PD&VCC, NGOs and other relevant stakeholders (Gillespie and Mitchel, 2014).

3.2.2.4.Harvest

As mentioned previously, the demonstration plot forms a seedcane nursery, which is then harvested strategically to ensure that local small-scale farmers plant the seedcane while it is fresh and free from diseases and rot. The first harvest occurs during the Harvesting Field Day as a method of teaching local small-scale farmers and contractors the appropriate methods of harvesting. They are taught importance of knowing the correct harvesting stage, cutting of cane, topping, handling and transportation and costs involved in the whole process of harvesting. As a part of the Harvesting Field Day, a small portion of the plot is harvested and the seedcane sold to a farmer who is ready to plant (Gillespie and Mitchel, 2014).

Extension officers are also involved in teaching the small-scale farmers about the different seedcane varieties, including their physical characteristics and their strengths and weaknesses. On the Harvest Field Day, extension officers present the yield estimate, the recoverable value and the estimated gross margin for each cane variety. The pricing of the seedcane is also done on this field day to help farmers choose the variety they prefer. Pricing is based on the sucrose percentage of each variety, which is tested at a laboratory (Gillespie and Mitchel, 2014).

Cane payment occurs after the small-scale farmers have delivered their cane harvest to the local mill. The sugarcane mill send the farmer's cane payment statements capturing the cost incurred for growing and managing their cane and also the recoverable value of their cane based on sucrose content (%). The process of cane payment is explained to farmers during the Cane Payment Field Day by extension officers for them to better plan and budget for their cane business (Gillespie and Mitchel, 2014).

In the process of the harvesting stage the Role-player Feedback Field Day is conducted to demonstrate the success of the project. Presentations are conducted by stakeholders that were involved in the implementation process of the project, demonstrating the increased acceptance and development of sugarcane production in the area of investment. Role-players (funders) are taken to the demonstration plot for field inspections to show the growth of the project and a potential area for the expansion of sugarcane (Gillespie and Mitchel, 2014).

3.2.2.5. Ratoon management (demonstration plot)

Ratoon crop in this context refers to the crop that is produced after the first harvest in the demonstration plot. This crop will also be used as seedcane for further expansion of the sugarcane production to local small-scale farmers at cost. Ratoon management of the demonstration plot is conducted in a similar pattern to the planting and management approach. Training is provided by extension officers and other relevant role-players to the individual co-operators to make them confident and independent in sustaining their sugarcane businesses to ensure that these farmers are able to continue growing sugarcane commercially after the project has been moved to another site (Gillespie and Mitchel, 2014).

Ratoon management training addresses topdressing, soil conservation and maintenance, weed inspection and weedicide application, pest and disease inspection, variety yield estimate and seedcane distribution planning, and actual distribution of seedcane (Gillespie and Mitchel, 2014).

3.2.2.6. Expansion of sugarcane areas

The process of sugarcane expansion entails that local small-scale farmers are sold seedcane from the demonstration plots to be planted in their field. Most small-scale cane farmers farm in a cooperative to obtain financial support, extension support (public and private),

distribution of their overhead cost of production, and access to structured management. In the process of expanding the area under sugarcane in rural communities located close to the mill, each year the extension officers select a new site and individual co-operators. This ensures the continual supply of seedcane in the area and provides additional sites for the purpose of technology transfer. The sustainability of this expansion of sugarcane demonstration plots and the progression of small-scale farmers remain the responsibility of the extension officers (public and private) and other relevant role-players (government and non-governmental) (Gillespie and Mitchel, 2014).

3.2.3. Technology transfer

Technology transfer in the context of a SGDP is used as the main approach of enhancing the farmers' knowledge and skills of farming sugarcane as a business. In using this approach, farmers are engaged in structured training, semi-formal education and mentorship in field days about various aspects of sugarcane farming. There are four specific objectives of using technology transfer in SGDPs: creating awareness; grower skills development; sugarcane expansion; and sustaining rural livelihoods (Gillespie and Mitchel, 2014).

3.2.3.1. Creating awareness

The main strategy for creating awareness is field days. These days are essential for:

- Making rural farmers aware of the potential areas for sugarcane production;
- Informing people about type, source and level of support that the cane grower will benefit from through partaking in sugarcane production;
- Introducing new and existing varieties;
- Making people aware of the value of PD&VCC visits; and
- Notifying people about reduction in planting cost due to local production of seedcane (Gillespie and Mitchel, 2014)

3.2.3.2. Grower skills development

As part of the responsibility of extension officers, it is imperative that they engage in planning the programme for developing small-scale farmers' skills and maintain close contact with farmers at all times. The skills development programmes are made to correspond with

the time of the year at which the activities are to be undertaken on the field. Facilitation of the grower development programmes should be conducted in a language that all the farmers are familiar with, using materials and examples that are easily grasped. Extension officers (public and private) are also given the task of visiting the small-scale sugarcane growers regularly in order to establish credibility, understand growers needs and challenges, as well as share local knowledge and research/technology developments (Gillespie and Mitchel, 2014).

3.2.3.3.Sugarcane expansion

In implementing the demonstration plot methodology using the technology transfer approach, farmers are meant to recognise an opportunity to earn money from their tribal land. The decision of the farmers in planting sugarcane is be influenced by the level of support available (financial, training and education, input) and the success of the demonstration plot planted in their community. The success of the demonstration plot is determined (Gillespie and Mitchel, 2014) by demonstrating:

- Reduced transport costs due to locally produced seedcane;
- Disease-free seedcane which results in higher yields over the long term;
- The appropriate variety planted (suitable to the area) resulting in high yields and therefore, income; and
- The low cost of seedcane due to input subsidies made by key-stakeholder involved in the programme.

3.2.3.4.Creating sustainable livelihoods

Technology transfer in the context of SGDP is linked to creating sustainable livelihoods. It is argued that adopting sugar cane production as demonstrated can result in improved standards of living and income generating activities. It is further argued that the objective of creating sustainable livelihood is achieved through incorporating consistent and progressive processes of implementing the programme. Incorporated within the strategies for creating sustainable livelihoods is the rural farmers' development to becoming independent and profitable commercial sugarcane farmers in the long run (Gillespie and Mitchel, 2014).

3.2.4. Logical framework of the SGDP

Table 3 shows the logic driving the implementation of the SGDP.

Table 3: Logical Implementation of SGDP

	Indicators	Means of measurement
Goal: Nurturing and facilitation of sustainable small-scale sugarcane farming communities	Sustained livelihood and improved quality of life for small-scale sugarcane growers	Asking the farmers
Purpose: Facilitation of the strategic distribution of the sugar industry's resources towards the development and empowerment of SSF in the growing region	Improved food security, employment creation and economic growth	Employment contract/record and Ask farmers
Outputs: 1. Establish a demonstration plot as a site for technology transfer and nursery for seedcane 2. Expanding sugarcane to surrounding areas of the community 3. Providing technology transfer as means of enhancing farmers capacity in planting sugarcane	1. Demonstration plot is operational 2. Sugarcane co-ops are established and are operating 3. Small-scale farmers are self-sufficient and independent in sugarcane farming and, livelihoods are improved and sustained	1. Observe the demonstration plot and project records 2. Observe sugarcane plot, production record, financial records and 3. Ask farmers
Activities:	Responsibility/champion	
1.1. Identify and involve key stakeholder 1.2. Assess potential natural resources of where the project will take place 1.3. Acquire funding for demonstration plot 1.4. Identify suitable site and co-operator for the project 1.5. Procure inputs and equipment 1.6. Prepare land 1.7. Plant the land 1.8. Ratoon management (fertilizing, weed and disease control, conservation measures etc.) 1.9. Harvest the demonstration plot 1.10. Price the seedcane from the demonstration plot 2.1 Acquire funding for co-op 2.2 Procure inputs 2.3 Prepare land 2.4 Plant sugarcane 2.5 Manage sugarcane plantation (fertilize, control weeds and disease, conservation measures) 2.6 Harvest sugarcane 2.7 Transport sugarcane to the mill 2.8 Remunerate farmers 3.1 Plan and facilitate field days and workshops throughout the implementation phase of the demonstration plot 3.2 Provide regular extension services to farmer (responds to farmer issues, analytical services and improve technology) 3.3 Provide mentorship and management support to farmer	1.1 Extension officer 1.2 Extension specialist and officer 1.3 Extension officer 1.4 Extension officer and community leadership 1.5 Extension officer and co-operators 1.6 Extension officer 1.7 Extension officers and co-operators 1.8 PD&VCC, SASRI and Extension officer 1.9 Extension officer 1.10 Extension officer 2.1 SACGA and extension officer 2.2 Extension officer and co-operators 2.3 Extension officer 2.4 Extension officer 2.5 Extension officer, SASRI and PD&VCC 2.6 Extension officer 2.7 Extension officer 2.8 Extension officer and local mill 3.1. Extension officer and extension officer's supervisor 3.2. Extension officer 3.3. Extension officers and commercial farmer	

3.2.5. Expected outcomes and impact of SGDPs

While SASRI and SASA determine the goals, purpose and activities of the grower development programme, the Department of Rural Development and Land Reform clarifies the outcome and impact expected from the grower development programme. DRDLR is a strategic partner in the grower development programme as they are involved in issuing land as part of the land reform programme and cater for sustainable rural development. To cater for sustainable rural development, DRDLR injects finances, inputs and equipment into the programme to ensure its continuity. According to Madhanpall (2012), the following are the expected impact and outcomes for the grower development programme:

- The appointment of Strategic Partners/Mentors to ensure that the State's investment leads to sustainable production practices by the Small-scale farmers rather than growers reverting to the State in a few years for additional financial support;
- The State's investment must lead to increased production, job creation, entrepreneurial development, and the circulation of capital within those rural local economies;
- The members of the co-operative are not to be passive participants in the projects, who only realise the benefits of the programme from the sugar cane production proceeds. Co-operative members are to be actively involved (through direct employment in all aspects of the production cycle, and as local contractors/service providers);
- Growers are to be given capacity through structured training, skills development and mentorship programmes to enable them to sustain production, once the Strategic Partner and DRDLR have exited the project; and
- The projects are to have a level of product diversification which does not compromise sugar production, but complements the cash flows of the co-operatives.

3.3. Conclusion

This paper established that the notion of developing small-scale farmers through sugarcane existed long time ago. The history of the SGDP presented in this paper clearly shows that this notion has evolved over time, with contributing factors including politics, finances, natural causes and extension support. It is evident from history that the SGDP was driven primarily by motive to increase cane production and throughput to the millers to meet the increasing demand for sugar. Although documents make claims to the contrary, a review of the

processes used in implementing the SGDP, the injection of finance and skills development support into the SGDP was not for the objective of promoting small-scale farmers' self-reliance and sustainable livelihood.

Despite the development rhetoric used in the SGDP documentation, the clear logic presented in its logical framework, and the consistency with which the SGDP is implemented, the methods and processes employed and the conditions set on the impacts (most notably that diversification must not compromise sugar production), clearly demonstrate the actual intention of the programme. The exclusive use of technology transfer as the mode of extension is particularly telling. As argued in Chapter 2, there is ample evidence that relying solely on technology transfer will not lead to sustainable development. It will focus on the production of sugar, and not the true development of the farmer.

This paper also shows that the SGDP seeks to involve as many role-players as possible as a means of providing sufficient and relevant support to small-scale farmers. Involvement of various stakeholders in an intervention is a productive indication however, it is also essential that common goals are established. The DRDLR (strategic partner) is, according to its documentation, more concerned about the creation of self-reliant farmers with sustainable livelihoods, albeit based in sugarcane production. Contrarily, SASA is focussed on engineering farmers to be efficient sugarcane producers to maintain a steady flow of raw material to the mills.

These conflicting goals and the reliance on technology transfer as the sole framework for implementation strongly suggest that the SGDP cannot realistically 'develop' small-scale sugarcane growers who are resilient and independent and who have livelihoods that are genuinely sustainable.

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Chapter Four: A framework for assessing agricultural extension for small-scale sugarcane farmers

4.1. Introduction

Agricultural extension forms a significant part in the Small-scale Sugarcane Grower Development Programme being implemented in KwaZulu-Natal as a joint venture between the provincial government extension service and private sector sugar agencies. The question is what is the relevant role of extension in such a programme. It is one element in what is essentially a tripartite relationship that includes extension, farmers and enablers (e.g. researchers, funders, policy makers). It is important that extension being positioned correctly and its role clearly understood so that its contribution can be properly assessed. This paper, then, seeks to develop a framework for assessing agricultural extension for small-scale sugarcane farmers.

The paper first provides a brief review extension theory covering: history of extension in South Africa, considers definitions of agricultural extension, and explores dominant extension approaches. The paper then discusses the Agriflection extension framework and the Extension Learning Carousel as basis for creating a framework for assessing agricultural extension. The paper then investigates the connection between agricultural extension and sustainable livelihoods (which is an integral part of Agriflection) and self-reliance (which is a key goal of SGDPs). Finally, the paper presents a framework for assessing agricultural extension for small-scale farmers derived from the themes explored in the paper.

4.2. Extension theory

4.2.1. History and background of extension in South Africa

According to Jones and Garforth (1998), agricultural extension is a social innovation for over more than 4000 years. Much of that history is not recorded. The current notion of extension finds its origin in the late 1800s when Oxford and Cambridge Universities in the United Kingdom began 'extending' their knowledge. Initially, the knowledge extended was not related to agriculture but eventually evolved to include agriculture. In a parallel development, in Ireland, in response to the potato blight in 1845, the British Viceroy urged existing agricultural societies (e.g. the Royal Agricultural Society), to send itinerant teachers to help

farmers improve their production and grow crops other than potatoes (Jones & Garforth, 1998).

Similar developments occurred in the United States of America (USA). In the late 1800s, the American government formalised its efforts to provide extension support to farmers. Land grant universities were established to bring agricultural learning to all major parts of the country. By the early 1900s extension had become a mandated functions of the land grant universities (Swanson and Rajalahti, 2010). While the Americans retained extension in the university system, the British Government transferred extension to the Ministry of Agriculture (Jones & Garforth, 1998). The concept spread throughout Europe and eventually to Africa as a part of the British Commonwealth.

In 1920, Col. H Du Toit witnessed the developments that occurred in the USA and became the first to introduce the concept of agricultural extension in South Africa. After Du Toit's extension services received recognition in 1925, he was declared the first head of extension in South Africa (Koch, 2007). Worth (2012) states that extension was first formally established in South Africa in 1924, however the state did not indulge in planned agricultural development prior to the 1950s. Before 1950, the settlers (white people) and missionaries used agriculture as a means of engaging African men in church activities, within their homesteads. In 1915, the colonial leadership realized a need of providing training to local rural farmers in proper western agricultural methods such as ploughing, crop rotation and plant spacing as a means of improving rural livelihoods as mean of improving their livelihoods (NDA, 1998; Kingon, 1915).

In the 1980s, long after the arrival of the European settlers, colonial leadership and toward the end of the apartheid era, extension evolved as the geopolitical entity of South Africa. The existence of white settlers and colonial leadership transformed the agricultural sector such that two broad groups of agricultural producers were formed. One group was called tribal-based agriculture from which peasant farming among black communities emerged. The other group was called commercial farming which consisted of European white settlers. This artificial and politically supported division of the South African agricultural sector led to the demise of black peasant farmers which ultimately resulted in them returning to subsistence farming, working as permanent and migrant farm labourers on commercial farms owned by white farmers (Bundy, 1988).

As history unfolded, the divide in the agricultural sector gave rise to separate agricultural support systems being provided to the two agricultural groups. It was then that the parallel extension system emerged, one allocated for tribal-based agriculture and the other for commercial white farmers. Commercial farmers received quality extension services as they were involved in the country's economic improvement, whilst the tribal-based group received poor quality extension services. The parallel extension system expanded also to academic side of extension, especially after the existence of policies prohibiting black people from accessing proper education. As a result, commercial farmers had access to well-educated extension officers, whilst black subsistence farmers received extension officers with far less agricultural education (Worth, 1994; Machethe, 2004; Worth, 2012).

After the South African elections in 1994 that brought an end to apartheid, agricultural extension, along with many other aspects of society, significantly transformed to reflect the new political aspirations. The two systems were merged into a single system. Provision of extension was no longer divided by race. The focus of extension also shifted, directing more resources to the tribal-based farmers (now referred to as smallholder farmers) in an effort to help them commercialise. Progress was limited. Extension was initially modelled on the principles and practices that had worked with the white market-oriented farmers.

By 2012, numerous studies and project evaluations had seen a gradual transformation of extension in South Africa. It remains dominated by the desire to commercialise so-called subsistence farmers using technology transfer, credit provision and market access. However, despite the efforts of the government-based extension service, most smallholder farmers have not progressed from subsistence farming. The extension worker's inability to apply appropriate development and extension approaches to facilitate empowerment of rural farmers and enhancement of rural livelihood is apparent (Worth 2012). Hence, the need for a framework to assess extension for small-scale farmers. Such a framework will facilitate evidence-led decision-making and policy formulation to shape appropriate extension services for small-scale farmers.

4.2.2. What is agricultural extension?

There is a plethora of definitions of agricultural extension. And there are often very divergent views on these definitions.

The most universal definition is that agricultural extension is a non-formal education system aimed primarily at adult farmers (Rivera and Qamar, 2003). Chauhan (2007) argues that extension can be seen as a branch of the university to reach those students who do not formally attend universities facilities, in other words, extension is an ‘out of school’ system of education.

As a system of education its function is to disseminate and provide advice, to build farmers’ knowledge and skills, to change their behaviour, and to help them find solutions in challenges they face in their day-to-day life – particularly on their farms (Knowles, 1980; Rivera and Qamar, 2003; Swanson, 2008). Within the ambit of being a system of non-formal education is the understanding that extension is an applied science. It is science because it involves studying theories, procedures and methods related to disseminating new technologies created from agricultural and social research (Nuraini, 1977). It is applied because, according to Pye-Smith (2012) and Nuraini (1977), the learning from this studying is applied in the education process to disseminate the results of research with the express purpose of promoting understanding, acceptance and application of the research in problem solving. Similarly, Rogers (1962) noted that extension workers specifically learn effective ways of communicating new technologies to speed up the process of diffusing knowledge, information and innovations. Another aspect of being a non-formal education system is in this mode, extension seeks to provide knowledge to improve agricultural practices in a convincing manner. The education process seeks to induce behavioural change through establishing firm linkages between research and farmers (Chauhan, 2007, citing Sanoria (1986); Dahama, 1973) with the broader aim of improving social, economic and psychological status of rural people (Chauhan, 2007).

This latter consideration highlights another common conceptualisation of extension: that it is a system of bridging between farmers and researchers (Chauhan, 2007). Within this definition is the notion that extension is a mediator between farmers and researchers. Further, the function of the bridge is to diffuse innovations (Rogers, 1962) by focusing on ‘how to teach’, rather than of ‘what to teach’, because knowing ‘how to teach’ has a more positive impact on adoption of new research (e.g. technologies) (Chauhan, 2007). In this context, extension becomes a partnerships most often between the government and farmers in which services and education relevant to meeting farmers’ needs are provided (Kelsey and Harne, 1963).

Similar to the bridging concept, Chauhan (2007), citing Rambhai (1986) adds that extension is a continuous two-way channel that brings research information to farmers and takes back the farmers' problems to research institutions.

Depending on who is providing it, the purpose of extension varies from technologies transfer facilitated by companies who work with specific farming systems to problem solving education approaches and to participatory intervention aimed at poverty alleviation and promoting community involvement (Rivera and Qamar, 2003). In some instances, extension goes beyond transferring scientific technology. It and linking farmers to markets and other key role-players in the agricultural value chain to facilitating the attainment of skills, information and relevant technologies for the improvement of the farmer's livelihoods (Davis, 2009).

A common thread runs through all these definitions. Extension seeks to share information, innovations, knowledge and other results of agricultural research with the express purpose of improving farmers' skills and persuading them to adopt what is being offered. A key element is behaviour change. In this context, extension is often used as a political instrument used to facilitate development (Rivera and Qamar, 2003) It is often manifested as a body of organisations that collectively seek to help people engaged in agricultural production, by facilitating capacity building in order to improve their problem solving skills (Davis, 2009).

4.2.3. Agricultural extension approaches

Approaches to extension can be viewed from four broad perspectives: technology transfer; advisory; facilitation; and learning. These are briefly discussed to give a general context for the more in-depth discussion of a learning-based approach to extension.

4.2.3.1. Technology transfer

This extension approach was widely used during the colonial era, between the 1970 and 1980 in many Asian and Sub-Saharan countries and, also gave rise to the training and visit (T&V) system. Technology transfer is also referred to as a linear approach which aims to maintain national food security for both the rural and urban population in the country. This is a supply-driven approach with extension taking the initiative to take technologies to farmers. This approach uses persuasive methods of conveying information, which entails telling farmers which varieties and production methods they should employ in-order to increase their

productivity (Swanson and Rajalahti, 2010). The primary aim is adoption of the technology on offer. However, this approach has been criticised after because it often does not take account of farmer's needs and demands, as well as because of its tendency to treat farmers as end-users (as opposed to partners) (Naamwintome and Millar, 2013). Röling (1995) on the other hand argues that technology transfer is not inherently wrong or ineffective, but that its effectiveness depends on the context of each situation. The choice must be made consciously.

4.2.3.2. Advisory

Although intent on technology adoption, the advisory approach differs from the linear approach (where the technology transferred to farmers is based on a generalised issue), in that in the advisory approach the farmer seeks advice from the extension officer or other expert regarding their problems. This is a demand-driven approach where the farmer initiates the contact. This approach is driven by the entrepreneurship of the farmer or farm manager and his ability to approach external advisory facilities when they face challenges that they cannot solve independently. In this approach, advice given is not only relevant to the commodity but it ranges from problem solving capacity building, management to decision making (Röling, 1995). Wijeratne (1988) noted that in this approach, extension workers might not have enough work to do since their function is dependent on the farmers who seek their advisory services. Which, as a result in some cases, Training and Visit approaches were practiced to improve extension workers' repertoire.

4.2.3.3. Facilitation

The facilitation approach has evolved over time from practice with participatory methods, and is now focused on clustering farmers with a common interest to work together in order to achieve both individual and common goals (Swanson and Rajalahti, 2010). This approach is different from both linear and advisory approach as its fundamental purpose is on assisting farmers to learn and thus, become experts within their farming enterprises. The form of learning that occurs within this approach encourages farmer's independence from relying on external inputs and tradition, and encourages them to rely more on their own observations, knowledge and ability to make decision. This transformation is based on participatory activities such discovery learning, making things visible, learning through experimentation and observation. It is demand-driven, responding to requests for help from farmers. The most common extension method practiced in using this approach is the Farmer field School where

farmers work in groups to learn to solve the various technical problems they encounter. It has been practically proven that the facilitation approach helps to improve farmer's enthusiasm, self-reliance as well as their capacity to observe, draw conclusions and develop their own solutions. The main criticism of the facilitation approach is that it is time consuming to conduct and achieve any outcomes; the learning process may extend over several months before bearing any fruit (Röling, 1995).

4.2.3.4. Learning

The learning approach is an outgrowth of the facilitation approach which also focuses on farmer learning. In developing this particular approach to extension, research suggested that the facilitation approach was demand-driven (i.e. it intervened upon request) and that it did not appear specifically to address the learning capacity of farmers and power relations between farmers and extension and research. Thus, a key purpose of the learning approach is to develop and build the learning capacity of farmers to give greater equity to and synergising the relationship between farmers, on the one hand and policy-makers, researchers and extension workers, on the other. It is a supply-driven approach. Second, the learning approach is goal focus, meaning that the tripartite arrangement (farmers, extension, enablers) are meant to have a common goal – generally that of improving the sustainability of the farmers' livelihoods. Further, the learning that occurs in this approach does not happen or benefit farmers only, but the other stakeholders involved as well. It promotes individual and collective learning as a deliberate part of the extension process. Unlike other approaches, this extension approach specifically addresses three aspects of orientation, which are clients (farmers), process (learning process) and the appropriate placement of technology (Worth, 2006).

4.3. Agriflection

4.3.1. Understanding Agriflection

The Agriflection framework was developed through integrating sustainable livelihood concepts and principles, adaptations of the Agricultural Knowledge and Information Systems (AKIS) developed by FAO and the World Bank, and learning theory (primarily Kolb's four-stage learning theory). The purpose of the Agriflection is to recognise and deal with the complex issue of farmer's farming systems and livelihood strategies by focusing on the

farmers' capacity to learn and engage with scientific enquiry. Agriflection provides a theoretical framework of analysing the training (and learning) status and requirements of farmers, extension practitioners and other stakeholders in the extension mix (Worth, 2006).

The concept of 'Agriflection' emerged as Worth (2006) was attempting to demonstrate the significance of adopting a reflective learning approach to development. Agriflection posits that reflective learning can be promoted through engaging farmers in genuine learning partnerships with researchers, funders, policy makers and extension officers. There are three significant learning processes highlighted by this model: learning about what farmers do; learning why they do it; and learning how they make their current farming systems more profitable and sustainable. In brief, this model creates an understanding that if the farmers partner with enablers and extension practitioners genuinely for learning, then the creation of relevant technology will occur and a prosperity pathway will be created and embarked (Worth, 2006).

4.3.2. Function of the Agriflection model

Figure 3 presents the Agriflection framework. It is constructed using three triangles each representing the role-players (farmers, extension providers and enablers) in the extension mix. They are connected with a dual-direction arrow-headed line representing the learning dynamic among the partners in the process of development. The diagram assumes equity among the role-players (which the associated theory argues is not generally the case; thus driving the need to create greater equity). The learning process in this model is represented by 'IAS' (Investigation, Assimilation and Sharing) on the edge of the triangle of role-players. At a glance, the model clearly demonstrates the essence of learning ownership in all three role-players, both individually and collectively. Worth (2006) clarifies that learners acquire knowledge in the process of investigation and, understanding through the process of application or assimilation and gain skills in the process of sharing, and argues that this needs to happen at the level of each role-player as well as among the entire collective. As shown in the diagram, learning has a purpose – in this instance improving the sustainability of the livelihood of the farmer.

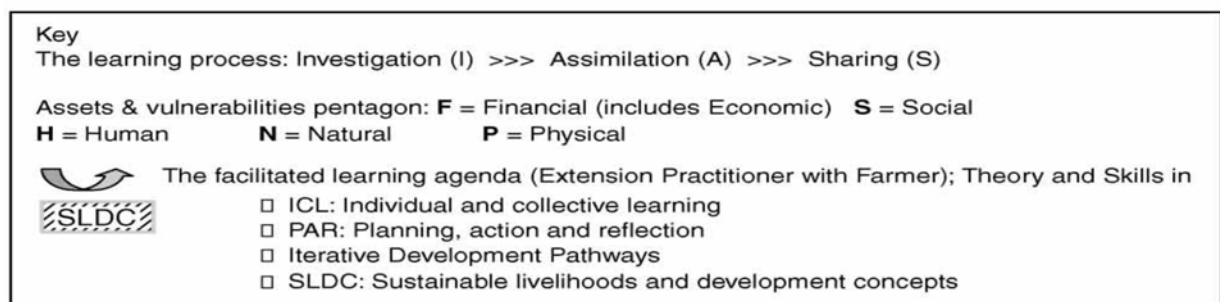
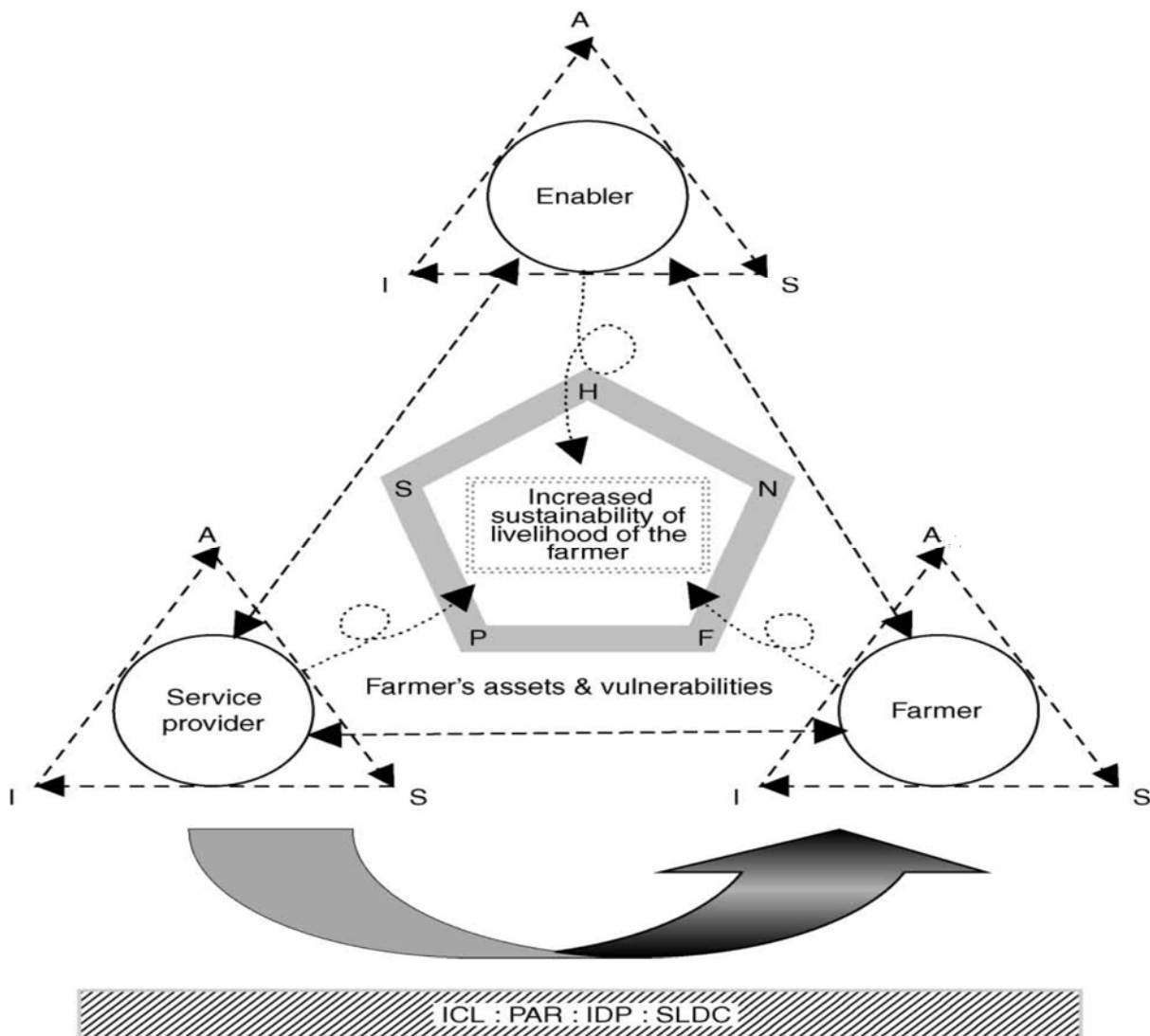


Figure 3: Agriflection model (Worth, 2006)

The success of the implementation of this model on the ground is highly dependent on the commitment of each role-player to the paradigm of learning and sharing, and to their capacity to learn. In this paradigm, technology transfer is not significant, rather collective and individual learning and sharing (investigation, application and sharing) is central. The focus of this paradigm creates space for farmers to move away from being passive into being

experimenters and innovators in the development process (Worth, 2006). Worth also states that Agriflection adopts the principles of sustainable livelihoods as the context for learning and suggests that that progress is achieved through identification of farmer's assets and assessing strengths and vulnerabilities. Learning informs what actions to take – strengthen existing assets, add to them, or reduce their vulnerability. Application of Agriflection suggests that, in addition to farmers using learning to decide what to do in their space, extension and enablers also use learning to decide what they must do in their respective spaces (e.g. extension interventions, policy and funding) to support farmers in their efforts to strengthen their livelihoods.

4.3.3. Facilitated learning agenda

As shown in Figure 3, also embedded in the Agriflection model is the facilitated learning agenda, represented by the curved arrow linking extension providers and farmers. This depicts the mission of extension practitioners to facilitate learning to farmers, and specifically to build their capacity to learn. Facilitated learning agenda comprises:

- Facilitating participation in and fostering individual and collective learning;
- Planning, action and reflection (reflective learning) by all stakeholders in the pursuit of fostering sustainable prosperity among farmers;
- Forging iterative development pathways to support farmers in the pursuit of prosperity; and
- Sustainable livelihoods development concepts as they apply to the farmers' farm/livelihood systems (Worth, 2006, p.11-12).

The Facilitated Learning Agenda is essentially a deliberate plan to build capacity of farmers in specific areas related to their farming enterprises, their sustainability context and learning. The learning agenda is not random, but developed after a careful analysis of the farmers' current situation and capacity. The analysis is conducted using the Extension Carousel of Learning (Worth, 2014).

4.3.4. Extension carousel of learning

In 2002, Agriflection model was postulated as a modification in dealing with extension's failure to improve the welfare of the resource-constrained smallholder farmers in South

Africa. This model was suggested as an improvement to facilitation approaches in extension, as it stresses the aspect of learning in extension engagement characterized by the continuous process of investigation, assimilation and sharing. As discussed in the previous section, embedded in the concept of Agriflection is a facilitated learning agenda which seeks to foster learning and, learning capacity among farmers. However, the description of the facilitated learning agenda in Agriflection was not detailed enough to clarify the nature, process, function and content of the learning agenda, and thus the extension carousel was designed to provide a framework that extension officers can use to facilitate the learning agenda (Worth, 2014).

Additional research was conducted into the nature of the Learning Agenda and to give it more structure and clarity. The extension carousel entails that it is essential that extensionists employ a framework that covers an array of factors including production, economic and management in the process of engaging with farmers and determining their current capacity for manage their farming enterprises (and in developing a plan to enhance that capacity). These factors are viewed in two contexts: social and environmental sustainability; and iteration of learning. As shown in Figure 4 the extension carousel comprises of the learning base and the wheel of content encapsulated by the facilitated learning agenda (Worth, 2014).

Figure 4 shows that when using the extension carousel in the process of engaging in conversation with farmers, extensionists need to view the elements of the carousel along two lines and two sweeps. One line is referred to as practical and the other is command. The first sweep investigates the status quo of the practical aspects impacting on the farmers' enterprises. The second sweep investigates the status quo with respect to the farmers' knowledge and skills. Together, the two sweeps establish the basis for determining the content and learning procedure of the facilitated learning agenda. The practical line establishes a status quo of all the elements of the carousel by investigating and exploring the current farmer's practices and context, examined on the basis of access, availability and affordability. The command line assesses farmers' level of skills, knowledge, attitude, behaviours, and, specifically, opportunity to command over all the elements of the carousel using the scale of dependence and self-reliance (Worth, 2014).

Extension Carousel of Learning

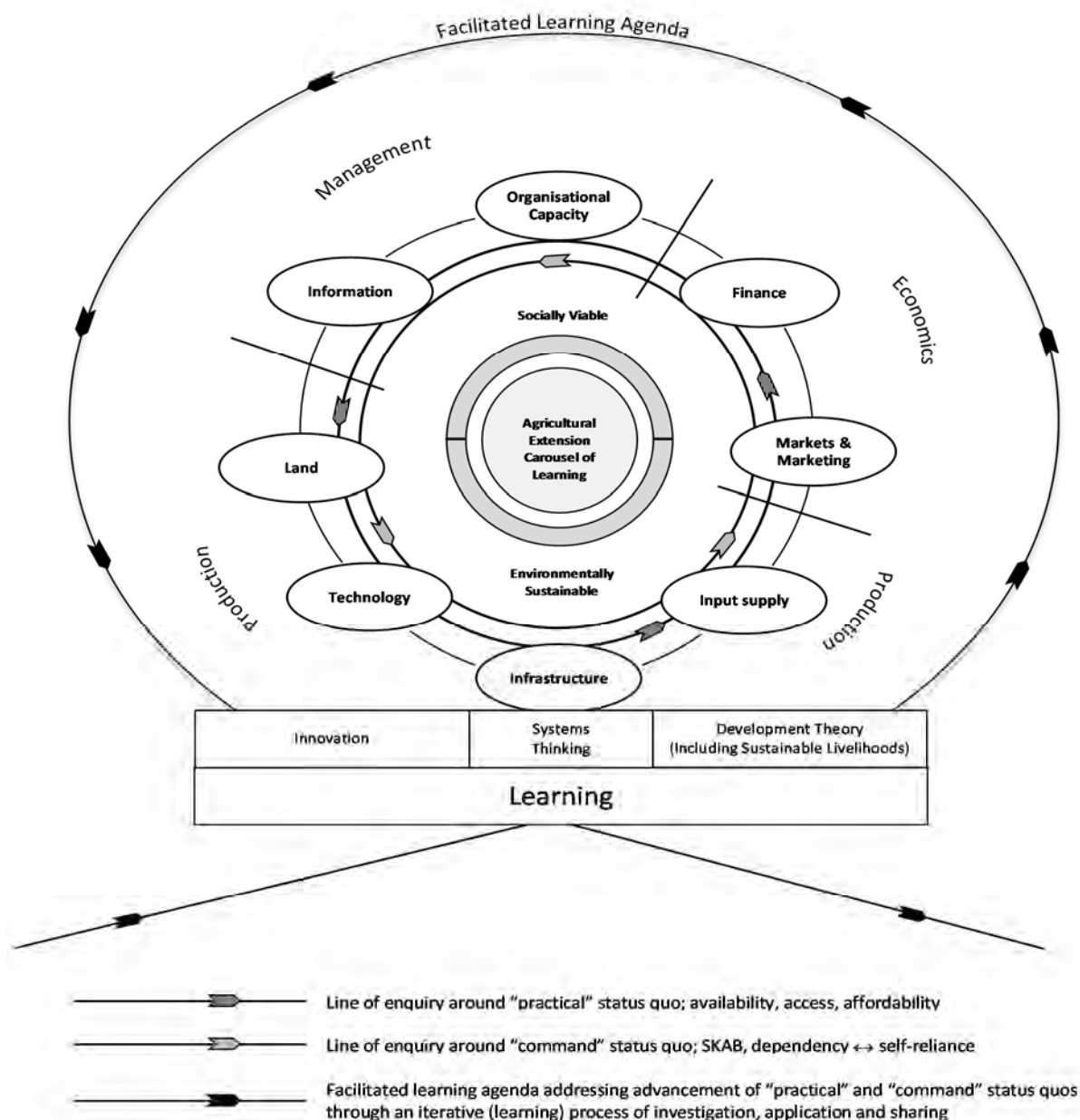


Figure 4: Extension Carousel of learning

The facilitated learning agenda then drives the extension carousel in the process of investigation (where knowledge is obtained) to application and sharing (where skills are developed). Included in the process of application and sharing is an aspect of reflection on

outcomes which enforces the recursive process of research and action. This then informs the role of extension in the context of extension carousel to be the driver of the learning process to objectively develop framework/scope for addressing problems and opportunity and enhancing farmers' capacity to command the learning process based on a detailed understanding of the farmers' current situation, context and capacities (Worth, 2014).

4.3.5. Agricultural extension and sustainable livelihoods

The diagram in Figure 5 shows the link between agricultural extension in the context of Agriflection and Sustainable livelihood.

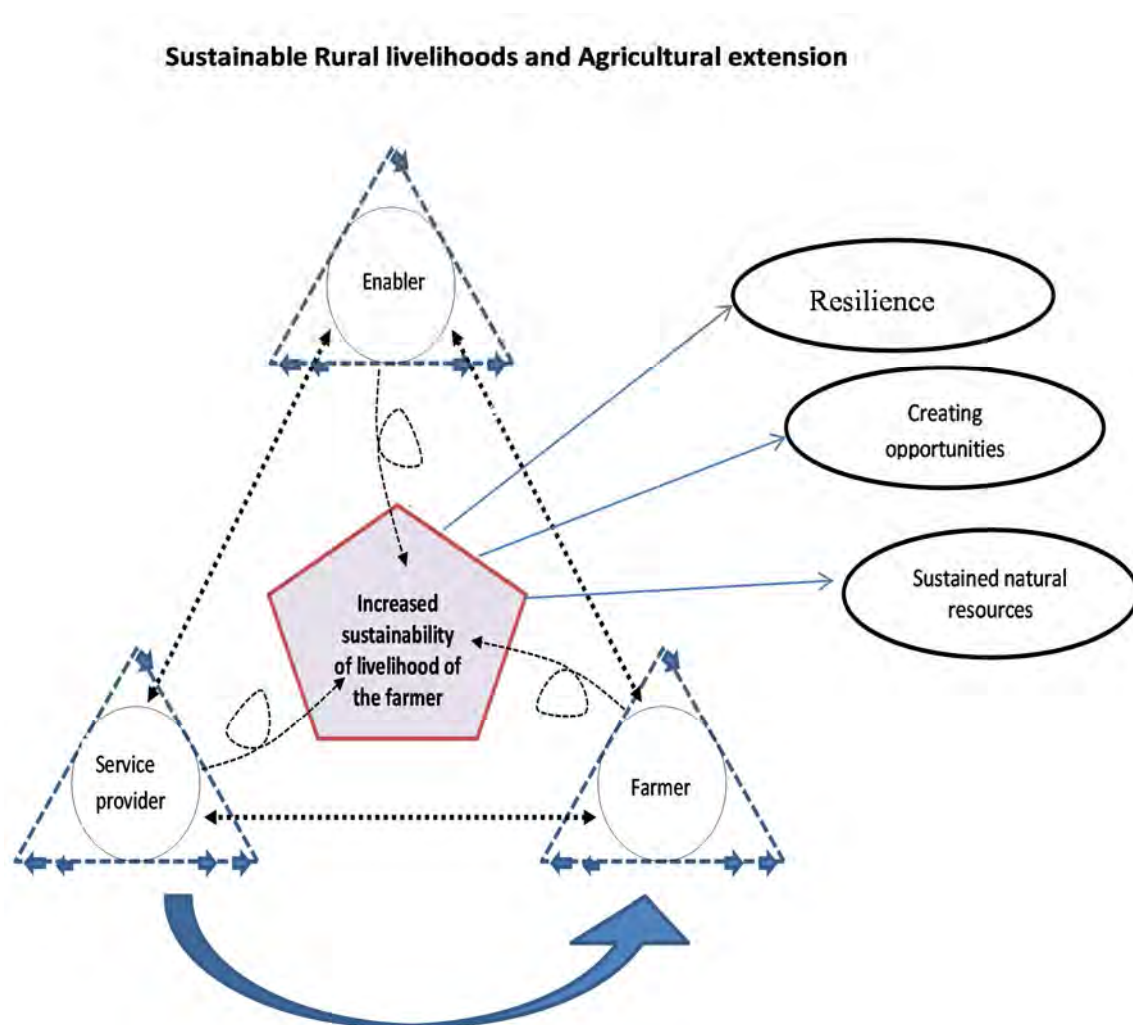


Figure 5: Link between agricultural extension and sustainable livelihood

Chambera and Conway (1991) and Hoon *et al* (1997) outline that a rural livelihood is sustainable once it is able to cope and recover from stresses and shocks. Morse and McNamara (2013) add that a rural livelihood should be able to maintain and improve its capabilities and assets for current and future generations. Also noted by Scoones (1998) is that the maintenance and improvement of livelihoods should not deplete the primary stock of natural resources. From the literature, the following three indicators were identified to be the measure for the sustainability of livelihoods:

- Resilience;
- Creating opportunities; and
- Sustained natural resources.

Agriflection appears to draw on these same factors positing that agricultural extensionists should work to facilitate learning partnerships between farmers, service providers and enablers in the process of development for the objective of increasing sustainability of rural livelihoods. Figure 5, then, demonstrates that in the context of Agriflection, the goal of agricultural extension is to aid farmers to increase the sustainability of their livelihoods – measured by the three indicators of resilience, creating opportunities, and sustained natural resources.

4.3.6. Agricultural extension and self-reliance

The concept of self-reliance, one of the key measures of a livelihood that is sustainable, can be seen from a number of perspectives. One is that self-reliance can be equated to self-sufficiency and independence. Another is that it is determined by an individual's capacity to sustain his or her livelihood, utilising available and affordable resources (Sandbrook, 1985; Fonchingong and Fonjong, 2013; Kim and Isma'il, 2013). A third perspective suggested by Carter (2012) states that the concept of self-reliance has three components:

- Knowing that people can solve their own problems;
- People have access to resources and skills to utilize them; and
- Having freedom from external obstacles.

The UNHCR (2005) maintains that the state of self-reliance is characterised by the individual's ability to partake in the decision-making and planning processes, and also be an

active partner in his or her development instead of being passive beneficiary. Literature suggests the following indicators for measuring self-reliance:

- Persistence;
- Weaned and taking responsibility for one's action;
- Draw on own resources;
- Energetic; and
- Involved in decision-making

Figure 6 shows how self-reliance is dependent on managerial capacity. Literature stresses the importance of improving a farmer's capacity when describing the above listed indicators. Figure 6 also depicts how the management aspect of the extension carousel, discussed in an earlier section, is integral to self-reliance in that it informs and otherwise determines the successful operation of other aspects/elements. However, self-reliance must also be reflected by the farmer for each of the elements of the extension carousel as each has a particular influence in the farmer's farming enterprise. It is suggested that the degree to which self-reliance is reflected in each of the elements of the carousel, indicates the degree of the sustainability of the farmer's enterprise – greater self-reliance equates with greater sustainability; the less self-reliant, the less sustainable is the farming enterprise.

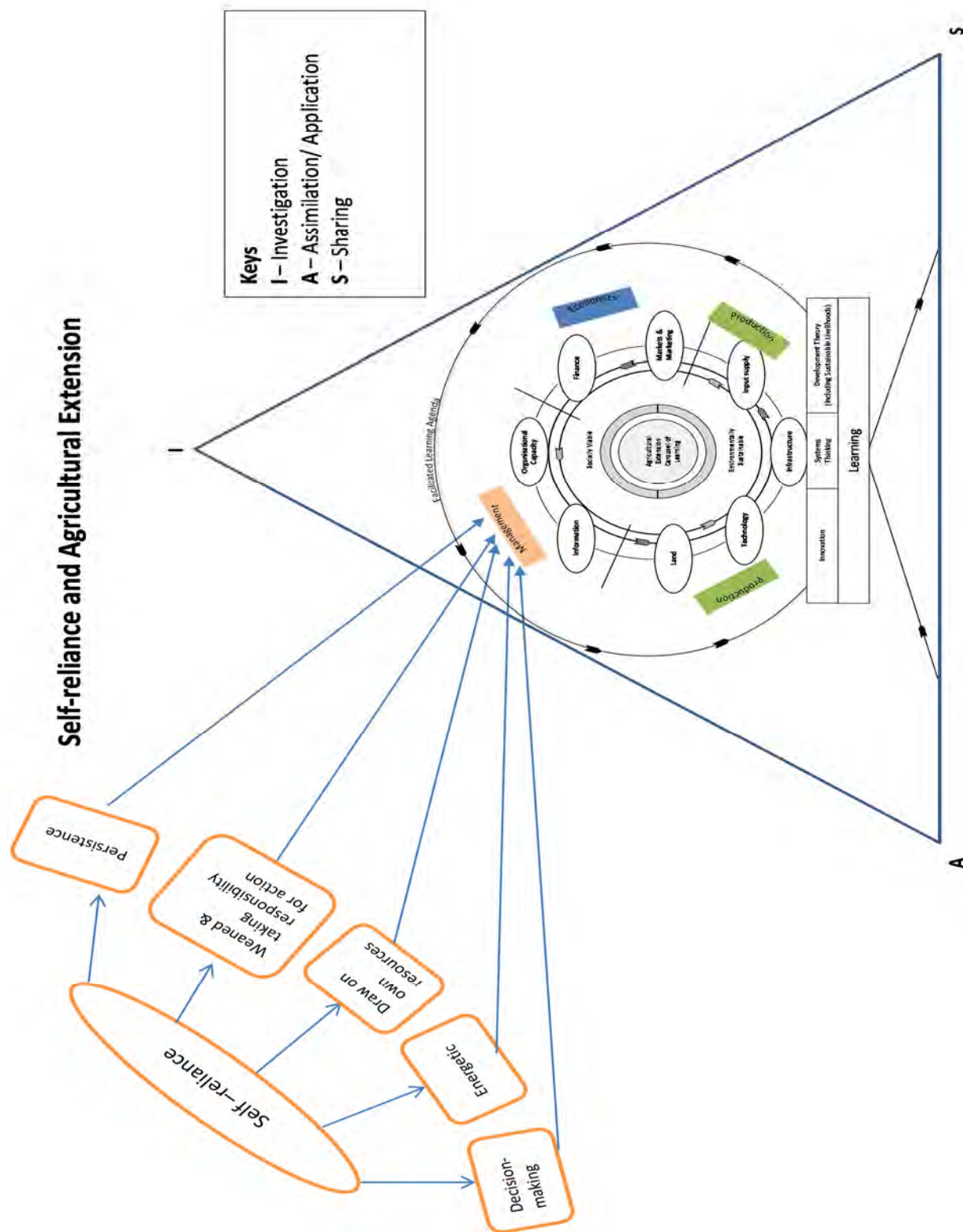


Figure 6: Link between Agricultural extension and self-reliance

4.4. Framework for assessing agricultural extension amongst small-scale sugarcane farmers

In the context of Agriflection, agricultural extension can be defined as a system that encourages and facilitates synergic partnerships between farmers, extension workers and enablers to achieve a common goal. The partnership is driven by an iterative learning process which includes investigation, assimilation/application and sharing. Agricultural extension can, thus, be described as being goal- and learning-oriented and seeks to achieve appropriate placement of technology based on engaging farmers in scientific enquiry.

Further, the learning-based extension approach suggested by Agriflection, seeks to develop farmers' aspirations and build the learning capacity of all the partners in the extension mix (farmers, extension providers and enablers). This model suggests that a learning-based approach in rural development will contribute significantly in achieving increased sustainability of rural farmers and their farming enterprises.

The paper proposes the link between self-reliance, sustainable livelihood and agricultural extension. The accomplishment of self-reliance is shown to be highly dependent on farmer capacity. Further, self-reliance was found to be directly related to 'human capital' in the livelihoods context, and to 'management' in the extension carousel context. Thus, self-reliance is a key measure of both extension (using the Agriflection framework) and of the sustainability of the farmer's livelihood (using the Sustainable Livelihoods framework). Given that the goal of Agriflection is to achieve increased the sustainability of farmers' livelihoods, it was demonstrated that it can best be achieved by enhancing human capital. In terms of extension, enhancing human capital is required amongst all technical elements of a farmer's enterprise (as reflected by the extension carousel), but is particularly important in the management cluster in the carousel because of its particular influence on the rest of the farming system. It is noted that in this context human capital refers to farmer capacity which comprises of farmer capacity to run the farm enterprise, manage sustainability and learn continuously.

Based on the foregoing discussion, the framework for investigating the role of extension in promoting sustainable rural livelihood and self-reliance among small-scale sugarcane farmers can be consolidated from elements of the Agriflection concept and sustainable livelihoods

theory and practice. The extension carousel of learning provides a practical tool for investigating, analysing and evaluation extension among small-scale farmers. The extension carousel of learning can be used to unpack the extension conversation (in whatever form it exists in particular extension programme) to determine its effectiveness in terms of two key areas. First, increasing sustainability of the farmers' livelihood measured by impact on the resilience, creating opportunities, and sustaining natural resources of those livelihoods. Second, in measuring the impact on self-reliance of the farmers, measured by changes in the levels of persistence; being weaned and taking responsibility for one's action; drawing on own resources; energy; and involvement in decision-making. This framework can be used to assess the status quo (as a base-line) and progress made by farmers as a result of the implementation of an extension programme or project. 'Successful' projects and programmes will see a genuine increase in the sustainability for the farmers' livelihoods and in the self-reliance of farmers.

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Chapter Five: Perceptions of small-scale sugarcane famers about agricultural extension to small-scale sugarcane famers

Abstract

Achieving sustainable rural livelihoods through sugarcane farming remains a challenge in KwaZulu-Natal. Illovo Sugar Company in association with Department of Agriculture and Environmental Affairs (DAEA) have initiated a SGDPs which seeks to improve and sustain rural livelihoods through the establishment of small-scale farming in the Noodsberg area. Extension is well positioned in order to help achieve the desired outcomes, however, its current contribution remains mysterious. A study was conducted to investigate the role of extension in promoting sustainable rural livelihoods and creating self-reliant farmers within the context of Small-scale Grower Development Programme (SGDP). It sought the perceptions of the farmers, the extension agents and other key informants involved in the programme. This paper presents findings from the perspective of small-scale sugarcane farmers.

In this part of the study, data were collected using the semi-structured interviews, focus group discussions, Venn diagrams and observation with 35 respondents. These respondents comprised sugarcane farmers farming in cooperatives under the SGDP.

This part of the study discovered that the role of extension is based primarily on transferring technology and providing technical support in production related activities. The study also found that neither extension nor other role-players have played a role in developing farmers' capacity to be self-reliant in their farming operations. It was found that extension has not been contextualized in the farmers' livelihoods since their roles do not go beyond technology transfer. In light of this, the study recommends that there is a need for the role of extension to be extended beyond technologies transfer. It should be contextualised in farmers' livelihoods and include facilitating farmers' learning capacity and broader advisory services

Keywords: Agricultural Extension, Sustainable rural livelihood, self-reliance, small-scale sugarcane farmer

5.1. Introduction

The functioning of South Africa's Sugar Industry is primarily dependant on a steady and reliable supply of sugarcane from the field to the sugar mill. Over the past years, the sugar industry has experienced a decreasing number of commercial farmers, competition for land for non-agricultural development, and loss of land quality due to poor management. This has led to drastic drop in sugarcane supply. As a result SASA started investing in small-scale sugarcane farmers as replacement suppliers of sugarcane. The KwaZulu-Natal provincial government realised a development opportunity from the initiative and established a joint venture with SASA to develop small-scale farmers. Illovo sugar mill became one of the millers to establish SGDP supported and by KwaZulu-Natal provincial government (Gillespie and Mitchell, 2014).

The joint venture implemented SGDPs to improve South Africa's sugarcane industry and ensure sustainable livelihoods of the participating small-scale farmers. In the case of Illovo, in 1996 this programme deployed extension workers from both the state and Illovo to implement an extension plan developed by the South African Research Institute (SASRI). Five cooperative consisting of farmers in Noodsberg area were included in the programme. The focus of the plan was to increase the amount of land and small-scale farmers under sugarcane. The farmers were invited to demonstration field days to be advised and convinced to convert to sugarcane production. Some 419 farmers agreed to convert to sugarcane production. At the beginning of the programme, 224 small-scale farmers in the area collectively grew 267.3 hectares of sugarcane with an average of 1.19 ha/farmer. At the time of this study, 462.6 hectares were planted to sugarcane by 419 farmers with an average of 1.1 ha/farmer.

The Illovo plan was successful in terms of increasing the number of farmers and amount of land planted to sugarcane. However, a number of questions arose: In the implementation of the plan, to what extent did extension engage in improving the livelihoods of small-scale farmers? How was manifested? What was the impact on livelihoods? Will this be sustained into the future while maintaining steady supply of sugarcane to Illovo? How will this be done?

To investigate these questions, a study was conducted amongst the participating farmers, extension workers and Illovo management to determine their respective perceptions of the

process and results of the plan in terms of the livelihoods of the participating farmers. This paper presents the perceptions of the farmers.

5.1. Purpose

Based on the foregoing discussion, a case study was conducted to examine the extent to which the SASRI-Ilovo extension plan is contextualized in the livelihoods of small-scale sugarcane farmers. The paper presents the perceptions of the farmers using the Extension Carousel (Worth, 2014) and discusses them in the context of resilience aspects of sustainable livelihoods theory. Drawing on these findings, the study examined the role extension could and should play in sugarcane SGDPs to refocus such programmes on the farmers (rather than on the commodity), to build their capacity, and to make their livelihoods more sustainable in the face of change and opportunities for improvement.

5.2. Theoretical framework

This study was conducted using two frameworks: sustainable livelihoods; and learning-based extension. These frameworks supported research design and data collection, analysis and interpretation.

5.2.1. Sustainable livelihoods

Sustainable livelihoods can be looked at from two perspectives. First is the concept of livelihoods – what they are and how they are made sustainable. Second is the sustainable livelihoods approach (SLA) and how it would be applied in the advancement of small-scale sugarcane farmers.

From the concept perspective, sustainable livelihoods entails that farmers' livelihoods can be sustainable when they can endure for a long time and recover from setbacks and mitigate erosion of assets (Chamber and Conway, 1991). Sustainability is derived from people's capabilities to use their various assets to make a living and to cope with, recover from and adapt from stresses and shocks. An added dimension is that a livelihood is only sustainable if it does not deprive others of livelihood options and demonstrate equity (Hoon *et al.*, 1997).

Sustainable livelihood as an approach suggests a shift from technology-oriented development approach toward more people-centred approach. The SLA stresses enabling people to think

about the objectives, scope and priorities for their development in order improve progress out of poverty through wealth creation (Caroline and Carney, 1999; SWVR, 2011). In the context of small-scale farmers, as suggested by the State of the World's Volunteerism Report (SWVR) (2011), the SLA would place farmers in the centre of the process, would focus on farmers' livelihoods, and would support and empower farmers, embracing the variety of strategies and activities aim at sustaining their livelihoods. Further, this approach adopts a holistic approach that takes in to account all aspects of farmers' livelihoods and related activities both on- and off-farm (SASA, 2003).

Resilience: A key element of sustainable livelihood

Resilience is associated with vulnerability, and is defined as a livelihood's ability to cope and recover from stresses and shocks (Scoones, 1998). Resilience is key to both livelihood adaptation and coping. However, it is essential that farmers learn to determine which strategies will increase or decrease the vulnerability of their livelihoods. This, then, suggests that resilience be driven by the notion of learning to learn in the face of change which implies that farmers should have capabilities of solving any problem they encounter regardless of its time and area of occurrence (Hoon *et al*, 1997).

The concept of resilience stresses that the farmers be self-reliant in their operations. Self-reliance, as a concept, is defined as farmers' ability and capacity to make sound decisions and do things on their own, which entails that they are able to improve their livelihood condition by consciously using existing knowledge and resources (Kim and Isma'il, 2013; Fonchingong and Fonjong, 2013). On a collective scale in a (agricultural) development context, self-reliance is a development benchmark which resonates people-centeredness and entails participation in all levels of the development initiative (Anyanwu, 1992) which seeks to develop and strengthen one's livelihood by reducing the vulnerability of assets and increasing their asset base (UNHCR, 2005; Fonchingong and Fonjong, 2002).

Learning-based extension

Learning-based extension suggests the role of extension be based on developing aspirations of the farmers and building learning capacity among farmers, researchers and extension. This type of extension stresses that farmers, research and extension should have synergistic partnership, which puts three elements in the centre of development: clients (farmers),

process (learning process) and appropriate placement of technology. The Agriflection model adopts learning-based extension which also integrates the principles and concepts of sustainable livelihood and adaptation of Agricultural Knowledge and Information System (AKIS) model into its framework (Worth, 2006).

This study adopted the Agriflection framework to guide research design, as it addresses the range of issues being investigated and aligns well with the research methods selected. Briefly, this model posits that extension should be learning-centred (depicted by an iterative process of investigation, application and sharing), should focus on building farmers' capacity to learn and strengthen their livelihood assets, and should result in improved and more sustainable livelihoods (Worth 2006). This study adopted this model as framework to investigate the role of extension in promoting sustainable rural livelihoods amongst small-scale sugarcane farmers participating in the SGDP.

An outgrowth of Agriflection is an Extension Carousel of learning. The Extension Carousel is the framework that clarifies the nature, process and function of building farmer capacity on three levels: managing their farming enterprises; managing their sustainability contexts; and engaging with learning (depicted as engaging with scientific enquiry). It was designed to provide extension workers with a conceptual structure of facilitating a learning agenda in the process of engaging with farmers. At the farming enterprise level, the Extension Carousel covers an array of factors grouped around production, economics and management. Sustainability addresses issues related to social and environmental sustainability. Engaging with learning (scientific enquiry) is framed in learning theory, innovation, systems thinking and development theory, the latter as a philosophy or world's view guiding decision-making (Worth, 2014).

Briefly, literature suggests that the key element to improving and making livelihoods more sustainable is through developing human capital. In agricultural livelihoods, using the Agriflection framework, this translates into building farmer capacity: to run their operations using own resources; to manage the social and environmental sustainability of their livelihoods; and to learn individually and collectively in the context of scientific enquiry, based on a clearly articulated world's view. Development of human capital according to Scoons (1998) will influence the livelihood choices farmers make about how to utilise their livelihood assets to improve their well-being, at the same reducing vulnerability of their assets.

5.3. Methods

Data for this part of the study were collected using semi-structured interviews and focus group discussions with 35 farmers selected using snowball sampling from farmers from two cooperatives (Nzwakele and Siphapheme) in Swayimane, near Noodsberg, KwaZulu-Natal, South Africa (Welman *et al*, 2005). The Illovo Development Manager identified the two cooperatives and the state extension worker serving them who assisted in identifying key informants from each cooperative. These informants suggested additional informants, each of which suggested additional names. This process continued until data saturation was reached and no new information or insight was forthcoming (Glasser and Strauss, 1967).

One-on-one semi-structured interviews were conducted with all 35 key informants using open-ended questions to acquire in-depth data (Patton and Cochran, 2002). Questions were based on the key elements of the Extension Carousel. Focus group discussions were held with six of the key informants, selected purposively based on their understanding/ knowledge about SGDP to verify and further explore the data from the interviews (Gibbs, 1997). Keeping to the parameters of the interviews, the focus group discussions were aided by developing Venn diagrams to surface deeper insights about elements of the Extension Carousel and extension in term of provision of services (Cavestro, 2003) The study was supported further by participant-observation where, in accordance with Driscoll (2011), the researcher interacted with the participants and became part of the community resulting in descriptive data that illuminates what happened and how it happened.

Data were analysed through content analysis where main themes were systematically developed from the raw data (Langen, 2009) in three stages: identifying the main themes; classifying responses under these themes; and integrating themes and responses in to the research report (Syed, 2012).

5.4. Results

The 35 farmer respondents shared detailed insight about how the Illovo-SASRI programme impacts on their farming and livelihood situations. Findings are presented around the key elements of the Extension Carousel: the farm enterprise (land, infrastructure, technology, input supply, organizational capacity, information, finance, markets & marketing); their sustainability context (social & environmental sustainability); and their learning context (learning, innovation, systems thinking and development theory).

Table 4 presents basic background information about the respondents in terms of their age, gender, education, source of income hectares under production, and their production framework.

Table 4: Background of respondents (n=35)

Age (years)	>50	30-49	18-29
	63% (22)	34% (12)	3% (1)
Gender	Female: 77% (27)	male: 23% (8)	
Level of education	Secondary	Primary	None
	63% (22)	23% (8)	14% (5)
Source of income	Sugarcane only	Sugarcane & Government grant	Sugarcane & off-farm income
	3% (1)	46% (16)	51% (18)
Ha under production ¹	<1	1-3	>3
	40% (14)	37% (13)	17% (6)
Production framework	Sugarcane only	Sugarcane & other farm products	Sugarcane & other farm products
	Income only	Income only	Income & home consumption
	57% (20)	9% (3)	34% (12)

¹ 6% (2): did not know the size of their farms

The majority of the respondents were female, over 50 years of age, had secondary school education, and produced only sugarcane for the sole purpose of generating income. The farms are very small; 40% have less than 1 ha, while 37% have 1-3 ha. A significant percentage (34%) produced sugarcane and other farm products for both income and home consumption. Only one farmer derived income only from sugarcane, the majority derived income from a combination of sugarcane and off-farm sources (51%) or sugarcane and government grants (46%).

Organisational capacity

In the context of this study organisational capacity is described as the farmers' ability to command and manage the operations and activities of their farms with minimum external support. This concept captures the ability to diagnose, plan, synchronise, implement, monitor and evaluate management operation (Worth, 2014).

Most farmers stated that part of the programme focuses on building organisational capacity of the cooperative, however it is only available to the management committee of each cooperative. Three structures/stakeholders are involved in this: Illovo officials, SASRI and government extension workers. The Illovo officials and state extension workers focus largely

on the production aspect of the management system by providing on-going training courses to cooperatives committee members. SASRI's contribution was described as training site for a selected number of the cooperative management committee members for a period of one month to advance their knowledge and skills in the aspect of organisational capacity.

Farmers have limited command over the marketing system in their sugarcane enterprise. They have linked it to their limited knowledge to how that market operates. The management committee members noted that the current structures focus largely on production and financial aspects of the management system, and little attention is given to building marketing capacity. Apart from marketing, the management committee members have substantial knowledge pertaining to managing their cooperatives, however they feel that their skills level will be a limiting factor if they were to be fully in charged.

Some farmers suggested that their skills be enhanced through field trips and farmer visits where they can be exposed to management practices of similar enterprises. Farmers that are not part of the committee suggested that their leaders should be given more opportunity to participate in the management system of their cooperatives, and that guidance should be provided by external stakeholders to ensure progress and skill development. A minority of the respondents indicated they have little trust in their cooperative leaders, and felt it is best that the external stakeholders make the cooperatives' final management decisions.

Information

The concept of information in this study refers to the farmers' ability to identify, locate relevant information for their operations. Further, this concept captures the farmers' ability to assess, interpret and use acquired information, as well as an aptitude to generate new information (Worth, 2014).

Some of the farmers who are members of the management committee revealed that Illovo sugar mill and extension worker are their main sources of information. On the other hand, majority of farmers stated that they acquire information from extension workers and from their management committee. Above all, most of the information farmers have about sugarcane farming business was provided to them as part of the agenda of the SGDP. Illovo officials, government workers, Pest Disease and Variety Control (PD&VC) committee, World Wildlife Foundation (WWF) and SASRI were identified as the main stakeholders involved in imparting information.

Illovo hosts a series of field days aimed at conveying information to small-scale sugarcane farmers within the cooperatives, largely relating to the production side of the farming business. Stakeholders such as PD&VC and WWF are involved to a play role during these field days depending on the theme or focus of the sessions. PD&VC provide information in the form training regarding relevant seedcane varieties as well as pest and diseases affecting sugarcane. WWF on the other hand provide information in the form of training that is relevant to environmental management.

Farmers have limited opportunity to command the ‘information’ systems and structures especially in the aspect of information related to their market and marketing (Illovo sugarcane) for sugarcane. The suggestion was that farmers still require knowledge and skills of being able to source, interpret and generate information on their own. The suggestion to creating self-reliance in information is through ensuring farmers’ access and capacity to use library and Internet.

Finances

The finance element in this study refers to the farmers’ ability to source and allocate funds according enterprise’s needs and, more importantly, account for funds related to their farming operations. The definition extends to the aptitude of knowing how and where to source funds; what, where and when to spending money and working out the enterprise’s budget, gross margins and profitability (Worth, 2014).

The training and educational courses related to finance are only provided to farmers who are in the management committee that are supposed to be in charge of the co-op’s funds.

Umthombo Agricultural Finance (UAF), Government, Illovo Sugar mill, extension workers and SASRI were identified as stakeholders relevant to the finance component of the SGDP. UAF acts as a development bank that offers loans to small-scale farmers that are willing to farm cooperatively. Government provided two extension workers and subsidy funds to assists small-scale farmers in the planting and ratoon/growth management phase of sugarcane. Funds from government and UAF are kept by the Illovo Sugar mill on the farmers’ behalf.

Thereafter, the funds are dispersed according to enterprise needs. SASRI, with help from extension workers, play the role of building the capacity of the small-scale farmers participating in the programme (especially co-op leaders) in financial management.

Farmers who are part of the management committee were given substantial knowledge on how to source, allocate and account for funds, through training. However, farmers noted that they were not yet ready to command finance systems because they are not fully included or involved in financial processes through which they may gain exposure and also enhance their skills and confidence. The respondents feel that Illovo has not been transparent to farmers pertaining to finances, because not all the financial processes are explained to farmers.

All of the farmers also shared that there is a portion of money that is deducted from income earned from the harvest for the purposes of sugarcane ratoon/growth management for the following season. The deducted money is retained by UAF and the Illovo sugar mill; they issue written invoices to farmers to collect inputs from the supplier at the appropriate time on enterprise needs.

Most of the farmers suggested that they all receive financial management training and be granted opportunity to enhance their skills and confidence to command financial operation on their own. It was also suggested their co-ops have an external financial auditor that will ensure transparency at Illovo pertaining to management of funds.

Market and marketing

Market and marketing in the context of this study refers to the farmers' capacity to understand the fundamental elements of their markets, and have an opportunity to command systems and structures relevant to markets (Worth, 2014).

All cooperatives under the SGDP supply their sugarcane harvest to the nearest sugar mill. In the case of this study, Noodsberg small-scale farmers supply to the Illovo sugar mill. The marketing operations of the cooperative are managed and controlled by Illovo sugar mill. At the establishment of the cooperatives in the community, each co-op signs a supply agreement with Illovo to benefit from the SGDP.

On the day of the harvest, the committee members, alongside extension workers, provide assistance in order to ensure that the sugarcane is harvested accordingly and that transportation is organised. Before remuneration, each farmer under a cooperative who has supplied their cane to Illovo gets a statement reflecting the number of hectares, the tons harvested, a credit amount for supplying sugarcane, expenses and the income due to the farmer. Extension workers help farmers who are illiterate by explaining and interpreting the statements issued to farmers.

Farmers do not receive any form of training from any of the stakeholders involved in the SGRP related to marketing. The reason for this is because they are not meant to partake in the marketing systems since Illovo manages it for them. Lack of transparency was also noted in marketing. They cited that farmers do not benefit from products made from their sugarcane by-products such as compost and oil and that they are not shown how Illovo do marketing on their behalf.

However, the majority of farmers noted that training on the marketing side of the co-op was not necessary since Illovo will not give them opportunity to command their marketing operation. A minority of farmers suggested that they should be engaged in an on-going training on marketing and also be granted an opportunity to partake in the marketing system of their business so that they can be self-reliance in commanding all process related to marketing.

Input Supply

In the context of this paper, investigation regarding input supply was centred on the issues related to farmers' ability to access, choose and evaluate inputs relevant to their enterprise. The focus was more on understanding the role that extension plays in ensuring farmers' self-reliance in the above-mentioned issues (Worth, 2014).

The structures and institutions identified by farmers relevant to the input supply are the Illovo team, the co-op committee, extension workers, commercial input supplier and the Government. Illovo acts as a middleman between the commercial input supplier and small-scale farmers. Illovo performs the duties of purchasing inputs and accounting for funds on farmers' behalf. The management committee help extension workers collect and distribute inputs to farmers. Extension workers train farmers in proper application methods or use of the inputs. Farmers are then required to observe how contractors apply the inputs in their plots as a method of advancing their knowledge. Government funds or subsidises small-scale farmer through Illovo as means of absorbing/relieving the stress of input procurement during planting seasons.

Most farmers suggested that the role of extension be extended to building capacity on how to evaluate inputs and identify input supply options. Farmers also suggested that their management committee be involved in all the processes of input supply so that they can gain confidence and skill to be self-reliant in commanding systems and structures related to input

supply. Most farmers noted that as much as they enjoyed the benefits of sitting back and having outsiders do things on their behalf, they foresee the danger of not learning how to do things themselves.

Technology

This study defines the concept of technology by referring to it as farmers' ability to evaluate, select and use technologies. The definition extends to farmers' ability to explore other technology options and choosing technologies that are affordable and suitable for their farming enterprises (Worth, 2014).

The relevant structures and institutions relevant to technology are the extension service, SASRI, PD&VC and WWF. Extension workers engage in organising and facilitating field days focussed on transferring technologies relevant to sugarcane production. SASRI scientists transfer more scientific technologies relevant to sugarcane farming. PD&VC, in association with extension workers, plays a role in teaching farmers about pest and diseases affecting sugarcane and ways to prevent and control them. PD&VC also educates farmers about different varieties of sugarcane; the teaching is focussed on advantages and disadvantages of each variety suited for the area. WWF holds training sessions on environmental management giving focus to soil conservation and management and alien species.

Farmers receive sufficient training and education on technologies related to farming sugarcane however still missing is training on ways of evaluating, selecting and acquiring technologies on their own, in order for them to be self-reliant. Most farmers suggested a need for an opportunity to put their knowledge into practice, e.g. establishment of farmer owned-contractors which they foresee having a financial benefit to small-scale sugarcane farmers.

Infrastructure

The concept of infrastructure in the context of this paper is defined as basic facilities, installation and services needed for the functioning of the sugarcane farming operation. As with the other element of the Carousel, a key concern is the capacity of the farmers to manage their infrastructure and make decisions about their infrastructure requirements. This section will then discuss issues related to access, quality, knowledge, skills and the role that extension plays (Worth, 2014).

The structure and institution relevant to infrastructure are: Illovo, DAEA and Umshwathi municipality. The government issued grants to SGDP for farmers to build storage facilities for production inputs. In this instance, Illovo is responsible for managing and allocating funds for construction of storage facilities. Umshwathi municipality is involved in construction of infrastructure facilities for the entire community such as community halls, roads, schools, libraries and clinics. At the time of the study, Nzwakele was the only co-op to have received the grant among the co-ops investigated in this study, but has not yet built the shed.

The infrastructure relevant to sugarcane enterprise operation are storage facilities, community roads and farm machinery. Storage facilities and machinery were not high priorities for the farmers, because they are able to rent it when needed. Community roads, especially the ones near the farmers' plots, are in poor condition as they make the process of ploughing and transportation of sugarcane time and fuel consuming. These are the priority for the farmers.

In addition, Nzwakele Co-op suggested the need to own a hall to hold their monthly meetings so that they can stop using the old age home as their gathering site. Siphapheme Co-op, on the other hand, suggested that they build an office for the management committee, where the farmers can visit to enquire about anything relevant to their farming operation.

Extension has not been contextualized in assisting the farmers in matters related to accessing or owning infrastructure relevant to their operation or in building capacity of farmers in relation to managing infrastructure. However, most of the farmers revealed that infrastructure improvement is not in the list of things they first need since their co-ops are still less than 5 years in operation.

Land

Land in the context of this paper is defined as plots on which farmers have planted their sugarcane. The Extension Carousel is concerned with the farmer's capacity to manage various aspect related to land, including acquisition and decisions about appropriate use. This section firstly investigates land issues related to size, ownership, suitability and productivity. It then explores the role of extension in facilitating farmers' access to suitable and productive land. Lastly, it discusses extension's role in building farmer capacity relevant land aspect as mechanism for building self-reliance (Worth, 2014).

Extension workers, traditional leader and WWF were identified as stakeholders relevant to land systems related to the SGDP. Extension workers (Illovo and government) facilitate the

system of land assessment focusing on size, quality, potential and suitability. Traditional leaders (chief) control the land procurement system, since the community is under Ingonyama Trust. WWF facilitates the system of environmental management compliance (pertaining to land) such as establishment of contour banks and other erosion control measures, removal of alien plants and protection of water sources.

Issues raised by some of the farmers pertaining to land were mostly related to land size. They observe that sugarcane farming appears to be financially viable if it is done extensively on a large area. Thus, most of the farmers were convinced to plant sugarcane in all their available plots. This land issue has adversely affected most sugarcane farmers since they have had to convert their food land to sugarcane resulting in a shortage of food supply within households. Farmers are then in need of more land for the purpose of diversifying and expanding their sugarcane production, and to resume food production.

Land assessment prior to planting crops is another issue related to land. Farmers received ample training on land assessment during demonstration field days. However, they felt they do not have sufficient skills to do it themselves because they lack the opportunity to put into practise the knowledge that they have acquired through training, specifically on their own fields. During interviews one farmer stated that, “even if we get the opportunity to assess our own plots we will not be able to interpret the result to say whether the land is good or bad. We still need more training that will make us capable of doing the whole process of land assessment on our own, and for us to be considered self-reliant.” Other farmers indicated that they need to be taught how to use the GIS device to measure their land size, access land assessment equipment, and where to send soil samples after being collected.

Social viability

Social viability in the context of this paper is defined as the degree to which the farm enterprise is viable and acceptable in the farmers’ cultural traditions and the extent to which the farming operation promotes social cohesion. Socially viability takes into consideration issues related to cultural heritage, labour laws and regulations and social cohesion activities and events. It is, again, concerned with the capacity of the farmers to manage issues related to their farming operation’s social sustainability context. The paper will pay attention primarily to exploring the role of extension in promoting social viability (Worth, 2014).

Extension workers and Illovo staff were identified as relevant stakeholders to the element of social viability. Extension workers are involved in organizing and facilitating workshop where sugarcane farmers from different co-ops gather to discuss issues and share views related to small-scale sugarcane farming. Illovo plays a role in strengthening the social cohesion among co-op leaders through hosting meetings where co-ops' management committees get to share their views and perceptions with each other.

Most of the farmers indicated that the sugarcane enterprise is culturally acceptable to almost all the members of the community. However, farmers who fall under the Shembe religion group are prohibited from conducting out any farming activities on Saturdays. Further, sugarcane farming has been viewed as a means to improve the financial status of the farmers and has no adverse effect on the community heritage.

In respect to social cohesion, the formation of sugarcane cooperatives in the community has brought the sense of unity among farmers to a certain extent. However, a minority revealed that being under the SGDP has reduced unity among farmers, since there are very few activities that enable farmers to meet, when compared to when the land was used to produce vegetables which they planted prior to sugarcane. The monthly meeting that each co-op holds has partly become a way of promoting social unity within farmers because that is where they get to share experiences and new ideas.

It was suggested by most farmers that more activities aiming to enhance social cohesion among sugarcane farmers should be incorporated in the SGDP. Examples of social cohesion activities suggested were Farmer Field School, farmer workshops and farmer-owned contractors. That the farmers look to the programme to create social cohesion suggests that they do not see themselves as self-empowered to create the social cohesion they seek.

Environmental sustainability

Environmental sustainability in the context of this paper is described in the light of farmers' ability to grasp the essence of managing and conserving natural resources and comply with environmental laws. This will be explored in this section with the aim of understating the role that extension plays in building farmers' capacity and facilitating farmer access to services and equipment relevant to environmental sustainability (Worth, 2014).

WWF and extension workers were identified as the main stakeholders involved in ensuring environmental sustainability in small-scale sugarcane farming within the rural context. WWF

is involved in training farmers on the importance of conserving the environment and also facilitating farmers' access to environmental control services and equipment. Extension workers are involved in ensuring that all individual farmers comply/conform with environmental laws and actually implement soil control measures.

All of the farmers indicated that the knowledge and experience they have received from WWF is exceptional because they could relate what they have been taught to past experiences pertaining to environmental (especially soil) constraints. Some farmers stated that as much as they grasped and appreciated the knowledge and experience they received from WWF, there were some activities or laws they could not comply with simply because of their limited land size. One of the examples highlighted was of protecting water sources by leaving 100 metres space between water source and sugarcane plantation; this is not feasible when operating on one hectare or less.

Most of the farmers have also acknowledged the role played by extension workers in providing assistance on their individual plots related to the removal of alien species. Extension workers also engage in extending farmers' knowledge and skills on environmental management by granting them opportunities to do most of the activities related to soil conservation and alien species eradication.

Learning

The concept of learning in the context of this paper refers to farmers' ability to continue with the process of learning and adoption even after external support is withdrawn. This element will then focus more on exploring the role of extension in building farmers capacity to continuously learn on their own. It also encompasses factors related to farmers' ability to innovate, and operate from a systems perspective and within a development context as discussed earlier (Worth, 2014).

In attempting to gauge farmers' ability to continuously learn on their own farmers were asked what they had learnt on their own pertaining to sugarcane. They were also asked if what they had been taught by extension workers helped them in learning new things on their own.

The majority of the farmers are still dependant on external stakeholders (especially extension workers) to provide them with new learning. Farmers still have the mentality that outsiders know better than they do, since they are generally more educated than they are. The responses of the majority of the farmers reflected that extension workers are their main

source information. However, among the farmers there were some who had previous experience in farming sugarcane and who have acquired a passion in this enterprise. The responses from these farmers strongly indicated that they are continuously learning about sugarcane farming on their own, despite assistance from extension.

Innovation

Innovation in the context of this paper refers to farmers' ability to apply problem solving approaches in their operation on the continuum of learning and adoption. The paper then focuses on assessing farmers' capacity to innovate, and seeks to understand the role that extension plays in building innovative farmers (Worth, 2014).

In assessing farmer capacity to innovate and understanding extension role, the following questions were asked: 'in your farming experience, have you ever changed or adapted your farming practices? What informed your decision to change or adapt? Did extension play a role in your realization for change and adaptation, and how?'

From the responses it can be summarised that most farmers are innovative, however, they innovate based on advices and information from neighbours. Farmers have indicated that extension plays no role giving them advices on how to solve problem related to farming in general. Other farmers stated that, they were told that in the event that a problem arises in their operation, they should consult an extension worker first. Furthermore, extension focuses largely on sugarcane enterprise and pays no attention on other livelihoods strategies and activities that contribute/affect farmers' livelihoods.

Systems Thinking

Systems thinking in the context of this paper is described as the farmers' ability to solve problems from understanding its core roots contextualised in the wider system in which the problem occurs. This section then assesses the degree to which farmers can apply a systems thinking approach to problems and understanding the role of extension in building farmers' capacity to solve problems (Worth, 2014).

The following questions were asked to assess farmer's capacity to solve problems using the system thinking approach and understanding how extension is contextualized:

Farmers were given scenarios, such as the occurrence of stunted and yellowing sugarcane, and asked to describe how they would solve the problem, where they learned that method of problem-solving and the extent to which they apply it to other situations – and to what effect.

Responses from most farmers reflected that they are being taught a single-focus approach to problem-solving. There were, however, some farmers who have received training and have experience in solving problems using a systems thinking approach in their past work environments. Other farmers indicated that they would call an extension worker should such a problem arise – suggests farmer dependency on extension services.

Development Theory (including Livelihoods)

Development theory in the context of this paper refers to the extent to which farmers perceive their farming activities in a wider context of issues generally associated with development theory. It is admittedly a subtle area that attempts to understand how conscious farmers are of the role their farming enterprises play on a wider scale and to what extent decisions are contextualised in world's view that resonates with development theory. On the simplest level, this element tests the extent to which decision-making is grounded in the understanding of livelihood's philosophies and theory (Worth, 2014).

To elicit some measure of understanding, farmers were asked to indicate what they would do if Illovo decided to leave them to produce sugarcane on their own and to negotiate independently with the market. The farmers were also asked on what they based their answers and what informed them.

The responses obtained from asking this question reflected that most farmers have limited capacity and opportunity on making decisions pertaining to their operations outside of meeting the requirements of sugarcane production within the framework of the programme. Some farmers indicated that they would withdraw from their cooperatives if Illovo were to withdraw their assistance. Other farmers stated that they would simply convert back to planting food crops because they felt that without external support from Illovo and other stakeholders they will not be able to function as a co-op. The majority did not demonstrate any conscious thinking about bigger pictures or anything that could be considered related to development theory.

However, some responses indicated that some farmers do make conscious decisions reflecting philosophical understanding of their livelihoods rather than development as a

theory. This was particularly true of farmers that are in the management committee, whose responses were different from the other farmers. Their responses reflected that they understand the type of development this sugarcane programme brings to them. They reckoned that Illovo would not withdraw their assistance because these programmes existed as government attempts to develop small-scale farmers by ensuring that they have reliable market and comprehensive support. They added that the government would bring other people to assist them should Illovo decide to withdraw their assistance.

5.5. Analysis

Table 5 serves as a summary of the data collected through interview highlighting critical themes and related issues. These themes were identified/ developed in the field after analysing the result from semi-structured interviews for the purpose of preparing for focus group discussion to be conducted with farmers.

Two main themes emerged: skills and knowledge to command the cooperative's operations; and the opportunity to command the cooperative's operations.

Table 5: Thematic description developed from the interview with farmers

Identified themes	Related Issues
Skills and knowledge to command co-op operations	<ul style="list-style-type: none"> • Demonstration field days and co-op meeting are the only time extension get to engage with farmer knowledge advancement • Extension provides training and education based primarily on production • Extension remains the main source of information for cooperatives pertaining to production • There is no training provided it improve farmers knowledge and skills to learn on their own • Extension transfers technology and provide no knowledge or skills to farmer to source further technology • Farmers have no knowledge nor skills on market and marketing • Farmers have poor decision-making skills related to their farming operations • Farmer have poor problem solving skills pertaining to their farming operation
Opportunity to control co-op operations	<ul style="list-style-type: none"> • Training and education is provided related to production however contractors are hired to work their plots • Contractors consist of people outside the community • Co-op leaders receive training on finance management but Illovo manages all co-op finances • Farmer have no ability nor opportunity to control their market (Illovo) • Generally co-op leaders have limited opportunity to partake in decision-making in their operation

The findings captured in Table 5 very clearly suggest two things. First, while the farmers are provided with a substantial level of technical training related to producing sugarcane, they not trained on other aspects of running a farm business such as marketing or financial

management. Second, despite the training given to farmers and the members of the cooperative committee, farmers do not actually have (are not given) the opportunity to truly manage their cooperatives or the business aspects of their sugarcane production.

Training appears to be problem or task specific to address narrow issues, problems or operations. Farmers are trained how to do something, but are not educated beyond the task orientation. The focus is training, not sustained learning.

Figures 7 and 8 both serve as a schematic summary of the data gathered through group discussions with the two co-ops. The Venn diagram was conducted during the each group discussion session held with stakeholders, for the purpose of visualising the critical issues highlighted during the discussion.

In both figures, the distance between elements of Extension Carousel from extension implies the degree to which extension play a role in that specific element. The more distant and element is from extension the less of a role extension plays in that element and vice versa. The lines between extension and elements show the level of knowledge and skill and the opportunity to command issues related to the particular element. The absence of line implies that extension play no role in that particular element either in provision of knowledge or in enabling opportunity opportunities for farmers to acquire skills.

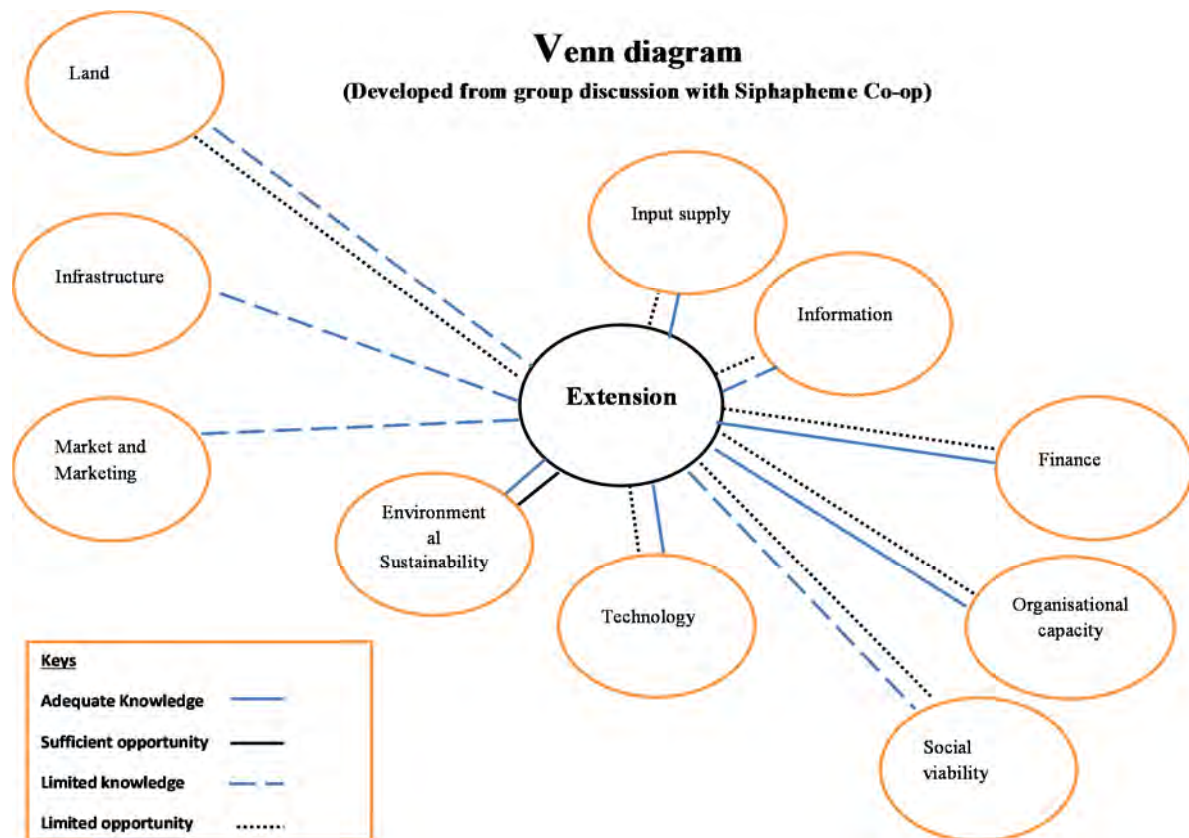


Figure 7: Venn diagram developed with Siphapheme Co-op

Both diagrams demonstrate that the role of extension in the SGDP focuses more on technology, environmental sustainability and input supply. It also shows that among the areas to which extension focuses on, their role is more on providing knowledge to farmers and less efforts is put in enabling opportunities for practical learning. With regards to information, Sphapheme co-op placed the information element closer to extension because of the significant role they play in providing them with information. On the other hand, Nzwakele co-op placed the information far from extension because it does not engage in assisting farmers learn to acquire information on their own. Further, the diagram demonstrates that extension assumes that knowledge is equivalent to capacity.

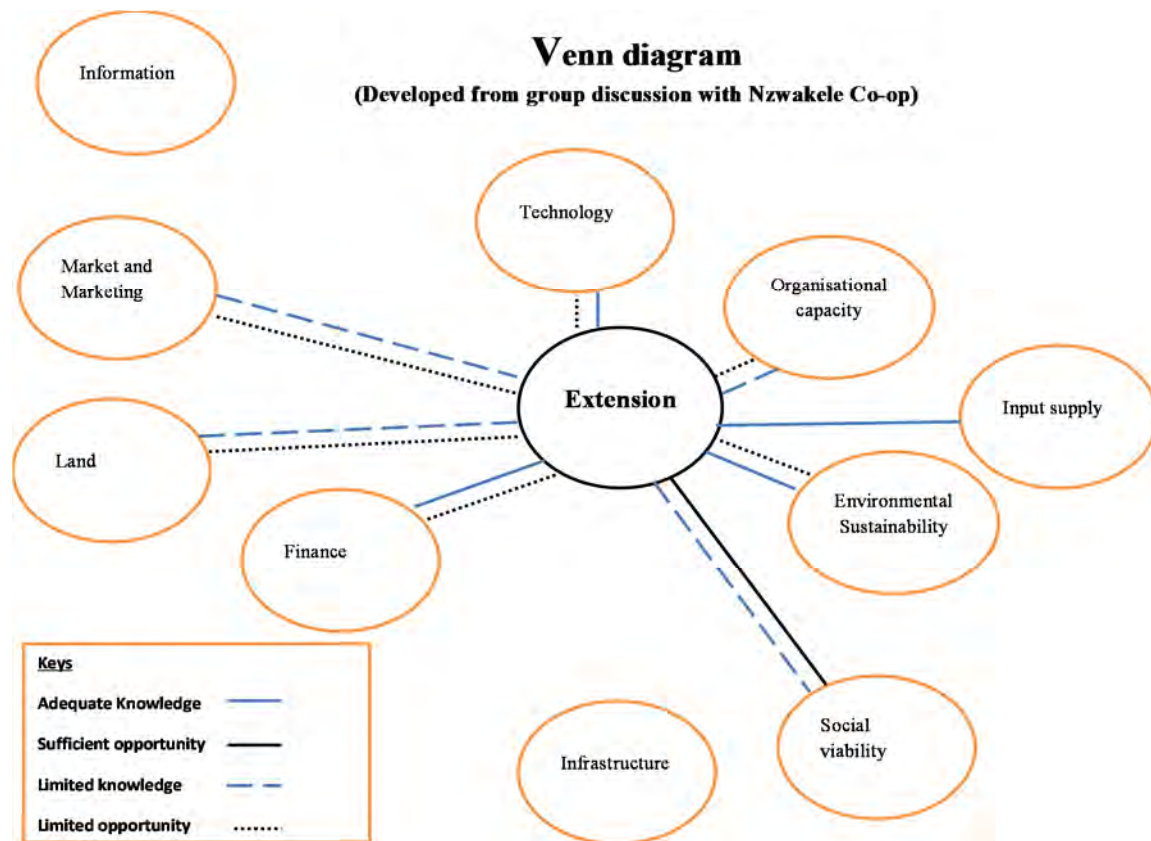


Figure 8: Venn diagram developed with Nzwakele Co-op

5.6. Discussion and conclusion

Using the Extension Carousel enabled the study to uncover rich details of the nature of the engagement of the farmers in the SGDP by extension and Illovo. It explored, from the farmers' perspectives, the extent to which farmers have knowledge, skills and opportunity to command their farming enterprises, their sustainability contexts and to take command of their own learning.

The results show that, from the perspective of the participating farmers, this programme focuses primarily on imparting knowledge relevant to the farmers' sugarcane enterprises, but does not offer opportunities to farmers to acquire usable skills. Farmers have limited opportunity to acquire skills because they are not being engaged in any the processes of the programme. Active participation, on the other hand, is considered an indicator of achieving self-reliance of farmers in the context of development interventions (Fonchingong and Fonjong, 2003). Further, active participation in development fosters farmers' ownership of the development process which later results in farmers being self-reliant in their operations.

In the face of resilience, theory suggests that development should seek to build farmer capacity to cope and recover from stresses and shocks in their livelihood to increase the sustainability of their livelihood (Scoones, 1998). However, the results of this part of the larger study indicate that the farmers depend on external stakeholders (the programme's role players) in making decisions relevant to their development, which is caused by their limited participation in their operation. The results indicate further that training provided by the programmes does not build farmers' capacity to be able to control all the systems in their co-op or to engage with scientific enquiry relevant to their farming operations.

The results also show that the programme engages extension in transferring technology and information to farmers and in ensuring that sugarcane is grown according to the provisions of the programme. This is done by involving contractors to do all the production activities on farmers' behalf. This is clear evidence that the SGDP focuses more growing sugarcane than on building farmers' capacity to enhance their livelihoods.

Both the Agriflection framework and the sustainable livelihood approach argues that the development should put farmers in the centre of the process, focus on farmer livelihoods and their respective human, social, financial, physical and natural assets, support and empower farmers to make wise decisions with respect to their farming operations, and embracing diversity of strategies and activities aiming at sustaining their livelihood (SWVR, 2011, Worth 2006).

This aspect of the study concludes that the SGDP employs a technology-centred approach which focuses more on developing an enterprise than people. It found further that extension is not very effective in building farmer capacity and aspiration to own and sustain their development. The study also found that farmers are not being offered an opportunity to actively participate in the process of the programme which implies that the programme focuses on the commodity rather than on farmers' livelihoods. Based on the theories used to design this study, the findings suggest that the SGDPs are not sustainable in their current form. They may serve the purpose of producing a more stable supply of sugarcane to the mills and thereby the sugar industry, but they do not serve the purpose of building the capacity of farmers to carry this process into the future without continued external support. This is the antithesis of development.

5.7. Implications

The findings of this aspect of the study imply that the programme shifts the focus from technology and commodity focus to people-centeredness which enables farmers to actively participate in all the development processes. Further, the study suggest that the programme adopts a learning-based approach which stresses that farmers, extension and enablers engage in the process of learning from each other following the iterative learning process of investigation, application and sharing.

The study further recommends that extension be contextualized in livelihoods of the farmers. This would include building farmer capacity to engage in scientific enquiry as the basis for acquiring knowledge, promote farmer participation in all the developmental processes and embracing variety of activities aiming at making the farmers' livelihoods more sustainable.

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Chapter Six: Perceptions of agricultural extension providers about agricultural extension to perception of small-scale sugarcane famers

Abstract

Small-scale farmer development through the sugarcane commodity has become popular in KwaZulu-Natal (KZN) as an intervention to promote sustainable rural livelihoods. Illovo Sugar Company adopted such development years ago as strategy to develop small-scale farmers and ensuring consistent supply of sugarcane to the mill. In 2006, South African Sugar Association (SASA) and the KZN provincial agricultural department created a joint venture aiming at supporting Illovo's small-scale development initiative. Illovo implemented an extension programme designed by the South African Sugar Research Institute (SASRI) to engage in transferring technologies and information relevant sugarcane production. This study investigated the role that Illovo-SASRI extension play in improving and sustaining the livelihoods of small-scale farmers. It forms part of a larger study which included with three groups of participants: namely small-scale sugarcane farmers; extension providers; and enablers (e.g. funders and policy-makers). This paper presents the findings from the extension providers.

As a part of the larger case study, data were collected using semi-structured interviews, rich picturing and participant-observation methods with four respondents. These respondents comprised Illovo's development manager, an Illovo extension worker, a state extension worker and a SASRI extension specialist. The small number of respondents allowed this part of the study to collect rich details about the Small-scale Grower Development Programme (SGDP).

The study found that extension focuses on imparting production technology and information relevant to sugarcane commodity to small-scale farmers. This indicates that extension adopted a technology transfer approach in engaging with farmers. The study also found that extension is involved only in conveying knowledge; farmers have limited opportunity to participate and take ownership of their development. Limiting farmers' opportunities to acquire skills through practical application of knowledge learned has resulted in farmers losing interest in attending training facilitated by extension workers. The study suggests that extension revise the their programme to align with goal of the development programme, shift extension from the current technology and commodity focus toward a more farmer-centred

approach and adopt a learning-based approach focusing on building farmer capacity that will contribute toward improving farmers livelihoods and making the more sustainable.

Keywords: Agricultural extension, Sustainable rural livelihood, self-reliance, small-scale sugarcane farmer.

6.1. Introduction

The functioning of South Africa's Sugar Industry is primarily dependant on a steady and reliable supply of sugarcane from the field to the sugar mill. Over the past years, the sugar industry has experienced a decreasing number of commercial farmers, competition for land for non-agricultural development, and loss of land quality due to poor management. This has led to drastic drop in sugarcane supply. As a result SASA started investing in small-scale sugarcane farmers as replacement suppliers of sugarcane. The KwaZulu-Natal provincial government realised a development opportunity from the initiative and established a joint venture with SASA to develop small-scale farmers. Illovo sugar mill became one of the millers to establish SGDP supported and by KwaZulu-Natal provincial government (Gillespie and Mitchell, 2014).

The joint venture implemented SGDPs to improve South Africa's sugarcane industry and ensure sustainable livelihoods of the participating small-scale farmers. In the case of Illovo, in 1996 this programme deployed extension workers from both the state and Illovo to implement an extension plan developed by the South African Research Institute (SASRI). Five cooperative consisting of farmers in Noodsberg area were included in the programme. The focus of the plan was to increase the amount of land and small-scale farmers under sugarcane. The farmers were invited to demonstration field days to be advised and convinced to convert to sugarcane production. Some 419 farmers agreed to convert to sugarcane production. At the beginning of the programme, 224 small-scale farmers in the area collectively grew 267.3 hectares of sugarcane with an average of 1.19 ha/farmer. At the time of this study, 462.6 hectares were planted to sugarcane by 419 farmers with an average of 1.1 ha/farmer.

The Illovo plan was successful in terms of increasing the number of farmers and amount of land planted to sugarcane. However, a number of questions arose: In the implementation of the plan, to what extent did extension engage in improving the livelihoods of small-scale

farmers? How was manifested? What was the impact on livelihoods? Will this be sustained into the future while maintaining steady supply of sugarcane to Illovo? How will this be done?

To investigate these questions, a study was conducted amongst the participating farmers, extension workers and Illovo management to determine their respective perceptions of the process and results of the plan in terms of the livelihoods of the participating farmers. This paper presents the perceptions of extension providers.

6.2. Purpose

Based on the foregoing discussion, a case study was conducted to examine the extent to which the SASRI-Illovo extension plan is contextualized in the livelihoods of small-scale sugarcane farmers. The paper presents the perceptions of the farmers using the Extension Carousel (Worth, 2014) and discusses them in the context of resilience aspects of sustainable livelihoods theory. Drawing on these findings, the study examined the role extension could and should play in sugarcane SGDPs to refocus such programmes on the farmers (rather than on the commodity), to build their capacity, and to make their livelihoods more sustainable in the face of change and opportunities for improvement.

6.3. Theoretical framework

This study was conducted using two frameworks: sustainable livelihoods; and learning-based extension. These frameworks supported research design and data collection, analysis and interpretation.

6.3.1. Sustainable livelihoods

Sustainable livelihoods can be looked at from two perspectives. First is the concept of livelihoods – what they are and how they are made sustainable. Second is the sustainable livelihoods approach (SLA) and how it would be applied in the advancement of small-scale sugarcane farmers.

From the concept perspective, sustainable livelihoods entails that farmers' livelihoods can be sustainable when they can endure for a long time and recover from setbacks and mitigate erosion of assets (Chamber and Conway, 1991). Sustainability is derived from people's

capabilities to use their various assets to make a living and to cope with, recover from and adapt from stresses and shocks. An added dimension is that a livelihood is only sustainable if it does not deprive others of livelihood options and demonstrate equity (Hoon *et al*, 1997).

Sustainable livelihood as an approach suggests a shift from technology-oriented development approach toward more people-centred approach. The SLA stresses enabling people to think about the objectives, scope and priorities for their development in order improve progress out of poverty through wealth creation (Caroline and Carney, 1999; SWVR, 2011). In the context of small-scale farmers, as suggested by the State of the World's Volunteerism Report (SWVR) (2011), the SLA would place farmers in the centre of the process, would focus on farmers' livelihoods, and would support and empower farmers, embracing the variety of strategies and activities aim at sustaining their livelihoods. Further, this approach adopts a holistic approach that takes in to account all aspects of farmers' livelihoods and related activities both on- and off-farm (SASA, 2003).

6.3.2. Resilience: A key element of sustainable livelihood

Resilience is associated with vulnerability, and is defined as a livelihood's ability to cope and recover from stresses and shocks (Scoones, 1998). Resilience is key to both livelihood adaptation and coping. However, it is essential that farmers learn to determine which strategies will increase or decrease the vulnerability of their livelihoods. This, then, suggests that resilience be driven by the notion of learning to learn in the face of change which implies that farmers should have capabilities of solving any problem they encounter regardless of its time and area of occurrence (Hoon *et al*, 1997).

The concept of resilience stresses that the farmers be self-reliant in their operations. Self-reliance, as a concept, is defined as farmers' ability and capacity to make sound decisions and do things on their own, which entails that they are able to improve their livelihood condition by consciously using existing knowledge and resources (Kim and Isma'il, 2013; Fonchingong and Fonjong, 2013). On a collective scale in a (agricultural) development context, self-reliance is a development benchmark which resonates people-centeredness and entails participation in all levels of the development initiative (Anyanwu, 1992) which seeks to develop and strengthen one's livelihood by reducing the vulnerability of assets and increasing their asset base (UNHCR, 2005; Fonchingong and Fonjong, 2002).

6.3.3. Learning-based extension

Learning-based extension suggests the role of extension be based on developing aspirations of the farmers and building learning capacity among farmers, researchers and extension. This type of extension stresses that farmers, research and extension should have synergistic partnership, which puts three elements in the centre of development: clients (farmers), process (learning process) and appropriate placement of technology. The Agriflection model adopts learning-based extension which also integrates the principles and concepts of sustainable livelihood and adaptation of Agricultural Knowledge and Information System (AKIS) model into its framework (Worth, 2006).

This study adopted the Agriflection framework to guide research design, as it addresses the range of issues being investigated and aligns well with the research methods selected. Briefly, this model posits that extension should be learning-centred (depicted by an iterative process of investigation, application and sharing), should focus on building farmers' capacity to learn and strengthen their livelihood assets, and should result in improved and more sustainable livelihoods (Worth 2006). This study adopted this model as framework to investigate the role of extension in promoting sustainable rural livelihoods amongst small-scale sugarcane farmers participating in the SGDP.

An outgrowth of Agriflection is an Extension Carousel of learning. The Extension Carousel is the framework that clarifies the nature, process and function of building farmer capacity on three levels: managing their farming enterprises; managing their sustainability contexts; and engaging with learning (depicted as engaging with scientific enquiry). It was designed to provide extension workers with a conceptual structure of facilitating a learning agenda in the process of engaging with farmers. At the farming enterprise level, the Extension Carousel covers an array of factors grouped around production, economics and management. Sustainability addresses issues related to social and environmental sustainability. Engaging with learning (scientific enquiry) is framed in learning theory, innovation, systems thinking and development theory, the latter as a philosophy or world's view guiding decision-making (Worth, 2014).

Briefly, literature suggests that the key element to improving and making livelihoods more sustainable is through developing human capital. In agricultural livelihoods, using the Agriflection framework, this translates into building farmer capacity: to run their operations

using own resources; to manage the social and environmental sustainability of their livelihoods; and to learn individually and collectively in the context of scientific enquiry, based on a clearly articulated world's view. Development of human capital according to Scoons (1998) will influence the livelihood choices of farmers about how to utilise their livelihood assets to improve their well-being, at the same time reducing vulnerability of their assets.

6.4. Methods

Data for this part of the study were collected using semi-structured interviews with four key informants who are role-players in the SGDP selected. They were selected using snowball sampling (Welman *et al*, 2005). The role-players were Illovo's development manager, two extension workers (one from Illovo, and other from the state) and an extension specialist from SASRI. The Illovo Development Manager identified the state extension worker serving small-scale sugarcane farmers who then assisted in identifying the other key role players (Glasser and Strauss, 1967).

One-on-one semi-structured interviews were conducted with each of the four key informants using open-ended questions to acquire in-depth data (Patton and Cochran, 2002). Questions were based on the key elements of the extension carousel (Worth, 2014). The interviews were aided by developing a Rich Picture to surface deeper insights about the development programme and its extension plan (Bell and Morse, 2012). The study was supported further by participant-observation where, in accordance with Driscoll (2011), the researcher interacted with the participants and became part of the community resulting in descriptive data that illuminates what happened and how it happened.

Data were analysed through content analysis where main themes were systematically developed from the raw data (Langen, 2009) in three stages: identifying the main themes; classifying responses under these themes; and integrating themes and responses in to the research report (Syed, 2012).

6.5. Results

The four extension provider respondents shared detailed insight about how the Illovo-SASRI programme impacts on farmers' farming and livelihood situations. The findings are presented around the key elements of the extension carousel: the farm enterprise (land, infrastructure,

technology, input supply, organizational capacity, information, finance, markets and marketing); their sustainability context (social and environmental sustainability); and their learning context (learning, innovation, systems thinking and development theory).

Table 6 presents basic background information about their company, educational attainment, and years of experience.

Table 6: Background of respondents

Participants	Company/ organisation	Educational attainment	Years of experience for current position
Extension worker A	State	B-tech in Agricultural management	9
Extension worker B	Illovo	B-tech in Agricultural management	17
Development manager	Illovo	Certificates in petrol and diesel mechanic, sugar technology and management, project management, health and safety and N3	8
Extension specialist	SASRI	B.Sc. Agriculture	16

Two of the extension workers who participated in the study have a Bachelor of Technology (BTech) in Agricultural Management, and have more than five years of experience as extension workers. The Illovo Development Manager has higher certificates in fields relevant to agriculture and development, and has more than five years of experience working as a development manager. The extension specialist from SASRI has bachelor's degree and more than 10 years of experience in the fields of agriculture and extension.

6.5.1. General description of the programme

Illovo's SGDP started over 30 years ago, after Illovo realized the potential of developing rural farmers and maintaining consistence supply of sugarcane to keep the mill going. In 1996 the Department of Agriculture and Environmental Affairs (DAEA) supported the initiative which the department saw as a contribution to the KZN's rural development. DAEA and SASA started a joint venture that is driven by the goal of ensuring sustainable rural livelihoods and prosperity of South African sugar industry.

DAEA engaged in funding these programmes and provided the programme with extension workers specialising in sugarcane development because the department, as whole, had limited capacity relevant to sugarcane farming. SASA receives funds from DAEA and diverts them to Illovo sugar mill as key role-player/owner of this development initiative. SASA also deployed the South African Sugarcane Research Institute (SASRI) to be part of the joint

venture and assist in setting sugarcane production standards, developing new technologies and designing an extension work programme.

The Rich Picture in Figure 9, developed with the extension specialist, depicts the key role-players in this programme – DAEA, SASRI, Illovo Sugar Mill and the small-scale farmers. It shows the four extension workers; two deployed by DAEA and the other two working for the mill. All four extension workers work collaboratively; the scope of their work is developed and set by SASRI.

Figure 9 also illustrates that Illovo Sugar Mill and SASRI work jointly in developing the projects and executing strategies for the programme. Illovo also invited other stakeholders such as Pest, Disease and Variety Control Committees (PD&VC), commercial farmers, the municipality, the World Wildlife Foundation (WWF), and the South African Cane Growers Association (SACGA) to jointly assist with technology transfer and in providing other technical support. The Rich Picture in Figure 9 is a good indication that all the role-players work collaboratively in achieving the goal of the intervention.

6.5.2. Findings against the Extension Carousel

The extension carousel framework used for interviewing the respondents has three broad levels: managing the farm enterprise, managing the sustainability context, engaging in learning. As an extension tool it is used to determine farmer capacity on each of these levels so that a learning agenda for increasing capacity can be developed. In this study, the framework was used to determine the nature of and extent to which the elements of the carousel on each level were addressed by the SDGPs.

6.5.1.1. Managing the farm enterprise

This level addresses organisational capacity, information, finance, markets and marketing, input supply, technology, infrastructure, and land.

- **Organisational capacity**

Three structures are involved in building farmer organisation capacity in this SGDP: Extension, SACGA, SASRI. Extension provides training relevant to sugarcane production management to farmers as means of developing farmer capacity. SACGA and SASRI impart

Rich Picture

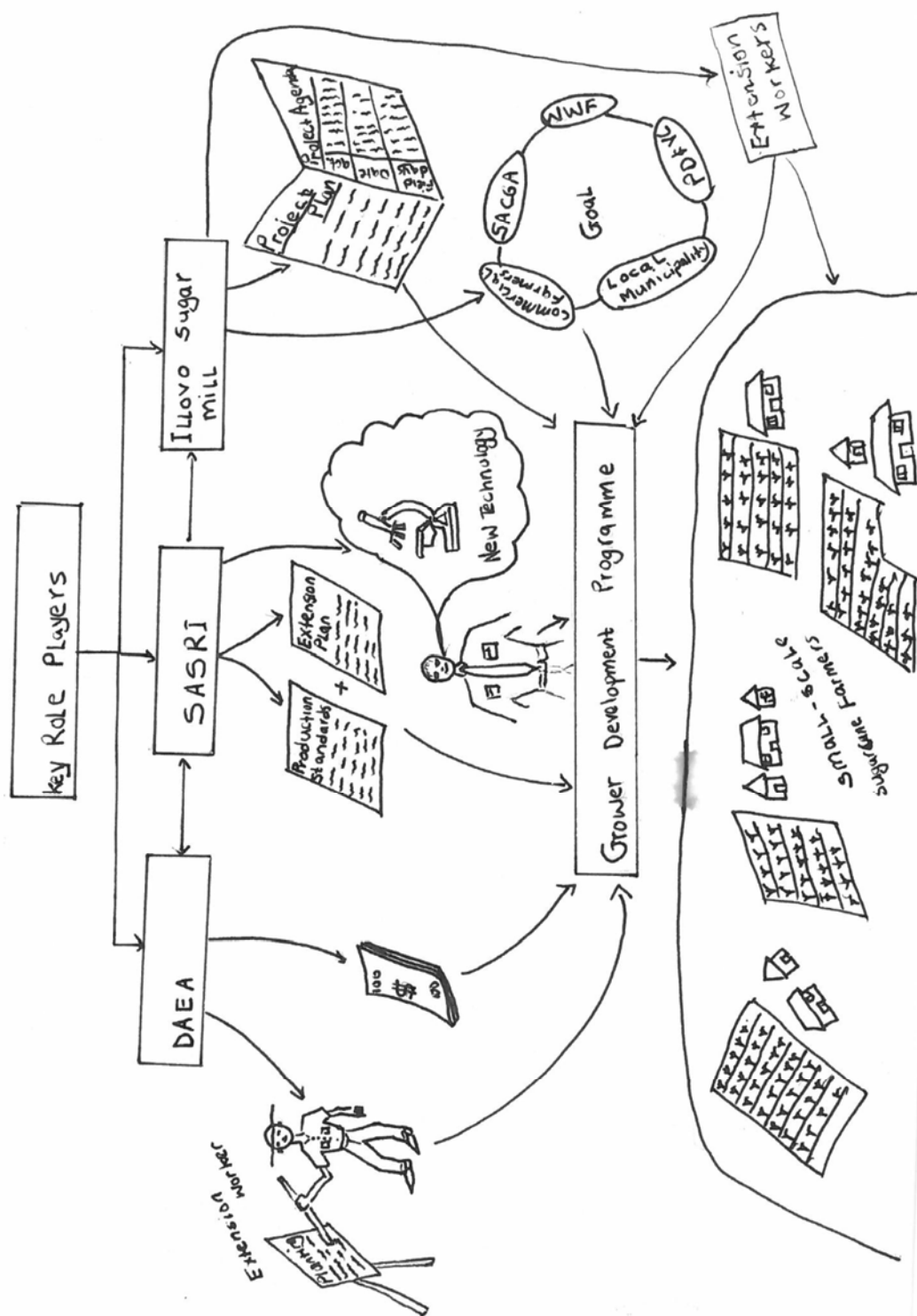


Figure 9: Rich Picture showing role-players and their contributions to the SGDP

knowledge relevant to business management, including financial, production and human resource management.

Training relevant to building farmers' organisational capacity is provided to cooperative management committees in preparation as farmers who will be managing the co-op in future. The management committee's role then becomes to inform the farmers about the progress on finances and production. Further, extension workers added that they also assist farmers to understand the financial records during the monthly meeting that all co-ops hold.

Information

To facilitate knowledge acquisition by farmers, the SGDP deploys extension to transferring all necessary information to farmers. Extension officers indicated that they used demonstration field days as forums for providing information to farmers. On these days, extension engages other stakeholders such as WWF, and PD&VC, in transferring information relevant to sugarcane production. The Illovo Development Manager clarified that it is the priority of all the role-players involved in this programme to provide information to farmers that will make them self-sufficient in farming sugarcane.

All of the extension officers observed that it is most effective to work with independent (individual) small-scale farmers than with farmer under co-ops. One extension worker noted:

“Small-scale farmers under co-ops tend to not care about their sugarcane and they rely highly on their leader (co-op leaders). Co-op leaders are the ones attending the trainings and have more knowledge on what is going on in their fields. Other co-op members do not avail themselves in training days and on their monthly meetings. On the other hand independent small-scale farmers are the ones who are passionate about farming sugarcane and they commit themselves to acquiring as much information as possible from training days because they do not receive financial support from anyone. Co-op farmers do not even know how many bags of fertilizers are put in their plots, they only expect money at the end of the season.”

Another extension worker added that until the small-scale farmers commit themselves by fully participating in the programme's operations, the extension services will have a greater impact on them with respect to information transfer.

Finance

The main source of funds for SGDP at the moment is the DAEA and Umthombo Agricultural Finance (UAF). SAGCA and Illovo collaborate to educate the co-op leaders on how to write proposals to apply for funds. Once the funds are approved by UAF, the funds are transferred to Illovo Sugar mill under the account of that specific co-op. Funds approved by DAEA are transferred to SASA, which also transfers them to Illovo Sugar mill, again, under the account for that specific co-op. Funds from UAF are dispersed as a loan which is repayable on a seasonal basis, whilst funds from DAEA come in as a subsidy to farmers. Illovo then manages the funds on farmers' behalf and disperse it when necessary.

Extension does not have a specific role on the finance side of the programme, because its role is to build the farmers' production capacity. The extension specialist indicated, however, that extension does play a role in training farmers on how to manage their funds. SAGCA is also involved in training farmers, however their training reaches only selected farmers serving on the co-op management committees.

It was observed that the small-scale farmers in the study have poor finance management skills because they do not get practical lessons or opportunities to actually manage their farming finances. The farming finances (i.e. income, expenditures, loan repayment) are managed by Illovo. UAF deduct a certain portion from farmers' income from sugarcane every season to ensure that farmers are able to get necessary inputs for ratoon (growth) management for the next production season. The only money the farmers get is the residual income (net income) generated from the harvested cane they delivered to the mill. This money is generally for household needs. Thus, there is not opportunity to develop financial management skills for the farming enterprise.

One extension worker expressed his opinion, stating:

“Farmers are in need of money to buy food and other assets to improve their livelihood. The priority for extension is to help farmers produce good quality sugarcane so that they can get good money to sustain their livelihood. It is not possible to make small-scale farmer self-reliant particularly with respect to finances and it has been proven in many countries in Africa that small-scale farming cannot go on without government support”.

It appears that at least one of the key role-players in the SGDP is predisposed to the perpetual incapacity of the farmers he is meant to train and support, and anticipates permanent dependency.

Market and Marketing

In the SGDP, Illovo Sugar mill remains the only market for the small-scale farmers residing around and within Noodsberg area. The mill has committed its self to doing all the marketing activities on farmers' behalf. This was done to reduce the amount of farmers' responsibilities in their operation and also to ensure farmers focuses on producing good quality cane. Taking Illovo's commitment on marketing aspect of small-scale farmer into consideration the extension programme has determined that there is no need to provide any training to farmers related to marketing.

No training and no opportunity to be involved in any of the marketing activities means that farmers will not build any capacity in this aspect.

Input supply

The small-scale farmers have access to all the inputs required to produce sugarcane for the market. Illovo Sugar mill monitors the co-op's funds and manages the procurement of inputs required by farmers. Extension workers train farmers about types of inputs are required and how they are applied. Extension workers are also involved in helping individual farmers determine the amount of inputs that they need and send the information to Illovo sugar mil. Illovo sugar mill review the data received from extension workers and purchase the required inputs on farmers behalf. Farmers then collect inputs from Illovo to their plots where contractors will apply those inputs on farmers' behalf.

The current challenge faced by extension providers is of getting all or majority of small-scale farmers to attend training field days. This challenge is anticipated to be caused by farmers' reliance on the management committee, which is led by their belief that they should know better than them. Another factor contributing this challenge is the disperse location of farmers and the fact that majority of these farmers are old.

Technology

The role of extension centres primarily around transferring technology to small-scale farmers. The SGDP was developed with an overriding goal of training farmers to be capable of

producing sugarcane own their own. In this programme SASRI designs the scope of work and the agenda for extension workers, and Illovo designs the projects. The extension officers from the government and Illovo Sugar mill work according to extension programme designed by SASRI.

Extension workers work in collaboration with other role-players such as WWF, PD&VCC to ensure successful transfer of relevant technologies to small-scale farmers. Extension services run throughout the year with training events designed to correspond with the sugarcane planting and management activities. Most of the training sessions are conducted on demonstration plots, which are regarded as a 'field school' for small-scale sugarcane farmers.

Tractors and other machinery relevant to sugarcane operation are made available to the farmers through the local contractors that are employed to work their plots. The role of extension in this instance is to get the list of good local contractors and give it to farmers to choose one they prefer. This contracting of mechanical operations is consistent with the pattern in the programme of work being done for farmers, once again underscoring the fact that farmers are given little opportunity to learn through doing.

Infrastructure

Most of the informants indicated that infrastructure such as roads and buildings is the responsibility of the local municipality. However, through observation, it is evident that poor gravel roads near the farmers' plots have detrimental impact on their gross margin, as it consumes more machinery fuel to work such plots.

Above all the respondents revealed that as far as the programme has been running there has never a problem or complaint around the aspect of infrastructure except for the inadequate roads going to farmers' plots.

Land

In small-scale farming, land has been identified as a limiting factor particularly in sugarcane farming hence the initiative of developing cooperatives emerged. The majority of the farmers possess plots that are less than 2 ha. It is not be economically viable to farm sugarcane independently on land of that size. Cooperative Sugarcane farming in small-scale farming has assisted farmers to share certain expenses and made them realise a reasonable income.

The informants stated that the soils tests conducted on farmers' plots demonstrated that the Swayimane community have good soils that are fertile and suitable for sugarcane. Soil tests on farmers' plots are conducted by extension workers using a method that trains the plots owners to be able to do it themselves. More formal training on assessing the conditions of the soil and measuring plots size is conducted during the field days on demonstration plots by extension workers.

Land size being the limiting factor on small-scale sugarcane farming, also contributes to other problems such as violation of environmental laws. Farmers tend to not conform to environmental laws, such as building contour banks and protection of water sources, because it reduces the amount of the land they can put into production.

The extension informants indicated that another challenge they face is getting all or most farmers to attend training field days on land assessment and preparation. This was anticipated to be caused by farmer's dependency on their management committee and that some farmers do not reside near their plots due to other commitments.

Summary of farm enterprise context

The foregoing discussion suggests that the main aim of the SGDPs is to ensure cane production to ensure a flow of raw material to the mill. Training (capacity) building does take place, but farmers are rarely given the opportunity to exercise what they learn on their own fields. The use of contractors for all the major farming operations is evidence of this. On this level, despite intentions to the contrary, the SGDPs do not appear to be genuinely involved in building farmer capacity to be independent, self-reliant farmers.

6.5.1.2. Sustainability Context

This level addressed social viability and environmental sustainability.

▪ Social Viability

Farming sugarcane is generally socially acceptable to the Swayimane community. The farmers who joined the SGDP are coming from different religious and traditional groups. However, there is one religious group, Shembe, which does not allow any farming activities to be carried out on Saturdays. This has not created a major problem for the programme because there are few farmers who affiliate with that religious group.

With regard to social cohesion, cooperative farming of sugarcane has been identified as core function that promotes farmers to socially unite. Extension workers and the Illovo Development Manager commanded the farmers to hold monthly meetings for the purpose improving their working relationships and enhancing social cohesion. At those monthly meetings, the extension workers assist, when necessary, the farmers in solving problems they face, and clarify issues raised by farmers. Extension officers also facilitate yearly workshops that invite farmers from the different cooperatives farming sugarcane to share their experience and ideas for the way forward. Usually the attendance on those conferences is poor, but the farmers who attend learnt something out of them. Poor attendance of farmer to these workshops is generally caused by farmers being lazy and dependency on their management committee. This depicts that farmers do not see the significant of learning and sharing farming experiences.

▪ **Environmental sustainability**

During the investigation on environmental sustainability, the extension informants indicated that SGDPs ensures the protection and maintenance of soil and water sources. With regard to soils, the programmes ensure that the sugarcane planting and the methods used comply with national environmental law. The programmes focuses particularly on the matters related to soil erosion such as ensuring ground cover, planting row direction and contour banks. With respect to water source protection, the programme makes sure that the sugarcane plots are at least one hundred metres away from water sources, although as noted earlier many of the farmers refuse to comply with this.

One of the Illovo informants stated that most of the training they hold with small-scale farmers are conducted in collaboration with other stakeholders who are knowledgeable or who specialise in that particular theme of the training. With respect to environmental sustainability, both extension providers confirmed that training is facilitated by extension workers in collaboration with WWF. Extension workers use the field days as a 'school' for small-scale farmers to learn about environmental management.

On the other hand, extension providers also pointed out that, after training on environmental management has been conducted, the farmers do not implement the training themselves. Rather, they observe the contractors do it in practice. The extension specialist and the extension workers justified this practice on the grounds that it is time effective for the field

work to be done by contractors because the majority of plot owners are old, and others are not available because they are away working far from their plots.

As noted earlier, one of the challenges identified was farmers' reluctance to conform with environmental laws when their plots are being planted. Farmers tend to ignore the acts of protecting water sources and building contour banks because they reduce the amount of land available to plant on their, already very small, plots, which will lower their yield, thus their income.

▪ **Summary of sustainability context**

The primary concern in connection with social viability is creating social cohesion. Efforts are made to build this among the farmers – with limited success. There is no evidence of any effort to build farmer capacity in this area – only to achieve the outcome. This is consistent with the production primacy shown with respect to production.

The programme itself is concerned with environmental sustainability; particularly from the perspective of being legally compliant. There is tension between the need to be compliant and the reluctance of the farmer with small plots to take any land out of production or to implement other environmental controls if it means they will ultimately produce less sugarcane. Training is given to the farmers, but, again, implementation is done by others.

6.5.1.3. Engaging with learning

This level covers learning, innovation, systems thinking and development theory.

▪ **Learning**

The informants struggled to understand this aspect of the investigation. However, they did mention that the SGDP focuses on farmer learning which they described as the process where farmers learn from training provided by key role-players involved in this programme. The extension workers do learn from farmers when they do situational analyses to understand the livelihoods of the farmers before a programme starts. In the case of this SGDP, one of the key informants stated that farmers are the ones who require learning about farming sugarcane the most because they are the ones have the task of taking care of their sugarcane. This is clearly inconsistent with the actual practice relevant to training, where farmers are rarely given any

opportunity to apply their learning on their plots because of the greater efficiency achieved through using contractors.

▪ **Innovation**

While the intention of this aspect of the investigation was to determine the extent to which innovation is fostered among farmers, the only practical example of innovation was a change in the system of administering payments. The innovation came from SASRI and Illovo. One extension worker explained that:

“At start, the programme allowed all farmers to submit their sugarcane to the mill under one grower code. This system guaranteed farmers money based on the size of their plots regardless of the quality of sugarcane. Then SASRI in collaboration with Illovo sugar mill realized that most farmers do not take care of their cane (they would not chase away cows eating their sugarcane) and it was not fair to farmers who cared for their sugarcane well. The methodology of submitting sugarcane to the mill was then changed to force farmers to care for their sugarcane. Farmers now submit their sugarcane under their individual grower codes and they get money based on their individual cane quality and weight.”

This suggests that there is some inclination toward innovation within the programme, but this does not extend to farmers. The extension providers, perceive no need to train or educate farmers to be innovators in their operation since they want farmers to do what they have been taught. Through observation it was realised that extension providers believe that one's ability to innovate comes naturally or with experience to doing something – not from any formal process to foster this quality.

▪ **Systems thinking**

The informants did not understand the concept of systems thinking and how it applies to development and extension. However, all key of the informants stated that extension services are put in place to solve the problems that farmers are unable to solve on their own.

Particularly with sugarcane, farmers are required to call an extension worker should they identify a problem in their sugarcane. The extension specialist confirmed that there is no training or education relevant to systems thinking provided to farmers given that they have extension workers working closely with them.

▪ **Development theory**

The one Illovo informant and all of the extension workers had highlighted that in the past that farmer development programmes failed because the millers established programmes that were driven by the pressure to meet the sugar supply. These programmes spoiled small-scale farmers by doing everything on their behalf, which had an adverse impact in their livelihoods. The development manager stated:

“We have learnt from the past and other millers’ experiences that growing sugarcane to grow people is not a way to go, it does not promote sustainability. We then adopted the strategy of growing people to grow sugarcane which makes us focus more on training and educating farmers on how to grow and manage sugarcane.”

However, all the informants revealed that it is impossible and irrelevant to teach theory to farmers who are old and most of them illiterate. Respondents stated that the training they provide to farmers at the moment seem to serve their purpose and goals. This suggests that, while there is an underlying appreciation for operating within a theoretical framework, there is little practical capacity or incentive to implement it.

▪ **Summary of learning**

This level presented the greatest challenge for the informants. The data gathered suggests that there is some appreciation for the concepts – particularly development theory – but there is little evidence that these concepts are put into practice.

6.6. Analysis

Table 7 presents an overview of the findings drawing on three themes: Extension focus; Field days attendance; and Farmer opportunity to command co-op systems. The findings captured in the table 7 clearly suggest three things. First, SGDP employs extension to transfer technology to farmers related solely to the commodity (sugarcane) using training as a method; extension remains the only source of information and knowledge for farmers. Second, while extension engages in transferring technology to farmers, a decline in the number of farmers attending trainings has been realised which appears to be influenced by the dispersed location of farmers, farmers’ dependency on their management committee, off-farm commitments, and the fact that contractors do everything for them. Third, training is provided as a method of building farmers’ capacity, however it appears that farmers are given only limited opportunity to acquire skills through participating in all the process of the development and their farming business. Instead of building capacity and self-reliance, this approach makes farmers less capable of doing things themselves.

Table 7: Thematic description developed from the interview development role-players

Identified themes	Related issues
Extension focus	<ul style="list-style-type: none"> • Extension only engages in transferring technology related to production • Extension workers employ a training method to transfer technology • Extension remains main source of information for farmers • Extension focuses on commodity rather than on farmers' livelihoods
Field days attendance	<ul style="list-style-type: none"> • Few farmers do not attend field days because they are reliant on their management committee • Farmers do not attend field day because they are geographically disperse • Other farmer do not attend field day because they have off farm employment commitments • Some farmers don't attend meeting because they know that contractors will do all the work on their behalf
Farmer opportunity to command co-op systems	<ul style="list-style-type: none"> • Farmers get practical experience of managing their operation during training days only • Farmer are provided with training but contractors are hired to prepare plots, plant, manage sugarcane growth, harvest and transport sugarcane to the sugar mill • Trainings on financial management are provided but Illovo manages finances and do marketing on their behalf

6.7. Discussion and conclusion

This part of the study found that Illovo sugar mill, SASRI and DAEA are the key-role players of the SGDPs. Illovo designs projects for the programmes, provides extension services, and engages with outside stakeholders, including SACGA, WWF, commercial farmers, PD&VC and the local municipality. SASRI engages primarily in designing extension plans, setting production standards and developing new technologies for the programme. DAEA is involved by providing extension workers and granting funds to the programme.

6.7.1. Extension focus

This aspect of study showed that extension in this programme employs a technology-transfer approach which, according to Swanson and Rajalahti (2010), entails imparting information to farmers and telling them how things are done. This, in light of the sustainable livelihood's theory (which suggests a shift from technology-oriented development toward people-centred approach) implies that it is unlikely that the programme will achieve the goal of improving and sustaining livelihood of sugarcane farmers. In light of self-reliance, which suggests that farmers acquire capacity to do things on their own, the results show that farmers will not be self-reliant if extension focuses on transferring information rather than developing capacities.

6.7.2. Skills acquisition

Capacity comprises of two essential components: knowledge and skills. Knowledge is acquired through information that is thought to person or read somewhere, whilst skills is obtainable from a continuous experience (Worth, 2006). The results show that, in this programme, farmers are being given knowledge in the form teaching during training events. Furthermore, the results highlight that the programme limits the farmers in acquiring skills by doing things on their behalf and not giving them opportunity to practice what they have been taught. This is also inconsistent with sustainable livelihood theory that suggests that extension should place farmers in the centre of the development process and enable farmer participation in all the programme's activities (SASA, 2003; Anyanwu, 1992)

The study draws connection between limited opportunity to command operations and farmers unwillingness to attend trainings provided by the programme. This link assumes that after the farmers realised that everything is done on their behalf, they lost interest in learning things (during training) that they are not going to get an opportunity to practice in order build their skills. This is inconsistent with learning-based extension that suggests a learning process of investigating (knowledge acquisition), assimilation (creating understanding) and sharing (skill acquisition) which stresses ownership of development by farmers and their active participation in process of development (Worth, 2006). The results, in the light of learning-based extension, imply that extension in SGDP does not go beyond knowledge acquisition (investigation) – therefore, true learning does not occur.

This paper concludes that the role of extension in the development programme is primarily focused on imparting scientific technologies developed by SASRI to farmers. This confirms again that extension adopts a technology-transfer approach in engaging with farmers. The study also found that there is a disconnection between the goal of the programme and the executing strategy. The programme documentation states that it aims to improve sustainability of farmers' livelihoods, but this aspect of the study shows that the programme does not focus on livelihoods, rather on the commodity (sugarcane). In brief, the programme as whole assumes that economic improvements will result in improved and more sustainable livelihoods of the farmers.

The study further found that the role of extension assumes that farmer capacity is built through enhancing farmer knowledge. Training provided by extension workers focus solely on transferring technologies (in the form of knowledge) to farmers; on the other hand, however, farmers remain with no skills in using these technologies because they have limited

opportunities to do things on their own. Finally, the study found that extension neglects the learning-based approach's principle of building from what farmer know and have, and rather focuses on giving farmers what they assume is needed by them to be self-reliant and able to sustain their livelihoods.

6.8. Implications

The findings of this aspect of the study imply that the programme needs to revise its goals and plans to ensure that its intended purpose of establishing self-reliant farmers and improving the sustainability of their livelihoods can actually be achieved. This can be done through reviewing literature to identify principles and methods of achieving self-reliance and sustainable livelihoods.

The study also suggests a shift in the extension focus from technology-transfer to facilitating acquisition of skills by farmers to engage with scientific enquiry, while concurrently sharing their knowledge and information. Furthermore, extension should adopt a learning process akin to investigating, application and sharing, to be universally applied by extension workers, researchers and farmer to trigger innovation throughout the partnership, farmers to own their development.

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Chapter Seven: The role of agricultural extension in promoting sustainable livelihoods amongst small-scale sugarcane farmers

7.1. Introduction

This chapter draws together the findings and discussions presented in the previous chapters. The study has attempted to understand the nature, content, rational, focus and operational characteristics of the Small-scale Grower Development Programmes (SGDPs) implemented by the Illovo Sugar Company in collaboration with the KZN Department of Agriculture and Rural Development (DARD) and the South African Sugar Research Institute (SASRI).

This was essentially a case study. It drew its data from 35 small-scale farmers who were involved in the programme and from four key informants comprise of two extension workers, Illovo Development Manager and extension specialist from SASRI.

Sustainable livelihoods and learning-based extension informed the theoretical framework of the study. Livelihoods theory essentially focuses on the strengthening of livelihood assets and reducing their vulnerability. Learning-based extension focuses on developing the capacity of farmers to engage with scientific enquiry. In the livelihood context this equates with building human capital as the core underpinning to sustainability. An important part of building human capital is developing the quality of self-reliance. Thus, the primary focus of the theoretical framework was building human capacity as the key to sustainability.

7.2. Learning to manage the farming enterprise

In addition contributing to the theoretical framework for this study, the extension carousel discussed in Chapter 4 created the structural framework for the research design. Effectively, the carousel tracks farmer learning. The carousel has three levels: managing the farming enterprise; managing the sustainability context; and engaging with learning. Managing the farming enterprise has three areas: Organisational capacity and information management; production operations; and farm economics. The results presented in this section show the overall perceptions of farmers and extension workers and enablers in the programme on the basis of congruence and differences.

7.2.1. Organisational capacity and information management

Most of the farmers and the programme role-players submitted that the management committee of the co-ops receive training to advance their management capacities. However, some farmers stated that the committee does not actually participate in the management of the co-ops' operations. Further, some of the farmers argued that the management committee is not trained enough to participate in managing the co-ops operations because they are not involved in the decision-making regarding what the programme intends to implement.

Most of the key role-players justified that the management committee participates in management operations because they convey most of the management matters to farmers. Thus, despite the training given to the management committee, the farmers have not acquired the skills and confidence to manage operations on their own and are effectively relegated to the role communicating to member decisions made by Illovo, SASRI and DARD. Theory suggests that this arrangement will deepen the farmers' dependency on external stakeholders, particularly with regards management of co-op operations.

7.2.2. Farmer capacity to manage production operations

All respondents for this study disclosed that farmers are engaged in training on demonstration field days to build their capacities in the aspects of land, technology and input supply. During the field days, contractors are also trained as people who will be carrying out the production activities. Farmers revealed that the employment of contractors to conduct production activities has limited their opportunity to acquire production skills, confidence in managing production operation and earning extra income to supplement sugarcane income, because they do not do the work for themselves. On the other hand, the role-players submitted that, in considering the intensity of labour in sugarcane production, employing local contractors to conduct production activities was the better option that will ensure that all the production standards and requirements are met. Further, some role-players added that farmers have the tendency of not attending the trainings simply because they don't find them significant. However, farmers stated that training is rendered unnecessary if they will not get an opportunity to use the knowledge imparted to them. Clearly, the farmers and key role-players have different views, which suggests a clear disconnection, at least on the level of communication, but probably on a much deeper level in terms of differing objectives for

being involved in the programme. The farmers want to manage their farms, the stakeholders want the sugarcane.

7.2.3. Farmer capacity to manage economic operations

The development programme engages a selected number people in the management committee or each co-op to attend training on financial management. The role-player informants added that farmers are also educated on the importance of keeping records and accounting for their money. Again, most farmers acknowledged the training provided, but again question its value since the programme does not give them opportunity to participate in managing their funds. The opinion of one of the role-players is that funds are better managed by Illovo because they are knowledgeable about the enterprise's financial needs, and because the management committee does not participate in financial operation because they avoid accountability. All the respondents reported that no training is provided to farmers or the management committee on market and marketing because Illovo manages that aspect of the farm operations on farmers' behalf. However, farmers suggested that they should be trained in marketing so that they will have capacity to manage all their farming operations.

The findings clearly repeat a number of themes: training is not followed up by practical application; genuine farmer capacity is not being built; the role-players retain control on all the critical elements of the field operations that affect cane production and management of funds. This, again, points to a divergence of interests. The farmers want to manage their farms, whilst the role-players want the sugarcane.

7.3. Farmer capacity to manage sustainability

The results from all the respondents show that the programme provides training to farmers related to environmental management. The trainings focus on building farmer capacity to conserve soil, protect water sources and removal of alien plants. All of the role-players indicated that farmers are involved in all the process of environmental management. However, all of the farmers indicated that they are primarily involved in removal of alien species; contractors do the environmental earthworks. Some farmers added further that they instruct the contractors to violate some of the environmental laws such as building contour banks and planting at least 100 metres away from water sources, so that they can plant more sugarcane.

With regard to social sustainability, all respondents indicated that no specific training is provided to farmers for building their capacity to manage their social context. However, the respondents identified two ways that the programme has enabled farmers to build social relationships for learning and sharing of experiences: monthly co-op meetings; and annual workshops. Farmers added that one outcome of the training the programme provides on demonstration plots is that they have united them to a certain degree.

7.4. Farmer capacity to learn

As noted earlier, the training that farmers receive only gives them knowledge of how to run a sugarcane farm business, not the actual capacity to run the business. Neither are they helped to learn how to acquire further knowledge on their own. All of the role-players confirmed that the trainings that are offered to farmers are for the purpose of transferring technology and information. Further, all of the farmers submitted that their learning is dependent on role-players. The role-players teach farmers things they think is relevant for the farmers to know in order to run their farm and expect farmers to call them if they encounter a problem; there appears to be little honest exchange between farmers and the programme managers. This tends to increase the farmers' reliance on the role-players in terms of innovating, problem-solving and decision-making in their operation.

7.5. What does this mean in relation to theory?

The provision of training for the purpose of transferring knowledge, technical information and technologies to farmer is partly consistent with sustainable livelihoods theory of extending farmers knowledge for the purpose building human capacity and improving other livelihood assets. However, limited participation of farmers in management, production and economics is inconsistent with the notion depicted that in using the sustainable livelihood approach, farmers should be put at the heart of the intervention and should participate in all the process of the development (SWVR, 2011) because active participation of farmers in the development of process is an indicator for self-reliance (Fonchingong and Fonjong, 2003).

With regard to environmental sustainability, provision of educational training is, again, consistent with Scoones (1998) suggestion sustainable livelihood approach should extend farmers knowledge as part of building farmers capabilities of sustainable use of natural

resources. However, violation of environmental laws by farmers for the purpose of achieving more income is inconsistent with creating resilience of livelihoods and protecting resources for the future (Hoon *et al*, 1997). This suggests that farmers should learn to determine and apply adaptation activities that will make their livelihoods less vulnerable and more sustainable through the maintenance of their natural resources.

With regard to building farmer capacity to learn, the results depicts that the programme only focuses on providing farmers with knowledge about running their farms and ensuring environmental sustainability. There is no formal training on social viability. The programme does not build farmer capacity to learn, innovate, solve problems and make decisions grounded to development theory and livelihoods on their own. This is inconsistent with the understanding that extension programmes should also strive to build farmer capacity to learn and command operation for the purpose of ensuring self-self-reliance of farmers (Worth, 2014), which is characterized by farmers' ability to be 'weaned', draw on their own resources, fully participate in the process of development, persist in the absence of external support, and take responsibility for the outcome of their actions (good or bad).

The results further illustrate that extension in this programme is almost exclusively focused on transferring production-related technology which is a linear approach that uses persuasive methods of conveying information to farmers (Swanson and Rajalahti, 2010). While linear technology transfer has its place, it is ineffective as the sole approach employed. Livelihoods theory suggests that development should be people-centred (Caroline and Carney, 1999). Learning-based extension theory suggests that extension should shift from being technology-focused toward focusing on people and should, in particular, focus on learning in a framework of investigation, application and sharing (Worth, 2006) and in this way build the capacity of farmers to engage in scientific enquiry Worth (2012).

7.6. Conclusion

The study found that there is a disconnection between what the development programme intends to achieve and what the programme is actually implementing and achieving. The programme's goal is to make the livelihood of the farmers more resilient and sustainable which is stated to be achieved through building farmers' capacity as a priority. The study confirms that training is provided, primarily on matters related to sugarcane production.

However, it also determined that the training is limited to knowledge transfer and does not include skills development as it has no practical element where farmers get the opportunity to learn by doing. In effect, farmer capacity is not built. There is no opportunity for the farmers to command their operations. This resulted in farmers being more dependent on external support – in other words, they are less self-reliant. Figure 6 in chapter 4 also confirms that self-reliance is determined by the farmers' capacity (knowledge and skills) to run and manage their farming operations, the opportunity and freedom they have to command farming operations, and capacity to learn.

Regarding building capacity of the farmers to run the farming enterprise, ensure sustainability and to learn, as suggested by the extension carousel, the programme only focuses on building farmers' capacity to run the farm and ensure environmental sustainability – but does not actually build any skills. Further, the study found that farmers are not taught about social sustainability or how to acquire knowledge, innovate, be systems thinkers in solving own problems and be development and livelihood grounded in making decisions. This is a clear reflection of the fact that the programme employs a linear approach to its extension, transferring technologies and information the programme managers assume is relevant to farmers.

The programme itself appears not to operate within a context of development and livelihood theory. Rather it operates under a more economic model that assumes that improving the financial status of the farmers will automatically improve and make the farmers' livelihood more sustainable, thus their focus remains on enterprise and commodity.

With regard to the role of extension, as noted earlier, the study found that extension engages primarily on conveying knowledge and information to farmers relevant to production (technology, input supply, and land) in a linear approach. Extension also involves in mobilizing other relevant role-players to partake in the process of imparting knowledge and information to farmers relevant to environmental management, organizational capacity and finances. Extension is not used in any discernable way to facilitate real learning. And despite intentions to the contrary, extension has not resulted in increased self-reliance, but has, instead increased farmers' dependence on extension as a source of information and knowledge and on external agents and contractors to carry out the operations on their farms.

7.7. Recommendations

From the findings and conclusion of this study the following recommendations are suggested.

The programme needs to revise its framework and plan and align them more consciously to livelihoods theory and learning-based extension in order to ensure that what is implemented will contribute toward achieving its goals. The main role-players will need to be immersed in the relevant literature from which they can learn about the principles and methods of achieving sustainable livelihoods, and about which extension approaches will best suit the programme and be relevant to situation and circumstances of the farmers. The study further suggests that the programme incorporates an evaluation system that will monitor progress and indicates whether the programme activities are in line with goals and approaches.

As corollary to the above, it is recommended that programme shift from its present commodity and technology orientation toward a more people-centred development which places farmers in the centre of the intervention and encourages farmer-participation in all processes of the development. Farmer participation in this programme can be improved through establishing farmer-contractors for production activities, engaging management committees in management processes and operations done by Illovo and enabling farmers to manage some of their funds.

Finally, it is recommended that the focus of extension also be changed from technology transfer to learning where facilitating acquisition of skills by farmers to engage with scientific enquiry is the focus. This learning framework should be used by extension workers, researchers and farmers, as well as by Illovo, SASRI and DARD. This will trigger farmers to own their development and other role-players to make contribution or support that is relevant to farmers' lives resulting in greater self-reliance on the part of the farmers.

7.8. Recommendations for further study

This study investigated the role of extension in promoting sustainable livelihoods and self-reliance among small-scale sugarcane farmer in the context of Illovo's SGDP in Noodsberg, South Africa. Future research on the following topics can provide new insights on how livelihoods of small-scale farmer can be improved and made more sustainable:

- Effective strategies of building farmer capacity among small-scale sugarcane farmers
- Ways of ensuring environmental sustainability of in SGDP

- How can ‘learning-based extension theory’ be applied in SGDP
- How can farmer participation be improved in SGDP as a mechanism of facilitating acquisition skills by farmers to manage their farm enterprise, manage sustainability and engage with scientific enquiry?

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Appendices

Appendix 1: Interview guide for Enablers

A) Demographics

1. Position holding _____
2. Educational attainment _____
3. Years of experience _____

B) Semi-structured interview

Key Question: to what extent is extension contextualized in rural livelihood

1. Describe the relationship existing between Illovo, SASRI and the Department of Agriculture (how does the relationship work, who sets the rules and scope for Grower development programmes, what does each party bring on the table)
2. Can you describe the overall role of Illovo in the Small-scale Grower Development programme?
3. What is the Illovo`s role around the following aspects of the programme (can describe around the areas of ensuring accessibility, affordability and availability; what role do you play in improving farmer`s ability to command the following aspects and how is done and what challenges are there around the following aspects respectively)
 - Organizational capacity
 - Information
 - Finance
 - Market and marketing
 - Input supply
 - Technology
 - Land
 - Infrastructure
 - Environmental sustainability
 - Social viability

In-depth probes will be based on understanding the situation from the perspective of the farmers and other potential stakeholders engaged with prior to meeting enablers. Other probes will be developed during the interviews with the enablers.

How is the programme evaluated (how is the progress assessed, what indicators are used, how do you know you have achieved your goals and milestones)

Appendix 2: Interview guide for extension worker

A) Demographics

1. Private or public Extension_____
2. Level of Qualification_____
3. Number of farmers working with_____

B) Semi-structured interview

Key Question: to what extent is extension contextualized in rural livelihood?

4. How is the extension programme implemented and evaluated?
5. Who designs the scope of work and how? (on what do they base their design, who do they work with and where are they based)
6. Who is involved in carrying out extension service? (what role do they play and where do they come from)
7. How do extension programme cater for improvement of farmer capacity in light of the following aspect:
 - Organizational capacity
 - Information
 - Finance
 - Market and marketing
 - Input supply
 - Technology
 - Land
 - Infrastructure
 - Environmental sustainability
 - Social viability

C) Probes

1. Can you describe extension role around the matter of accessibility, affordability and availability
2. Can you describe the role of extension around improving farmer capacity to command and control the above listed aspects
3. Can you list challenges or constraint existing around the above-listed elements (NB other probes to be developed on the understanding obtained from engaging with farmers)
4. What knowledge do you have around the following concepts Learning, Innovation, systems thinking, development theory and livelihood? (probes to be based on the responses)

Appendix 3: Interview guide for Small-scale sugarcane farmers

A) Demographics

1. Age

1) 18- 29	2) 30- 49	3) > 50
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2. Gender 1) Male 2) Female
3. Level of Education 0) None 1) Primary 2) Secondary 3) Tertiary
4. Source of Income_____
5. Number of Hectares under production_____
6. Production framework_____

B) Semi-structured interview

Key question: What characterizes rural Livelihood of farmers from a perspective of Sustainable livelihood?

Guide questions

1. Production

Can you tell me how much land you access to for agriculture and what are you producing on it? (Is your land sufficient, do you own the land, is it suitable, what else you use the land for, what other knowledge and skills you have about land, are you allowed to apply your knowledge and skills)

Where do the inputs you use come from and, how do you use them? (who supplies the inputs, who pays, do you know how to use them, do you actually get a chance to use

them, do you know other inputs suppliers, do you know which inputs are suitable for your enterprise and what are the challenges around input supply)

Tell me about the technologies you use in your sugarcane enterprises (Who provided the technology, who decided which technology is suitable, do you have any knowledge and skills about types of technologies and how they are applied, which technologies do you use personally, do you get a chance to use the technology you know, what other challenges do you have about technology)

What is the status quo of the current infrastructure related to sugar production and other agric. operation? (who owns it, what quality is it in, do you have access to it, what knowledge and skills do you have to command the use of infrastructure, do you have the opportunity to command the process of use and what other challenges do you have around infrastructure)

2. Economics

Can describe you financial operations pertaining to sugarcane production (Sources of income, who manages finances, who makes decision about finance distribution, what knowledge and skills do you have about managing finances, do you have opportunities to manage and account for your finances and what challenges do you have around finances)

Can you tell me about your marketing strategies and options (where is your market, who decides on the market place, do you have knowledge about marketing options, what skills and knowledge do you have on commanding marketing operation, do you have opportunities to command them and what challenges do you have around market and marketing)

3. Management

Discuss how you obtained information and skills relevant to running a sugarcane farming business (sources of information, how do you access them, how do you develop skills, do you choose the information and skills you require, what skills and knowledge do you have about acquiring information and skills relevant to you farming operation, do you have the opportunity to command the process of acquiring information and skills and what challenges do you experience related to information)

Can you tell me about your capacity to coordinate the farming business operations (what structures and systems are involved in diagnosing, planning, organising, implementation and monitoring of your farming operation; who makes the final decision; level of skills and knowledge do you have in making decisions; opportunity do you have to partake in the decision making process and what challenges do you have regarding this aspect)

4. Context band

To what extent does the Small-scale grower development programme cater for social viability (what structures and systems are in place to promote social viability, what cane practices affect your social structures and how, what knowledge and skills do you have about commanding the programme to cater for your social systems, do you get the opportunity to command, and what challenges are you facing pertaining to social structures and systems)

To what extent does the Small-scale Grower Development Programme cater for environmental sustainability (what practices are carried out to conserve soil, who makes decisions about when and how practices to be carried out, what level skills and knowledge do you have about carrying out practices on your own, do you get the opportunity to do it yourself and what challenges are there regarding environmental management)

5. Learning band

To what extent do extension services advance your capacity to learn for yourself about any aspect of your farming operation?

How do you decide when to change or adapt your farming practices (what informs your decisions, on what is your decision based on, to which extent you seek extension advices?)

If your sugarcane stunts and yellows on leaves, how do you attempt to solve the problem (who taught you that way, do you apply such approach to other farming enterprise and what is the outcome)

What will be your impression if Illovo decides that they will leave you to plant sugarcane on your own and each farmer has to negotiate a market with them on their own (on what do you base response, where did you learn that?)

Interview Guide for Extension Specialist from SASRI

1. Can you help me understand, using Rich Picture, the relationship between all the institutions and stakeholders relevant to Small-scale Grower Development Programme and how they work together practically.
2. Can you describe the process of designing an extension programme for Small-scale grower development programme in particular
3. How is the extension programme implemented and who monitors all the activities?
4. To what extent does extension programme for Small-scale grower development programme cater for rural sustainable livelihood in the light of extension carousel's elements?:

- Discuss the role of the extension in ensuring Access, availability and affordability for the following livelihood aspects
- Discuss the role of extension in ensuring farmers capacity and opportunity to command the element of extension carousel listed below

4.1 Management

- Organisational Capacity
- Information

4.2 Production

- Input Supply
- Technology
- Land
- Infrastructure

4.3 Economics

- Finances
- Market and Marketing

4.4 Context

- Social Viability
- Environmental Sustainability

4.5 Learning Bases

- Learning
- Systems thinking
- Innovation
- Development theory and Livelihoods

5. How is Small-scale grower development programme evaluated (include indicators)?
6. How is Extension programme evaluated (include indicators)?