NEW INSTITUTIONAL ECONOMIC ANALYSIS OF EMERGING IRRIGATION FARMERS' FOOD VALUE CHAINS

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I, Henry Jordaan, hereby declare that this thesis work submitted for the degree of Philosophiae Doctor in the Faculty of Natural and Agricultural Sciences, Department of Agricultural Economics at the University of the Free State, is my own independent work, and has not previously been submitted by me to any other university. I furthermore cede copyright of the thesis in favour of the University of the Free State.

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Henry Jordaan   Date
Bloemfontein
July 2012

"I can do everything through Him who gives me strength."

Philippians 4:13

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HENRY JORDAAN

ANC	African National Congress
ARC	Agriculture Research Council
CAET	College of Agricultural Economics and Trade
CDE	Centre for Development Enterprise
CDF	Cumulative Probability Distribution Function
CLARA	Communal Land Rights Act
CPA	Communal Property Association
CRDP	Comprehensive Rural Development Programme
DBSA	Development Bank Southern Africa
DEA	Data Envelopment Analysis
DMU	Decision Making Unit
DTI	Department of Trade and Industry
EAC	Eksteenskuil Agricultural Co-operative
EFA	Eksteenskuil Farmers' Association
EFO	Ezemvelo Farmers' Organisation
ESTA	Extension of Security of Tenure Act
FLO	Fairtrade Labelling Organisation
GMO	Genetically Modified Organisms
HACCP	Hazard analysis and critical control points
IIED	International Institute for Environment and Development
ILO	International Labour Organisation
KMO	Kaiser-Meyer-Olkin
LRAD	Land Redistribution for Agricultural Development
LRB	Land Rights Bill
MEC	Member of Executive Council
NDA	National Department of Agriculture
NDP	National Development Plan
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental Organisation
NIE	New Institutional Economics
NPC	National Planning Commission
OLS	Ordinary Least Squares
OWC	Orange River Wine Cellars
PCR	Principle Component Regression
PTO	Permission to Occupy
RSA	Republic of South Africa
SAD	South African Dried Fruit
SADT	South African Development Trust
SCP	Structure-Conduct-Performance

SLAG	Settlement/Land Acquisition Grant
SME	Small and Medium Enterprise
TCE	Transaction Cost Economics
TRANCRAA	Transformation of Certain Coloured Rural Areas Act
UK	United Kingdom
USAID	United States Agency for International Development

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION *1*

CHAPTER 2

LITERATURE REVIEW AND DEVELOPMENT OF CONCEPTUAL FRAMEWORK *12*

CHAPTER 3

CHARACTERISATION OF EKSTEENSKUIL FARMERS' VALUE CHAIN 50

CHAPTER 4

SOCIAL CAPITAL ANALYSIS OF THE EKSTEENSKUIL FARMERS 89

ANALYSIS OF THE GOVERNANCE STRUCTURES   *107*

EFFICIENCY ANALYSIS OF INPUT USE BY EKSTEENSKUIL FARMERS   *132*

CHAPTER **7**

MODELING THE POTENTIAL IMPACT OF RECOMMENDED CHANGES ON THE FINANCIAL PERFORMANCE OF THE EKSTEENSKUIL FARMERS 161

CHAPTER **8**

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS   *181*

List of Tables

List of figures

ABSTRACT

The main objective of this research was to develop and apply an integrated framework that will allow researchers to comprehensively investigate agri-food chains within which emerging farmers operate to identify potential leverage points that will contribute towards improving the financial performance and hence the livelihoods of emerging farmers. An integrated value chain (VC)-New Institutional Economics (NIE)-Structure-Conduct-Performance (SCP) framework was developed to allow for considering the constraints associated with institutional failure, high transaction costs, and the lack of support structures that typically exclude emerging farmers from participating in commercial agri-food chains, but also vertical coordination and collective action that contribute to the successful participation of emerging farmers in commercial agri-food chains. The integrated VC-NIE-SCP framework allows for a comprehensive analysis of the behaviour and performance of emerging farmers in their social, physical and institutional environment.

The integrated VC-NIE-SCP framework was applied to the case of emerging raisin producers from Eksteenskuil who export raisins via the fairtrade initiative. Correctly aligned incentives through the Fairtrade initiative (price premium for good quality raisins) incentivised the farmers to comply with the strict rules of Fairtrade, but also to establish additional rules by registering the EAC to improve their ability to meet the strict rules and regulations of the fairtrade initiative. The incentives through fairtrade also incentivised the support structures to actively support the farmers to comply with the strict rules and regulations. Support structures, especially the board of directors of EAC, play a major role in the operations of the farmers from Eksteenskuil in the fairtrade value chain. Correctly aligned incentives thus have a major influence on the behaviour of the farmers and other role-players that may support them to meet the strict requirements of participating in commercial agri-food chains.

The technical and cost efficiency levels of the respondents were examined to gain insight into their current performance and the scope for improving their performance in their current technology set. A cash flow optimisation model was also developed to model the potential impact of recommended changes on the financial performance of the farmers from Eksteenskuil. The results show that there is major scope to improve the financial performance of the raisin producers from Eksteenskuil by improving the levels of efficiency with which they use their production inputs. The current incentive structure, however, is not conducive to improving the efficiency levels of the farmers. The lack of secure land tenure means that the farmers do not have the primary incentive to invest in their land. Insecure tenure also contributes to the lack of cash flow which is central to most of the stumbling blocks that constrain the behaviour, and hence the performance, of emerging farmers. Land tenure reform has to be concluded promptly to contribute to an enabling environment for emerging farmers to allow them to improve their livelihoods through irrigated agriculture.

Emerging farmers need effective support, extension and education to successfully operate in the liberalised market environment. Providing such support to emerging farmers, however, should not be the sole responsibility of government. The private sector has a major contribution to make in this regard. Key role-players in agri-food chains exhibit the necessary skills to successfully operate in the chain. Government should rather focus on creating incentives for such role-players to get involved with emerging farmers to develop the necessary skills of the farmers. Correctly aligned incentives that create a vested interest for such firms in the performance of emerging farmers may convince the private sector to effectively support the farmers. Such a vested interest may convince the key role-players to enter into vertical coordinated relationships (i.e. strategic alliances) with emerging farmers, giving farmers access to the accompanying benefits of effective support, and a ready market for their produce. Government then can focus on meeting its responsibility of providing the farmers with an enabling environment.

The main conclusion from this research is that the integrated VC-NIE-SCP framework provides a holistic approach to identify workable solutions that may improve the financial performance of emerging farmers, and hence the livelihoods of emerging farmers. By understanding the social and institutional dynamics in the system within which the emerging farmers operate, the incentive structure can be adjusted accordingly to effectively guide the behaviour of all parties involved to contribute towards the successful participation by emerging farmers in the mainstream of the economy. Each case, however, needs to be assessed comprehensively to ensure that recommendations will optimise the benefits for the farmers under consideration.

INTRODUCTION

1.1   BACKGROUND AND MOTIVATION

Poverty is a major cause for concern in South Africa. According to the United Nations Development Programme (UNDP) (2003), 48.5% of the South African population lives below the poverty line. The Water Research Commission (WRC) (2008) argues that the only way in which an impact can be made to improve the livelihoods of the rural poor is by giving them access to available resources or assets in agriculture. The new democratic government of South Africa also recognises the role that can be played by agriculture in alleviating rural poverty as is evident from the prominence of agriculture in the National Development Plan (NDP) of the National Planning Commission (NPC) of South Africa and the Comprehensive Rural Development Programme (CRDP) that is implemented by the Department of Rural Development and Land Reform. According to NPC (2011) agriculture (commercial and small-scale) has the potential to create about one million new jobs (direct and indirect) by 2030. NPC (2011) argues that the expansion of irrigated agriculture, supplemented by dry-land production where feasible, will be the driving force to meet the vision of the NPC for 2030 that South Africa's rural communities should have greater opportunities to participate fully in the economic, social and political life of the country. CRDP is part of government's plans to accelerate growth in rural areas. Essentially the programme aims to enable people living in the rural areas to use the natural resources at their disposal to become economically active (Republic of South Africa (RSA), 2009). Government is of the view that small-scale farmers can contribute significantly to the reduction of food insecurity (Molewa and Doidge, 2010). According to Backeberg and Sanewe (2010), agriculture contributes to economic development and rural livelihoods by providing food products, but it also represents a range of opportunities for earning income in production, processing, distribution and retailing phases of the food value chain. The role of agriculture thus extends the mere provision of food to rural communities. Emerging farmers are thus expected to have a major role to play in the alleviation of rural poverty in South Africa.

Rural development strategies are often based on increased productivity with the aim of ensuring higher production levels for direct consumption and for commercial disposal, thereby enhancing the generation of economic surpluses necessary for uplifting rural communities (Comprehensive Africa Agriculture Development Programme of NEPAD, 2003). The food security approach (increased productivity) has dominated agricultural development interventions for the past 30 to

40 years whereby development projects, regardless of market access issues, have remained focused on increasing production of low value, staple food (Lundy *et al.*, 2004). Although food security may be achieved through intensified agriculture, rural communities are often unable to gain the skills to take on the second step of finding and developing other supplementary income streams.

The recent shift away from national trade protection towards a free trade environment means that farmers need to alter their strategies, from a productivity approach, to a competitive approach. For farmers in developing countries, this means a radical shift from a strategy that relies upon so-called comparative advantages such as those gained by virtue of natural resources, cheap labour, state subsidies, and lightly processed products, which are easily duplicated by other zones or countries, towards a strategy of competitive advantage. This means that farmers within an enterprise need to understand how their markets operate, how their enterprise is positioned within a market chain and how that market chain can be organised to make it function more efficiently (Lundy *et al.*, 2004). International development efforts have recognised these problems and are increasingly focused on the understanding of value chains with the aim to integrate farmers into competitive value chains (Magistro *et al.*, 2004).

Eksteenskuil is a community of Coloured farmers who produce raisins on the banks of the Orange River in the Northern Cape Province of South Africa. Eksteenskuil is near Keimoes, about 50km West of Upington. In 2003 the Eksteenskuil Farmers' Association (EFA) obtained accreditation from the Fairtrade Labelling Organisation (FLO) to export their choice grade raisins to Traidcraft, a fairtrade affiliated buyer from the United Kingdom (UK). In 2006 the Eksteenskuil Agricultural Cooperative (EAC) was registered. Since 2006 the farmers from Eksteenskuil export their choice grade raisins through the fairtrade initiative as EAC (Kok, 2008). The idea behind fair-trade is to fight poverty by improving production and trading conditions to benefit smallholder farmers, farm workers and disadvantaged employees and artisans (Fair Trade South Africa, 2011). In essence, previously marginalised producers receive fair prices (higher than market price) for their produce to assist them to transform their lives through trade. The community also receives a fair-trade premium that has to be spent according to a list of strict guidelines (Kok, 2008). It is noted that the farmers only get access to the incentives through the crops they export via the fair-trade initiative. The farmers thus have to produce crops that meet stringent quality requirements in order to get access to the fairtrade incentives.

It is noted that the farmers from Eksteenskuil only export their raisins collectively. Each farmer produces his/her raisins and delivers it to SAD individually. At SAD all of the raisins from Eksteenskuil are mixed together to be exported collectively under the name of EAC. Collectively the farmers from Eksteenskuil thus operate in a highly sophisticated niche market. The access to the niche market provides the farmers with an excellent opportunity to substantially boost

their financial performance and hence the contribution of raisin production to their livelihoods. However, despite having access to the lucrative export market, the financial performance of the raisin producers from Eksteenskuil is not meeting the expectations. The volumes of raisins that are produced by the group of farmers keep on declining year after year. The decline in volumes affects the financial performance of the producers for the worse. The farmers from Eksteenskuil thus fail to benefit optimally from having access to the lucrative fairtrade market. Thus, merely having access to sophisticated agri-food chains does not necessarily mean that the farmers under consideration will easily lift themselves out of poverty.

The poor performance of the farmers from Eksteenskuil corroborates the findings by Van Averbeke, Denison, and Mnkeni (2011) who found that most smallholder irrigation schemes perform well below their potential. The poor performance of the raisin producers from Eksteenskuil and other emerging farmers is a major cause for concern. Since the beginning of democracy in South Africa in 1994, government has committed itself to working towards decreasing rural poverty through the implementation of policies that include initiatives to link emerging farmers to commercial agricultural value chains (Letsoalo and van Averbeke, 2005). Government has also spent a large amount of money on research projects on ways to successfully link emerging farmers to commercial agri-food chains, and on the revitalisation of smallholder irrigation schemes (Denison and Manona, 2007).

1.2   PROBLEM STATEMENT

Despite the commitment from government and the huge investments made to help emerging farmers from smallholder irrigation schemes to be integrated into commercial agri-food chains, the performance of emerging farmer in commercial agri-food chains leaves much to be desired. Ultimately, the poor performance of the emerging farmers means that the objective to allow farmers to improve their livelihoods through irrigated agriculture is not met.

Various researchers in South Africa and southern Africa have endeavoured research on the topic of successfully linking emerging farmers to markets as a means to alleviate rural poverty. Most of those researchers have investigated the stumbling blocks that exclude emerging farmers from participating in commercial agri-food chains. The stumbling blocks that were identified in such research include, amongst others, the stringent requirements of commercial agri-food chains in terms of consistent supply of good quality produce (Louw *et al.*, 2008; Bienabe and Vermeulen, 2007); the small scale of operations of emerging farmers (Khaile, 2012; Baloyi, 2010; Randela *et al.*, 2008; Masuku *et al.*, 2007; Ntsonto, 2005; Perret, 2002; and Matungul *et al.*, 2001); insecure property rights (Khaile, 2012; Baloyi, 2010; Ortmann and King, 2010; Ntsonto, 2005; Matungul *et al.*, 2001); lack of access to credit (Khaile, 2012; Baloyi, 2010; Van der Heijden, 2010); poor conditions of physical infrastructure (Van der Heijden, 2010; Baloyi, 2010; Jari and Fraser, 2009; Ortmann and King, 2007; Matungul *et al.*, 2001); lack of

trust among value chain participants (Van der Heijden, 2010; Randela *et al.*, 2008, Vermeulen *et al.*, 2008; Albu and Griffith, 2006; Anseeuw, Van Rooyen, and D'Haese, 2002); lack of market information (Baloyi, 2010; Randela *et al.*, 2008; De Bruyn *et al.*, 2001; Masuku *et al.*, 2001); long distances to the market (van der Heijden, 2010; Baloyi, 2010; De Bruyn *et al.*, 2001; Masuku *et al.*, 2001); and the lack of support services (Van der Heijden, 2010; Anseeuw *et al.*, 2000). Based on the identified stumbling blocks, recommendations then are made how the farmers and government should change their behaviour to allow the farmers to overcome the stumbling blocks. Alarmingly, the stumbling blocks that were documented by researchers in the early 2000's are very similar to the stumbling blocks that were identified by researchers even in 2010 and 2012. The behaviour of the farmers and other role-players thus prove not to have changed considerably despite the recommendations from the volume of research.

Some researchers have reported success stories in recent years where emerging farmers from South Africa are successfully participating in commercial agri-food chains. Amongst others, some of the success stories include the studies by Hendriks and Lyne (2009), Louw *et al.* (2008), Louw, Vermeulen and Madevu (2006), Bediako and Debrah (2007), Ewert, Eva and Hamman (2006), and Sartorius and Kirsten (2002). The potential contribution of collective action and vertical coordination to overcome some of the stumbling blocks is very evident from the documented success stories. Collective action allows the farmers to overcome the problems associated with the small scale of operations. Vertical coordination proves to give farmers ready access to a market for their produce, but also to substantial levels of support from their transacting partners. Through the vertical coordinated relationships the farmers mainly receive technical support and market information, but in some cases also financial support. Collective action and vertical coordination thus allow emerging farmers to overcome a number of the stumbling blocks that typically exclude emerging farmers from participating in commercial agri-food chains. The success stories provide good descriptions of the way in which the role-players behave in the successful operations of the farmers in commercial agri-food chain. Based on the behaviour of the role-players in the success stories other emerging farmers are recommended to form co-operatives and to enter into vertical coordinated relationships with their transacting partners.

Both groups of research focus mainly on the way in which the farmers and other role-players behave and make recommendations for change in the behaviour that likely will contribute to the level of success with which the farmers operate in commercial agri-food chains. The theory of New Institutional Economics (NIE), however, suggests that the behaviour of economic agents is influenced by the social and institutional environments within which they operate. The social environment includes the social dynamics within the communities of farmers under consideration. The degree of success with which a group of emerging farmers will operate collectively is influenced by the social capital of the individuals (Putnam, 1993) and the social dynamics (i.e. customs, norms and traditions) within the community. Moreover, the influence of

social dynamics within different communities mean that no single model exists that can be replicated in different regions (Louw *et al.*, 2006). The institutional environment contains the rules and regulations that aim to create order to protect individuals against opportunistic behaviour, but also the incentives that guide the behaviour of economic agents under consideration (Milagrosa, 2007a). Importantly, the incentives guide the behaviour of the farmers, but also the behaviour of the transacting partners and the individuals/organisations that can support the farmers to overcome the stumbling blocks. The social and institutional environments thus have a major influence on the behaviour of all of the parties that may contribute to emerging farmers successfully overcoming the stumbling blocks. By ignoring the social and institutional environment the researchers make recommendations for change without considering the existing incentive structure that caused the current behaviour in the first place. The failure to consider the existing incentive structure when making recommendations to change behaviour may be a reason for the failure to change the behaviour effectively to allow the farmers to successfully participate in commercial agri-food chains.

1.3   OBJECTIVES

The main objective of this study is to develop and apply an integrated framework that will allow researchers to comprehensively investigate small-scale farmers' agri-food chains with the aim to identify potential leverage points that will contribute to improving the financial performance and hence the level of success with which the farmers participate in their agri-food chain. Special attention is awarded to the social and institutional environments within which the farmers operate to comprehensively understand the existing incentive structure for current behaviour. Such information is crucial when making recommendations for change that will effectively guide the behaviour of all parties involved in such a way to contribute to improving the financial performance.

The main objective will be achieved through the following objectives:

Objective 1: To develop an integrated framework that can be used to analyse the agri-food chains within which emerging farmers operate with the aim to improve the financial performance of the farmers, and hence the level of success with which they operate in their value chains.

The stumbling blocks that were identified in the literature to constrain the performance of emerging farmers in commercial agri-food chains include stringent requirements, challenges associated with institutional failure (i.e. small farm size, insecure tenure, and lack of access to credit), high levels of transaction costs (i.e. poor condition of physical infrastructure, long distance to the market, lack of access to market information, and lack of trust among market imperatives) and poor support. Success stories reported collective action among the emerging farmers, vertical coordinated relationships between the farmers and their buyers, and high levels

of technical and/or financial support to contribute to the success. The framework thus has to consider the stumbling blocks in the social, physical and institutional environment within which the farmers operate; the transactions within which the farmers operate to better understand the relationships between the farmers and their buyers; and the support structures that are available to support the farmers to overcome the stumbling blocks also need special attention.

An integrated value chain (VC) – New Institutional Economics (NIE) – Structure-Conduct-Performance (SCP) framework is developed to allow for considering all of the above aspects when analysing emerging farmers' agri-food chains. The value chain concept of Roduner (2007) is used in this framework to expand the focus on the actors who are directly involved with moving the physical product from the input suppliers to the end consumer (value chain players), to also include the actors who provide the rules and regulations that have to be met (value chain influencers) by the value chain players, and the support structures (value chain supporters) that are available to support the value chain players to comply with the rules and regulations specified by the influencers. The integration of the NIE-SCP framework into the extended value chain framework extends the value chain influencers to also include the social and physical environment that influence the behaviour of the farmers, while also allowing for special attention to be awarded to the relationship between the different value chain players. The integrated VC-NIE-SCP framework thus allows a researcher to consider all of the typical stumbling blocks that constrain the behaviour of emerging farmers, and the success factors that prove to contribute to the success in cases where emerging farmers are successfully operating in commercial agri-food chains. Thus, instead of focusing only on the current behaviour and performance of the farmers under consideration, the developed framework also provides insight into the incentive structures that influence the behaviour of all role-players in the value chain under consideration.

Objective 2: To apply the integrated VC-NIE-SCP framework to characterise the agri-food chain within which the group of emerging raisin producers from Eksteenskuil operate in order to get a comprehensive understanding of the way in which the farmers behave and perform within their social, physical and institutional environment.

Special attention is awarded to the social, physical and institutional environments within which the farmers operate. The nature of the fairtrade value chain within which the farmers from Eksteenskuil operate means that the farmers have to operate collectively, and they have to comply with a number of strict rules and regulations (institutions), in order to supply raisins to the fairtrade market. The application of the integrated framework to the case of Eksteenskuil will provide insight into the social dynamics that will affect the collective action amongst the group of farmers, the incentive structure that is set by the institutional environment within which they operate, and the characteristics of the physical environment that constrain the behaviour of the farmers from Eksteenskuil. In terms of the institutional environment special attention is also awarded to the institutions that relate to land tenure and the strict rules associated with

participating in the fairtrade market. The emphasis on land tenure centralise around the fact that secure tenure is the primary incentive to invest in farm land. The political history of South Africa in terms of land allocation means that few emerging farmers do have secure tenure. Emerging farmers thus have to operate in an environment that lacks the primary incentive to invest in their farm businesses. The emphasis on the strict rules associated with the fairtrade market is to better understand how the group of farmers comply with the strict rules instead of viewing it as a barrier to entry that cannot by overcome.

Objective 3: To explore the social capital levels of the farmers from Eksteenskuil as part of the social environment within which the farmers operate to understand the social dynamics within the group of farmers that affect the functioning of Eksteenskuil Agricultural Cooperative (EAC). The farmers from Eksteenskuil can only access the incentives from fairtrade through collective action. The social capital of the farmers thus affects their access to the incentives, and hence their financial performance.

In order to quantify the social capital levels of the different farmers a distinction is made between structural social capital (actual membership of formal networks) and cognitive social capital (intangible levels of trust, tradition and morals) (Grootaert and Bastelaer, 2002). The distinction ensures a comprehensive analysis of the social capital levels of the farmers under consideration. The quantification of the social capital levels is extended by exploring the determinants of social capital. Social capital has a direct impact on the potential success to uplift emerging farmers through government's strategies to promote collective action (NPC, 2011; CRDP, 2009) and farmer-to-farmer skills transfer (NPC, 2011). The lack of trust was also listed as a major stumbling block that excludes emerging farmers from commercial agri-food chains (Ortmann and King, 2010). A comprehensive analysis of the social capital levels and its determinants thus may contribute to improving the performance of the farmers, and hence to the upliftment of emerging farmers. The calculated social capital index is also considered in a subsequent objective (Objective 5) as a possible determinant of the level of efficiency with which the farmers from Eksteenskuil use their inputs.

Objective 4: To assess the transaction between the farmers from Eksteenskuil and SAD to identify the type of governance structure (vertical coordination strategy) that will minimise the transaction costs faced by the emerging farmers from Eksteenskuil. All of the raisin producers from Eksteenskuil currently are in (specifications) contracting relationships with SAD as required by the fairtrade initiative. The farmers, however, entered into the contractual relationship based on requirements from the fairtrade initiative and not as a means to optimise transaction costs. Thus, it is not known whether or not the specifications contract type of governance structure actually minimise the transaction costs faced by the farmers from Eksteenskuil.

Objective 4 will be achieved first by assessing the attributes of the transactions between the farmers and their buyers, followed by the application of two decision making frameworks to identify the appropriate type of governance structure that will minimise the transaction costs faced by the farmers. Firstly, the decision making framework of Mahoney (1992) will be used to match a type of governance structure to the attributes of the transaction. Thereafter, the decision making framework of Peterson, Wysocki, and Harsh (2001) is used to assess whether or not the current governance structure needs to be changed to better match the attributes of the transaction. The application of the framework of Peterson *et al.* (2001) thus contributes to validating the findings from the application of the Mahoney (1992) framework. While previous research has investigated the optimal type of governance structure with special attention on minimising the transaction costs faced by the agribusiness (the transacting partner of the emerging farmers) the focus of this research is to minimise the transaction costs faced by the emerging farmers in the transaction. Objective 4 directly address government's strategies to promote strategic partnerships (CRDP, 2009) and agro-processors to support emerging farmers (NPC, 2011). It also directly address the high levels of transaction costs faced by emerging farmers that are well documented to be a major stumbling block that exclude emerging farmers from commercial agri-food chains (Ortmann and King, 2010).

Objective 5: To evaluate the performance of the farmers by quantifying the degree of technical and allocative efficiency with which the raisin producers from Eksteenskuil use their production inputs in order to get an understanding of the scope for improving the farmers' performance within their existing technology set. The determinants of technical and allocative efficiency are also explored to identify the factors that are associated with higher levels of efficiency to guide recommendations that will ultimately contribute to improved financial performance of the raisin producers from Eksteenskuil.

In order to meet Objective 5 technical and allocative efficiency scores will be calculated for each decision-maker using Data Envelopment Analysis (DEA). A double bootstrap approach will be followed when exploring the factors that contribute to higher levels of technical efficiency in order to overcome severe limitations inherent in the approach that is normally used to investigate factors effecting efficiency. Previous research in South Africa (i.e. Khaile, 2012; Speelman *et al.*, 2007) who explored the determinants of technical efficiency followed the two stage approach where they used efficiency scores that were calculated in the first stage using DEA to identify determinants of efficiency in the second stage using tobit regression analysis. The problem is that the inherent dependency among the efficiency scores (dependent variable) were ignored. The dependency among the DEA efficiency scores implies that a basic model assumption (no serial correlation) required by regression analysis is violated (Xue and Harker, 1999; Balcombe *et al.*, 2008) hence the procedures that were followed is invalid. By implication, the findings from Khaile (2012) and Speelman *et al.* (2007) thus may be invalid. The double bootstrap approach will also be performed within a principle component regression (PCR)

framework to reduce the number of covariates relative to the number of respondents that are included in the analysis. The PCR procedure also removes any possible correlation between the covariates that are included in the final regression model. Existing research on technical efficiency and its determinants of emerging farmers in South Africa thus is extended in this research by applying a more appropriate approach to overcome the limitations of the approach that is normally used. The use of the PCR framework extends existing applications of the double bootstrap approach by removing any possible multicollinearity that may exist between covariates that may negatively affect the consistency of the estimated model.

The analysis of the determinants of allocative efficiency faces similar limitations than those discussed under technical efficiency above. Since a double bootstrap procedure has not yet been developed to explore the determinants of allocative efficiency, a procedure recommended by McDonald (2009) is used to explore the determinants of allocative efficiency in this study. The allocative efficiency scores (dependent variable) are transformed to logarithms to better handle the problem of serial correlation in the dependent variable. By achieving Objective 5 this study thus will generate new knowledge that may contribute to improving the performance of emerging farmers from South Africa within their existing technology set. The results from Objective 5 will also be used in Objective 6 to quantify the potential improvement in the financial performance of the raisin producers from Eksteenskuil that may result from the implementation of recommendations based on the results from Objectives 2 through 5.

Objective 6: To model the potential financial impact from improving efficiency levels of the raisin producers from Eksteenskuil, and to model the potential impact of the implementation of other recommendations on the cash flow positions of the farmers. All of the recommendations from Objective 2 through Objective 5 aim to cause changes in the behaviour of the relevant role-players to improve the degree of efficiency with which the farmers use their inputs as a means to improve their performance. The first part of Objective 6 explores the potential returns that can possibly be earned from initiatives to implement the recommendations for the case of raisin production and marketing at Eksteenskuil. Thus, while research exploring efficiency levels of emerging farmers typically concludes after exploring the determinants of efficiency, this research extends such research by considering the potential financial gains that can be achieved by improving the efficiency levels of the farmers. Such information will indicate whether or not initiatives to improve the efficiency levels of emerging farmers are financially feasible to implement.

Limited cash flow is central to a number of the stumbling blocks that contribute to the exclusion of emerging farmers from participating in commercial agri-food chains. While recommendations may prove to be likely to improve the financial performance of the farmers under consideration, the viability of the recommendations is very much influenced by the cash flow positions of the farmers. The impact of recommended solutions on the cash flow position of the farm businesses

thus may be a good indication of the actual influence of the recommendations on the livelihood of the farmers from Eksteenskuil. In order to model the impact of the implementation of the recommendations from earlier objectives on the cash flow of the farmers, procedures were developed to incorporate the DEA production frontier into a cash flow optimisation model of Grové (2010) to specify the technology set of the farmers from Eksteenskuil. The net cash flow then is optimised for each respondent for each recommendation that is expected to improve the financial performance of the farmers from Eksteenskuil. This research extends existing research by considering the impact of recommendations on the cash flow positions of the emerging farmers. Thus, achieving Objective 6 will generate knowledge on the scope and viability of improving the financial performance of the raisin producers from Eksteenskuil.

The organisation of the thesis is discussed next.

1.5   ORGANISATION OF THE THESIS

The thesis consists of eight chapters including the Introduction (Chapter 1) and the Summary, conclusions and recommendations (Chapter 8).

Chapter 2 covers the review of research that was conducted on the topic of linking emerging farmers to markets. The literature review aims to identify stumbling blocks that typically exclude emerging farmers from the markets, and to identify possible key success factors from success stories that may be used to benchmark the case studies in this study. After the review of the literature the conceptual framework that is used to analyse the respective agri-food chains is developed. Given the scope of the stumbling blocks and the identified success factors a conceptual framework is proposed that considers role-players at three different levels (micro, macro and meso) in the value chain. The proposed conceptual framework also extends mere economic analyses of the value chain to also include a certain level of social analyses.

The developed conceptual framework is used in Chapter 3 to characterise the value chain within which the farmers from Eksteenskuil operate in terms of the three levels of a value chain. Special attention is awarded to the support structures and the social, physical and institutional environment within which the chain operates. The characterisation contributes to a better understanding of the functioning of the value chain in order to gain insight into the potential leverage points that may contribute to the level of success with which the emerging farmers participate in commercial agri-food chains.

The objective of Chapter 4 is to explore the levels of social capital of the farmers from Eksteenskuil. Firstly, the levels of structural and cognitive social capital are quantified after which it is used to compile an overall social capital index. Thereafter follows analyses to identify factors that contribute to higher levels of social capital.

Chapter 5 covers the analysis of the transactions within which the farmers participate. The attributes of the transaction are assessed after which two decision making frameworks are applied to identify the transaction cost minimising type of governance structure. Based on the attributes of the transactions, transaction cost minimising governance structures are presented and discussed.

The results from the efficiency analyses are presented and discussed in Chapter 6. The levels and determinants of technical efficiency are quantified first using the double bootstrap approach of Simar and Wilson (2007). The double bootstrap approach correct for bias in the efficiency scores, overcome the problem of violating some of the important assumptions of regression analysis, and consequently improve inferences from the analysis of determinants of technical efficiency. Chapter 6 is concluded with an analysis of the allocative efficiency levels of the raisin producers from Eksteenskuil and the determinants of allocative efficiency. Chapter 7 contains the results from the modelling of the potential financial impact of efficiency improvements and the cash flow optimisation model that investigates the potential impact of recommended solutions on the cash flow positions of the farmers' farm businesses.

The thesis is concluded by Chapter 8 that provides a summary of important results and conclusions in terms of potential leverage points that may contribute to improving the financial performance of the farmers from Eksteenskuil, and hence the levels of success with which they participate in a commercial agri-food chain. Chapter 8 is concluded by providing some recommendations for policy makers to contribute to meeting key success factors, and for further research that will contribute further towards the successful participation of emerging farmers in commercial agri-food chains.

LITERATURE REVIEW AND DEVELOPMENT OF CONCEPTUAL FRAMEWORK

The objective of Chapter 2 is to discuss the relevant literature that contributes to meeting the objectives of this study. Literature on research investigating ways to link small-scale farmers to the mainstream economy is reviewed. The aim of the literature review is to identify typical stumbling blocks that exclude emerging farmers from participating in commercial agri-food chains, and potential key success factors from success stories where emerging farmers are successfully operating in commercial agri-food chains. Based on the requirements from the literature review a conceptual framework is developed that allows for a comprehensive analysis of the agri-food chains within which the emerging farmers are operating to identify key success factors.

2.1 LINKING SMALL-SCALE FARMERS TO THE MAINSTREAM ECONOMY

The literature review is divided into three main sections. The first section considers international research that investigates potential solutions through which small-scale farmers can be linked to markets. Within the second section the focus of attention shifts to research within the South African context that investigates the major stumbling blocks that contribute to the exclusion of emerging farmers from South Africa from participating in commercial agri-food chains. The last section covers a review of success stories from South Africa where emerging farmers are successfully participating in commercial agri-food chains.

2.1.1 *INTERNATIONAL RESEARCH ON LINKING FARMERS TO MARKETS*

One of the major constraints faced by emerging farmers all over the world is lack of market access. Value chain analysis is a popular method that is used to help producers gain market access (Schmitz, 2005). International studies that use value chain analysis to identify possible links where emerging farmers can join the mainstream economy include, amongst others, the research conducted by the Regoverning Markets programme (Regoverning Markets, 2011), and studies by Schipmann (2006) and van der Meer (2005).

The Regoverning Markets programme is a major contributor to the body of literature on linking farmers to markets. The Regoverning Markets programme recognises that small-scale agriculture is poorly prepared for the rapid changes that are taking place in the agri-food markets in middle and low-income countries. The overall aim of the Regoverning Markets programme is to provide strategic advice and guidance to all role-players on approaches that can anticipate and manage the impact of dynamic changes in local and regional markets (Regoverning Markets, 2011). Special emphasis is placed on implications and opportunities for small-scale producers, and the best means for linking small-scale farmers to dynamic markets (Regoverning Markets, 2011). In a synthesis of research conducted for the Regoverning Markets programme, Berdegue, Bienabe and Peppelenbos (2008) document a number of conclusions that prove to be important in the quest to successfully link small-scale farmers to markets. Amongst others it is concluded that the emphasis of governments and donors should be shifted from compensatory and reactive to proactive and anticipatory. Incentives thus have a major role to play. It is argued that significant scope exists for governments to introduce pro-poor policies in combination with pro-market policies within the overall framework of free trade and liberalised markets. The private sector also proves to have great potential to effectively link smallholder farmers to dynamic markets. Collective action is viewed to be an important strategy that small-scale farmers can use to successfully participate in dynamic markets. Innovative financial products have to be created to cater for the needs of small and medium enterprises. Thus, based on the research that was conducted internationally through the Regoverning Markets programme a number of potential success factors have already been identified to contribute to successfully linking emerging farmers to markets.

Schipmann (2006) uses value chain analysis to identify ways to better integrate smallholders into value chains. More specifically, Schipmann (2006) compares international and national value chains in terms of the potential benefit for smallholders and to identify existing barriers to entry that constrain smallholders in joining the specific value chain. On the one hand, it was found that although the benefits are higher within the export channel, the export channel is also associated with higher barriers to entry. On the other hand, when distinguishing between the alternative national value chains and comparing all of those to the more beneficial export channel, Schipmann (2006) finds that there actually is a national chain that earns a higher income than the export chain. This channel again, however, has even higher barriers to entry for smallholders than the export chain. Schipmann (2006) concludes finally that the difference between export and national markets is thus not the decisive distinction for possible benefits and entry barriers, but rather it is the final product that is supplied. Schipmann (2006) also finds a strong correlation between the complexity of the final product and the governance structure, and also between the governance structure and the benefits and entry barriers for smallholders. The more complex and

the higher the quality of the final product, the stronger is the relationship between producers and traders. Furthermore the stronger the relationship between producers and traders, the greater are the benefits that accrue to the smallholders.

Van der Meer (2005) argues that the integration of producers and consumers in deepening and broadening markets is a crucial characteristic of development. Van der Meer (2005) recognises that a lot of effort is placed on identifying ways to link small-scale producers to markets. Van der Meer (2005) discusses various factors that may be of importance when designing practical interventions. Amongst others, van der Meer (2005) reckons buyers' preferences, the characteristics of the country, market outlets, the specific product and supply chain, the nature of the product, commercial strategies and the market segments are important issues to consider. Van der Meer (2005) argues that in markets with low requirements, private investment in supply chain organisation is in general not possible as the gross value added is generally lower that the necessary transaction costs. Contract farming arrangements by monopsonic buyers, however, may be the only exception. Although the public sector often plays a major role in improving small-scale producers' access to markets, van der Meer (2005) emphasises that public sector intervention should be based on ways to mitigate market failure, to achieve net benefits and also to improve livelihoods. The emphasis of improvements should focus on the reduction of transaction costs, securing minimum food safety and improving on-farm technology. In markets with moderate requirements, private investment may be feasible (van der Meer, 2005). By implication it means that the formation of coordinated supply chains may be feasible especially in the case of monopsonic power, or in the case of sharing value added among chain partners. In this sense, public interventions could target support for the formation of coordinated supply chains through process facilitation, improvement of the investment climate, reduction of transaction cost and risk (van der Meer, 2005). Finally, for markets with high requirements, van der Meer (2005) argues that returns from investment in coordinated supply chains will be higher than the transaction cost. Coordinated supply chains are thus a common feature in this market segment.

2.1.2 SOUTH AFRICAN RESEARCH ON LINKING EMERGING FARMERS TO MARKETS

The topic of linking emerging farmers to markets is well researched within South Africa. Ortmann and King (2010) conducted a review of such research in southern Africa and found no fewer than 31 articles published only in *Agrekon* during the past decade. Although these articles include studies conducted in Southern Africa (with special emphasis on South Africa) it is important to note that Ortmann and King (2010) only considered the research that was published in Agrekon. In addition to the volume of research already published in the past decade, the past five years

has seen at least two PhDs (Cloete, 2010; Magingxa, 2006) and five Masters degrees (Khaile, 2012; van der Merwe, 2012; Baloyi, 2010; van der Heijden, 2010; Boonzaaier, 2009) that were obtained in the general field of linking farmers to markets within South Africa.

The reason for the large volume of research that is being done on this topic is the fact that the South African government has paid greater attention by means of research and extension efforts to promote the growth of emerging small-scale farmers with the aim to promote food security to the rural poor (Ortmann and King, 2010). Ortmann and King (2010) also state that non-governmental organisations and researchers at universities have invested considerable resources to investigate practical ways of linking emerging farmers to mainstream agri-food chains. Such investments seem justifiable given the fact that NPC (2011) specifically lists linking small-scale farmers to markets as one of the recommendations to meet the vision that, by 2030, South Africa's rural communities should have greater opportunities to participate fully in the economic, social and political life of the country.

For the purpose of discussion, this section is divided into research that identifies constraints that contribute to the exclusion of emerging farmers from commercial agri-food chains, and research that reports on success stories where emerging farmers are successfully participating in commercial agri-food chains.

2.1.2.1 Factors constraining emerging farmers in South Africa from participating in commercial agri-food chains

The main factors that constrain emerging farmers from participating in commercial agri-food chains are centred around their inability to consistently produce a sufficient volume of good quality produce. Emerging farmers find it difficult to supply formal markets due to their stringent requirements. Louw *et al.* (2008) cite IIED (2004), who mentions that domestic markets in liberalised economies increasingly have more in common with the export markets in terms of grades, standards, business practices, prices and ownership. According to Bienabe and Vermeulen (2007), most of the major retail stores within South Africa require internationally recognised food quality and safety systems at farm level (EurepGAP), and at packhouse / processing level (HACCP). The implementation, maintenance and auditing of the safety systems are complex, time-consuming, and expensive, which contributes to the difficulty faced by emerging farmers to supply such retail stores (Bienabe and Vermeulen, 2007).

In addition to the quality requirements, emerging farmers generally are unable to assure a consistent supply of the required volumes of produce. Baloyi (2010) found that some of his

respondents have participated in formal markets in previous year, but contracts were cancelled due to the inconsistency of the volume and quality of supply. The buyers of agricultural produce in principle have no problem with procurement from emerging farmers. Baloyi (2010) actually interviewed some of the buyers of fresh produce in the Limpopo Province to determine their willingness to procure fresh produce from smallholders. The interviewed buyers include retail stores, a fresh produce market, and a potato processing company. All of the interviewees indicated that they would be more than willing to procure from smallholder farmers if they comply with quality standards and consistency of delivery. Such a finding echoes the argument by Vermeulen *et al.* (2008), as cited by van der Heijden (2010), that the buyers of agricultural produce may generally be viewed as being objective and neutral market agents who have a vested interest in working with reliable producers as partners. Their focus is only on getting a sufficient volume of good quality produce to be able to efficiently service their consumers.

The factors that contribute to the inability of emerging farmers to consistently produce a sufficient volume of good quality produce are well documented in the literature. Those include the small scale of operations, insecure property rights and the consequent lack of access to credit, high levels of transaction cost (including poor condition of physical infrastructure, lack of market information and trust amongst actors, and dispersed production by emerging farmers), and the lack of support structures to assist farmers in meeting the stringent requirements. Those constraints are discussed below in more detail.

- **Small scale of operations**

The scale of operations of emerging farmers is typically very small which means that emerging farmers have to produce high value crops to make ends meet. The small scale of operations also means that emerging farmers have no bargaining power to negotiate for better prices when purchasing inputs or when selling their produce (van der Heijden, 2010). Emerging farmers are also not able to benefit from economies of scale. A number of researchers, including Khaile (2012), Baloyi (2010) and Ntsonto (2005), found that the average farm size of emerging farmers was less than five hectares. Baloyi (2010) analysed the constraints faced by smallholder farmers in the agribusiness value chain with special focus on two districts in the Limpopo Province. Khaile (2012) investigate the technical efficiency of emerging raisin producers at Eksteenskuil in the Northern Cape Province. Ntsonto (2005) assessed the performance of smallholder irrigation schemes focusing on Zanyokwe Irrigation Scheme in the Eastern Cape Province. Perret (2002) and Matungul *et al.* (2001) found even smaller average farm sizes in their study areas. Matungul *et al.* (2001) examined the characteristics of smallholder households in Impendle and Swayimana in rural KwaZulu-Natal and found the average sizes of plots allocated to farmers to be 1.1 ha in

Impendle and 1.8 ha in Swayimana. Perret (2002) compiled a typology of existing irrigation schemes in South Africa and found that the average farm size per beneficiary ranges between 1.3 ha and 1.7 ha. Interesting to note from the above studies is that the small size of farms is not restricted to certain provinces within South Africa. The small size of farms is a typical problem faced by emerging farmers throughout South Africa.

The impact of farm size on the marketing behaviour of smallholder farmers has also been investigated by some authors, including Randela *et al.* (2008) and Masuku *et al.* (2007). They found that the size of land cultivated affects farmers' marketing decisions. Randela *et al.* (2008) found that the size of land significantly influences the degree of market participation of small-scale cotton producers in Mpumalanga. Masuku *et al.* (2001) found that farm size has a significant influence on smallholder maize farmers' choice of marketing channels in Swaziland. Given the small size of land that is available to emerging farmers for production purposes in South Africa, it is understandable that individual farmers struggle to meet the requirements of buyers in the formal market in terms of the consistent supply of a sufficient volume of produce.

- **Insecure property rights**

Within South Africa, a major factor constraining emerging farmers from participating in commercial agri-food chains is centralised around the lack of secure property rights (Ortmann and King, 2010; Baloyi, 2010). Not having formal ownership of their land has some major implications for those farmers who are cultivating the land. Secure land tenure is primary incentive to invest in farm land. Farmers who do not have formal ownership of their land have a disincentive to invest in improvements on the land. The lack of formal ownership of the land also means that the farmers are unable and without any form of incentive to rent unused arable land. Farmers can also not use the land as collateral to obtain credit to buy production inputs (Matungul *et al.*, 2001). Insecure property rights thus may have a substantial constraining impact on the behaviour of emerging farmers from South Africa.

The insecurity in property rights for emerging farmers stem from the political history in South Africa. White governments in the 19th and 20th centuries actively marginalised black farmers through legislation that viewed land to be an asset exclusively controlled by white authorities (Rudman, 2009). Under the apartheid regime black farmers were forced into homelands (Centre for Development and Enterprise (CDE), 2005) where communal land was held in trust for Africans by the South African Bantu Trust. The occupation of land where Trust tenure applies is principally based on the Permission to Occupy (PTO) system (Manona *et al.*, 2010; Weideman, 2004). The

responsibility of land allocation often lies with tribal authorities hence households cannot claim formal ownership of the allocated pieces of land (Matungul *et al.*, 2001).

Although a number of different policies were introduced since 1994 to contribute to securing tenure (Tlou *et al.*, 2006), the issue of insecure tenure remains to be a problem. None of the farmers within the two study areas covered by Matungul *et al.* (2001) had formal ownership of their allocated pieces of land. Khaile (2012) also found that only a few (less than 29%) of the Eksteenskuil raisin producers have the title deeds for the land they cultivate. At Zanyokwe Irrigation Scheme, Ntsonto (2005) found that 44% of the farmers do have freehold tenure of their land. Although this is substantially higher than findings by Matungul *et al.* (2001) and Khaile (2012), it still is low, being less than 50%. Given the insecure property rights that are prevalent among emerging farmers, and the consequences of insecure tenure discussed above, emerging farmers from South Africa face a major uphill battle.

- **Lack of access to credit**

The lack of financial capital is a constraint that is typical of emerging farmers from South Africa and is a major contributor to them being excluded from participating in commercial agri-food chains (Van der Heijden, 2010). Sartorius and Kirsten (2007) argue that small-scale farmers in developing countries who want to produce products that meet the requirements of modern markets need access to a range of production inputs, as well as the necessary financial means to purchase those inputs. A number of studies, however, including those of Baloyi (2010) and Khaile (2012), have found that few emerging farmers from South Africa have access to credit to finance the necessary production inputs. Baloyi (2010) found that few of the farmers from the two study areas in Limpopo Province have access to modern production inputs since they do not have access to credit. Khaile (2012) too, found that few (less than 40%) of the raisin producers from Eksteenskuil have access to credit and hence access to the required production inputs. Khaile (2012) found a positive relationship between access to credit and the level of technical efficiency of the raisin producers at Eksteenskuil. The findings by Khaile (2012) thus confirm the notion that the lack of access to credit contributes to emerging farmers being excluded from participating in commercial agri-food chains due to insufficient production volumes.

The lack of secure property rights thus has a major impact on emerging farmers' ability to participate in competitive commercial agri-food chains. It is important to thoroughly assess the security of property rights when aiming to integrate emerging farmers into competitive commercial agri-food chains.

- **High transaction cost**

One of the major contributors to the exclusion of emerging farmers from participating in commercial agri-food chains is the high levels of transaction cost faced by emerging farmers (Matungul *et al.*, 2001; Wynne and Lyne, 2004; Randela *et al.*, 2008). The role of transaction cost in marketing behaviour has been extensively researched in the last decade as is evident from the review by Ortmann and King (2010). Factors that contribute to higher levels of transaction cost include poor conditions of physical infrastructure, lack of trust among value chain participants, lack of market information, and distance to the market.

- **Poor conditions of physical infrastructure**

A major contributor to the higher levels of transaction cost faced by emerging farmers relate to the poor condition of the physical infrastructure in the rural areas. The road infrastructure (Matungul *et al.*, 2001; Ortmann and King, 2007; Jari and Fraser, 2009; Baloyi, 2010; Van der Heijden, 2010), telecommunication and transport infrastructure (Matungul *et al.*, 2001) in the rural areas typically are in a poor condition. There is usually a lack of access to electricity that is needed to operate coolrooms and packhouses (Van der Heijden, 2010), hence the majority of smallholder farmers do not have access to cold rooms or pack houses to keep harvested produce fresh till it reaches the market (Baloyi, 2010). Lastly, market facilities are often either in a poor condition or even non-existent (Van der Heijden, 2010).

- **Lack of trust among value chain participants**

Another contributor to transaction cost faced by emerging farmers relates to the lack of trust among the actors involved in the transactions within the value chain. Agri-food systems are changing in response to the global forces of globalisation and liberalisation which have led to "new kinds" of consumers and producers (Louw, Kirsten and Madevu, 2005). Van der Heijden (2010) cites Vermeulen *et al.* (2008), who argue that the buyers of agricultural produce can generally be viewed as being objective and neutral market agents who are interested in working with reliable producers to ensure that they meet the requirements of the new kind of consumers. The buyers need to have trust in the ability of the producers to allow them to meet the requirements of the new kind of consumers. The importance of trust in the relationship is also echoed by Albu and Griffith (2006) who state that "mistrust and misunderstanding between actors" are major contributors to the exclusion of small-scale farmers from the markets (van der Heijden, 2010).

The importance of trust in the relationship between sellers and buyers is confirmed by Anseeuw, Van Rooyen, and D'Haese (2002), who found one of the main problems faced by the flower sellers to be the quality and reputation of their flowers, and Randela *et al.* (2008) who found that trust influences the degree to which small-scale cotton farmers participate in the market.

- **Lack of market information**

Lack of access to market information is another cause of the higher levels of transaction cost faced by emerging farmers. Baloyi (2010) indicates that 76% of the farmers he interviewed in the Limpopo Province do not have access to market information, especially information on market prices and seasonal trends in the demand for agricultural products. Respondents also lack information regarding quality requirements for the products, the best times and places to sell their produce, and information on potential buyers for their produce (Baloyi, 2010). As a proxy for transaction cost, De Bruyn *et al.* (2001) found that access to market information has a significant impact on the level to which cattle farmers from Namibia sell meat through the formal market. The decision whether or not smallholder maize farmers sell their maize was found to be influenced by access to agricultural information (Masuku *et al.*, 2001). Similarly, Randela *et al.* (2008) found that access to market information has a statistically significant influence on the degree of market participation by small-scale cotton producers.

- **Distance to the market**

Distant input and product markets are also considered to be major barriers to market access (van der Heijden, 2010). The distance of the farms from the input and product markets also contributes to the high levels of transaction cost faced by emerging farmers (Baloyi, 2010). Especially perishable products such as fresh produce are negatively affected by a large distance from the market, given that smallholder farmers typically do not have access to refrigerated transport facilities to keep the produce in a good quality while being transported to a distant market (Baloyi, 2010). It is, however, not only the producers of perishable products that are influenced by the distance to the market. When investigating the influence of transaction cost on the marketing behaviour of Namibian cattle farmers, De Bruyn *et al.* (2001) found that the greater the distance of the farm from the auction point, the smaller the proportion of cattle sold through the formal market. Masuku *et al.* (2001) found that the transport cost influences the decision of which marketing channel to use by smallholder maize farmers. Since the transport cost depends on the distance to the market, Masuku *et al.* (2001) too, provide evidence that the distance to the market has a major influence on smallholder farmers' use of formal marketing channels.

- **Lack of support**

Given the stringent requirements with regard to the consistent supply of a sufficient volume of good quality produce, it is understandable that there is a major need for support services to assist small-scale farmers to meet the requirements. Anseeuw *et al.* (2000) found that informal street-sellers of cut flowers in Pretoria indicated that the weak support infrastructure is a major problem that they face. Van der Heijden (2010) mentions that case studies show that rural households who have access to markets and the necessary support services have succeeded in producing for the market. The important role played by support structures to assist emerging farmers to meet the stringent requirements is also evident from the body of literature reporting on success stories where emerging farmers are successfully participating in commercial agri-food chains (Weatherspoon and Reardon, 2003; Louw *et al.*, 2006; Denison *et al.*, 2009). Extension as a support service is an important means for linking farmers to the new technology (Baloyi, 2010) that may contribute to them producing higher volumes of good quality produce in order to meet market requirements.

2.1.2.2 Success stories where emerging farmers from South Africa are successfully participating in commercial agri-food chains

Some of the success stories that have been documented include the studies by Hendriks and Lyne (2009), Louw *et al.* (2008), Louw *et al.* (2006), Bediako and Debrah (2007), Ewert *et al.* (2006), and Sartorius and Kirsten (2002).

Hendriks and Lyne (2009) edited a report on a case study that aims to investigate whether or not food security will improve when smallholder access a niche market. The study was conducted with members of the Ezemvelo Farmers' Organisation (EFO) in the Embo community in the KwaZulu-Natal Province of South Africa. They found that fully certified organic farmers earn farm incomes that are more than 175% higher than the income earned by non-organic certified producers in their study area. Ferrer *et al.* (2009) found that certified growers were less risk averse than those farmers who are not certified to produce organic crops. Such a finding suggests that the personal characteristics of the farmer, such as the entrepreneurial skills (that relate very much to the risk attitude of the farmer), may have an important role to play in whether or not he will participate in a high-value market. Chitja *et al.* (2009) found that the smallholders were not well informed with regard to the different types of crops that could be grown organically in that region, the required rate for applying organic fertiliser to maintain soil fertility, composting techniques or natural pest controls. Respondents were also found to be in need of more information about the institutional, governance and contractual arrangements that were adopted

by EFO, and means to improve such arrangements to allow EFO to better serve its members (Stefano *et al.*, 2009). Katundu, Hendriks and Gadzikwa (2009) found that farmers were not informed about the benefits of sequential harvesting of potatoes, although they were well trained in organic production methods. Hendriks and Lyne (2009) conclude that the studies by Chitja *et al.* (2009), Stefano *et al.* (2009) and Katundu *et al.* (2009) all agree that there is a definite need for better teamwork between the farmers, external agents, researchers, and extension staff. Hendriks and Lyne (2009) conclude that there is some evidence that food security has improved by linking the farmers to the high-value market, but they question the sustainability of the project due to institutional, contractual, and organisational flaws. They recommend that EFO should be organised in the form of an investor-owned firm. They also argue for higher level institutional change in order to ensure property rights that may promote an efficient land rental market to allow farmers to increase their land size.

As part of the Regoverning Markets programme, Louw *et al.* (2008) discuss three diverse case studies where small-scale farmers are successfully linked to mainstream agri-food systems in South Africa. The first case study is concerned with tomato processing. Two of the largest tomato processing companies (Giant Foods and Tiger Brands) in the major tomato production region in South Africa (Limpopo and Mpumalanga provinces) procure their tomatoes from local farmers. Giant Foods procures about 60% of its tomatoes from emerging farmers, with the remaining 40% being supplied by two or three large commercial farmers. Giant Foods typically do not have contracts with the emerging farmers and the price depends on the price of tomatoes from China. Tiger Brands works with ECI-Africa to manage the PAL (Promoting Agribusiness Linkages) project funded by USAID. Tiger Food manages the tomato cultivars that are planted by the farmers to secure the flow of tomatoes to the factory. The second case study is concerned with an initiative of the Spar supermarkets in Thohoyandou and Giyani in the Limpopo Province of South Africa (Bienabe and Vermeulen, 2007). The target market of the supermarkets, both in Thohoyandou and Giyani, is low income rural communities. Both stores procure directly from local farmers due to the remoteness of their locations from distribution centres and fresh produce markets. By procuring from the local small-scale farmers, the stores adhere to the corporate strategy of the Spar group. The Giyani Spar provides its suppliers with personalised technical assistance and a flexible interest-free production loan system for technological investment and the purchase of inputs. The case of the Thohoyandou Spar is discussed in more detail below in the case study by Louw *et al.* (2006). The last case study referred to by Louw *et al.* (2008) is that of Thandi Fruit and Wine, which was conducted by Ewert *et al.* (2006). Thandi Fruit and Wine is a partnership between workers, growers, wine and fruit export businesses and the state. According to Louw *et al.* (2008), the Thandi project has "sustained itself for more than ten years in a domestic and international environment with a skewed trade regime and unforgiving competition."

Workers who are involved with the Thandi project, and their families, have acquired shares in a fruit and wine business which can be considered to be successful by normal business standards. Louw *et al.* (2008) argue that the case of the Thandi project shows that ordinary farm workers can become co-owners of a successful commercial agribusiness. It is, however, a complicated and time consuming process that requires "political will, partnerships, capital, know-how, and patience". From the three case studies, Louw *et al.* (2008) conclude that a multi-actor approach is required for the successful integration of emerging farmers into commercial agri-food systems. Louw *et al.* (2008) argue for strengthening of collective activities to reduce transaction cost and increase negotiating power, and sustained capacity building for farmers to enhance their competitiveness.

Research by Louw, Vermeulen, and Madevu (2006) illustrates the potential for successful, mutually beneficial engagement between the commercial sector and small-scale farmers. Their case study is also about the Spar supermarket in Thohoyandou in Venda, which provides a market for the vegetables of small-scale farmers. In addition, it also provides a number of support services to the farmers. The Thohoyandou Spar has a policy that involves the procurement of fresh produce from the surrounding area as far as possible. They also commit themselves to pay a fair, market-related price and they try to build long-term trust relationships with fresh produce suppliers (Louw *et al.*, 2006). The services to emerging farmers include the provision of interest-free production loans of R2 500 to farmers supplying vegetables, upon presentation and approval of a business plan; frequent farm visits by Spar personnel; a requirement of progress reports from the farmers to enable Spar personnel to provide management support; providing technical training and assistance regarding product quality standards; and providing a virtually unlimited and stable market for the farmers' fresh produce based on a verbal contract and involving a very strong trust component. A follow-up interview found that the same model has been replicated at five new Spar outlets. Louw *et al.* (2006) conclude, however, that it is not enough to merely transfer or duplicate the model as a whole. One needs to acknowledge the dynamics of the community and region and then adapt the model accordingly. Thus, the most important finding of their study is that private entities could serve as important facilitators of market entry for the emerging agricultural sector in South Africa.

Bediako and Debrah (2007) report on a sustainable linkage that was developed between emerging farmers from Zanyokwe in the Eastern Cape and one of the major retail stores in South Africa, Pick 'n Pay. The project identified and facilitated the creation of sustainable linkages between farmers and the private sector by using information on the products of small-scale producers, and information regarding the needs of business. By doing that, Bediako and Debrah (2007) argue that they were able to bridge the gap from both ends of the production chain. The

necessary information was obtained from a number of workshops that were organised. In the workshops, Pick 'n Pay outlined the purchase requirements and product standards, and procedures to be followed when contracting the farmers. Farm visits and farmer tours were also organised to expose farmers to commercial vegetable production and selling centres, to learn about production techniques, quality, grades, standards and packaging. The fact that all role-players participated in identifying and facilitating the linkage between the farmers and Pick 'n Pay may be a major contributor to the success story documented by Bediako and Debrah (2007).

Sartorius and Kirsten (2002) report on a case study of small-scale timber farmers in KwaZulu-Natal who are in a contract farming relationship with Sappi-Saiccor. A tree-farming scheme (Project Grow) was launched in 1983 by Sappi Forests which aims to convert rural subsistence farmers into emerging commercial operations. The management of the project, however, has been contracted out to a rural development non-governmental organisation since 1989. According to Sartorius and Kirsten (2002), the Project Grow arrangement provides small-scale farmers with financial assistance, seedlings, technical advice and a guaranteed market for the timber at harvest. Technical advice is provided upon request to the contracted small-scale farmers by Sappi Forest Division. All farmers (both commercial and small-scale) who want to supply timber are obliged to enter into a timber purchasing agreement with Sappi Forests (Pty) Limited. Agreements can be modified to separately specify the conditions related to the financing arrangements. All contracts that are used to govern the relationship between the small-scale farmers and Sappi-Saiccor accommodate communal land tenure and tribal authority requirements (Sartorius and Kirsten, 2002). Sartorius and Kirsten (2002) found that the participants of Project Grow are competitive with other growers of timber. They warn, however, that the fact that small-scale farmers receive free loans and high levels of company inputs make it unlikely that the relationship between the small-scale farmers and Sappi Forest will contribute to developing the emerging farmers into commercial farmers.

Despite the number of stumbling blocks that typically exclude emerging farmers from participating in commercial agri-food chains, the success stories prove that there are cases where emerging farmers are able to overcome the stumbling blocks to participate in commercial agri-food chains. Next some conclusions are drawn from the literature to highlight the implications of the reviewed literature for this research.

2.1.3   *CONCLUSIONS FROM THE LITERATURE ON LINKING EMERGING FARMERS TO MARKETS*

From the literature that investigates ways to link emerging farmers to the mainstream economy it is evident that much of the attention is placed upon identifying the constraints that exclude the

farmers from participating in commercial agri-food chains. The stringent quality requirements that resulted from globalisation and liberalisation are listed as a major barrier to entry. Other stumbling blocks can roughly be grouped under the consequences of institutional failures (i.e. small scale of operations, insecure property rights and the lack of access to credit), high transaction costs (i.e. poor conditions of physical infrastructure, lack of trust among the participant, lack of market information, and the distance from the farms to the market), and the lack of support faced for emerging farmers. Most, if not all, of the documented constraints are expected to also feature in the case study that is reported in this thesis. A comprehensive analysis of the physical and institutional environments within which the farmers operate, and of the attributes of the transactions within which the farmers are to participate, thus are crucial to find potential solutions to overcome such constraints.

The review of success stories from South Africa where emerging farmers are linked to commercial agri-food chains also highlights some interesting findings. There are cases where emerging farmers are participating in contractual relationships with large processing companies. Those farmers thus are in vertically coordinated relationships with their buyers. Transaction Cost Economics (TCE) theory suggests that vertical coordination may contribute to reducing transaction costs (Williamson, 1998). The contractual relationships thus may have assisted the farmers to overcome some of the transaction costs that typically exclude emerging farmers from participating in commercial agri-food chains.

In other success stories emerging farmers supply their produce directly to retail stores, albeit not under contract. It is important to note that in all of the cases the initiative came from the retail stores. Although the corporate strategy of the group to which two of the retail stores belong includes the procurement of produce from local small-scale farmers, the authors also indicate that the distribution centres and fresh produce markets are far from those particular stores. The stores thus do also have a financial incentive to procure from the local small-scale farmers. The success stories thus provide evidence that retail stores may be willing to procure from emerging farmers if the incentives are correctly aligned. In both groups of success stories it is also evident that the (private sector) buyers provide substantial levels of support to the farmers. Ultimately, the produce still needs to meet the stringent quality requirements of the consumers. The success stories thus show that, if incentives are correctly aligned, private sector firms are willing to procure from emerging farmers, and also to provide them with the necessary support. Once the buyers commit to procure from the emerging farmers, they have a vested interest in the quality of the produce since poor quality produce may ultimately damage their brands. Thus, it is important to assess the potential relationships between the farmers and major buyers in the chains to identify incentives that may convince the buyers to procure from the farmers.

Importantly Louw *et al.* (2006) acknowledges that the dynamics of different communities and regions mean that the same model cannot be merely replicated in other regions. Especially in a country such as South Africa with such a large number of indigenous groups, it is crucial that the social dynamics within the groups are considered before implementing initiatives that aim to link emerging farmers to commercial agri-food chains.

Based on the review of the literature on linking emerging farmers to commercial agri-food chains it is evident that the conceptual framework has to address the major stumbling blocks that typically exclude emerging farmers from commercial agri-food chains, as well as the success factors that contributed to the farmers in the success stories overcoming the stumbling blocks. The framework thus has to consider the quality requirements of the agri-food chain under consideration, the institutions that determine the incentive structure for the farmers in the chain, the characteristics of the transaction within which the farmers participate that contribute to high transaction costs, and the support structures that are available to assist emerging farmers in overcoming the stumbling blocks. Special emphasis is required with regard to the social, physical and institutional environment within which the value chain functions, the nature of the relationships between the farmers and their buyers, and support structures that are available to support the farmers to overcome the challenges they face in their environment. The conceptual framework is developed next that will be used to analyse the value chains within which the emerging farmers are operating.

2.2 DEVELOPMENT OF THE INTEGRATED VALUE CHAIN AND NEW INSTITUTIONAL ECONOMICS (NIE) – STRUCTURE-CONDUCT-PERFORMANCE (SCP) FRAMEWORK

Much of the research on value chain analysis considers only those actors who are directly involved with moving the physical product from the input suppliers to the end consumer. Roduner (2007) argues for a systemic view of value chains that integrates three important levels within a value chain network, namely, value chain players, influencers and supporters. A systemic view of the value chain allows for the discovery of opportunities and bottlenecks within these levels, as well as in the dynamic interactions between the levels. The actors who are directly involved with transforming the physical product into the final product are called the **value chain players**. For the purpose of this research the relationships between the value chain players, especially between the farmers and their buyers, are crucially important. The value chain players do not operate in isolation, however. There are a number of rules and regulations that have to be complied with when operating within a value chain. Roduner (2007) calls those rules and regulations **value chain influencers**. Value chain influencers influence the operations within the

chain by providing the regulatory and administrative conditions that have to be met by all players within the value chain. The impact of the lack of trust among transacting partners, and the role of the poor condition of physical infrastructure (i.e. road networks) as entry barriers for emerging farmers, show that the value chain players are also influenced by the social and physical environments within which they operate. The concept of value chain influencers as used by Roduner (2007) thus should be extended to also consider the social and physical environments within which the farmers operate. The last level is called the **value chain supporters**. These include all actors responsible for providing information, training and support to the value chain players. The value chain supporters have the responsibility to support the value chain players to operate in such a manner that they meet all the rules and regulations specified by the influencers. The approach followed by Roduner (2007) thus provides a holistic view of the value chain under consideration. Rather than focusing only on the processes by which inputs are transformed into the final product, it considers all factors that influence the way the value chain players operate within the chain, and also all the support services that are available to allow value chain players to operate in such a way as to keep the value chain competitive.

Given the scope of analysis that is required for the purpose of this study, the integrated New Institutional Economics (NIE) and Structure-Conduct-Performance (SCP) framework (Milagrosa, 2007a) is integrated into the value chain framework of Roduner (2007) to allow for a comprehensive analysis of all three levels of the value chain. The contribution of the integrated NIE-SCP approach lies therein that it allows the theoretical examination of society on four interrelated levels (the social embeddedness level, institutional environment, governance structures and resource allocation) and then also the appropriate evaluation at the lower three levels using the structure-conduct-performance analysis framework, which is more of an applied approach. Milagrosa (2007a) argues that there are strong similarities between the two frameworks, but that the differences allow for the two approaches to supplement each other at points where the other method is deficient. The high degree of similarity and complementarity between the two frameworks contributes to the integrated NIE-SCP approach giving much more depth when assessing behaviour within the value chain. By integrating the NIE-SCP framework into the value chain framework an in-depth analysis of all three levels of the value chain is ensured. The new integrated framework is presented in Figure 2.1 and is used as the conceptual framework to analyse the agri-food chains within which the emerging farmers are operating.

Figure 2.1 shows that the value chain influencers in the new integrated framework consist of the social environment (social embeddedness of NIE), the physical environment (structure of SCP), and the institutional environment (of NIE). From the NIE-SCP framework, the downward arrow from the social embeddedness level to the structure and institutional environment represents the

constraints that are imposed from the higher level on the lower level. The existing social environment thus imposes constraints on the institutional and physical environments within which the different role-players operate. The upward arrow in turn represents the feedback from the lower level to the upper level. In the long run the physical and institutional environments thus may influence the social environment through feedback (Milgrosa, 2007).
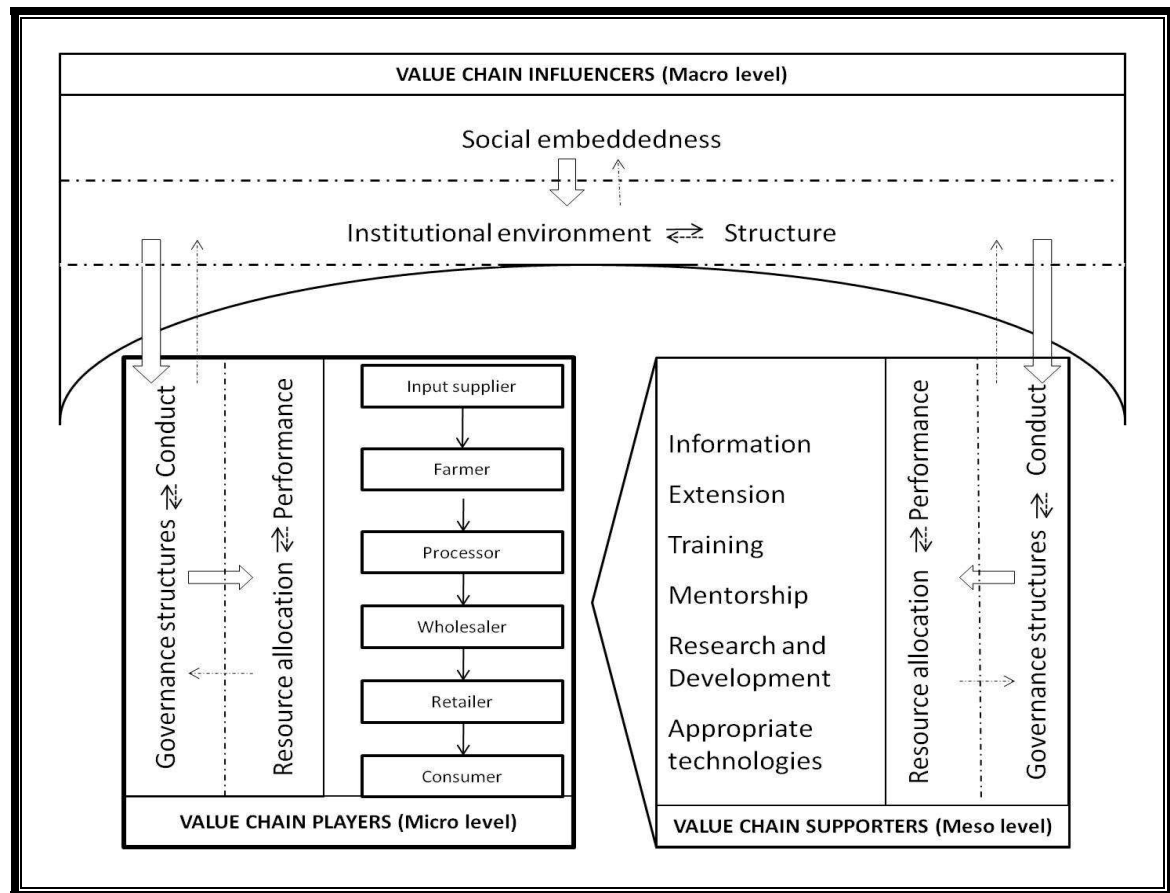
Figure 2.1:   Conceptual framework for the analysis of agri-food value chains

Figure 2.1 also shows that the level in the integrated framework that is concerned with conduct (of SCP) and governance structures (of NIE) again is influenced by constraints that are imposed by the physical (structure) and institutional environments. Moreover, it is important to note that the value chain influencers provide the environment within which both the value chain players and the support structures have to operate. Figure 2.1 thus shows that the physical and institutional environment also influence the behaviour (conduct and governance structures) of the support structures. The conceptual framework thus also allows for a comprehensive analysis of the behaviour and performance of the support structures. For the purpose of this study, however, the behaviour of the supporters is only considered to the extent of their behaviour in support of the farmers under consideration.

Lastly, the behaviour (conduct and governance structures) of the value chain players and supporters has a direct influence on their performance (of SCP) and the way they allocate their resources. The dynamic nature of the integrated NIE-SCP framework also allow for feedback from the performance of the value chain players and supporters to have an influence on the behaviour (conduct and governance structures), and indirectly on the physical, institutional and social environment within which they operate. The strengths of the NIE-SCP framework and the value chain framework thus complement each other very well to allow for a comprehensive analysis of the agri-food chains under consideration.

Next the respective components of the integrated NIE-SCP framework are discussed in more detail.

2.2.1 *SOCIAL EMBEDDEDNESS (LEVEL 1 OF NIE)*

Social embeddedness is located at the highest level and refers to customs, traditions, and societal norms (Williamson, 2000). Changes in social embeddedness occur at rates of centuries to millennia, and consequently the level of social embeddedness often is taken as a given by economists (Williamson, 1998). The concept of social embeddedness has been advanced, however, to explain why informal constraints have such a major influence upon the long term character of economies (Granovetter, 1985, as cited by Williamson, 2000). Putnam (1993) also states that economists are increasingly interested in the role of culture as an explanation for why some countries or regions are rich and others remain poor.

The level of social embeddedness can be analysed using social capital theory (Williamson, 2000; Milagrosa and Slangen, 2005). Social capital consists of observable but non-contractual elements such as trust, shared norms and social networks (Slangen, 2005 as cited by Milagrosa, 2007a). Putnam (1993) defines social capital as being "features of social organisation (for example trust, norms and networks) that can improve societal efficiency by facilitating coordinated action". Other elements also include volunteerism, reciprocity, associatedness, formal and informal organisation, traditions and beliefs. Of all of these elements of social capital, trust is argued to be the most important, since trust can make people go beyond the requirements of the contract, through early delivery, higher quality or some other means, to support their good intentions and sustain trust (Milagrosa and Slangen, 2005).

From the literature, there is ample evidence to prove the significance of social capital. It is acknowledged that social capital is an important factor behind economic development (Beugelsdijk and Schaik, 2001), since trust, norms and networks "[boost] economic and

institutional machinery" (Putnam, 1993). It has also been argued that long-term economic development efforts hinge strongly on the levels of national, regional or local social capital (Ostrohm and Ahn, 2001, as cited by Milagrosa and Slangen, 2005). The acknowledgement of the importance of social capital is complemented by research that shows that social networks influence economic performance and general productivity. Putnam (1993) found that social capital has a major influence on horizontal networks, which in turn were found to play a major role in economic growth in Northern Italy. Chuzu (2005) cites Maluccio, Haddad and May (1999), who specify three mechanisms whereby household welfare might be affected by group activity. Firstly, group activity may reduce transaction costs by improving the flow of important information, such as new opportunities or threats, from one member to the next. Group activity may also promote consultative decision making and collective action. Lastly, group activity contributes to "the fostering of time-sensitive exchanges for mutual benefit by developing norms of civil behaviour, trust, and reputation dissemination." According to Murray (2005), there is also a reciprocal relationship between participation in group activities and trust. The more people participate in their communities, the more they learn to trust each other. Again, the more people trust each other, the more they are likely to participate in group activities. The reciprocal relationship shows the importance of using group activity continuously to increase social capital levels in order to benefit economic development.

2.2.2 INSTITUTIONAL ENVIRONMENT AND STRUCTURE

2.2.2.1 Institutional environment (Level 2 of NIE)

The second level of the NIE framework comprises the institutional environment and refers to all of the formal rules and informal constraints that regulate the way transactions are carried out (Williamson, 2000). Changes within the institutional environment occur at the slow rate of 10 years to a century (Williamson, 1998).

Institutions are "humanly devised constraints that structure human interaction" (North, 1994:1). The importance of the institutional environment lies around the fact that "institutions form the incentive structure of a society, and the political and economic institutions, in consequence, are the underlying determinants of economic performance" (North, 1994). Institutions therefore play a significant role in shaping events at the downstream levels of governance and resource allocation.

Good institutions and good governance structures contain efficient information transfer mechanisms, which result in better informed decisions among parties involved. Good institutions

thus create a more favourable environment, which supports economic growth. As argued by Milagrosa (2007a:24) "Economic development and good institutions are mutually occurring reciprocal phenomena. On the one hand, economically developed areas demand for and contribute to good institutions. On the other hand, a good institution creates economic development."

Formal rules and regulations

The institutional environment contains the formal rules and informal constraints that regulate the way transactions are conducted (Williamson, 2000). Actors involved in the production and marketing of agricultural products need protection against opportunistic behaviour. The types of protection mechanisms and the manner in which government arranges those mechanisms are translated into the formal rules of the institutional environment (Milagrosa, 2007a). The formal rules include, amongst others, constitutions, laws, and other rules (North, 1994). The rules in the institutional environment aim to facilitate economic transactions and have to be respected by all actors in the market (Hai, 2003). The formal rules have the purpose to ensure that transactions are conducted in an efficient manner from society's point of view. These formal rules and regulations are nowadays even more important than ever since more agricultural producers are linked to consumers and corporations of the rich nations. Those consumers not only demand choice, they also want quality, consistency and value (Kherallah and Kirsten, 2002). In order to supply agricultural produce to such buyers, producers have to meet the requirements specified in the formal rules and regulations at the institutional level.

As formal rules, property rights have a major influence on the way transactions are conducted. Slangen, Van Kooten and Suchánek (2004) argue that property rights over land and water are probably the most important formal rules in agriculture. The importance of property rights centres around the fact that externalities can be internalised if property rights are well-established (Coase, 1937). Property rights refer to formal and informal rules that determine access to assets, both tangible (i.e. land, water, buildings, etc.) and intangible (i.e. contract rights, patents, etc.), and also the way those assets can be used (Herrera, 2005). The property rights give the holder of those rights the right to derive value from the asset by using it as he sees fit, to exclude others from using the asset, and to transfer the ownership of the asset to another party. Property rights thus give the holder of the rights an incentive to invest in the underlying asset.

The incentive embedded in property rights depends on the level of individualisation of ownership of the property right. The individualisation of ownership of the property rights can be expressed along a spectrum (Herrera, 2005). Open access refers to the absence of exclusive rights (anyone

can use the resource as he likes) and lies at the one end of the spectrum. The other end of the spectrum is private property, which gives the holder exclusive decision-making power. Between private property and open access, there are also common property and state property. Common property refers to the situation where a collective entity (e.g. a co-operative group) owns the decision-making power, while state property refers to the situation where the government has the decision-making power (Herrera, 2005). Herrera (2005) argues that the lack of individual decision-making power serves as a disincentive for an individual to invest in the underlying asset. Within the South African context, the rules and regulations associated with the land tenure systems that apply at smallholder irrigation schemes are crucially important.

Formal rules and regulations associated with land tenure in South Africa

Most of the institutions that influence the behaviour of farmers in terms of land tenure relate to the land reform programme that was implemented by the first government of the new democratic South Africa in 1994. Understanding the history of legislation for land tenure in South Africa is important to understand the dynamics of land tenure that currently exist for emerging farmers from South Africa. Land reform is a vital political issue in South Africa (CDE, 2005). In order to understand the institutions that relate to land tenure, one has to consider the historical context within which the institutions were established. The 19th century saw white colonial and settler governments depriving black (non-white) Africans of control of vast areas of land. During the first half of the 20th century the process of marginalisation continued with white governments aiming to destroy independent African farming communities in order to favour white commercial farmers. The 20th century also saw the apartheid regime forcing millions of Africans into overcrowded "homelands" (CDE, 2005). During the colonial and apartheid rule, land was regarded as an asset exclusively controlled by the white authorities (Rudman, 2009). The above was achieved through legislation such as the Natives Land Act of 1913, the 1936 Natives Trust and Land Act, and the Group Areas Act of 1950 (CDE, 2005).

The Natives Trust and Land Act of 1936 legislated that the land be held in "trust" for Africans by the South African Bantu Trust (later the South African Development Trust (SADT)). The different systems of land tenure in the SADT areas include ownership and deeds of grant, leasehold, Permission to Occupy (PTO) Certificates, building permits and trading permits. However, the occupation of land where Trust tenure applied was principally based on the PTO system (Manona *et al.*, 2010; Weideman, 2004). After the promulgation of the Bantu Authorities Act of 1951, traditional leaders played a major role in terms of land allocation (Ntsebetza, 1999). The process of issuing PTO certificates started with the chief and headmen allocating land, where after agricultural officers surveyed the boundaries of sites and fields, before the magistrate allocated

the PTO certificate. Registers of permit holders were to be kept at the magistrates' offices (Cousins, 2008). Thus, although the headmen or tribal councils were directly involved in the land allocation process, the allocation was not valid until the commissioner issued a PTO certificate (Smith, 2008). According to Ntsebetza (1999), the holder of a PTO agreement was guaranteed permanent occupation of the land, but was still vulnerable. Cousins (2008) explains that the security of individual rights in communal systems was weakened in several ways under apartheid. Some of the ways through which individual rights were weakened include "a one-man-one-lot requirement, restrictions on plot size, a rigid system of male primogeniture to govern inheritance, and non-recognition of women's land rights" (Cousins, 2008). In terms of regulations, PTO's cannot be sold and are not inheritable. It can only be issued to men, or to elderly widow of a male holder (Cousins, 2008). Since government was the nominal owner of the land (Ntsebetza, 1999), officials were given extensive powers to appropriate land and to cancel PTOs (Cousins, 2008). Such insecurity contributed to financial organisations not recognising PTOs as collateral for formal credit (Ntsebetza, 1999). Interestingly, the pre-1994 system of issuing PTO certificates is still in place in some areas and provinces within South Africa (Cousins, 2008).

Since the 1990s, a number of policies were introduced aimed at overcoming the racial imbalance that was caused by the historical marginalisation of black Africans. Hall (2010) describes two distinct cycles of land policy in South Africa since the 1990's. The first cycle range from 1990 to 1997 and "embraced much more explicitly a language of radical restructuring and transformation of class relations, [but] it lacked any real provisions to realise this vision" (Hall, 2010). Within the second cycle (1998 to 2004), the vision shifted towards deracialising of the existing commercial farming sector, through the settlement of a new black capitalist farming class.

The first cycle of land policy started with the removal of the ban on the African National Congress (ANC). In the period between 1990 and 1994 proposals for land reform were highly disparate, but were brought together under a unified policy through years of negotiations (Hall, 2010). In 1994, a land reform programme was implemented in South Africa in order to redress the racial imbalance in ownership of land, and to secure the land rights of the previously marginalised groups of people. The legal basis for land reform is set out in the Bill of Rights in the Constitution of the Republic of South Africa (Lahiff, 2002). The land reform programme was pursued through four processes, namely restitution, redistribution, tenure reform, and by providing funding and other resources to support the emergence of black farmers. More specifically, restitution refers to the returning of land to people who were dispossessed under apartheid, or providing a cash equivalent to those people (CDE, 2008). The legal basis for restitution was created under the Restitutions of Land Rights Act (Act 22 of 1994) (Lahiff, 2002). According to the Restitution Act, a person has the right to restitution if he/she, or a direct descendant to the entitled person, was

dispossessed of a right in land after the 19th of June 1913 (the specific date of the enactment of the Land Act of 1913) (Rudman, 2009).

Redistribution refers to the transfer of land to the landless poor, labour tenants, farm workers and emerging farmers. Such land can be used for residential and/or productive purposes that will contribute to improve the livelihoods of the beneficiaries. Lahiff (2002) notes that, until 2001, land redistribution have mainly been achieved through the provision of the Settlement/Land Acquisition Grant (SLAG). The focus of SLAG was on the poor with only households with a monthly income of less than R1 500 qualifying for the grant. Since 2001, however, a new programme was introduced that aimed at promoting commercial-oriented agriculture. The new programme, Land Redistribution for Agricultural Development (LRAD), requires from applicants to make an own contribution of at least R5 000 to qualify for grants between R20 000 and R100 000 (Lahiff, 2002). The LRAD programme thus removed the income ceiling that excluded the more well-off black households from benefitting from land redistribution (Hall, 2010). According to Lahiff (2002), the Provision of Certain Land for Settlement Act (Act 126 of 1993) remains to be the legal basis for land redistribution. The Act was amended in 1998 and is now titled the Provision of Land and Assistance Act.

Tenure reform refers to the modernising of land tenure rules and access to land ownerships (CDE, 2008). According to CDE (2008), tenure reform is a constitutional obligation since the constitution states that a person or community who has legally insecure tenure due to past racially discriminatory laws or practices, is entitled to tenure that is legally secure, or to comparable redress. The aim of farm tenure reform is to balance the rights and interests of land owners and occupiers (Cousins and Hall, 2011). The first legislative component of tenure reform is the Upgrading of Land Tenure Rights Act (Act 112 of 1991) (as amended). The Act provides for the conversion of informal land rights into formal ownership rights (title deeds or deeds of grant) (Lahiff, 2002). During the period between 1994 and 1998, tenure reform focussed mainly on securing the rights of labour tenants and farm workers, and to create a new form of legal entity for holding land in common (Cousins and Claassens, 2004). The period saw an active pursued by government to establish laws and programmes to achieve the above outcomes. The key tenure legislation since 1994 include the Land Reform (Labour Tenants) Act (Act 3 of 1996), Communal Property Association (CPA) Act (Act 28 of 1996), Interim Protection of Informal Land rights Act (Act 31 of 1996), Extension of Security of Tenure Act (ESTA) (Act 62 of 1997), and The Transfer of Certain Rural Areas Act (Act 94 of 1998) (Cousins and Claassens, 2004).

The Land Reform (Labour Tenants) Act and the Extension of Security of Tenure Act were passed to implement tenure reform in commercial farming areas (CDE, 2008). The Land Reform (Labour

Tenants) Act regulates tenancy terms for those who have historically worked on farms in return for access to their own land for the purpose of using it for agricultural activities. The Act affirms the rights of such labour tenants to continue to use the land, and also specifies the procedures through which such rights can be legally terminated (Cousins and Hall, 2011). The Act also provides a claims process that can be used by labour tenants to acquire full ownership of the land they occupy (CDE, 2008). In essence, the Land Reform (Labour Tenants) Act thus protects the land rights of labour tenants on privately-owned farms (Cousins and Claassens, 2004). The aim of the Extension of Security of Tenure Act (ESTA) is to protect dwellers on privately owned land against arbitrary eviction. The Act also allows for farm workers to upgrade their rights over such land from tenancy to freehold (CDE, 2008) through mechanisms for the acquisition of long-term tenure security (Cousins and Claassens, 2004).

The Communal Property Associations Act is the result of the fact that government wanted to enable the communities that would have their land claims granted, to have the opportunity to assume legal personality, and co-owning and managing the restituted land (Rudman, 2009). The CPA Act provides for the establishment of a Communal Property Association (CPA) as a legal land holding entity (Ntsebeza, 1999). Rudmann (2009) argues that the establishment of a CPA "instituted a way of formalising customary rights in land held by groups under the informal system of customary tenure mainly after receiving land titles under the Restitution Act". In terms of the CPA Act, the CPA has all the rights and full private ownership of the land (Cousins and Hall, 2011). The primary intension of CPAs was to be used by beneficiaries of land restitution and redistribution programmes, as an alternative to the commonly used trusts. The reason for searching for an alternative to trusts is that the trustees of a trust have too much control compared to the members of the land-holding group (Cousins and Hall, 2011). The CPA Act does not prescribe the rules and procedures for decision-making and land allocation, nor the manner in which the CPA Committee should be constituted. The majority of the membership of the CPA must decide on land allocation. The only condition is that the legal entity must conform to the requirements of the Bill of Rights in the Constitution of the Republic of South Africa (Ntsebeza, 1999).

The Interim Protection of Informal Land Rights Act was intended as a temporary measure to secure the rights of people who are occupying land without any formal documentary rights, pending the introduction of more comprehensive reform (Cousins and Claassens, 2004). Cousins and Claassens (2004) continue stating that the Act has been extended annually since legislation for more comprehensive reform has not yet been introduced. The Transformation of Certain Rural Areas Act provides for the repeal of the Rural Areas Act 9 of 1987 that applied to coloured reserves in the Western Cape, Northern Cape, Eastern Cape, and the Free State (Lahiff, 2002).

The primary aim of the Act is to deal with the control of commonage land and to provide for the transfer of township land to a municipality (Cousins and Claassens, 2004).

According to Cousins and Claassens (2004) the focus of attention after 1998 has been a new law to provide improved security of tenure in communal systems. The change in focus of attention corresponds to the start of the second cycle of land policy-making as described by Hall (2010). In 1998, the drafting of the Land Rights Bill (LRB) was initiated in an attempt to embody the principles of tenure reform that was set out in the White Paper of Land Policy of 1997. Within the LRB, the land rights were vested in the members of group systems, rather than in legal entities, the chieftaincy or tribal authorities. The members of the group had the right to choose what organisation should manage and administer the land rights on their behalf. While the paradigm underlying the LRB was to transfer the ownership to the rightful owners, inherent difficulties hampered the transfer of the ownership. A key question in this regard was to define the unit of ownership in communal areas to determine whether the ownership should be transferred to tribes, nations, wards, villages, or to groups at tribal authority level. The unit of ownership have a major impact on the ability of different groups within the bigger group to influence decision-making with regard to the land. Cousins and Claassens (2004) argue that these questions derive from the nested and hierarchical nature of land rights in communal systems. Consequently, the LRB of 1999 did not adopt a paradigm of transferring the title. Rather, the drafters of the LRB moved towards a paradigm based on statutory rights which are secure rights but do not convey full ownership. The Minister of Land Affairs would continue to be the nominal owner of the land, albeit with strictly delimited powers. The holders of the rights would be the key decision makers with regard to the land and they would derive the full benefit from using the land. The rights would vest in the individuals who use or occupy the land, or who have access to the land. However, within group systems, these rights would be subject to those shared with others in the group. Individual rights thus would be relative to "group rights" as decided upon by the majority of the members of the group (Cousins and Claassens, 2004).

A new Minister of Agriculture and Land Affairs was elected in June 1999 who viewed the LRB to be too complex and costly to implement, and that it assumed that the state would protect the people's rights on their behalf. Consequently all work on the LRB was stopped. Instead, a Communal Land Rights Bill was drafted that appeared to privilege traditional leaders. The Bill allowed traditional communities operating under customary law, as well as authorised representatives (chiefs), to be recognised as juristic persons for the transfer of state land in full ownership. After a number of debates on earlier drafts of the Bill with regard to, amongst others, the power of traditional authorities, and the inadequate security of women's rights, some amendments were made and the Act was passed in 2004 as the Communal Land Rights Act (Act

11 of 2004) (CLARA) (Cousins and Claassens, 2004). The overall objective of the Act is to secure tenure by transferring land to communities and converting "old order rights" to "new order rights" (Smith, 2008). It is noted, however, that the Act was never actually promulgated due to the controversial content, especially with regard to the administrative structure set up under it (Rudman, 2009). In order to address the question of the power of traditional authorities, the final version of the law contains a definition of "land administration committee" without specifying that the committee will be the traditional council whenever such a council exists. An earlier draft specified that, in cases where traditional councils exist, such councils will perform the function of the land administration committee. Cousins and Claassens (2004), however, argue that, the fact that the final version of the law does not specify clearly that an alternative structure (i.e. an elected committee) may administer the land, it is open to competing interpretations. Rudman (2009) too argues that the way in which the two relevant sections (Section 21 subsection 2 and Section 22 subsection 2) are written in CLARA may imply that the traditional leaders will have the right to govern the communal land if such a council of traditional leaders exist in the specific community. In order to address the question of women's rights, one amendment provides that "old order rights" are deemed to be held by all spouses in the marriage rather than by the husband alone. No provision, however, was made for single women (widows, or unmarried women), and no requirement was included that land administration committees should allocate land to women on the same basis as men (Cousins and Claassens, 2004). Rudman (2009) also indicates that, if the land is governed by a land administration committee (i.e. if there is no traditional council as spelled out in section 21(2) of the Act), CLARA provides that only one third of the total membership of the committee has to consist of women, instead of a "fifty percent rule" which would have implied sincere protection of women's rights.

Given the above mentioned concerns, CLARA remained to be controversial. Claassens and Cousins (2008) edited a book that comprehensively assesses the Act in terms of the controversies. All of the authors were critical to the core provisions of the law and argued that such provisions will exacerbate, rather than reduce, tenure insecurity. The validity of CLARA was also challenged in 2006 in a case in the North Gauteng High Court (the High Court). The applicants argued, amongst others, that by giving traditional leaders undemocratic and unprecedented powers, CLARA actually undermines security of tenure; that CLARA allows traditional councils (that are not democratically elected) to become land administrators and sell land with the permission of the land rights board; and that CLARA therefore will make the tenure of the majority of women in the former homelands more insecure (Rudman, 2009). In October 2009 the High Court declared various provisions of CLARA invalid. It was judged that section 21(2) of CLARA infringes on the right of equality as set out in the constitution. The judge argued that some of the existing traditional councils had not been elected democratically, and the interest

of women may not be represented in such a council (Rudman, 2009). The High Court, however, failed to declare CLARA invalid for failure to enact it in accordance with the correct procedure. On 11 May 2010, however, the Constitutional Court judged CLARA to be unconstitutional and invalid in its entirety for failing to comply with the procedures for enactment as set out in the Constitution. Given that the CLARA was judged invalid and unconstitutional in its entirety, the judge indicated that it is unnecessary to consider whether its provisions are consistent with the Constitution (Constitutional Court of South Africa, 2010).

It is within this legislative backdrop that land tenure systems currently apply on smallholder irrigation schemes in South Africa. Given that secure tenure is a crucial condition for economic development (Weideman, 2004), the understanding of the degree of security of tenure associated with the different tenure systems that apply at the respective case studies is crucial to really understand the institutional environment within which the farmers operate.

Laws related to production and marketing of agricultural products

Other significant policies that have been enacted into laws by the South African government since 1994 include the Marketing Act of 1996; and the National Water Act of 1998 (Mbatha, 2007). The objectives of the new laws were to promote efficiency and development in agriculture, redistributing agricultural resources, and the efficient management of environmental water. Compared to the difficulty in obtaining information on property rights and land tenure, documents containing information on the regulations that relate to the production and marketing of agricultural products are easier to access since most of it is available for public viewing.

The Marketing of Agricultural Products Act (Act no 47 of 1996) specifically has the political aim to increase market access to all participants, to promote efficiency of marketing products, to optimise export earnings from agricultural products and to enhance the viability of the agricultural sector. The National Water Act (Act no 36 of 1998) again makes provision for the establishment of catchment management agencies and water users associations to manage water resources at basin-level. While the government still remains the custodian of the water resources in South Africa a lot of the regulatory functions have been transferred to these institutions. In terms of the act, water rights are granted in the form of user rights rather than being based on the existence of land rights.

Another act that was promulgated relates more to emerging farmers in South Africa. The Land and Agricultural Development Bank Act (Act No. 15, 2002) was promulgated to facilitate access to rural finance for emerging farmers by altering the mandate of Land Bank to provide services to

emerging farmers who were previously excluded. All of these formal rules and regulations have an impact on the way agricultural production and marketing is conducted in South Africa. Other industry specific formal rules and regulations may be applicable and should also be identified and included in such an analysis.

Informal institutions

The informal constraints of the institutional environment include norms of behaviour, conventions, self-imposed codes of conduct (North, 1994), and non-political, non-economic and unwritten conventions such as taboos and traditions (Milagrosa, 2007a). These aspects are also embraced within the context of social capital.

2.2.2.2 Structure (Level 1 of SCP)

Structure refers to the characteristics of the market or industry that have a strategic influence on the nature of competition and pricing within the market (Allen, Reeves and Mumma, 1999). The structure component of the SCP can be separated into farm-structure and market structure.

Farm structure refers to the physical characteristics of the region, the distribution of land within the region, and also land ownership and tenure (Milagrosa, 2007a). The characteristics of the region that are of importance include the specific location, its topography, the size of the population in the region, the proportion of the population involved in agriculture, the main crops produced in the region, and the total land area in the region. Land distribution is concerned with the number of farmers in the region, the average size of farms and also the distribution of farm sizes. Finally, farm structure is concerned with the different systems of land ownership and tenure that exist in the region under consideration. The number of farms related to the respective tenure systems, as well as the distribution of land under the respective tenure systems, are of importance (Milagrosa, 2007a).

Market structure is generally concerned with the characteristics of the organisation of a market which seem to influence strategically the nature of the competition and pricing within the market (Bain, 1951). Hai (2003) considers the degree of market concentration, the degree of product differentiation, the existence of entry and exit barriers, and the distribution of power when assessing market structure. When assessing market structure, CAET (2001) considers the different types of markets that are available, the different marketing channels, and all the actors who are involved in moving the physical product from the farm to the final consumer. Milagrosa

(2007a) also considers the location of the input and product markets, the market infrastructure, and the availability and condition of road networks to and from the farms.

According to the developed conceptual framework, the farm and market structure is also influenced by rules and regulations that are included in the institutional environment of the NIE-component in the framework.

2.2.3 GOVERNANCE STRUCTURES AND CONDUCT

2.2.3.1 Governance structures (Level 3 of NIE)

The third level of the NIE framework is concerned with governance structures and is often also referred to as the "play – or organisation – of the game" (Milagrosa, 2007a). Again it is important to note that the conceptual framework allows for assessing the governance structures that are used to enforce the rules and regulations for the value chain players, but also for the support structures at a meso level. For the purpose of this study, however, the focus of attention is only on the governance structures associated with the transaction between the raisin producers from Eksteenskuil and SAD.

Governance structures refer to the way in which a transaction is organised within the rules and regulations as defined by the institutional environment. Williamson (1998) notes that "the concept of governance is precisely responsive to the triple to which Commons (1932) referred" since "governance is the means by which *order* is accomplished in a relation in which potential *conflict* threatens to undo or upset opportunities to realize *mutual* gains." Governance structures can best be described along a spectrum (Shelanski and Klein, 1995). Three types of governance structures are generally distinguished (Williamson, 1985). At the one end of the spectrum lies a purely anonymous spot market, while the other end of the spectrum consists of hierarchy or vertical integration. Between those two modes of governance lies a variety of hybrid modes such as contracts and partial ownership (Williamson, 1985; Shelanski and Klein, 1995; Peterson, Wysocki and Harsh, 2001). Figure 2.2 presents the spectrum of governance structures (Peterson *et al.*, 2001).

Within the spot market as a mode of governance, the market price provides incentives for the exploitation of profit opportunities. Individuals can quickly and autonomously respond to market signals. The market typically will be the efficient mode of governance when the underlying transaction is concerned with low levels of asset specificity (Williamson, 1985; Shelanski and Klein, 1995). Shelanski and Klein (1995) argue that bilateral coordination or even joined

ownership may be more desirable whenever more specialised assets are at stake in the transaction, or in the presence of thin product and input markets. Hierarchy, otherwise referred to as vertical integration, refers to the situation where trading parties are under unified ownership or control. The level of asset specificity plays a major role in the decision whether or not to integrate vertically. The higher the level of asset specificity, the higher is the need for vertical integration.

| Spot/cash market | Specifications contract | Relation-based Alliance | Equity-based Alliance | Vertical Integration |

Characteristics of "Invisible-Hand" Coordination

Self interest
Short-term relationship
Opportunism
Limited information sharing
Flexibility
Independence

Mutual interest
Long-term relationship
Shared benefits
Open information sharing
Stability
Interdependence

Characteristics of "Managed" Coordination

Figure 2.2: The continuum representing the respective strategic options for vertical coordination

Source: Peterson *et al.* (2001)

Note: The diagonal line represents the mix of invisible-hand and managed coordination characteristics found in each of the five alternative strategies for vertical coordination. The area above the diagonal indicates the relative level of invisible-hand characteristics and the area below the diagonal indicates the relative level of managed characteristics.

There are hybrid forms of organisation that deal with bilateral dependency without going so far as vertical integration. Ownership autonomy is preserved, although there are some safeguards to protect parties from opportunistic behaviour by other parties. Peterson *et al.* (2001) provide a thorough discussion of the different hybrid modes of coordination along the continuum. Specification contracts are legally enforceable establishments of specific and detailed conditions of exchange. Within relation-based alliances the firms involved in the relationship share risks and benefits that emanate from mutually identified objectives. Peterson *et al.* (2001) cite Martin *et al.* (1993), who argue that a strategic alliance is relation-based if parties mutually identify objectives, mutually control the decision-making process and mutually share the risks and benefits. The next level of vertical coordination is referred to as equity-based alliances. Equity-based alliances differ

from relation-based alliances through the presence of a formal organisation that has an identity distinct from the exchange actors, and that is designed to be their joint agent in the conduct of the transaction. The different types of hybrid governance structures differ mainly in terms of the intensity of control, which increases the further you move to the right in Figure 2.2.

The number of different modes by which a transaction can be organised emphasises the need to thoroughly assess the different modes of governance in order to identify the most efficient governance structure for the specific transaction under consideration.

2.2.3.2 Conduct (Level 2 of SCP)

Conduct refers to the behaviour of the agents within the farm and market structure. Conduct, again, can be divided into production and marketing conduct (Milagrosa, 2007a). Production conduct is concerned with the cropping practices of the producers under consideration, the farming techniques used, and the sources and availability of credit to those producers (Milagrosa, 2007a). Although the conceptual framework also allows for a comprehensive analysis of the conduct of the support structures, the conduct of the support structures is only considered to the extent to which it influences the behaviour of the farmers from Eksteenskuil.

Market conduct, on the other hand, refers to "the set of competitive strategies that a trader or a group of traders use to run their businesses" (Hai, 2003:17). When assessing marketing conduct, the aspects to be considered include the sources and availability of market information, the method of price formation, investment in new technology, research and development of new products, investment in technical training and services, the level of competition in the market, the types of contracts that are employed, and the marketing strategies that are used (CAET, 2001; Milagrosa, 2007a).

2.2.4 RESOURCE ALLOCATION AND PERFORMANCE

2.2.4.1 Resource allocation (Level 4 of NIE)

The fourth and final level of the NIE framework is concerned with the allocation of resources and employment (Williamson, 1998). At the level of resource allocation, market performance is evaluated with special reference to the quantities produced and marketed, production and marketing costs, and price analysis in the form of farmer's and traders' share of total market sales (Milagrosa, 2007a). Level 4 is analysed with neoclassical economic theory in the form of marginal analysis, where the firm, again, is described as a production function (Williamson, 2000) rather

than a governance structure. Weintraub (undated) summarises the framework of neoclassical economics as follows: "Buyers attempt to maximise their gains from getting goods, and they do this by increasing their purchases of a good until what they gain from an extra unit is just balanced by what they have to give up to obtain it. In this way they maximise 'utility' – the satisfaction associated with the consumption of goods and services." Similar to the view from buyers, producers, again, attempt to produce respective units of a good until the cost of producing the incremental or marginal unit (marginal cost) is just balanced by the additional or marginal revenue it generates (marginal revenue). Profit is maximised at the exact level where the marginal cost equals the marginal revenue.

Neoclassical economics is thus concerned with the allocation of resources in an optimal manner, which is the level where profit and/or utility are maximised. By definition, optimal allocation of resources implies that the resources are allocated efficiently. The concept of efficiency is the most widely used concept in economics (Haji, 2008). In general it is measured by comparing the observed output against the feasible (or optimal) output. The importance of efficiency to economics is centred around the scarcity of resources.

One can distinguish between different types of efficiency. Two important forms of efficiency include technical efficiency and allocative efficiency. The concept of technical efficiency refers to the ability of the producer to produce maximum output from given level of inputs, or to produce a given output by using the minimum feasible amount of inputs (Farrell, 1957). Based on the focus of attention of the respective definitions, the two definitions are generally distinguished as the output-oriented and the input-oriented technical efficiency measures (Coelli, Rahman and Thirtle, 2002). Essentially, the degree of technical efficiency is expressed as the ratio of the observed level of production to the optimal level of production (or the production frontier). The level of technical efficiency ranges from zero to one where a value of one indicates that the firm operates on the production frontier and hence is considered to be technically efficient. A firm thus will be considered to be technically efficient only if the output produced is the maximum that can be produced from the given level of input given his technology set, or if it used the minimum possible amount of inputs to produce the current output level (Haji, 2008).

Allocative efficiency, on the other hand, measures the ability of the producer to use inputs in optimal or profit maximising proportions, given specific factor prices (Farrel, 1957; Haji, 2008). A firm can thus be considered to be allocative efficient if the combination of inputs that are used to produce the output lies on the expansion path. The ratio of the marginal physical products (MP_{xi}/MP_{x1}) thus should be equal to the inverse price ratio (r_i/r_1) of the respective production

inputs that are used to produce the product so that the condition, $MP_{xi}/MP_{x1} = r_i/r_1$, holds (Ajibefun & Daramola, 2003). A firm that does not use the expansion path combination of inputs does not operate at minimum cost and therefore are considered to be allocative inefficient. The level of allocative efficiency of a firm is expressed as the ratio between the minimum possible costs to produce the output to the incurred costs. By implication, allocative efficiency is also expressed as a ratio between zero and one. The larger the difference between the incurred costs and the minimum costs, the lower is the allocative efficiency ratio and hence the degree of allocative efficiency (Van der Merwe, 2012; Ozkan, Ceylan and Kizilay, 2009).

Given the definitions of the concepts of technical and allocative efficiency, if a firm has achieved both technical and allocative efficiency, it may also be considered to be economically efficient. Alene (2003) argues that technical and allocative efficiency are important in developing countries, since increasing technical and allocative efficiency are important factors of productivity growth.

2.2.4.2 Performance (Level 3 of SCP)

The study of performance deals with the state of reality that is achieved by an industry (CAET, 2001) and refers to economic results (Hai, 2003). The performance component of the SCP analysis is concerned with the actual volumes of the respective crops that were produced, the sales, costs and income earned by the respective agents along the value chain, and also an analysis of the marketing margins (CAET, 2001; Milagrosa, 2007a). A marketing margin is the difference in the price paid for the product at different stages along the value chain (Tomek and Robinson, 1990). The marketing margin thus includes costs such as packaging, transport, and storage of the product under consideration.

The conceptual framework also captures the link between the resource allocation level of NIE and performance. The degree of efficiency with which production inputs are used has a direct influence on the performance of the farmers under consideration.

2.2.5 *COMPLEMENTARITY OF THE NIE AND SCP APPROACHES*

From the above discussions, it is evident that there are definite similarities between the SCP approach and the NIE approach of Williamson (2000). Milagrosa (2007a) argues that the complementary overlapping characteristics of the two approaches contribute to a more comprehensive analysis of the sector under consideration. Both approaches are based on the notion that the different levels affect each other. The higher levels provide constraints that

influence the functioning of the lower ones, while the lower levels provide feedback to the higher levels in the long run.

In addition to similarities in the overall functioning of the two approaches, there are also some similarities between the individual components of the two approaches. More specifically, there are similarities between the structure component of the SCP and the institutional environment of NIE, between the conduct of SCP and the level of NIE that is concerned with governance structures, and lastly, between the performance component and the resource allocation level of NIE. The institutional environment (Level 2) plays a significant role in shaping events at the levels of downstream governance and resource allocation. By representing the formal rules and informal constraints that regulate the way transactions are conducted (Williamson, 2000), institutions form the incentive structure of a society, and the political and economic institutions, in consequence, are the underlying determinants of economic performance (North, 1994:). The structure component of the SCP, again, influences the way economic agents behave (conduct) by providing the physical environment within which the value chain players operate (CEAT, 2003). The integrated approach thus allows for considering both the physical and institutional environment within which the economic agents within the sector have to operate. The major difference between the structure component and the institutional environment is that, while the institutional environment refers to intangible aspects (formal rules and informal constraints) (Milagrosa, 2007a), structure is concerned with tangible aspects such as the region, topography, the distribution of land, land ownership and tenure, distance from input and product markets, and the road infrastructure that connects farms to markets (CEAT, 2003).

Both the conduct component of SCP and the governance structures of NIE focus on the way in which value chain players operate within the value chain in reaction to the physical and institutional environment specified at the higher levels. The governance structures refer to the specific way in which transactions between the different parties are organised. The type of governance structure used is influenced by the institutional environment within which it was formed (Milagrosa, 2007a). Conduct goes beyond the organisation of the transaction by referring also to the production and marketing behaviour of the economic agents within the farm and market structure as defined by the structure component of SCP (Milagrosa, 2007a; CEAT, 2003). Conduct is concerned with cropping practices, farming techniques, sources and availability of credit, the sources and availability of market information, the way prices are determined, competition and contracting, and the marketing strategies that are used (CEAT, 2003). The major similarity between conduct and governance is that both components aim to create order in the transaction under consideration (Milagrosa, 2007a).

The similarity between the resource allocation level of NIE and performance of SCP lies therein that both are concerned with measuring the efficiency of the behaviour of the agents within the social, physical and institutional environments as determined in the higher levels of the integrated framework. Both components are concerned with prices, margins, and costs. The performance of value chain players is expressed in terms of quantities produced, the value of sales, costs, and also the margins at the different stages along the value chain (CAET, 2003). Resource allocation is concerned with marginal analysis to analyse productive and allocative efficiency (Milagrosa, 2007a).

The high levels of similarity, combined with some distinct differences between the two approaches, lead to the conclusion that the integrated framework allows for a more comprehensive analysis of the value chain under consideration. Given the complexity in South Africa, which exhibits two distinct economies that developed in different social and institutional environments, such an integrated research framework may contribute substantially to providing a comprehensive understanding of the agri-food systems within which emerging farmers are to be integrated.

2.3   DISCUSSION AND CONCLUSIONS

The main conclusion from the literature review is that some emerging farmers are able to overcome the stumbling blocks that typically exclude emerging farmers from participating in commercial agri-food chains. The stumbling blocks that typically exclude emerging farmers from participating in commercial agri-food chains include stringent quality requirements, challenges associated with institutional failure (i.e. small farm size, insecure tenure, and lack of access to credit), high levels of transaction costs (i.e. poor condition of physical infrastructure, long distance to the market, lack of access to market information, and lack of trust among market imperatives) and poor support. The conceptual framework for the purpose of this study thus has to consider the support structures, the social, physical and institutional environments that influence the behaviour and performance of the farmers, and the relationship between the farmers and their buyers that affect the level of transaction costs faced by the farmers.

The integrated value chain and NIE-SCP framework that was developed in this chapter allows for a comprehensive analysis of the value chain under consideration. In addition to those role-players who are directly involved in the transformation of the physical product (value chain players), the conceptual framework also considers the institutional environment that influence the behaviour of the value chain players, and the supporters who support the value chain players to meet the regulations specified by the influencers. The integration of the NIE-SCP framework into the value

chain framework allows for an extended analysis of the value chain influencers by also considering the impact of the social and physical environment on the behaviour of the value chain players. The NIE-SCP framework also allows for a comprehensive analysis of the relationship between the farmers and their buyers.

More specifically, the analysis of the social embeddedness level will contribute to a better understanding of the levels of trust in the community as part of the social capital analysis. Lack of trust was identified as one of the stumbling blocks that contribute to the high transaction costs that exclude farmers from participating in commercial agri-food chains. A better understanding of the trust levels may contribute to improving the relationship between the different value chain participants, and hence may help the farmers to successfully participate in the value chain. The analysis of the social embeddedness will also provide insight into the role that is played by traditional authorities in the communities. Keep in mind that traditional authorities are often responsible for allocating land in communal areas, and that insecure land tenure is also listed as a major stumbling block that contribute to the exclusion of emerging farmers from commercial agri-food chains. The understanding of the role of the traditional authorities in the respective case studies may provide insight into the potential to increase tenure security.

Within the analysis of the institutional environment, more important information will be obtained with regard to the security of tenure. The consideration of the legal aspects, and hence the constraints, associated with the tenure systems that apply is a major component of the analysis of the institutional environment. A comprehensive understanding of the existing tenure systems will contribute to an understanding of the environment within which the farmers operate, the potential for prosperous farmers to be able to expand their production enterprises by buying or renting additional land, and it can also be used in negotiations with financial organisations to possibly develop a financing product that will allow emerging farmers access to formal credit. The small scale of operations and the lack of access to credit were listed as major stumbling blocks that contribute to the exclusion of emerging farmers from participating in commercial agri-food chains.

The analysis of the governance structures is concerned with finding the optimal vertical coordination strategy that will contribute to reducing the transaction costs faced by the farmers. The review of the literature on the factors that constrain the ability of emerging farmers to participate in commercial agri-food chains, shows that high transaction costs are considered to be a major barrier that exclude emerging farmers from commercial agri-food chains. The contribution of the analysis of the governance structures thus lies in the identification of a potential solution to overcome the problem of high transaction costs that exclude the farmers from commercial agri-food chains. Given that NPC (2011) also recommends the identification of potential partners in

agro-processing that can support the farmers, the optimal degree of vertical coordination that results from the analysis of governance structures will ensure that the partnership will be based on the optimal degree of coordination between the farmers and such a company, rather than merely forcing farmers into a relationship with an agro-processing company that may act opportunistically at their expense. It is also noted that the fact that there are a number of different types of formal relationships that can be formed between farmers and such processing companies, policy recommendations that farmers should enter into strategic partnership relationships with agro-processing companies (CRDP, 2010) may be an over simplified solution to a very complex problem.

The analysis of the resource allocation level is concerned with the degree of efficiency with which resources are used. While NPC (2011) recommends that the focus of research and development for the agricultural sector has to be on new technology due to the historical benefits associated with the ability to adapt highly sophisticated technology to South African conditions, it has to be recognised that emerging farmers typically exhibit low levels of human capital and financial capital that are required to adopt sophisticated new technology. The focus of research and development efforts only on sophisticated new technology may mean that emerging farmers do not benefit from investment in research and development. Moreover, cash flow constraints due to the lack of access to credit contribute further to the inability of the farmers to apply the recommended levels of production inputs to produce optimum yields. Efficiency analysis provides valuable insight into the degree to which farmers should be able to improve their performance at their current input levels, and within their current technology set. Thus, while most of the stumbling blocks are caused by the very nature of being start-up farmers, or relate to institutional failure, efficiency analysis shows the potential for improvement even in the presence of existing constraints.

The qualitative description of the physical environment (structure), the way people behave within the physical environment (conduct), and the level of performance of the farmers through the SCP-analysis, will provide important information on the current situation in the respective case studies. The analysis of the structure is concerned, amongst others, with the condition of the physical infrastructure (i.e. road networks), the identification of all role-players in the value chain, and the location of the markets. Conduct analysis includes an analysis of the sources and availability of credit to the farmers, and the sources and availability of market information. The analysis of the performance-component then gives an indication of the level of performance of the farmers given the way they currently behave in their existing environment. All of these focus areas within the SCP-analysis were also listed a constraints that contribute to exclude emerging farmers from participating in commercial agri-food chains. The SCP-analysis thus provides a form of situation

analysis to highlight the stumbling blocks that are present in the respective case studies and constrain the ability of the farmers to participate successfully in the intended commercial agri-food chains.

From the above discussion it is evident that the integrated value chain and NIE-SCP framework has some major advantages with great potential to identify key success factors that may contribute to the successful integration of emerging farmers into commercial agri-food chains, and hence to meeting the vision for 2030 of the NPC of South Africa.

CHARACTERISATION OF THE EKSTEENSKUIL FARMERS' VALUE CHAIN

3.1 INTRODUCTION

The main objective of Chapter 3 is to characterise the production and marketing activities in the value chains within which the group of emerging raisin producers from Eksteenskuil operate. The conceptual framework is applied to the case study to qualitatively describe the way in which the farmers behave and perform in their value chain. Through the application of the conceptual framework the value chain is considered at a macro (value chain influencers), micro (value chain players) and meso (value chain supporters) level. More specifically, the macro level in the value chain is described through qualitative descriptions of the cultural activities that influence the behaviour of the farmers (social embeddedness), and the institutional environment and the physical environment (i.e. farm and market structures) within which the respective value chains operate. Although it is recognised that social capital is embedded within the social embeddedness of the farmers, the levels of social capital of the farmers are not covered in Chapter 3. A comprehensive analysis of the social capital levels of the respective groups of farmers is covered in Chapter 4. It is also noted that the aim of the analysis of the farm and market structure is not to describe the whole industry, but rather to describe the physical environment within which that segment in the value chain operates where the group of farmers operate.

The micro level of the value chain is described through a qualitative description of the behaviour and performance of the farmers within their social, physical and institutional environments. The behaviour is described in terms of farm and market conduct, and the types of governance structures that are used to manage the transactions between the farmers and their buyers. The performance, on the other hand, is described in terms of production yields achieved by the farmers. Again the description of the governance structures in this chapter is limited to merely describing the different types of governance structures that are used by the farmers to organise their transactions. A comprehensive analysis of the governance structures follow in Chapter 5 to identify the type of governance structure that will minimise the transaction costs faced by the raisin producers from Eksteenskuil. Similarly, the qualitative description of the performance of the

farmers in Chapter 3 is extended in Chapter 6 with comprehensive analyses of the levels and determinants of efficiency with which the farmers use their inputs.

The description of the meso level is concerned with describing the support structures that are available that can support the group of farmers to overcome the challenges they face. Based on the descriptions from the three levels of the value chains, some conclusions are drawn in terms of potential leverage points that may be exploited to improve the performance of the farmers, and that may be developed into key success factors that will contribute to the successful participation of emerging farmers in commercial agri-food chains. Data that were used for the purpose this study was obtained through a number of personal interviews with key role-players in the raisin value chain, and a questionnaire survey (Appendix A). Next follows the characterisation of raisin production and marketing at Eksteenskuil.

3.2 CHARACTERISATION OF RAISIN PRODUCTION AND MARKETING AT EKSTEENSKUIL

The production and marketing of raisins by the farmers from Eksteenskuil are characterised at three levels: the value chain influencers at a macro level that provide the social, physical and institutional environment within which the farmers operate; the value chain players who include all actors who are directly involved with moving the physical product from the input suppliers to the end consumers; and the value chain supporters who support the value chain players to successfully operate in the environment that is created by the value chain influencers. It is important to note that, in addition to the overarching institutions that are similar for all parties operating in the value chain, there also may be some institutions that are specific to the value chain players and/or value chain supporters in the value chain.

3.2.1 VALUE CHAIN INFLUENCERS

3.2.1.1 Social embeddedness (Level 1 of NIE)

Social embeddedness refers to customs, traditions, and societal norms that affect the behaviour of the economic agents under consideration. The social embeddedness of Eksteenskuil farmers is assessed first by describing the historical background, polities and internal politics as informal constraints on the behaviour of the farmers.

- **Cultural norms and traditions**

Historical background

Eksteenskuil is an Act 9 area (Rural Coloured Settlement). The land in Eksteenskuil is held in trust by the Minister of Agriculture and Land Affairs. The first Coloured families were settled in Eksteenskuil during the 1920s, and they had to lay out the land, clear it for vineyards and build the infrastructure themselves. The rest of the families were awarded plots only during the mid-1950s after the white farmers who were cultivating the land by that time were bought out and relocated elsewhere. The political past of South Africa means that the political environment has a direct impact on the Eksteenskuil community. Thus, the level of social embeddedness in Eksteenskuil is expected to have a major influence on farmers' behaviour, and hence also their performance. The next section covers a discussion of the impact of politics on Eksteenskuil and also Eksteenskuil farmers' perceptions regarding politics and politicians.

Polities

When communicating with farmers within Eksteenskuil there is a general feeling that the Eksteenskuil community does not have a lot of trust in the government. Eksteenskuil farmers feel that they do not receive any form of assistance from government and even that they are being marginalised.

One of the main reasons that Eksteenskuil farmers perceive government to be marginalising them relates to the TRANCRAA (Transformation of Certain Coloured Rural Areas Act) process. The TRANCRAA process was initiated after the removal of the apartheid government with the aim to decide on what should happen to remainder land. In the case of Eksteenskuil, consultants were appointed to investigate the situation and they had to advise the Minister regarding the use of remainder land. As far as community participation was concerned, that process was completed in Eksteenskuil during November 2005 with a referendum being held. The decision was made that the remainder land should be in the control of the community. However, the Minister had to conclude the process and transfer the land to its rightful owners. The problem, according to Kok (2008), is that the process was never concluded by the Minister and the land has still not been transferred. In addition to the lack of closure, communication with the Minister is redirected to local government, where still no progress is made. Similarly, enquiries directed to the Director General of the National Department of Agriculture (NDA) (now Department of Agriculture, Forestry and Fisheries (DAFF)) get redirected to the Deputy Director General, who in turn does not respond to the enquiries (Kok, 2008). Such behaviour is then perceived as the unwillingness of government to work with the Eksteenskuil community, and causes Eksteenskuil farmers to have very little trust in the government.

Another reason for Eksteenskuil farmers to perceive government to be unwilling to assist them relates to a hail storm in December 2002. According to Kok (2008), there was a severe hail storm at Eksteenskuil on 21 December 2002. Despite requests from Eksteenskuil for the government to assess the damage, the MEC (Member of Executive Council) only visited the region on 6 March 2003. During his visit he ordered the community to "put something on his table by 16:00 tomorrow" (Kok, 2008). They asked the MEC to declare Eksteenskuil a disaster area. The MEC, however, decided not to. Then in 2003 the Eksteenskuil community held a demonstration in town, but no one came to collect their memorandum. That led to mudslinging between Eksteenskuil and the Department of Agriculture in the media. According to Kok (2008), there were farmers even five years later who were still waiting and thinking they would receive some compensation from government. Kok (2008) concludes that there seems to be some evidence that the politicians may capitalise on the ignorance of people, or that public funds have become a political tool.

Similar views are held by Brink (2008), who was the extension officer who worked closely with Eksteenskuil farmers from the 1980s. Brink (2008) gave a brief description of the process that needs to be followed for a community project to be implemented. Firstly, you have to meet with the community board and explain to them what the project is about and what the proposed outcomes might be. Once they agree that such a project should be implemented the board then has to go to the community and inform them about the proposed project. Once the community agrees to it, the community board, together with the official who proposes the project, go to the Department of Agriculture. If the Department of Agriculture agrees that the project should be undertaken, they meet with the Minister of Agriculture who in turn will take the matter to parliament. Brink (2008) emphasises that a project will only be implemented if it has been approved at all levels. Brink (2008) goes on to state that the process normally goes smoothly until the Department of Agriculture is on board. It is usually at the local government level where the process becomes more of a challenge. Brink (2008) argues that politicians' reluctance to support such projects may be due to the fact that, if the politician does support a project that is not supported by the political party, he simply gets redeployed or may even lose his job. Thus there seems to be a disincentive for politicians to take the responsibility and support projects aimed at improving rural livelihood. The number of projects that get shut down at local government level enhances the perception that government is unwilling to assist the Eksteenskuil community.

In addition to the above, Brink (2008) states that certain organisations contacted him previously to find a way in which they could assist the Eksteenskuil community. Brink (2008) says, however, that he normally warns such organisations that they will have to get approval from government before they try to implement any project. Some of those organisations have indicated that they actually have contacted the government but did not get any response even after two years. Again Brink

(2008) concludes that the projects generally fail due to the lack of buy-in by politicians. The lack of co-operation from government enhances the negative perception Eksteenskuil farmers have of government.

From the above, there seems to be evidence that the Eksteenskuil community does have reason to feel that they are being marginalised. In addition, there is also some internal politics that affects the dynamics of the Eksteenskuil community. The next section covers some of the internal politics that exists in Eksteenskuil.

Internal politics

Recall that the people were settled as a community in Eksteenskuil. The major idea with regard to such a community is the fact that the community rules (Kok, 2008). A community board is elected only to serve as a mouthpiece for the community. Clearly a problem is likely to arise if the community perception is that board members make decisions that cause the board members themselves to benefit from such a decision. That was also the case in Eksteenskuil. Community members believe that some of decisions made by the board were to their own direct benefit. The problem is that, although there is not necessarily proof that the accusation is true, if the community thinks that a board member is benefiting unfairly they will become aggrieved. Such perceptions normally lead to a reshuffle in the people serving on the board.

Another potential cause of internal political instability relates to only some individuals from the community benefiting from projects. Again this scenario occurs in the case of Eksteenskuil. Recently there was a project where Orange River Wine Cellars (OWC) in conjunction with the NDA proposed to establish new vineyards at ten of the poorest farmers. The community itself needed to identify the ten participants which already caused a number of community members wanting to be considered amongst the ten poorest. The problem was inflated when the number of beneficiaries was reduced to six, and later only to four. Moreover, one of the four beneficiaries is a member of EAC that was co-opted as one of the board of directors of OWC. Such behaviour has a major negative impact on the dynamics within a community such as Eksteenskuil. Thus, one should guard against singling out some individuals who will benefit monetarily from a project at the expense of other members in the community (Kok, 2008).

The above discussions show that the political environment, both internal and at a national level, does have an influence on the community of Eksteenskuil. The current political environment within Eksteenskuil is expected to have a major impact on the level of trust amongst community members, as well as community members' level of trust in government. Given the social and political environment within which the farmers from Eksteenskuil operate one may conclude that

the social embeddedness of farmers from Eksteenskuil is expected to influence their behaviour within the raisin value chain. The fact that social embeddedness is not considered as a given in this study but rather was investigated in detail, allowed for important information to be generated. The next section gives a general description of the physical environment that also influence the behaviour and performance of raisin producers at Eksteenskuil.

3.2.1.2 Farm and market structure (Level 1 of SCP)

The structure component is concerned with the physical environment within which the value chain participants operate. The structure component is divided into farm structure and market structure. The farm structure includes information about the region within which the chain operates, the distribution of land among farmers, and the land ownership and tenure of the farmers in the study area. The market structure considers the different types of markets and actors in the markets, the different marketing channels that are available, the location of and the infrastructure at the markets, and the road networks that connect the farms with the markets. The farm and market structures are also influenced by the rules and regulations that are specified in the institutional environment.

- **Farm structure**

The region

Eksteenskuil is situated in the Northern Cape Province and is about 50 kilometres west of Upington. Figure 3.1 is a map of the Northern Cape Province to get an idea of the physical location of Eksteenskuil. Keimoes is the nearest town and is about ten kilometres away from Eksteenskuil. The Northern Cape Province is an arid region and experiences little rainfall, averaging less than 300 mm per annum (DEAT, 2009). Keimoes itself generally receives about 84 mm of rain per annum with the highest amount being recorded during the autumn months (SA Explorer, 2008). That part of the Northern Cape is also known to have high temperatures during the summer months with an average midday temperature during January of 33°C.
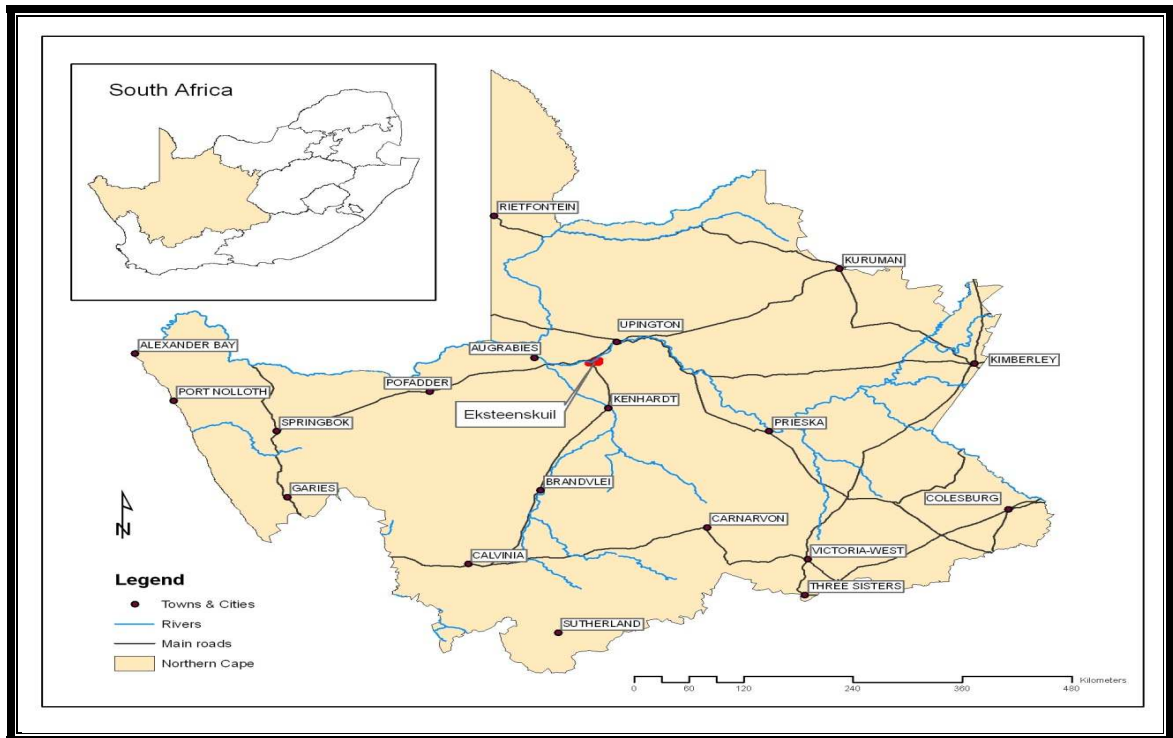
Figure 3.1:   Map of the Northern Cape Province of South Africa to show the proximity of Eksteenskuil in South Africa

The close proximity of the area to the Kalahari Desert means that the region experiences a desert-like climate. The Orange River passes through Eksteenskuil and splits the land into 17 small islands where the farmers produce their crops. The 17 islands form three main groups which are called South Island, Middle Island and North Island (Figure 3.2). Each group of islands consists of a number of smaller islands.
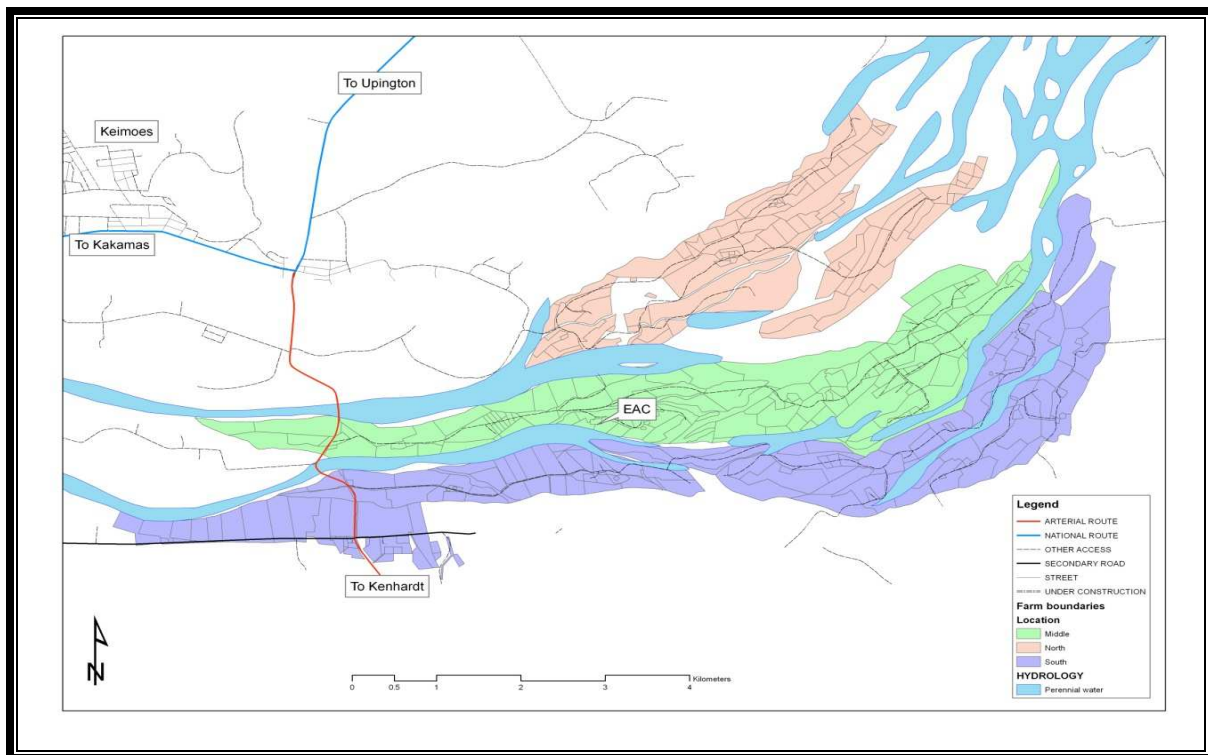
Figure 3.2:   Map of the Eksteenskuil region

Source: Van der Merwe (2012)

A major problem with regard to the different island groupings is that travelling from South Island to North Island is only possible by travelling around Middle Island. There is no road that connects all three groups of islands.

Distribution of land

The total land area of Eksteenskuil is about 2000 hectares whereof only about 600 hectares is arable. Eksteenskuil currently consists of approximately 100 farms with the sizes typically ranging from 2 to 5 hectares (Kok, 2008) which suggests that the farmers from Eksteenskuil are also constrained by the small scale of operations as was identified in the literature review. The average size of farms is about 3.8 hectares (Kok, 2008). The farmers live on their farms. The small scale of operations is a result of the historical institutions associated with land tenure in the previous political dispensation when plot sizes for black (non-white) farmers were restricted by law. The institutions that regulate land tenure in the new dispensation (since 1994), however, still fail to allow emerging farmers to significantly increase their scale of operations. The influence of the institutional environment on the farm structure thus is clear.

Land ownership and tenure

Similar to other situations concerned with emerging farmers in South Africa, land ownership at Eksteenskuil is a sensitive and complex topic. At this moment only about 40% of the farmers at Eksteenskuil have the title deeds for their land. The other farmers lease their land from other farmers or government.

Water distribution network

Eksteenskuil farmers irrigate from canals. The water distribution network is in a poor condition and the wall of the dam that is used to store water at Eksteenskuil is leaking. The canals are poorly maintained and consequently have a number of breakages and leaks. The poor condition of the water infrastructure has a negative impact on the security of water supply to the farmers, and causes substantial wastage of water.

- **Market structure**

Market types

Due to the nature of raisin production and the typical uses for raisins, they first need to be washed and cleaned to make sure that no foreign objects are mixed with the raisins. The washing, cleaning and packing of the raisins typically are referred to as the primary processing of raisins. The primary processing of raisins require sophisticated technology, especially for removing foreign objects from the raisins. Farmers do not do the primary processing themselves, but rather sell their raisins to processing companies that have the necessary facilities.

Market actors

In addition to the farmers, other actors in the market include the **input suppliers** and the **processing companies** in the region that buy raisins from the Eksteenskuil farmers. Some of the input suppliers where Eksteenskuil raisin producers purchase their inputs include, amongst others, Baard Landboudienste, Bayer, Kaap Agri, UAP, and Viking. Almost all the raisins produced at Eksteenskuil are sold to South African Dried Fruit (SAD) since it is the only avenue that allows the farmers to benefit from the fair-trade initiative. It is important to note, however, that Eksteenskuil farmers have full autonomy to decide to whom they want to sell their produce. Other processing companies in the region to whom farmers can sell their raisins include Carpediem, Fruits du Sud, Kalahari Raisins, Redsun Raisins, and the Raisin Company.

Transport for their raisins from the farm to the processing plant is the responsibility of the farmers. The processing plants, in turn, outsource the transport of the primary processed raisins from their plants to the downstream buyers (secondary processors, wholesalers, retailers, or exporters). The

nature of raisins allows them to be **stored** for a considerable period of time. The raisins are normally stored at the processing plant. The raisins are only processed and packed when the processor receives an order from their buyers.

Only a small proportion of the total raisin production (<20%) is sold to retailers to be sold as raisins. As a matter of fact, only SAD indicated that they sell some of their raisins to retailers to be sold as raisins. Most of the raisins are used as ingredients in the bakery industry. Raisins are used as an ingredient in many products, such as fruit cakes, muesli, energy bars and biscuits. By far the largest proportion of raisins is **exported** by the primary processing companies to international buyers. Choice grade raisins that are produced by farmers from Eksteenskuil are exported to the United Kingdom under the fair-trade initiative. Traidcraft is the fair-trade affiliated buyer who imports the Eksteenskuil raisins from SAD.

Marketing channels

The marketing channel refers to the flow of the physical product from the farm to the end consumer. There are four different marketing channels that can be used by raisin producers:

1.   Farmer → Local processor → Foreign processor (fair-trade) → Foreign retailer → Foreign consumer

2.   Farmer → Local processor → Local retailer → Local consumer

3.   Farmer → Local processor → Exporter → Foreign processor → Foreign retailer → Foreign consumer

4.   Farmer → Local processor → Secondary processor → Local retailer → Local consumer

From the above it is clear that, regardless of the specific channel to follow, the farmers sell their raisins to a local processing company (i.e. SAD). According to the rules and regulations of the fairtrade transaction between the farmers from Eksteenskuil and SAD, the ownership of the fruit is transferred to the processing company once the farmer gets paid for the delivered raisins. Thus, the decision as to which marketing channel to follow does not lie with the farmer.

The marketing channel that can be used from the local processor downstream is influenced by the grade of the raisins produced. Raisins that qualify for standard and industrial grades are normally used only as ingredients in the bakery industry and typically will follow Channel 4. Choice grade raisins can either be exported to be used as ingredients by foreign secondary processors (Channel 3), or they can be packed and sold as raisins to local retailers (Channel 2). It is important to note that grading only takes place on delivery of the raisins to the processing plant. Although there are some best management practices that can be followed by farmers to maximise the amount of choice grade raisins, there are also a number of factors that influence the quality of raisins that are

difficult to control. The grade to be achieved thus cannot be determined by farmers prior to delivery of the raisins to the processing plant, hence the inability of the farmer to choose which marketing channel to follow.

While standard and industrial grade raisins produced by Eksteenskuil farmers are mixed with those of commercial farmers, the raisins that qualify for those two grades will also follow Channel 4. The only difference in the marketing channel for raisins produced by Eksteenskuil farmers and those produced by commercial farmers relate to choice grade raisins. All of the choice grade raisins produced at Eksteenskuil are exported to Traidcraft via the fair-trade initiative (Channel 1). The characteristics of this channel are very similar to Channel 3 for the commercial farmers. The only difference is that Channel 1 represents the export of raisins via the fair-trade initiative. A system of traceability ensures that only raisins produced by members of the EAC are exported via the fair-trade initiative. The traceability system is a major requirement specified in the rules and regulations for being a fairtrade supplier of raisins. Again the influence of the institutional environment on the farm and market structure is evident.

The above discussion covered the flow of the physical product from the farmer to the consumer. Information, however, typically flows in the opposite direction. There is a flow of information from the processors to the producers. SAD, for example, has a code of conduct that farmers need to adhere to if they want to deliver to SAD. The code of conduct relates to international health and safety requirements. Eksteenskuil farmers too need to adhere to the code of conduct from SAD, but they also receive information from fair-trade with regard to the product that is exported through them. There are various rules and regulations regarding standards and business practices that have to be followed by Eksteenskuil farmers if they want to market their raisins through fair-trade. Information on the rules and regulations that have to be met is directly conveyed to the Eksteenskuil farmers.

Location of markets

Eksteenskuil farmers can buy all of their inputs at stores in Keimoes, which is within 10km from their farms. Farmers who cannot find the necessary inputs in Keimoes can travel to Upington which is a much bigger city about 50 km away. As stated, Eksteenskuil raisin producers normally sell their raisins to SAD. Although the processing plant is located in Upington, SAD has a depot in Keimoes. Eksteenskuil raisin producers thus only have to transport their raisins for about 10 km to Keimoes. Both the inputs and the output markets can thus be considered to be within a reasonable distance from the farms. Thus, while the distance to the market was found in the literature to be a major stumbling block to the participation of emerging farmers in commercial agri-food chains, the farmers from Eksteenskuil are not hampered by the distance to the market.

Infrastructure at markets

The infrastructure at the input suppliers and the processing plants is considered to be of good quality. All the input suppliers and the buyers are privately owned companies and hence are responsible for the infrastructure themselves. The general feeling amongst Eksteenskuil farmers is that the infrastructure at the input suppliers and their buyers is of good quality.

Road networks

Although the distance from Eksteenskuil to Keimoes is relatively short, the condition of the road network is a major problem for the farmers from Eksteenskuil. The poor condition of the roads also increases the cost of transportation. There was substantial improvement, however, in the quality of the roads at Eksteenskuil since 2010 when some of the roads were paved. Although the farmers from Eksteenskuil were initially exposed to the constraining impact of the poor condition of the road infrastructure as is the case for other emerging farmers that were found in the literature, government seems to be in the process of meeting its commitment in NPC (2011) to improve the road infrastructure in rural areas. There are still some roads, however, that are in an appalling state.

When considering the different components within the structure of the integrated framework, it is evident that the physical environment may have a constraining affect on the Eksteenskuil farmers. Although the environment is conducive to the production of raisins, the limited land sizes, lack of secure property rights of the land, and the poor quality of the water distribution network suggest that the farmers do not operate within an enabling environment. On the other hand, when considering the structure from the market's side, there is less of a problem. The farmers from Eksteenskuil operate in a sophisticated value chain that allows them to earn maximum return on the grapes they produce. In fact, through the fairtrade initiative the farmers from Eksteenskuil receive higher prices for their raisins than the prices earned by commercial raisin producers from South Africa. Within the next section the focus shifts to the institutional environment within which the farmers operate.

3.2.1.3 Institutional environment (Level 2 of NIE)

The institutional environment contains all the formal and informal rules and regulations that influence the way actors behave within the value chain.

- **Formal institutions**

Recall that the major aim of the formal rules is to provide protection against opportunistic behaviour of agents involved in the production and marketing of agricultural products (Milagrosa, 2007a). As mentioned, property rights are a major component of the formal rules that regulate production and marketing of agricultural products. This is especially true in the South African scenario where the issue of land ownership is very relevant due to the political past.

Land tenure

Despite the conclusion of the TRANCRAA process as discussed in Section 3.2.1.1, all of the land still has not been transferred to the rightful owners. Consequently, only some of the farmers from Eksteenskuil have freehold tenure, while most of the land is still held in trust by the Minister of Agriculture and Land Affairs with the farmers having to rent the land. Those farmers who have the title deeds for their land do have secure tenure, but none of the farmers who lease the Trust land from government was able to present a written lease agreement. The security of their tenure thus is questionable.

The lack of title deeds to the land has some serious implications for the farmers. Secure tenure is the primary incentive to invest in land (Matungul *et al.*, 2001). The lack of secure tenure by the raisin producers from Eksteenskuil means that the farmers have little incentive to invest in their land. Moreover, the farmers from Eksteenskuil who do not have the title deeds for their land cannot source commercial credit, nor can they sell their land to other prosperous farmers who want to increase the scale of their production activities. Clearly the lack of title deeds may have a constraining impact on economic activity within Eksteenskuil by negatively affecting the ability and willingness of farmers to invest in their land.

In addition to land tenure there are also some other formal rules and regulations that have to be met when producing and marketing agricultural products. Since most of those rules and regulations are generic to agricultural production and marketing in general, the focus of attention next will rather be on the rules and regulations that are specific to the case of Eksteenskuil.

Formal rules and regulations specific to the case of Eksteenskuil

The formal rules and regulations that are specific to the case of Eksteenskuil include the requirements that have to be met in order to export raisins via the fair-trade initiative, and also the rules and regulations specified in the constitution of EAC.

- Standards and requirements associated with the FLO

According to Kok (2008), the Eksteenskuil Farmers' Association (EFA) was established during 1994 with the aim to increase the lobbying power of Eksteenskuil farmers. With the assistance of a Non-governmental Organisation (NGO) EFA linked up with Traidcraft in the United Kingdom (UK). Since 1995, EFA started exporting some raisins on a small scale to Traidcraft in the UK. During 2003 EFA was inspected by the Fair Trade Labelling Organisation (FLO) after which they became FLO-accredited. Although the business practices of EFA already were based upon the principles of FLO, since their accreditation, EFA is required to meet some strict regulations referred to as the FLO-standards. The FLO-standards thus are the rules under which Eksteenskuil can do business in the fair-trade market. In order to ensure that all the requirements are met, EFA gets audited on an annual basis by FLO.

Despite having to comply with the strict regulations, there are some definite benefits to being a fair-trade producer. The FLO guarantees the producer a minimum price that is fair and sufficient to cover production costs as well as providing a reasonable return. In addition to the fair price, the group of producers also receive a Fair-trade Premium, which usually is between 7% and 15% of the total price of the product. The higher price and premium are made possible because some consumers are willing to pay more for products with the Fair-trade label.

An individual farmer, however, cannot become a Fairtrade producer himself. Small-scale farmers have to form an organisation which is able to contribute to the social and economic development of their members and their communities. Such organisations moreover can be certified by FLO only if they comply with the requirements of the Generic Fair-trade Standards for Small Farmers' Organisations. In setting the standards, FLO follows certain internationally recognised standards, especially those of the International Labour Organisation (ILO). There are two basic requirements that small farm producers must fulfil in order to be certified as a fair-trade producers' organisation. Firstly, there are minimum requirements that the producer organisation has to meet from the moment they join fair-trade. Secondly, there are progress requirements on which the organisation must show permanent improvement and a report of the progress requirements has to be submitted each year (FLO, 2005).

Of every fair-trade-certified product that is sold by the organisation, at least 50% of the volume must be produced by small producers. There are a number of specific requirements that have to be met during the production process by small-scale farmers. Firstly, the organisation is expected to assess the environmental impact of its operations. They have to develop plans that are designed to decrease those impacts and also to monitor the implementation of those plans. Secondly, fair-trade producers are expected to continually reduce the volumes and types of

agrochemicals that are used in production processes. With regard to agrochemicals FLO publishes a list of materials that may not be used at all. The third requirement relates to fair-trade producers' handling of waste. Producers are expected to reduce, reuse, recycle and compost waste in a manner that is suitable to the materials in question. A plan should be established for the disposal of all hazardous waste materials and also for the sustainable use of organic waste. Producers are also expected to maintain and enhance the fertility and structure of soil, as well as manage water resources with the aim to conserve and not to contaminate. Fire should not be used in a manner that will be detrimental to the natural system. Finally, they have to ensure that no genetically modified organisms (GMO) are used either in the production or processing of the product (FLO, 2005).

In addition to all the generic rules that have to be complied with there are also some standards that are specifically for dried fruit. These standards are frequently revised. These standards can be placed on three legs: social development, economic development and environmental development (FLO, 2005). The social development leg strives for members of the organisation to supply at least 80% of the fruit. Whenever fruit is grown by producers other than the members, the association must maintain a register of the suppliers and also develop a plan to increase the membership amongst suppliers. Moreover, suitable measures must be taken to increase the percentage of registered women growers and to promote their active role with regard to decision-making within the organisation.

As the second leg relates to economic development, the organisation must develop a plan to ensure that all suppliers benefit from the premium until 80% of the fruit is supplied by members. Such a specification is to ensure that the benefits from fairtrade are distributed to the deserving farmers and not going to other suppliers who do not really qualify to benefit from the fairtrade initiative. The producer organisation must show efforts to promote the marketing of other crops in order to decrease the economic dependency on one single crop and to provide producers with additional sources of income. The organisation also must have the necessary infrastructure and capacity to communicate with, sell to and deliver to overseas markets.

Finally, the environmental development leg relates to the requirement that all dried fruits which are sold with the fair-trade label must have been produced by FLO-Certified Producers' Organisations. The minimum prices are defined per dried fruit product and per country, and the farmers will receive a fair-trade premium in addition to the fair price. Whenever the current market price is higher than the fair-trade minimum price, the market price will apply and the buyers of the fair-trade products will pay producer organisations at least the fair-trade minimum price as set by FLO.

With regard to the fair-trade premium, there are also some strict specifications that have to be met when spending the premium. The premium should be spent on things that improve the lives of the small farmers, farm workers and the community. In the case of a small farmer organisation, the premium can also be used to improve the business since it is argued that improving the productivity of the business may ultimately lead to increasing the benefit for the whole community. Those specifications thus ensure that producers invest in their farms and communities and also that the producers protect the environment. The premium is paid only once the co-operative or farming company has sold their produce and submitted a report which contains the volume sold, the price received and also the premium that was earned to the FLO (Anonymous, 2008). More specifically, the FLO gives five criteria that have to be met when using the fair-trade premium. Firstly, it is required to benefit the whole community rather than only individuals; secondly, the benefit should last at least five years. The third requirement states that the project needs to respond to the most urgent and basic needs of the workers, while the fourth requires that the benefit should also reach the families of the workers. Finally, the last requirement when spending the fair-trade premium states that the project also needs to bring an additional benefit to the community (FLO, 2005).

From the above it is clear that there are a number of strict rules and regulations that need to be met by Eksteenskuil raisin producers for them to continue benefiting from fair-trade. At first glance it thus seems that the stringent requirements may also exclude the farmers from Eksteenskuil from participating in the value chain as was found in the literature. The farmers from Eksteenskuil, however, do comply with the rules and regulations. A consultancy firm was contracted to assist the farmers with environmental impact assessments and to design the plans to decrease the impact of their actions on the environment. The EAC buys chemicals in bulk and makes available smaller amounts to individual farmers. By centralising the distribution of chemicals, EAC has control over the types and amounts of chemicals applied during production. EAC also converted an old shed to meet the requirements for disposing of the chemicals.

Although the regulations specify that a small proportion of non-members may deliver under the name of the accredited organisation, EAC decided that only members would be allowed to do so. Instead of allowing other farmers to deliver under its name, EAC invited other previously marginalised farmers within the region to become members. Women producers also have a major role to play at Eksteenskuil. Two of the five directors of EAC are women. EAC has also contracted Vinpro to conduct a feasibility study for wine production at Eksteenskuil. EAC aims to obtain FLO accreditation for exporting wine in order to reduce their dependence on raisins as their sole source of income.

In order to meet the requirements with regard to the spending of the fair-trade premium, EAC also serves as the Premium Committee. The projects where money from the premium has been utilised include equipping and maintaining of EAC's office; buying and maintenance of farming equipment; coordination and dissemination of agro-chemicals to individual farmers; organising farmers' days (twice yearly) and information sessions; funding of educational equipment for primary schools; funding of women's projects; organising and facilitating training of a group of women in tourism; workshops on basic business management (for farmers and non-farmers); and hydroponic training for a group of youths from the community. These projects meet the requirements specified by FLO. It is worth to note that, by actively contributing to skills development in the Eksteenskuil community in order to comply with the specifications for spending the Fair-trade Premium, EAC also meets one of the recommendations of NPC (2011) that will contribute to meeting the vision for 2030.

The conscious efforts by EAC and its members to comply with the stringent requirements to supply raisins to the fair-trade market may be incentivised through the fact that, at this stage, the benefit generated from exporting raisins via the fair-trade initiative outweighs the costs of complying with the requirements. The findings at Eksteenskuil thus show that the stringent quality requirements do not necessarily have to exclude emerging farmers from participating in commercial agri-food chains. If incentives are correctly aligned, farmers will make a bigger effort to comply.

In addition to having to comply with the rules and regulations as stipulated by FLO, the members of EAC also have to comply with the rules and regulations specified in the constitution of the co-operative. Some of those rules and regulations are discussed next.

- Formal rules related to Eksteenskuil Agricultural Co-operative

After the 2006 audit, FLO enquired from EFA to explain what they plan to do with regard to their own exporting, since at the time the EFA sold the raisins to SAD who processed the raisins and sold them as their own. EFA thus was faced with a challenge that they had to start commercialising their operations as well. With that regard, EFA investigated a better legal entity and decided to become a co-operative. That decision was made through a participatory and consultative process during 2006. EAC finally was registered in December 2006 (Kok, 2008). The objectives of the co-operative include the provision of an organisation with common property rights to people who were marginalised by the previous political regime in South Africa; to allow members to benefit from buying inputs and selling produce on a larger scale; and also to provide support and training to members.

One of the requirements of a co-operative as a business entity is that it must have a constitution. The constitution provides another set of rules that have to be met by the members of the co-

operative. The constitution mostly consists of the general specifications and requirements that are common in the constitution of a co-operative. The constitution of EAC, amongst others, provides specific requirements that have to be met by farmers who want to become a member or cancel their membership of the co-operative; it stipulates the powers of the Annual General Meeting (AGM), the board of directors, and also the voting power of members; and it stipulates the requirements for a member to serve on the board of directors and the conduct of board members.

There are also a set of guidelines that have to be followed by members of EAC whenever they want to rent one of the implements under the control of EAC. A list of 21 guidelines is published by EAC which specifies the conduct related to renting and using communal implements. Another set of rules that have to be met by Eksteenskuil raisin producers relates to their relationship with SAD, who is considered to be a strategic partner. Recall that one of the requirements to be a fair-trade producer of dried fruit is that the producers' organisation needs to have the infrastructure to export the products. Due to the lack of infrastructure at Eksteenskuil, EAC actually outsources the exporting activities to SAD via their strategic partnership with SAD. This relationship too is governed by a set of rules and regulations that has to be met from both sides.

At this stage it is important to highlight a couple of interesting consequences of the farmers' endeavours to remain fair-trade producers of raisins. First and foremost, the farmers investigated the need for, and decided to change their collective business form from a farmers' association to an agricultural co-operative that is registered under the New Co-operatives Act of 2005. It is important to note that the decision to organise themselves as a co-operative was a business decision to enhance their access to the price incentives of the fair-trade initiative. Thus, while the Department of Trade and Industry (DTI) wants to incentivise emerging farmers to form co-operatives through gaining access to grants from the Co-operatives Incentive Scheme (South African LED Network, 2012), the case of Eksteenskuil shows that, by incentivising the farmers to improve their business, the farmers themselves decided to form an agicultural co-operative at Eksteenskuil. More importantly, the farmers have organised themselves as a co-operative in order to do business and not merely to get access to a government grant as is often the case with emerging farmers in South Africa. Ultimately, the farmers from Eksteenskuil actually created additional rules themselves, instead of viewing the stringent requirements of the fair-trade market as an entry barrier that will exclude them. The case of Eksteenskuil thus shows that, by correctly aligning incentives, institutions may effectively influence the behaviour of emerging farmers that may give them access to commercial agri-food chains.

- **Informal institutions**

The informal rules refer to the informal sanctions in the institutional environment, which consist of non-political, non-economic and unwritten conventions such as taboos, traditions, customs and norms. According to Adams (2011), Kok (2009) and the respondents to the study, there are no informal institutions at Eksteenskuil that affect the behaviour of the farmers. The only institutions that do affect the behaviour of the farmers are the formal institutions.

From the above discussion, it is evident that the farmers from Eksteenskuil have to comply with a number of strict rules and regulations if they want to benefit from fair-trade. Important to note, the institutions are strictly enforced and all farmers know that. If some farmers are found not to comply with the rules, EAC loses accreditation which means that none of the farmers will be able to benefit from fair-trade. The farmers, however, have a substantial financial incentive (fair-trade price and premium) to comply with those rules. Next the focus of the characterisation shifts to the actors who are involved with moving the physical product from the input suppliers to the end consumers.

3.2.2 *VALUE CHAIN PLAYERS*

The value chain players include all actors in the value chain who are directly involved with moving the physical product from the input suppliers to the end consumers. For the purpose of this study, the farmers from Eksteenskuil are of major importance as value chain players. The characteristics of the respondents resemble other groups of emerging farmers from South Africa very well. The average age of the respondents is almost 50 years, ranging from 24 years to 72 years. The high average age is typical of groups of emerging farmers in South Africa. The younger generation is not interested in agricultural activities mainly due to the low profit margins associated with farming. The average level of education of the respondents is 9.04 years. Thus, the majority of the respondents attended school until high school level but did not complete Grade 12. On average, the respondents have 17.52 years of experience in the production of raisins which suggests that the majority of farmers have ample experience in the art of raisin production.

The flow of the physical product along the chain is discussed next to get an understanding of the other value chain players who are involved in moving the raisins that are produced by farmers from Eksteenskuil to the end consumer. Thereafter the farm and market conduct are described to better understand the behaviour of the value chain players, followed by a brief description of the governance structure that is used to manage the transaction between the farmers from Eksteenskuil and SAD. The description of the value chain players in the case of Eksteenskuil then is concluded through a discussion of the performance of the farmers.

3.2.2.1 Flow of raisins from input suppliers to end buyers

A schematic representation of the product flow is shown in Figure 3.3. Despite Eksteenskuil farmers being organised as the EAC, members of EAC do not produce nor market collectively. Farmers produce individually and each farmer is responsible for selling his own produce and delivering it to the depot of South African Dried Fruit (SAD) in Keimoes.
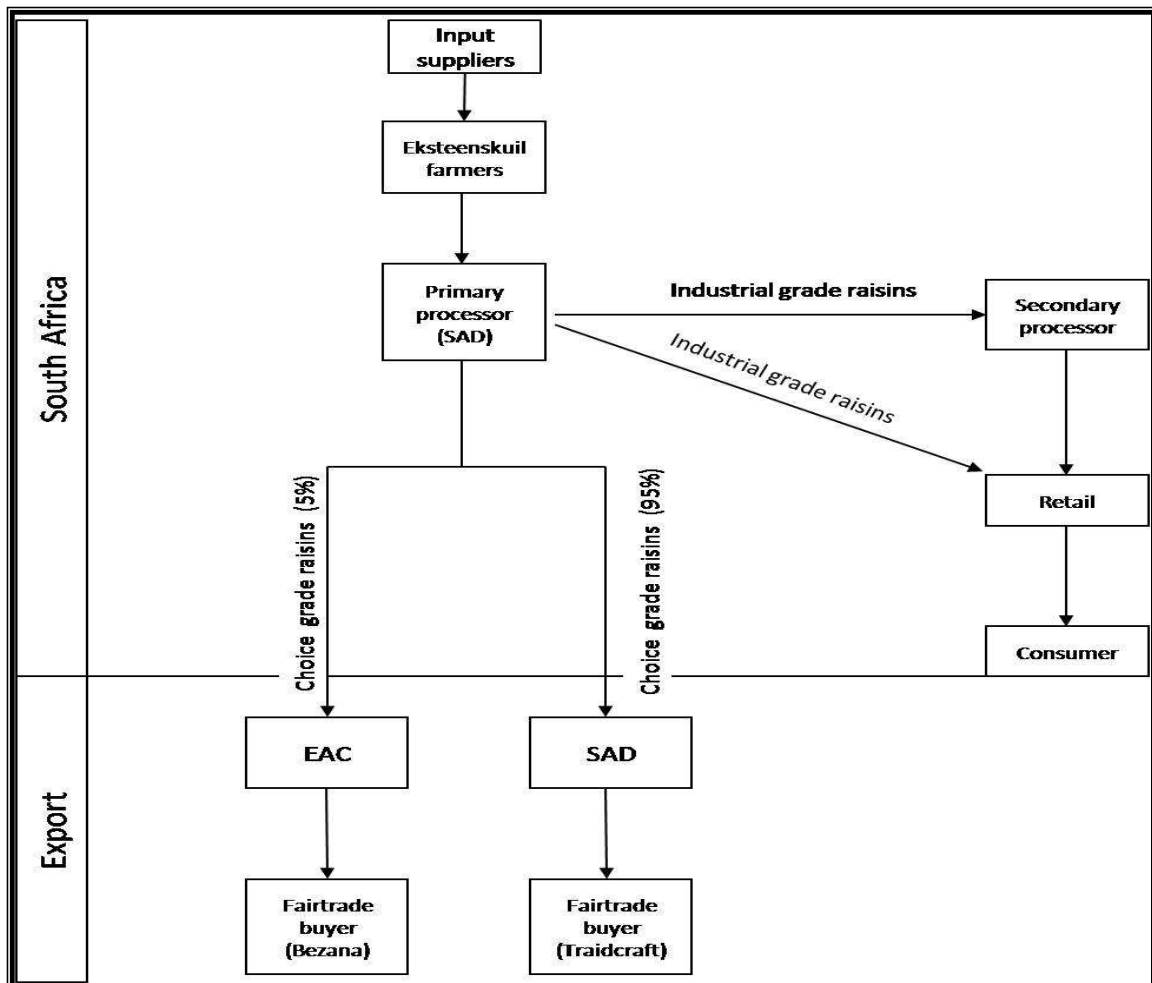
Figure 3.3: Schematic representation of the flow of raisins from Eksteenskuil producers to the end buyer

At the processor, SAD grades the raisins based on quality into choice grade, standard grade and industrial grade. SAD makes no distinction between Eksteenskuil farmers and commercial farmers. Everybody receives the same price for the respective grades. Standard grade and industrial grade raisins are marketed on the local market mainly through secondary processors where they are used as an ingredient in the baking industry. Choice grade raisins are exported via the fair-trade

initiative. Eksteenskuil farmers who sell their choice grade raisins through the fair-trade initiative do receive an additional payment from the fair-trade buyer once the raisins have been exported. The additional payment is made possible through the fair price which the fair-trade buyer is willing to pay to previously marginalised producers.

SAD is the only fair-trade accredited processor in the area, hence Eksteenskuil farmers have no choice other than to sell their raisins to SAD if they want to participate in the fair-trade value chain. Important to note, however, is that farmers do have a choice of within which marketing channel they want to participate. The additional amount paid by fair-trade, however, seems to be enough incentive for them to choose the chain via fair-trade. Fair-trade buyers want to be sure that the higher price is paid only to deserving producers. It is the responsibility of SAD to ensure that only raisins produced by Eksteenskuil producers enter the channel through fair-trade. In order to comply with FLO regulations, SAD keeps raisins delivered by members of EAC separately. When processing Eksteenskuil raisins, they use one of the processing lines exclusively for raisins from EAC members. The processed raisins then get packed into boxes that contain the FLO label to show that it is a fair-trade product. The packed boxes too are kept separately to ensure that no mix up takes place.

After the processing and packaging is done, SAD exports the raisins on behalf of EAC to Traidcraft under the fair-trade agreement. It is noted that it is only the export of raisins that is done collectively by members of EAC. The fair-trade agreement requires that the entity under which the farmers operate is audited annually to ensure that they fulfil the objectives of the fair-trade agreement. Based on such an audit, EAC was advised to participate more actively in export negotiations in order to increase their share in the final price. As a result, EAC bought back about 5% of their processed raisins from SAD and exported them under their own name. They conducted all negotiations with the fair-trade -buyer, but SAD was present in a supportive capacity. Important to note is that the logistics of exporting the raisins were still outsourced to SAD.

Next, the focus of attention shifts to the behaviour of the value chain players.

3.2.2.2 Farm and market conduct (Level 2 of SCP)

The conduct component of the SCP analytical framework refers to the way participants operate within the physical environment. Again the conduct component is divided into farm conduct and marketing conduct. Those two forms of conduct are discussed next.

- **Farm conduct**

Farm conduct is concerned with the cropping practices of the farmers under consideration, the types of farming techniques the farmers use and the sources and availability of credit to fund production activities.

Cropping practices

The crops that are currently extensively produced in the Eksteenskuil region are lucerne and grapes. Some farmers do have livestock but the livestock is only for domestic use. The lucerne that is produced is mainly used to feed the domestic livestock. Surplus lucerne, however, can be sold to a nearby feedlot located in Upington.

Although different crops are produced, the production of grapes serves as the main source of income for the farmers from Eksteenskuil. The climate along the Orange River is extremely suitable for grape production. The grapes that are produced in the area are for raisins, wine and grape juice. Although some Eksteenskuil farmers do produce a limited quantity of wine grapes, the Eksteenskuil community can mainly be considered to be raisin producers. Farmers from Eksteenskuil produce two cultivars (Sultanas and Merbein) that are closely related. After harvest, no distinction is made between the two cultivars.

Most of the farmers dry the grapes in the sun on cement slabs to produce Thompson's Seedless raisins. The cement slabs are normally close to the farm houses. Other farmers smoke the grapes with a sulphur solution and dry them on trays without exposure to the sun. Such raisins are golden in colour and are also called golden raisins. It is exactly the same types of grapes that are used to produce the Thompson's Seedless and the golden raisins. The only difference is in the way they are dried. It has to be noted that the nature of raisins is such that it is relatively easy to produce raisins of good quality. In fact, the farmers from Eksteenskuil, on average, achieve grades that closely resemble the average grade achieved by commercial raisin producers in their vicinity. Both groups of farmers obtain about 85% choice grade on average (Laubscher, 2009). The nature of the product produced by the farmers from Eksteenskuil thus may have a significant influence on the ability of the farmers to participate in a sophisticated value chain with strict requirements.

Farming techniques

Similar to most of the commercial farmers surrounding Eksteenskuil, the raisin producers from Eksteenskuil mainly use traditional farming techniques. Two of the major tasks associated with grape production include pruning and harvesting. Both tasks are highly labour intensive and are still carried out using manual labour. Some of the commercial farmers in the region have started to

use a harvesting machine, but none of the Eksteenskuil farmers use such a machine to harvest their grapes. Tractors and implements, however, are used to a certain extent for the purpose of weed control, and chemical and fertiliser application.

In terms of irrigation technology, all Eksteenskuil farmers exclusively use flood irrigation to irrigate their vineyards. The vast majority of commercial farmers on the surrounding farmers also use flood irrigation. There are currently also no prospects of converting to more sophisticated irrigation technology that might be more efficient than flood irrigation. The absence of such prospects may possibly be attributed to the perception of abundant available water, and also findings from a study by Myburgh and Mulidzi (2005) who observed that flood irrigation is an efficient irrigation method in the Eksteenskuil region given the current infrastructure.

Credit

Similar to the majority of emerging farmers in South Africa, access to finance is a major challenge in the case of Eksteenskuil raisin producers. Farmers from Eksteenskuil indicated that they have to apply for credit from commercial credit providers when they need funds to finance production inputs. Commercial credit providers, however, require collateral from the applicants before they would consider the application. There are some farmers who do obtain commercial credit to finance production activities. However, given that about 60% of the farmers do not have the title deeds for their land, few farmers have the ability to list their land as collateral for a loan. Given that the typical emerging farmer from Eksteenskuil can be considered to be resource poor, those farmers who do not have the title deeds for their land also do not have any other assets that qualify as collateral for commercial credit.

The lack of access to credit has some serious implications for the farmers. The general age of vines at Eksteenskuil is in excess of 30 years. The economic lifespan of the Sultana grapevines at Eksteenskuil is about 25 years. The lack of access to credit means that farmers are unable to replace their old vines. Keeping in mind that the establishment cost of vines is in the region of R108 000 per hectare (Vinpro, 2008), emerging farmers without access to a considerable amount of credit will not be able to replace their old vines. The older the vines get, the smaller the yields, which will lead to even more cash flow problems for the farmers. The lack of access to credit clearly has a major negative impact on the long-term sustainability of the raisin producers at Eksteenskuil.

In order to assist individual farmers to overcome the credit constraint, the EAC attempted to get credit from commercial banks with the idea to use that credit to provide soft loans to members of

the co-operative. However, the EAC has also failed to obtain credit since it is a relatively new organisation and does not yet have a reputable credit record.

- **Market conduct**

Market conduct is concerned with the behaviour of the farmers with regard to the marketing of their crops. More specifically, market conduct is concerned with the sources and availability of market information, the specific ways prices are formed, the level of research and development of new products, the level of investment in new technology and in training and services, the behaviour of the traders in the market, the level of competition in the market, contracting, and the marketing strategies that are followed by the farmers.

Market information

Price information is readily available during the season and raisin producers have a very good idea about the price they are going to receive for their raisins even prior to harvesting. SAD normally holds a road show around the end of the year with information sessions with the farmers where they discuss the market trends and price expectations. Whenever there is a change in the price, SAD sends a price list to the office of the EAC. Individual raisin producers from Eksteenskuil can get their market information via the office of EAC, or they can phone SAD or any of the other processing companies to find out what prices they would offer for the raisins. Farmers also get sms-notifications from SAD whenever prices change.

Market information for the raisins to be exported is less readily available. International production information is published regularly in Foodnews, which is a subscription-based magazine. Subscription fees, however, are expensive for individual farmers. The processing companies, who export the bulk of the raisins, subscribe to the Foodnews and then distribute the relevant information to the farmers. The fair price to be paid by the fair-trade affiliated buyer is negotiated between the buyer, SAD (as the fair-trade processor) and the chairperson of EAC, and is based in part upon the information published in the Foodnews. The farmers from Eksteenskuil thus seem not to be that much constrained by the lack of market information as was found for other emerging farmers in the literature. The relationship between SAD and the farmers from Eksteenskuil may also possibly contribute to the smaller impact.

Pricing

Individual farmers from Eksteenskuil have no influence over the price they receive from SAD. The price SAD is willing to pay for the raisins is based on market trends and general supply and demand conditions (Koch, 2009). SAD publishes a price list even before the harvest, so farmers

know the price to be received for their raisins when they deliver. The price determination process, however, is a continuous one. Whenever a new signal is received that may influence the price, SAD meets again and revises the current prices. Every time the price is adjusted, a new price list is distributed to the depots and farmers receive the new price (Koch, 2009).

In the case of Eksteenskuil, there is another price that is of importance. One of the aspects of fair-trade is that the previously marginalised producers must get a higher than market price for their produce. That price is negotiated with a fair-trade affiliated company such as Traidcraft. In the case of Eksteenskuil, SAD was responsible for negotiating the fair price with Traidcraft. There is an effort, however, to include Eksteenskuil farmers in the negotiation process, and indeed to include Eksteenskuil more and more in the exporting activities as is required by FLO. With regard to the fair price, the fair-trade affiliated company then pays the negotiated fair price to SAD who in turn pays it over to the farmers in the form of a second payment. By implication, the Eksteenskuil raisin producers receive a higher price for their produce than commercial farmers in the region.

SAD also has another initiative with regard to pricing. They now offer farmers a "risk share" marketing strategy where farmers are guaranteed a floor price for their raisins and then they are allowed to benefit from positive price movements. The floor price is typically a little lower than the market price at that stage. A farmer who takes part in the risk sharing strategy is guaranteed the floor price. If the price should decrease to a level lower than the floor price, the farmer will receive the floor price as stated in the contract. However, if the price should increase to a level higher than the floor price, they will share to a certain extent in the price increase. SAD uses a mathematical formula to determine the specific percentage of the increase that is paid to farmers. Although the farmer only receives a share of the increase in price, the risk sharing model allows him to benefit from positive price movements while protecting them from lower prices. For farmers to participate in the risk sharing there is a strict deadline for them to sign a contract. Only those farmers who have signed the contract are allowed to participate.

Research and Development

Active research is conducted at industry level in terms of new technology, especial for improving the varieties of vineyards to increase yields. The development of varieties for vineyards is undertaken by research organisations such as the Agricultural Research Council (ARC), and normally goes through long intensive trials under different weather conditions. Such investment cannot be done by famers alone hence research and development is either done at input level by input developers or at processing level by processors. Some desktop research, however, is conducted by some of the board members of EAC. For instance, the chairman does research by

obtaining more information on any product or project that may be adopted by EAC farmers for diversification purposes (Kok, 2009).

There are also quite regular feasibility studies that are conducted in the Eksteenskuil region. Two of those studies have included the Development Bank Southern Africa (DBSA), who appointed a consultant to conduct a feasibility study for the expansion of vineyards. Secondly, a consultant was contracted to assess the feasibility of the dam water capacity. Overall, the current research within the raisins industry proves to be inline with the recommendation in NPC (2011) to focus research and development on new technology.

Investment in new technology

A relatively newly developed technology that is available to Eksteenskuil raisin producers is the new cultivar, Merbein. Merbein was developed in Australia and is closely related to the Sultana, which is predominantly produced in the area. The major advantage of Merbein is that, while Sultanas are known to be low yielding every other year, Merbein has consistent high yields year after year. It is also argued that Merbein requires substantially less water to grow the crop (Brink, 2008). Despite the availability of the technology, few Eksteenskuil farmers are producing Merbein since they cannot afford the replacement costs. The concern regarding the fact that the focus of research and development should only be on sophisticated technology (NPC, 2011) may exclude emerging farmers from benefiting from investments in research and development thus proves to be valid.

Agricultural technology is expensive and normally designed for large scale commercial agriculture with large areas of land. EAC was established, amongst others, to help farmers to access technology at low cost for production purposes. Since farmers dry grapes themselves, they have invested in drying technology such as drying trays which allows easy handling of dried produce. EAC itself does invest in tractors and implements which then can be rented by the individual farmers to perform certain activities. There are strict guidelines, however, that have to be followed when using the tractors and implements.

The investment in technology at processing level is huge and expensive to maintain. The nature of raisins puts additional pressure on the processing company to ensure compliance with international health and safety standards. As an example, most of the processing companies use laser technology to eliminate foreign objects that may have been absorbed by the raisins. Given the high cost of a laser machine, not even the group of Eksteenskuil farmers collectively are able to afford one. Economies of size only allow processors to own the required processing technology.

Investment in technical training and service

A high value is placed on the investment of technical training and service at Eksteenskuil. EAC organises a number of training sessions per year for the farmers. Training has been conducted by various organisations such as, amongst others, SAD, Agriculture Research Council (ARC) Infruitec-Nietvoorbij, Sandra Kruger Consulting Services (EAC, 2009). ARC and Infruitec-Nietvoorbij provided training in the development of a central irrigation scheduling system and then also extended the training in the application of the system. SAD provides continuous training and expertise in the management and production of grapes. Sandra Kruger Consulting Services has provided individual farmers with training in financial record keeping, and in 2010 was also contracted to assist EAC with a strategic planning session for the EAC as an organisation. EAC themselves also invested in training one of the youths from Eksteenskuil by awarding a bursary to the student for tertiary education in vine management. The idea is to contribute to the training of the student, who can then return to Eksteenskuil to perform extension services to the community.

One of the main reasons for the active investment in training and services by EAC is that, as the Premium Committee, EAC has the responsibility to use the social premium for social, economic and environmental development. EAC thus has the funds to pay for training services to contribute to social and economic development in the region. SAD also has a vested interest in the performance of Eksteenskuil farmers since it has a direct impact on the benefit SAD receives from being the only fair-trade affiliated processor. SAD has technical advisors who assist farmers to contribute to the farmers being able to produce the maximum volume of choice grade raisins that can be exported via the fair-trade initiative.

Behaviour of traders in the market

Raisin production is strictly seasonal, with the whole raisin harvest taking place from January to the end of March. Farmers deliver the raisins in 500kg containers to the processing plant. The processing companies supply the containers to the farmers. Although the production of raisins is seasonal, the nature of raisins allows for them to be processed, packed and stored for a considerable period of time. The primary processing company typically buys the raisins from the farmers, stores them, and process and pack them upon orders throughout the year. Only a small proportion of raisins are sold to retailers to be sold as raisins. The bulk of choice grade raisins is exported, while standard and industrial grades are sold to secondary processors that use the raisins as ingredients in the bakery industry.

Competition

Historically, SAD was the only processor of raisins in the region. The deregulation of the agricultural commodities market has seen the rise of five additional processing companies

(Carpediem, Fruits du Sud, Redsun Raisins, Kalahari Raisins, and the Raisin Company). The processing market for raisins still is very concentrated. Processing companies are reluctant to provide information on the volumes of raisins that are processed, but it was mentioned that SAD normally processes about 50% of all the raisins in the area. Given that the facilities at SAD were established with the aim to be able to handle the whole harvest along the Orange River, the establishment of each additional processing plant increases the competition for raisins produced in the area. The general understanding is that the current processing capacity along the Orange River is double the volume of raisins that is produced. Such competition has placed substantial upward pressure on the farm prices for raisins.

Contract

Eksteenskuil farmers who want to participate in the fair-trade initiative are obliged to enter into a contracting agreement with both SAD as the processor, and Traidcraft as the fair-trade affiliated buyer. The contracts relate to the specifications type of contract (Peterson *et al.*, 2001) where the prices, volumes and quality are specified on the contract.

Interestingly, few commercial farmers enter into contracting relationships with any of the processing companies. This reluctance of farmers stems from the high level of competition between processing companies for the raisins in the area. Given that the processing capacity is double the production capacity, farmers believe that they will always have a buyer for their raisins. They are more concerned that they may miss out on higher prices from other processors if they enter into a contract with a specific buyer.

Marketing strategies

Eksteenskuil producers, who market their produce through fair-trade, employ a number of marketing strategies. As a product strategy, Eksteenskuil farmers ensure that the product is of a good quality since it is only choice grade raisins that are exported under the fair-trade label. Collectively, Eksteenskuil farmers also use standardised packaging where each box of raisins is packed in a carton that has the FLO label on each of the four sides of the box. The second marketing strategy that is used for marketing the Eksteenskuil raisins relates to branding. Fair-trade is a brand itself. The Eksteenskuil raisins are marketed as the Fair-trade brand. The brand tells the consumer what to expect with regard to the product. The fair-trade product tells the consumer that the product was produced by a previously marginalised producer who now has received a fair price for his product. Finally the Eksteenskuil producers can also be considered to use a channel strategy as a marketing strategy. The channel that they use for marketing their raisins through fair-trade gives them access to a niche market that cannot be used by non-members.

From the above discussion, one can see the influence of the structure on the behaviour of the economic agents. The next section describes the governance structure that is used to manage the transaction between the farmers from Eksteenskuil and SAD.

3.2.2.3 Governance structures (Level 3 of NIE)

The third level within the new institutional economics framework is concerned with the governance structures. Governance structures refer to the way the transactions between the farmers and their buyers are organised (Williamson, 2000). The farmers from Eksteenskuil currently can employ two types of governance structures when they market their raisins. The first type is the spot market, where farmers can sell their raisins to any of the processing companies in the region. Importantly, farmers who use the spot market as governance structure may act autonomously on market signals. The other type is a hybrid mode of governance where farmers can enter into a contractual relationship with the raisin processing company (SAD) that buys their raisins. The contract that is currently available to the farmers relates to the specifications type of contracting relationship as described by Peterson *et al.* (2001). The contract specifies the volume, quality and price of the raisins to be delivered. Next, the discussion of the value chain players is concluded through a description of the performance of the farmers from Eksteenskuil.

3.2.2.4 Performance (Level 3 of SCP)

Performance is regarded as a measure of success. The performance component is concerned with the level of success that the participants display (conduct) within the physical environment (structure). The performance component, more specifically, is concerned with the volumes of raisins produced, and the income and costs of the farmers.

There has been a general decline in the volume of raisins produced by Eksteenskuil farmers over the past three years. In 2006, the total volume of raisins delivered by members of EAC was about 650 tonnes, followed by deliveries of 540 and 450 tonnes respectively during 2007 and 2008. There are a number of reasons for the decline in volumes. First and possibly the most important is the fact that the general age of vineyards in Eksteenskuil is in excess of 25 years with a large proportion being older than 30 years. Keeping in mind that the economic lifespan for vineyards is about 20 to 25 years, one would expect the yields to decline. Furthermore, most Eksteenskuil farmers do not have the necessary cash flow to buy inputs such as fertiliser and pesticides. The decline in the volume of raisins is therefore expected, but it is a major source of concern. The poor performance of the farmers from Eksteenskuil also corroborate the findings by Van Averbeke, Denison, and Mnkeni (2011) who found that most smallholder irrigation schemes perform well

below its potential when reviewing research on the topic of smallholder irrigation schemes in South Africa.

The raisin producers from Eksteenskuil are the best paid raisin producers in the world (Koch, 2009). The ultimate price that Eksteenskuil farmers receive for their produce includes the price they receive from SAD, the fair price they receive from fair-trade, and then there is also the fair-trade premium. If you add it all together, the actual price is considerably higher than the price commercial farmers receive. Thus, the higher price may to a certain extent compensate for the lower volumes. However, although the price per kilogram is higher, the low levels of production mean that the farmers do not generate income that is sufficient to get them out of poverty. The poor condition of the physical environment thus proves to be a major constraint to the performance of the Eksteenskuil farmers.

In order to get a better understanding of the performance of the farmers more on an individual basis, Figure 3.4 represents a CDF of raisin yields obtained by the farmers from Eksteenskuil.
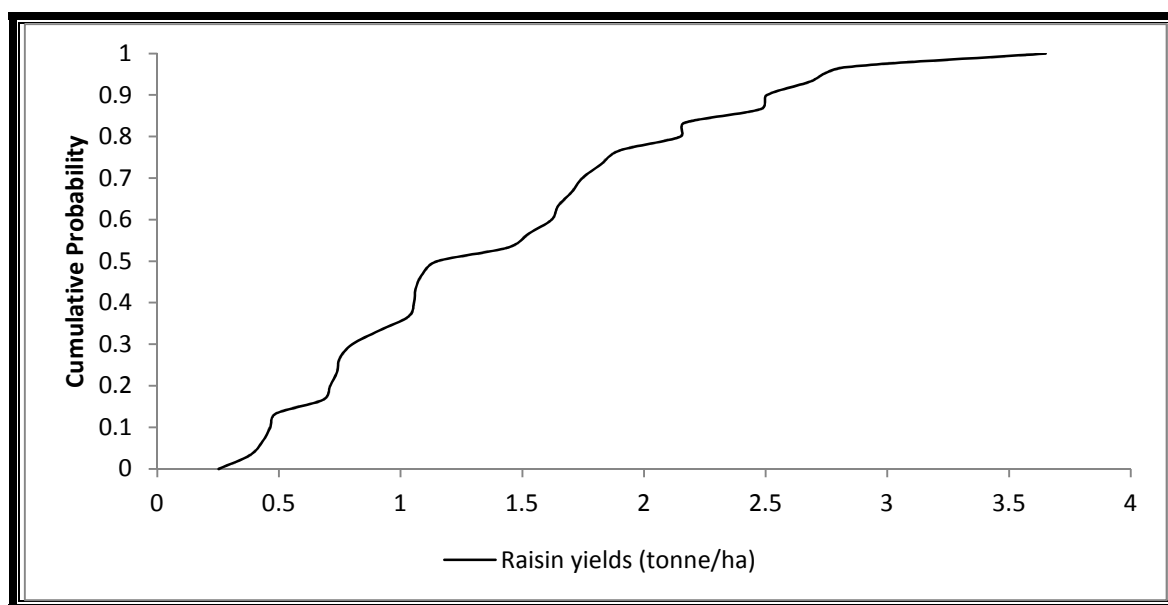
Figure 3.4: Cumulative probability distribution of raisin yields (tonne/ha) obtained by farmers from Eksteenskuil during the 2008/9 season

Figure 3.4 shows that the variation in the raisin yields range from about 0.25 tonne/ha to 3.65 tonne/ha. The average yield is very low being only 1.41 tonne/ha. The average yield of the top third of farmers is 2.39 tonne/ha, followed by 1.33 tonne/ha for the middle third and 0.60 tonne/ha for the bottom third group of farmers. The average yield of the top third farmers thus is about 80%

higher than that of the middle third. On the other hand, the average of the bottom third is only about 25% of the top third. Thus, while there are some raisin producers who achieve relatively good yields, a large number of farmers obtain very low raisin yields. The distribution of raisin yields suggests that there is scope for poor performing farmers to learn from the better performing farmers in terms of producing larger volumes of raisins.

Next, the description of the case of Eksteenskuil is concluded through a description of value chain supporters that support the farmers from Eksteenskuil to meet the requirements for supplying raisins to the fair-trade market.

3.2.3   VALUE CHAIN SUPPORTERS

Although the conceptual framework allows for a comprehensive analysis of the behaviour and performance of the support structures that are involved with the farmers from Eksteenskuil, the discussion of the support structures for this research is limited to the support services provided by the individual/organisation to the raisin producers from Eksteenskuil.

The raisin producers from Eksteenskuil receive support services from a variety of organisations. Such support structures include EAC, SAD, ARC Infruitec-Nietvoorbij, and some of the input suppliers. The main support structure for the raisin producers from Eksteenskuil is EAC. There are two full-time assistants in the office of EAC who support the farmers with administrative tasks. EAC organises the bulk of the training sessions at Eksteenskuil. Such training sessions include training in the technical aspects of raisin production and financial record keeping. EAC uses some of the funds that are earned through the fairtrade premium to fund training sessions that aim to develop the skills of the raisin producers. Such training sessions are presented as (fairtrade) premium projects as required in the rules of the fairtrade initiative. EAC also support the farmers by managing the transaction with the fairtrade buyer on behalf of the farmers. The chair person of EAC is actively involved with negotiations with the fairtrade buyer to specify the terms of the contract with the fairtrade buyer.

SAD, as the processing company through which the raisin producers from Eksteenskuil export their raisins, also is actively providing support services to the farmers from Eksteenskuil. SAD supports the farmers in negotiations with the fairtrade buyer. Initially SAD negotiated with the buyer on behalf of SAD. Recently, however, EAC became responsible for negotiating with the fairtrade buyer themselves. SAD still supports EAC in the negotiations. Most of the training sessions in the technical aspects of raisin production are presented by representatives from SAD. SAD also is in the process of establishing farmer study groups that will be used to provide additional support

services to the farmers. Every year in November SAD presents a road show where the market outlook is discussed with the producers. Such information sessions provides insight into the trends in supply and demand in the international market that may affect the prices received for the raisins at harvest. SAD also handles a lien for EAC. Before transferring payments for exported raisins to the farmers from the fairtrade buyer, SAD first pays the farmers' accounts at EAC. Only the surplus funds then are transferred to the individual farmers. It is important to note that SAD does not handle liens for any other organisation. Only EAC receives such services from SAD. SAD thus is heavily involved with the raisin producers from Eksteenskuil as one of their major support structures. It is important to note that the fairtrade initiative has created a vested interest for SAD in the performance of the raisin producers from Eksteenskuil. SAD can only access the benefits from fairtrade through the volume of choice grade raisins that is exported by EAC. Thus, SAD has a strong incentive to actively support the raisin producers from Eksteenskuil.

Other support structures include ARC Infruitec-Nietvoorbij which provides the farmers from Eksteenskuil with information and training in terms of optimal use of irrigation water for raisin production. Some of the input suppliers also provide support to the farmers in terms of the types of fertiliser mixtures and chemicals to apply to ensure optimal raisin crops.

The farmers from Eksteenskuil thus prove to have an effective support system that can help them to meet the requirements associated with being a fair-trade supplier of raisins. Next follows a problem tree analysis to gain insight into the farmers' perceptions of the stumbling blocks that constrain their performance.

3.3   PROBLEM TREE ANALSYIS OF STUMBLING BLOCKS THAT CONSTRAIN THE BEHAVIOUR OF RAISIN PRODUCERS FROM EKSTEENSKUIL

The idea behind the problem tree analysis is to identify critical points where the chain faces limitations that constrain the performance of the participants within the chain. A problem tree analysis reveals the causes and effects of such limitations with the aim to identify potential solutions to overcome the limitations (Lundy *et al.*, 2004). A problem tree is compiled by first identifying the main limitation(s) that constrains the performance of the market participants under consideration. Participants are then asked to identify the causes for the specific limitations to get a better understanding of the central problem and its causes.

Based on discussions with key role-players, the major problem facing the community of Eksteenskuil raisin producers is their inability to produce sufficient volumes of good quality raisins to meet the demand for fair-trade raisins. The findings from the application of the integrated

framework confirm the concern of the role-players. Figure 3.5 shows the problem tree for the problem of Eksteenskuil raisin producers' not being able to produce a sufficient volume of choice grade raisins to meet the demand for fair-trade raisins. The problem tree was compiled based on discussions with the key role-players mentioned earlier, as well as from information obtained from the questionnaire survey.
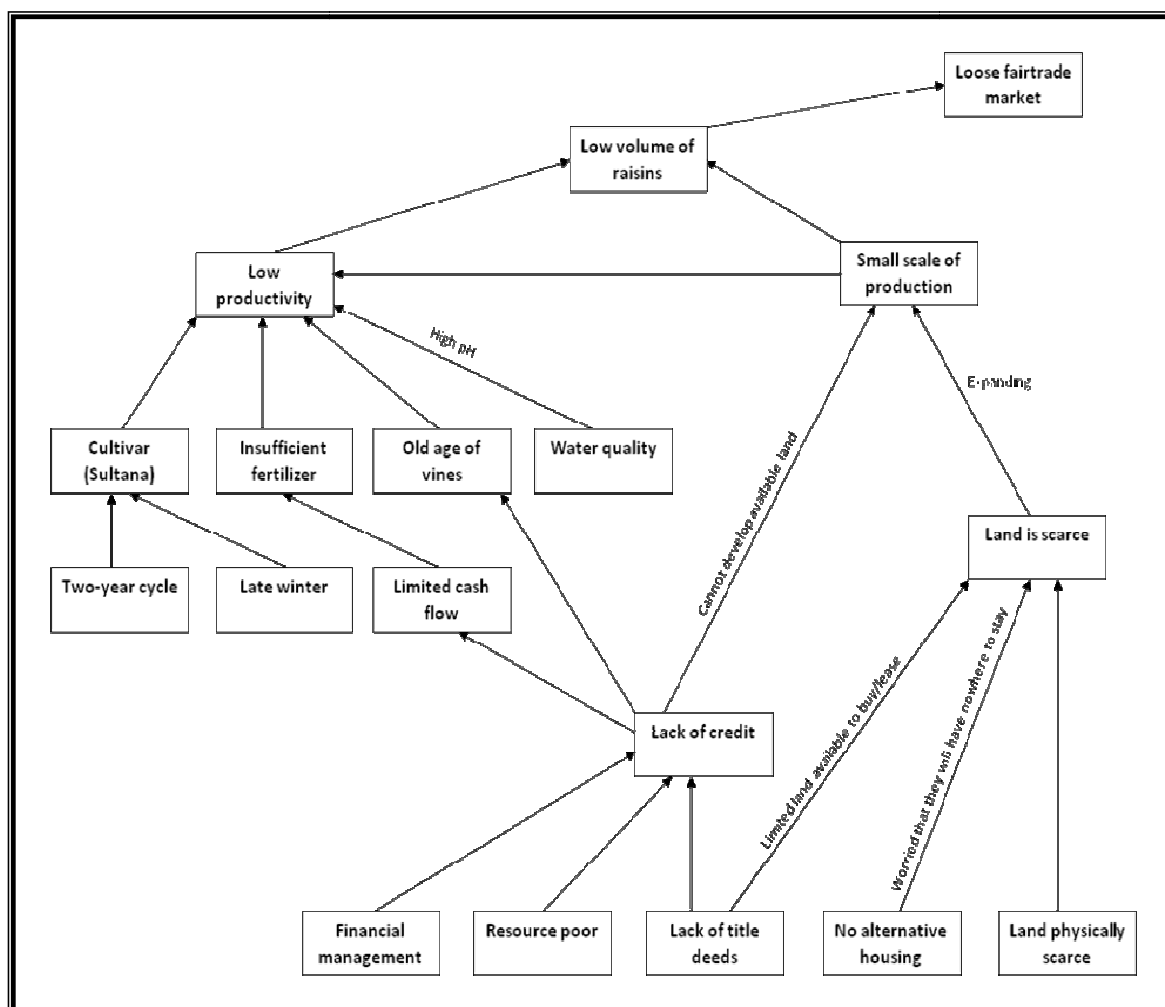
Figure 3.5:   Problem tree to investigate low volumes of raisins produced by Eksteenskuil raisin producers

Figure 3.5 shows that there are mainly two causes for the low volumes of raisins produced by Eksteenskuil raisin producers; the scale of operations is too small; and the general level of efficiency of raisin production by Eksteenskuil producers is insufficient.

Discussions with key role-players identified some causes for the problem of small land sizes (Figure 3.5). First of all there is only a **limited** amount of additional **land** that is **available** for raisin production in the area. The scarcity of land again has three major causes. There **physically** is not

enough land available to allow all farmers to increase their scale of production. Secondly, progressive farmers who want to increase their scale of operations by buying or renting additional land from other farmers struggle to do so since most of the farmers in the area do not have the **title deeds** for their land. Those farmers who do not have the title deeds cannot legally sell or rent out their land, even if they do not want to farm any more. The inability of non-title deed holders to sell or lease (part of) their land to progressive farmers constrains progressive farmers from increasing their scale of production in order to benefit from economies of scale. The third factor that leads to the limited amount of available land is the fact that Eksteenskuil farmers also **reside on their farms**. It was mentioned that some farmers are reluctant to sell or rent out their land since they do not have another place to stay.

The lack of available land is not the only cause of the small scale of operations at Eksteenskuil. Some farmers indicated that, although they do have some land available to establish vines, they do not have **access to credit** and hence they cannot financially afford the establishment of more vines. The cost of establishing one hectare of vines for dried grapes is in the region of R108 000/ha (Vinpro, 2009; Laubscher, 2009). The lack of access to credit, again, is caused, amongst others, by the fact that most of the farmers at Eksteenskuil do not have the **title deeds** for their land. Farmers who do not have the title deeds for their land cannot use the land as collateral for obtaining commercial credit. Farmers at Eksteenskuil typically can be considered to be **resource-poor**. Those farmers who do not have title deeds for their land and who do not have substantial off-farm income typically also do not have other assets that can serve as collateral for commercial credit. Such farmers cannot obtain credit to finance the establishment of grape vines. The last cause for the lack of access to credit was identified from a discussion with the SME Manager of ABSA Bank in the Free State Province. The manager argued that commercial banks would be willing to give credit to emerging farmers if the farmers have sound business plans to show how they will be able to repay the loans. The **lack of proper financial management** thus also causes the lack of access to credit.

As the second main cause for the low levels of raisins produced by Eksteenskuil raisin producers, the low level of efficiency with which they use their available resources too has a number of causes. First of all, in addition to having a direct impact on the low volume of raisins produced by Eksteenskuil raisin producers, the **small scale of production** also negatively affects the level of efficiency with which resources are used. The small scale of operations means that the vast majority of Eksteenskuil producers operate at diseconomies of scale. They need to increase their scale of operations in order to benefit from scale advantages.

Another cause of the low level of efficiency as identified by key role-players is the poor **quality** of the irrigation **water**. According to Baard (2009), the quality of the water has a major impact on the effectiveness of fertilisers and chemicals (pesticides and herbicides). An increase in the pH of the water negatively affects the level of efficiency of the applied fertilisers and chemicals. One of the commercial farmers in the region mentioned that he tested the pH of the water (on 12 August 2009) and found it to be 9.5 instead of the normal about 5. He was very concerned about the quality of the water. Similarly, 49 % of the respondents at Eksteenskuil listed the poor water quality as a threat to their operations.

The low level of efficiency is further caused by the fact that some farmers apply **fertiliser** at lower than the recommended levels (or they do not apply any fertiliser at all), and some farmers also tend to apply fertiliser later than the recommended application dates. According to Baard (2009), the timely application of fertiliser to vines is of the utmost importance. If it is not applied in time, the level of efficiency drops substantially. The main reason why farmers do not apply sufficient amounts of fertiliser in time relates to their poor cash flow positions. Similar to other emerging farmers, most Eksteenskuil farmers face a severe cash flow constraint. The main cause of the cash flow constraint is the lack of **access to credit**. As mentioned above, most of the Eksteenskuil farmers do not have access to credit since they do not have the title deeds for their land, and they do not own other assets that may serve as collateral for commercial credit providers. Most farmers also do not have written business plans and complete financial statements that can prove to credit providers that they will be able to repay loans. Interestingly, the lack of cash flow is further exacerbated by the low volume of raisins (the major problem) that is produced at Eksteenskuil. The small land sizes imply that farmers can generate a relatively low amount of net farm income.

Although the potential profit of golden raisins is substantially higher than that for Thompson's Seedless raisins, few (only five) Eksteenskuil farmers are producing golden raisins. Compared to Thompson's Seedless raisins that are sun dried on cement slabs, the process to produce golden raisins requires wooden trays on which grapes are placed to be smoked with sulphur. Again, the lack of access to credit prohibits the majority of Eksteenskuil farmers from buying the required trays in order to produce golden raisins. They thus have to settle with producing the lower income generating Thompson's Seedless raisins.

When the potential profit for Thompson's Seedless of R37 534/ha is considered, the profit for the median size farm can be R75 068. Keeping in mind that the average household at Eksteenskuil consists of 4.22 family members (Kruger, 2010), two hectares of optimally produced Thompson's Seedless raisins may struggle to cover the living expenditures of Eksteenskuil farmers. The limited

cash flow thus contributes to low volumes of raisins which again contribute to limited cash flow. It is thus a cycle that feeds on itself to constrain the performance of Eksteenskuil raisin producers.

Inefficient production practices are also caused by the **old age** of vines at Eksteenskuil. The economic life of Sultanas is in the region of 25 years (Brink, 2009; Kok, 2009; Laubscher, 2009; and Roberts, 2009). A number of respondents indicated that their vines are in excess of 35 years of age. The old age of the vines lead to progressively smaller yields and hence progressively lower profits. Again, the inability to obtain **credit** implies that farmers cannot finance the re-establishment of vines. Keep in mind that grapes cannot be harvested within the first four years after planting. Farmers will thus need funds to finance the re-establishment of vines, and to cover living expenditures during the period when they cannot harvest.

The last cause for the low level of efficiency is the grape variety that is used to produce raisins. Farmers at Eksteenskuil mainly produce **Sultana** grapes which are known to have substantial variations in yields from one year to the next. As a matter of fact, Sultanas are known to be high yielding every second year and low yielding the other year (Brink, 2009; Kok, 2009; Laubscher, 2009; and Roberts, 2009). The **nature of the Sultana variety** thus contributes to the low level of efficiency of Eksteenskuil raisin producers in certain years. In addition to the huge variations in yields, Sultanas also start to blossom relatively early in September. **Extreme cold** during the blossom stage has a major negative impact on the yield to be obtained. Farmers have indicated that such periods of late cold occur more frequently in recent years and attributed it to the phenomenon of climate change.

From the above discussion it is clear that there are a number of stumbling blocks that cause the low volume of raisins that are produced by Eksteenskuil raisin producers. The stumbling blocks that were identified by means of the problem tree analysis correspond very much to the stumbling blocks that were identified in the literature review on the factors that contribute to excluding emerging farmers from participating in commercial agri-food chains. The problem tree analysis thus shows that the farmers from Eksteenskuil still face the same problems as other emerging farmers, but they are more successful in overcoming/managing the challenges to be able to participate successfully in the fair-trade market. Although some of those stumbling blocks are external and cannot easily be overcome, there are some that can be used as leverage points to assist Eksteenskuil farmers to increase the volume of raisins they produce.

3.4   DISCUSSION AND CONCLUSIONS

The objective of Chapter 3 was to characterise the behaviour and performance of the raisin producers from Eksteenskuil in their social, physical and institutional environments. From the SCP analysis one may conclude that the physical environment and the behaviour of actors within the market constrain the performance of the Eksteenskuil raisin producers. Although the natural environment is very conducive to the production of good quality raisins, the raisin producers from Eksteenskuil face similar constraints that act as stumbling blocks that normally exclude emerging farmers from participating in commercial agri-food chains. However, contrary to the successful exclusion of emerging farmers from participating in commercial agri-food chains, the Eksteenskuil raisin producers do operate in a sophisticated value chain despite the stumbling blocks they face. The farmers get a good income from the choice grade raisins that are exported via the fair-trade initiative, and the role of the private sector, especially SAD and Traidcraft, is also very evident. The fair-trade initiative created an incentive for SAD and Traidcraft to actively support the farmers from Eksteenskuil to meet the stringent requirements for the export of the raisins. Despite the relatively high income earned by Eksteenskuil farmers for their choice grade raisins, a cause for concern is the steady decline in the volumes of raisins that are produced. The SCP analysis shows that the decline may be caused by the constraints posed by the farmers' physical environment. Thus, although the farmers from Eksteenskuil are currently able to overcome the constraints associated with the physical environment, such efforts likely will not be sustainable. Recommendations by NPC (2011) to improve road and communication infrastructure and to transfer secure tenure to farmers in rural areas, and government's commitment to do so already in 2009 through CRDP (2009), have to be implemented without further delay. Similarly, the plan of government to make credit available to emerging farmers through the Micro-Agricultural Finance Institutions of South Africa (Mafisa) scheme (CRDP, 2009) also has to be implemented promptly. Failure by government to comply with its own recommendations and commitments may cause the once success story at Eksteenskuil to cross-over to the bulk of failures that are documented in the literature.

Based on application of the NIE framework to characterise the production and marketing of raisins by the farmers from Eksteenskuil, the conclusion is that the social and institutional environments of the Eksteenskuil farmers do affect the way they operate and perform. The analysis of the levels of social embeddedness of the farmers highlighted the reasons why the farmers from Eksteenskuil have a negative perception of government. The majority of farmers are still waiting for the transfer of the title deeds into their names, and the farmers also perceive government to be unwilling to support them. There are also some internal political issues that affect the behaviour of the farmers. Interestingly, some of the internal political ructions are caused by the "interference" of external

parties who actually aim to contribute to alleviating poverty within the Eksteenskuil community. Care should be taken by organisations to consider the social dynamics within the community when entering a community with projects that aim to benefit the community.

One can also conclude that, if the incentives are correctly aligned and the necessary support structures are available, emerging farmers may be willing and able to comply with stringent requirements to participate in commercial agri-food chains. In terms of the institutional environment within which the farmers from Eksteenskuil operate, it is evident that the farmers do comply with a number of strict rules and regulations in order to be able to participate in the fair-trade initiative. While one would have expected that resource-poor farmers would struggle to meet the requirements, the farmers from Eksteenskuil prove that being resource-poor should not necessarily exclude one from participating in lucrative export markets. Through institutional innovation by the fair-trade initiative, a level of complementarity was created that incentivise SAD and Traidcraft to support the farmers to meet the requirements. SAD and Traidcraft have a vested interest in the performance of the farmers since they only benefit from the fair-trade initiative through getting access to the raisins produced by the farmers from Eksteenskuil. The results also show that farmers can be incentivised to organise themselves in an appropriate collective entity (i.e. an agricultural co-operative in the case of Eksteenskuil) if business conditions are such that the farmers will benefit financially from collective action. Incentives that stimulate farmers' efforts to conduct business will ensure that farmers will organise themselves in the appropriate collective entity (if necessary), and that incentives are used for the correct purpose. Ultimately, the case of Eksteenskuil thus proves that one can change the behaviour of resource-poor farmers and their transacting partners by means of correctly aligned incentives through institutional innovation.

The support structures have a major role to play in the case of Eksteenskuil. Although there are a number of strict rules and regulations that have to be met by the farmers from Eksteenskuil who want to participate in the lucrative fair-trade value chain, there are support structures that assist the farmers to meet the requirements. Especially SAD and Traidcraft do have an incentive to support the farmers from Eksteenskuil. Both parties have a vested interest in the performance of the farmers since they only benefit from the fair-trade initiative for the raisins that are produced by the farmers from Eksteenskuil that meet the requirements to be exported through the fair-trade initiative. Evidently, if the incentives are aligned correctly, the private sector is willing to support emerging farmers. It is noted that government played no role in establishing the supporting relationship between SAD and the farmers from Eksteenskuil. It is merely a result of incentives that were aligned such that SAD benefit only through the performance of the farmers from Eksteenskuil.

The case of Eksteenskuil also provides evidence that there may be merit in the question in NPC (2011) whether extension and other agricultural services are appropriately located at provincial level. The supporting role played by SAD, especially in terms of technical advice and support for the raisin producers from Eksteenskuil cannot be overlooked. Since the technical advisor from SAD already has the know-how for the production of raisins, the vested interest of SAD in the performance of the farmers from Eksteenskuil ensure that the technical advisor transfer the necessary knowledge and advice to the farmers to produce maximum yields. It is important to note, however, that the level of effort from agro-processing companies to provide effective extension services depend very much on the incentive the company has. A vested interest in the performance of the emerging farmers may be sufficient to incentivise an agro-processing company to perform extension services. Government thus may be well advised to investigate ways that will give agro-processing companies a vested interest in the performance of the emerging farmers to incentivise them to perform the necessary extension services.

The problem tree analysis leads to the conclusion that the major constraint faced by the raisin producers from Eksteenskuil in terms of producing high volumes of good quality raisins, is the lack of cash flow. Again the lack of cash flow is caused by some institutional problems, but also by some factors within the control of the farmers. While waiting for government to sort out the institutional problems (i.e. transferring the title deeds for the land to the farmers) the farmers can start keeping sound financial records. Sound financial records and business plans may also convince commercial credit providers to award the farmer with a production loan. The farmers thus should not only wait for government to correct institutional problems. They should do whatever they can to overcome the constraints.

The conclusion that the lack of cash flow is central to the stumbling blocks that constrain the behaviour of the farmers from Eksteenskuil concludes Chapter 3. Within Chapter 4 the levels and determinants of social capital of the different groups of farmers are explored.

SOCIAL CAPITAL ANALYSIS OF THE EKSTEENSKUIL FARMERS

4.1   INTRODUCTION

One of the major stumbling blocks that contribute to the exclusion of emerging farmers from participation in commercial agri-food chains relates to the inability of emerging farmers to ensure consistent supply of good quality produce (Baloyi, 2010; Vermeulen *et al.*, 2008). The small scale of operations (Khaile, 2012; Boloyi, 2010; Ntsonto, 2010; Perret, 2002; and Matungul *et al.*, 2001) implies that individual emerging farmers will not be able to consistently supply produce to the buyer. Collective action is advocated to be a solution to overcome such stumbling blocks to allow emerging farmers from South Africa to participate in commercial agri-food chains (Weatherspoon and Reardon, 2003). The South African government too considers collective action (more specifically agricultural co-operatives) as a solution to link emerging farmers to markets (South African LED Network, 2012; NPC, 2011). The role of social capital in the functioning of collective entities suggests that social capital is expected to have a major role to play in the performance of emerging farmers who have to operate collectively.

Social capital consists of observable but non-contractual elements such as trust, shared norms and social networks (Slangen, 2005). Putnam (1993) indicates that social capital refers to social connections or networks, norms and trust that can facilitate cooperation in society. Social capital is not a new topic for research in South Africa. Social capital is widely considered by researchers in healthcare (Kaschula, 2011; Hunter, Patterson and Twine, 2009; Pronyk *et al.*, 2009; Chiu *et al.*, 2008; and von Maltitz, 2005), and also in research on adaptive behaviour to climate change in South Africa (Bryan *et al.*, 2009; Thomas *et al.*, 2007; Vincent, 2007). Another study that is more relevant to the aim of this study is a study by Jari and Fraser (2009) who considered social capital as a determinant of marketing behaviour of smallholder farmers in the Eastern Cape Province of South Africa. Jari and Fraser (2009) measured the social capital of respondents by asking them how they relate to their buyers and whether any of the buyers were regular customers. Their measure of social capital is based on the assumption that trust is developed and regular exchange between transacting partners is encouraged through personal social networks. Jari and

Fraser (2009), however, make no attempt to measure trust levels and the levels to which the farmers get along with other people (cognitive social capital).

To the author's knowledge, no researchers have quantified the different types of social capital of emerging farmers in South Africa. Nor have any of the researchers explored the relationships between the personal characteristics of the farmers and their social capital levels. The objective of Chapter 4 is to explore the social capital levels of emerging farmers from Eksteenskuil. The levels of cognitive and structural social capital are quantified first to get insight into the degree of trust and a sense of belonging the farmers have within their communities, and the degree to which the farmers actively participate in formal organisations (i.e. church and agricultural co-operative). The cognitive and structural social capital scores then are used to compile an overall social capital index for each farmer. After the social capital levels of the respondents are described, the next step of the analysis is to explore the relationship between the personal characteristics of the respondents and their social capital levels. The compiled social capital index for each respondent is also used in Chapter 6 to determine whether or not the social capital levels of the respondents contribute to higher levels of efficiency, and hence performance.

Next the procedures for quantifying the social capital levels of the farmers from Eksteenskuil are discussed.

4.2   PROCEDURES

From the literature it seems that measuring social capital proves to be a challenge. Milagrosa (2007b) provides three possible reasons for the difficulty of measuring social capital. Firstly, she argues that social capital perceptions are highly subjective and it is "difficult to narrow down the subtleties of the population and to reduce the value of connectedness of a community to a number" (Milagrosa, 2007:16). The second reason centres around the fact that social capital is extremely dynamic and volatile since social capital dissolves once the ties between participants are broken. Social capital also needs to be renewed and used continuously otherwise its level will decrease. As the final reason, Milagrosa (2007b) states that trust, shared norms, beliefs and social networks cannot be entered into any formal written agreement, which, in combination with the fact that it is intangible, makes it extremely difficult to measure (Ostrom, 2000; Dasgupta, 1988, as cited by Milagrosa, 2007a).

Despite of the challenge of measuring social capital, Milagrosa (2007b) states that various approaches have been used to measure it. However, no standard measure of social capital can ever be achieved since the respective measurements are dependent on the definitions employed

by the researchers (Milagrosa, 2007b). Milagrosa (2007b) concludes furthermore that no single approach is superior to another.

Krishna and Shrader (2000) developed a framework that can be followed to measure social capital. The framework is shown in Figure 4.1.
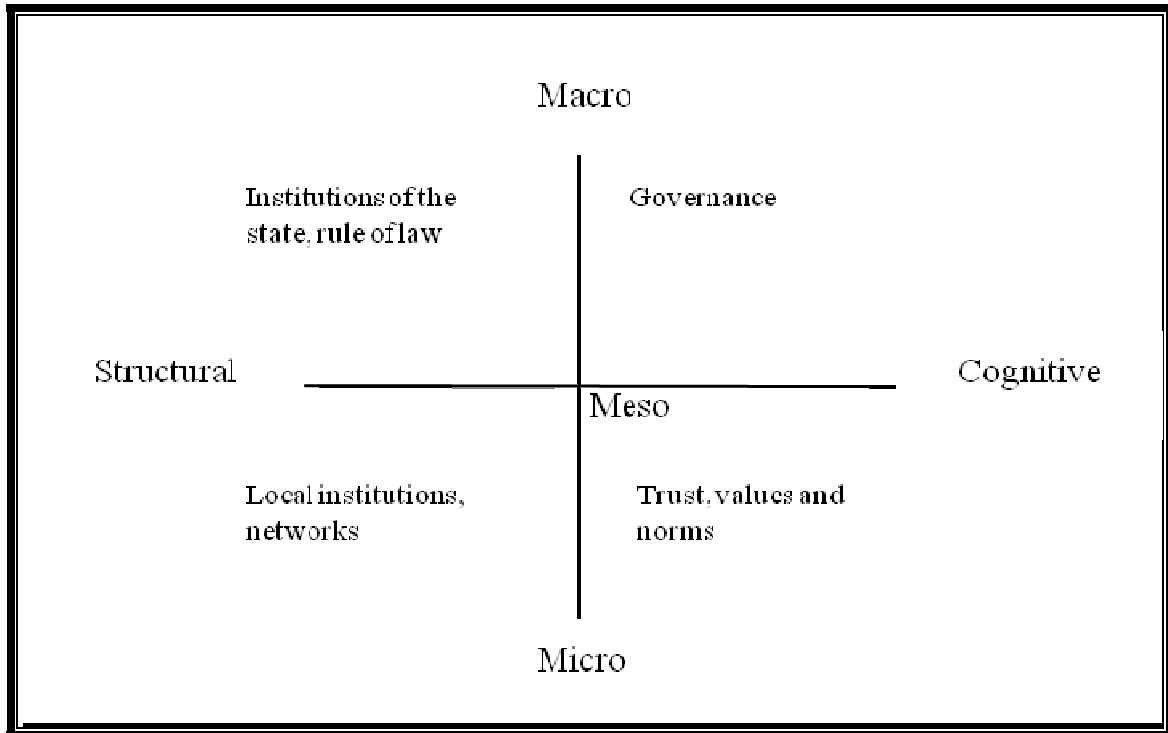
Figure 4.1:   Forms and scope of social capital

Source: Grootaert and Bastelaer (2002)

The first concept in Figure 4.1 is structural social capital. Structural social capital is tangible and deals with formal institutions. The level of structural social capital depends on membership of formal networks or local organisations such as churches, sports clubs or local government. The second concept is cognitive social capital and this is perceived to be embedded within people in the form of trust, local ethics, tradition and morals. By definition, cognitive social capital is thus intangible. Figure 4.1 also shows that measurement of social capital occurs along three dimensions, from the micro dimension, through the meso to the macro dimension. While the micro dimension captures horizontal networks and norms that motivate such associations, the meso dimension describes both horizontal and vertical interaction. The macro dimension again focuses on the wider institutional and political sphere.

When investigating levels of social capital, Krishna and Shrader (2000) suggest that one should first analyse the indicators of structural and cognitive social capital independently. Thereafter, the two can be aggregated and analysed together.

- **Structural social capital**

Recall that the structural social capital component is tangible and only refers to the respondent's membership of formal organisations. Respondents are asked in the questionnaire whether they are active members of, for example, a religious group, political party, farmers' co-operative, etc. The more organisations the respondent is an active member in, the higher his level of structural social capital. The structural social capital index is thus (Milagrosa, 2007a):

$$SSC_i = \sum membership_i$$

where SSC_i refers to the structural social capital of farmer i, and $membership_i$ refers to membership of farmer i to the various organisations presented in the questionnaire.

- **Cognitive social capital**

In order to measure the respondent's level of cognitive social capital, a 5-point scale can be used in the questionnaire to obtain information on all indicators necessary to measure cognitive social capital. Respondents were asked to indicate, amongst others, the degree to which they trust and get along with their family members, friends, other farmers, and members of the community; the degree to which they trust the legal system and the police services of South Africa; and the degree to which they are satisfied with their current situation and optimistic about the future.

The individual value for cognitive social capital indicators $\dfrac{SCIndicator_{ji} - 1}{J}$ is used, where ji refers to the cognitive social capital dimension j of farmer i. The product is multiplied by a factor representing the within group weight (wgw_j) of the variables being analysed. The within group weight depends on the number of items included in the measurement of the specific indicator (j). The total level of cognitive social capital is then calculated by adding the individual values of the cognitive social capital indicators together. Cognitive social capital therefore is (Milagrosa, 2007a):

$$CSC_i = \sum_{j=1}^{J}\left(\frac{\left(\sum SCIndicator_{ji}\right)-1}{J} * wgw_j\right)$$

j=1..., J

where *CSC$_i$* is the cognitive social capital of respondent *i*; SCIndicator$_{ji}$ is the score for social capital indicator *j* for respondent *i*; and *wgw$_j$* is the within group weight which depends on the number of items included in the measurement of the specific indicator.

- **Social capital index**

Once the structural and cognitive social capital levels have been analysed individually, an overall social capital index is calculated by adding the cognitive and structural social capital together, as shown in the following equation:

$$SCI_i = CSC_i + SSC_i$$

where *SCI$_i$* is the social capital index of respondent *i*, *CSC$_i$* is the cognitive social capital of farmer *i*, and *SSC$_i$* is the structural social capital of respondent *i*.

The social capital index thus contains information on both the respondent's structural social capital and his/her cognitive social capital. Next the results from the analyses of the social capital of the farmers from the three study areas are presented and discussed.

4.3 RESULTS FROM SOCIAL CAPITAL ANALYSIS OF RAISIN PRODUCERS FROM EKSTEENSKUIL

4.3.1 *COGNITIVE SOCIAL CAPITAL LEVELS OF RAISIN PRODUCERS FROM EKSTEENSKUIL*

The levels of cognitive social capital for raisin producers from Eksteenskuil is measured based on the level (on a five-point Likert scale) to which respondents agreed with a number of statements that serve as proxies for social capital. Structural social capital is measure based on individuals' participation in formal organisations. The first step when analysing the levels of social capital is to investigate the dimensions underlying the social capital of Eksteenskuil raisin producers. The

dimensions are investigated by means of factor analysis of the farmers' responses to the above mentioned statements. Thereafter social capital indices are compiled for each individual.

Factor analysis to investigate dimensions underlying social capital of raisin producers from Eksteenskuil

Given that all of the statements aim to measure the same underlying factor (cognitive social capital), factor analysis was used to investigate the underlying structure in the responses to the questions aimed at measuring the levels of cognitive social capital of respondents.

Based on the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, 13 of the original 20 questions were deemed to measure the same underlying aspect and were included in the factor analysis. Using the eigen-value criteria (eigen-value of 1 is the cut-off value for the inclusion of a factor), four principal components had eigen-values greater than one and explain 72.5% of the variance in the farmers' responses to questions aimed at quantifying their levels of social capital. The 13 variables thus were grouped into four factors. All of the variables that were included in the analysis have communalities greater than 0.5, with 10 of the 13 variables having communalities greater than 0.7. The extracted factors thus explain in excess of 50% of the variation in each of the variables that were included in the analysis. The 13 variables thus do measure the same underlying aspect, and the four factors extracted with the factor analysis do represent all 13 variables to a satisfactory level.

Varimax rotation was applied to ensure that each variable loaded high on as few factors as possible. The rotated component matrix is presented in Table 4.1. Table 4.1 shows that none of the variables have factor loadings greater than 0.5 in more than one factor.

Table 4.1 shows that the variables that loaded high in the first factor include "I trust the legal system", "I trust the municipal government", "I trust the police", and "I trust the board of EAC" (Eigen-value of 4.41). The first factor thus indicates that a person who trusts the legal system normally also trusts the municipal government, the police and the board of EAC. Given the respective variables that load high in the first factors, Factor 1 was called "institutional trust".

Table 4.1: Rotated component matrix[1] to show the dimensions underlying social capital of raisin producers from Eksteenskuil

	Component			
	Institutional trust	Core trust	Informal network	General trust
I trust the legal system	**0.843**	-0.090	0.109	0.215
I trust the municipal government	**0.813**	0.111	-0.043	0.062
I trust the police	**0.786**	0.231	-0.201	0.077
I trust the board of EAC	**0.603**	0.149	0.132	0.457
I trust my friends	-0.025	**0.828**	0.182	-0.007
People are trustworthy	0.112	**0.824**	-0.041	0.292
I trust other farmers	0.256	**0.722**	0.283	0.253
I'm trustworthy	0.275	**0.524**	0.120	0.411
I get along with my friends	-0.250	0.195	**0.837**	0.078
I get along with my family	0.284	0.024	**0.805**	0.150
I get along with other farmers	-0.148	0.493	**0.641**	-0.210
I trust the church and its people	0.228	0.231	-0.226	**0.823**
I feel safe in my neighbourhood	0.115	0.140	0.266	**0.813**
Eigen value	4.41	2.60	1.36	1.06
Cronbach's Alpha	0.81	0.80	0.73	0.69

[1] Rotation converged in six iterations

The variables that load high in the second factor include "I trust my friends", "People are trustworthy", "I trust other farmers", and "I'm trustworthy" (Eigen-value of 2.60). A person who believes that people generally are trustworthy also believes that he himself is trustworthy, and he also trusts his friends and other farmers. The second factor was called "core trust".

"I get along with my friends", "I get along with my family", and "I get along with other farmers" loaded high in the third factor (Eigen-value of 1.36). A person who gets along with his friends thus also gets along with his family and other farmers in the region. Since all of the variables are concerned with the level to which the farmer gets along with other people, the third factor was called "Informal networks".

The last factor contains "I feel safe in my neighbourhood" and "I trust the church and its people" (Eigen-value of 1.06). A person who trusts the church and its people thus also feels safe in his neighbourhood. The fourth factor was called "general trust".

Cronbach's Alpha was calculated for each of the extracted factors to assess the reliability of internal consistency within each factor. The first factor had a Cronbach's Alpha value of 0.81, and Factors 2, 3, and 4 had Cronbach's Alpha values of 0.80, 0.73, and 0.69 respectively. The high

Cronbach's Alpha values suggest that the internal consistency in all four factors is reliable and hence each item is measuring the same concept as the overall factor. The Cronbach's Alpha value of all the social capital statements altogether is 0.83. The high value of the Cronbach's Alpha on all of the variables that were used as proxies for social capital suggest that there is consistency between all of the statements that were used to measure the level of social capital of the raisin producers from Eksteenskuil.

Compiling cognitive social capital indices for raisin producers from Eksteenskuil

The values of the indicator that represents cognitive social capital range from zero to 50. A value of zero indicates no cognitive social capital, and a value of 50 indicates full cognitive social capital. When looking into more detail in the respective components of the cognitive social capital index shown in Table 4.2, one can see that the average scores for institutional trust and core trust are greater than 10, while the average scores for Informal networking and general trust are 7.19 and 3.27 respectively. This suggests that the cognitive social capital levels of raisin producers from Eksteenskuil are mainly driven by the core trust of farmers, and the levels to which they trust government, the police service, the legal system of South Africa and the board of directors of EAC. The role played by trust in social capital is thus evident at the case of Eksteenskuil.

Table 4.2:   Descriptive statistics of farmers' scores for factors representing cognitive social capital

Standardised social capital factor	Average	Minimum	Maximum	Standard deviation
Institutional trust	10.14	1.39	20.65	4.45
Core trust	11.21	2.56	20.65	3.95
Informal networking	7.19	2.91	10.42	1.81
General trust	3.27	0.21	4.89	1.01

T-tests were used to statistically compare the means of the respondents' social capital scores for each of the factors extracted with the factor analysis. Except for the mean values for institutional trust and core trust, all of the means of the respective factors are statistically different at a one percent level of significance. Thus, the average levels of institutional and core trust of the respondents from Eksteenskuil are significantly higher than the levels to which the respondents indicated that they associate with other farmers in the region, and to trust the members of the community in general.

4.3.2   STRUCTURAL SOCIAL CAPITAL LEVELS OF RAISIN PRODUCERS FROM EKSTEENSKUIL

The levels of structural social capital of raisin producers from Eksteenskuil were measured as the sum of their active participation in formal organisations. A value of two was given to those respondents who indicated that they are active members of the organisation, a value of one to inactive members, while non-members scored a value of zero. The structural social capital of the farmers is also standardised to a value of 50. A value of 50 indicates full structural social capital (an active member of all of the listed organisations), while zero indicates no structural social capital (non-member of all of the listed organisations). The average score for the standardised structural social capital index of raisin producers from Eksteenskuil is 30.9 which is statistically significant lower than the average score for the cognitive social capital (p<0.01).

When evaluating the respondents' participation in formal organisations in more detail (Table 4.3), one can see that the average scores for members of the farmers' co-operative and members of farmers study groups are the highest (13.41 and 12.61 respectively), followed by membership in religious groups (9.43), and political parties (3.83) respectively. The high level of active participation in the farmers' organisations (co-operative and study groups) is expected since farmers from Eksteenskuil who want to benefit from the fair-trade initiative are obliged to be a member of EAC.

Table 4.3:   Descriptive statistics of farmers' participation in formal organisations

Formal organisation	Average	Minimum	Maximum	Standard deviation
Farmers' co-operative	13.41	0	22.22	4.42
Farmer study group	12.61	0	33.33	11.21
Religious / Church group	9.43	0	11.11	3.10
Political party or group	3.83	0	16.67	4.64

There is no statistically significant difference in the mean score for farmers being members of the farmers' co-operative and being members of farmer study groups (p<0.67). The difference of the mean score for being a member or the farmers' co-operative and being a member of a political party, and being a member of a religious group is significant (p<0.01). Similarly there is also a statistically significant difference in the mean score for being a member of a farmer study group and being a member of a religious and political group respectively (p<0.01). Although some farmers are members of other organisations, there is a clear incentive for farmers to participate in the farmers' organisations.

4.3.3 *COMPARISON BETWEEN STRUCTURAL AND COGNITIVE SOCIAL CAPITAL LEVELS OF RAISIN PRODUCERS FROM EKSTEENSKUIL*

A cumulative probability distribution function (CDF) is drawn from the respective standardised social capital indices to get a better understanding of the difference in the structural and cognitive social capital of raisin producers from Eksteenskuil. Figure 4.2 shows that the CDF for cognitive social capital lies to the right of the structural social capital.
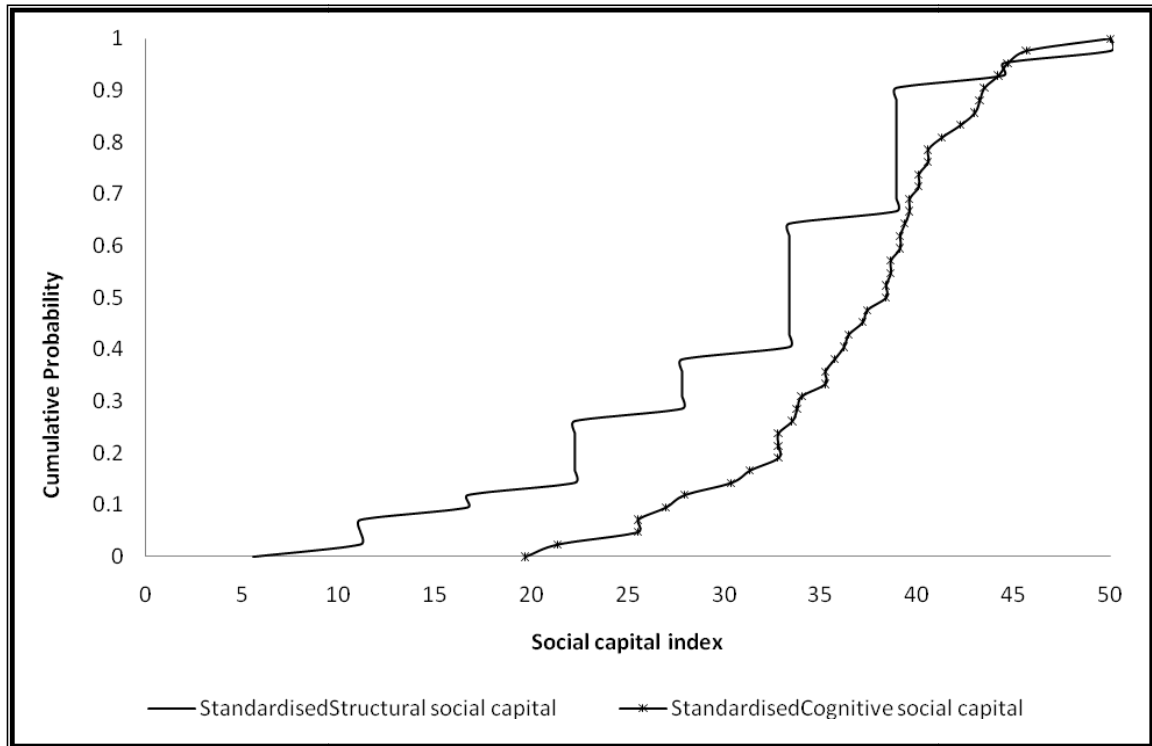
Figure 4.2: Cumulative probability distribution of the standardised structural and cognitive social capital of raisin producers from Eksteenskuil

Figure 4.2 shows that the standardised cognitive social capital levels of the respondents outperform the standardised structural social capital levels about 90% of the time. The minimum score for the cognitive social capital is about 20, compared to the minimum for structural social capital of about five. Thus, there are farmers who are rarely participating in organised group activities in the community. It is interesting to note that there is no significant correlation between the levels of structural and cognitive social capital. Thus, the levels to which the respondents indicated that they trust and get along with other people in the community do not significantly influence the level of active participation in organised group activities.

4.3.4 *OVERALL SOCIAL CAPITAL INDEX FOR RAISIN PRODUCERS FROM EKSTEENSKUIL*

The overall social capital index is calculated by adding the standardised cognitive social capital index to the standardised structural social capital index of each of the farmers. An overall social capital index of 100 thus implies full structural and cognitive social capital, while a value of zero would indicate no structural or cognitive social capital at all. A CDF graph of the overall social capital index for raisin producers from Eksteenskuil is shown in Figure 4.3.
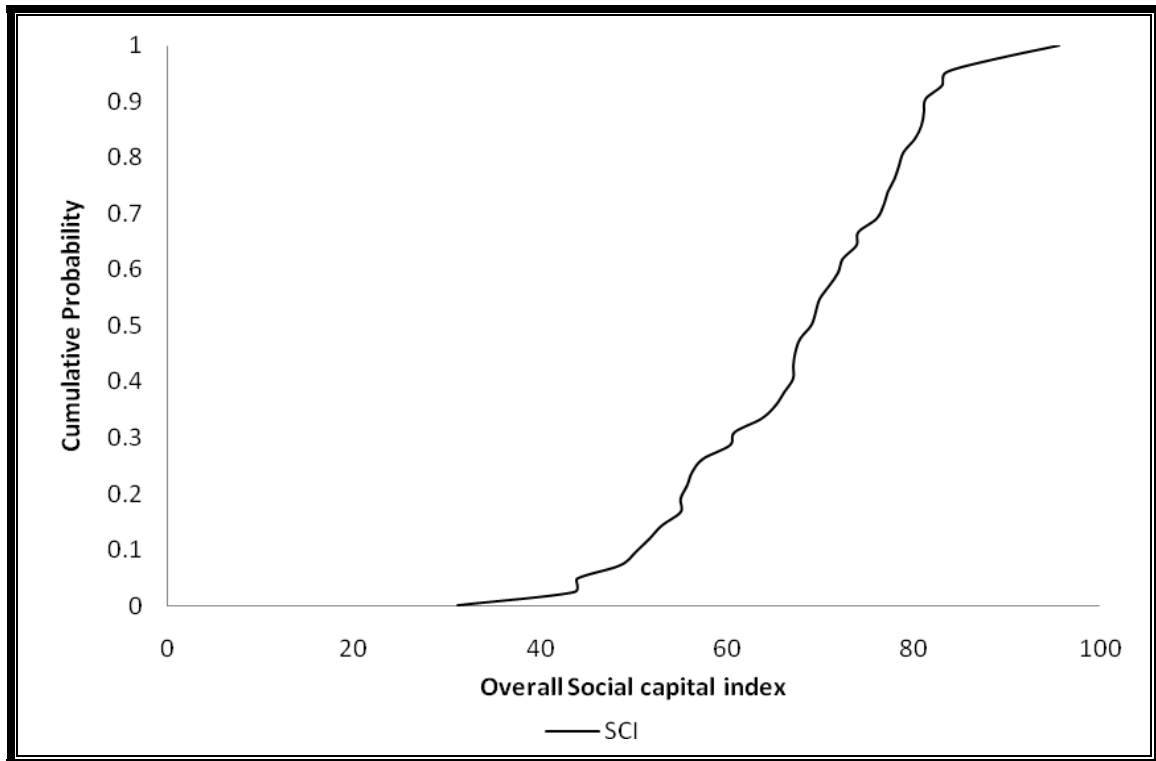
Figure 4.3: Cumulative probability distribution of the overall social capital indices of raisin producers from Eksteenskuil

The average score for the overall social capital index is 67.4 which seem to be relatively high. Figure 4.3 shows that the minimum overall social capital index achieved by a raisin producer from Eksteenskuil is about 30, while the highest index is about 95. Based on the results, none of the farmers from Eksteenskuil have full social capital, but also none of the farmers have no social capital at all.

The seemingly high levels of social capital of raisin producers from Eksteenskuil is good news since Eksteenskuil farmers can only benefit from the fair-trade initiative by working collectively. There seem to be generally high levels of trust and a sense of getting along amongst farmers and

99

members of the community. The nature of the transactions through which raisins are sold is such that it does not put a lot of pressure on the trust relationships between individual farmers. Farmers have complete autonomy with regard to the production of their raisins and selling them to SAD as the fair-trade affiliated processing company. The collective action only occurs when the raisins are collectively exported by SAD to the fair-trade affiliated buyer. Farmers thus have no direct influence on the performance of other farmers in terms of the production of raisins. The farmers, however, have to trust the management of EAC. EAC manages the transaction with the fairtrade buyer on behalf of the farmers. EAC thus has a direct impact on the bottom line of individual farmers.

The role of trust in the social capital of the farmers from Eksteenskuil leads to the conclusion that the social embeddedness of farmers from Eksteenskuil is expected to influence their behaviour within the raisin value chain. The fact that social embeddedness is not considered as a given in this study but rather was investigated in detail, allowed for important information to be generated with regard to the potential of collective action as a strategy to obtain economies of scale as recommended by NPC (2011).

Next follows an analysis of the influence of some of the personal characteristics on the social capital levels of the farmers from Eksteenskuil.

4.3.5 EXPLORING THE DETERMINANTS OF SOCIAL CAPITAL OF RAISIN PRODUCERS FROM EKSTEENSKUIL

4.3.5.1 Age and social capital

The correlation between age and the respective social capital indicators (Table 4.1) was assessed to determine whether or not there is any relationship between the age of respondents and their social capital levels. Table 4.4 represents the correlation coefficients that were calculated for the social capital indicators that were found to be significantly correlated with the age of the farmers. Only significant correlations are reported in Table 4.4. It is noted that a 15% significance level was considered to be acceptable since the aim is only to get an idea of possible relationships rather than predicting social capital levels based on the age of the respondents.

Table 4.4:   Correlation coefficients between social capital indicators and farmers' age

Social capital indicator	Correlation coefficients (2-tailed test of significance)
Government treat everybody equally	0.489***
Active member of church	0.277**
Active member of co-operative	0.327***

***, **, * indicate statistical significance at 5%, 10% and 15% levels of significance.

Table 4.4 shows that there is a positive and significant correlation between the age of the farmers and the level to which they believe that government treats everybody equally (p<0.05). The positive correlation suggests that the older farmers have higher levels of institutional trust than the younger farmers. There are also positive correlations between the age of the farmers and the level of active participation in church activities (p<0.10) and activities organised by EAC (p<0.05). The positive correlation between the age of the farmers and their participation in formal organisations in their region suggests that age may have a positive impact on the level of structural social capital of the farmers.

In order to confirm whether or not age does have a significant influence on the social capital indicators the non-parametric ANOVA test of Mann-Whitney is applied. The farmers were divided into two groups based on the median age of the farmers. The Mann-Whitney test was applied to test a number of hypotheses aimed at exploring whether or not there is a difference in the median of the social capital indicators between farmers who are younger than the median age, and farmers who are older than the median age. The results are presented in Table 4.5.

Table 4.5:   Mann-Whitney tests for age and social capital indicators

Hypotheses	Asymptotic Sig. (2-tailed)	Decision Rule
H0: There is no difference between young and old people in terms of the perception that government treats everybody equally.	0.002	Reject H0
H0: There is no difference in the active participation in church activities between young and old farmers.	0.027	Reject H0
H0: There is no difference in the active participation in co-operative activities between young and old farmers.	0.098	Reject H0

Table 4.5 shows that there is a significant difference between the farmers younger than the median age and farmers who are older than the median age in terms of the perception that government treats everybody equal (*p*<0.01), and the active participation in church (*p*<0.05) and co-operative (*p*<0.10) activities. The older group of farmers have a stronger belief that

government treats everybody equal, and are also more actively involved with the church and activities organised by EAC than their younger counterparts. The results presented in Table 4.5 moreover prove that the correlations from Table 4.4 are caused by the age of the farmers and not statistical noise.

Next, the relationship between the education levels of the farmers and their levels of social capital is explored.

4.3.5.2 Education and social capital

The correlation coefficients between the level of formal education of the farmers and the social capital indicators that exhibit significant correlation are shown in Table 4.6. Table 4.6 shows that there are only two social capital indicators that are significantly correlated with the level of formal education of the farmers. The level of optimism regarding the future is positively correlated to education levels ($p<0.05$), while a negative correlation exists between formal education and the degree to which respondents indicated to get along with their family members ($p<0.05$). The more educated farmers thus seem to be more optimistic with regard to the future, however, they tend to get along worse with their family members than the farmers with lower education levels.

Table 4.6:   Correlation coefficients between social capital indicators and farmers' education

Social capital indicator	Correlation coefficients (2-tailed test of significance)
Get along with family members	-0.310***
Optimism	0.369***

***, **, * indicate statistical significance at 5%, 10% and 15% levels of significance.

In order to test whether the correlation is caused by the education levels of the respondents and not noise in the data the Mann-Whitney test was used. The respondents again were divided into two groups based on the median of the number of years of formal education completed. The farmers who completed more than the median number of years of formal education (eight years) were awarded a value of one, and the others a value of zero. Table 4.7 shows the results from the Mann-Whitney tests.

Table 4.7:   Mann-Whitney tests for education and social capital indicators

Hypotheses	Asymptotic Sig. (2-tailed)	Decision Rule
H0: There is no difference between the levels to which lower and higher educated farmers get along with their families.	0.119	Reject H0
H0: There is no difference between the optimism of lower and higher educated farmers.	0.125	Reject H0

The first hypothesis that was tested is that there is no difference between lower and higher educated farmers in terms of the way they get along with their families. Table 4.7 shows that the hypothesis is rejected which implies that there is a significant difference ($p<0.15$). The less educated respondents prove to get along better with their families than the more educated respondents. On the other hand, the rejection of the second hypothesis ($p<0.15$) suggests that the more educated farmers are more optimistic about the future than the less educated farmers. In the next section the relationship between the experience and social capital levels of the farmers are explored.

4.3.5.3 Experience and social capital

Table 4.8 shows the correlation coefficients between experience and the social capital indicators that are significantly correlated with experience. From Table 4.8 can be seen that five social capital indicators are significantly correlated with the experience levels of the respondents. Two of the indicators are positively correlated with experience. The perception that government treats everybody equal ($p<0.15$) and the level to which respondents get along with other members in the community ($p<0.10$) are positively correlated with experience. The other indicators are negatively correlated with experience. Higher levels of experience are associated with lower levels of optimism of the future ($p<0.10$) and current levels of satisfaction ($p<0.15$). There is also a negative correlation between experience and the farmers' trust in government's policies towards agriculture ($p<0.15$).

Table 4.8:   Correlation coefficients between social capital indicators and farmers' experience

Social capital indicator	Correlation coefficients (2-tailed test of significance)
Optimism	-0.290**
Happy and satisfied with life	-0.245*
Get along with members from community	0.274**
Trust government policies towards agriculture	-0.255*
Government treats everybody equally	0.288*

***, **, * indicate statistical significance at 5%, 10% and 15% levels of significance.

Similar to the age and education of the respondents, the respondents again were divided into two groups based on the median number of years of experience of the farmers to test whether or not experience levels do influence the social capital indicators. The results from the Mann-Whitney tests are shown in Table 4.9.

Table 4.9: Mann-Whitney tests for experience and social capital indicators

Hypotheses	Asymptotic Sig. (2-tailed)	Decision Rule
H0: There is no difference between the optimism of lesser and more experienced farmers.	0.017	Reject H0
H0: There is no difference between the levels of satisfaction of lesser and more experienced farmers.	0.456	Accept H0
H0: There is no difference between lesser and more experienced farmers in terms of the way they get along with members in the community.	0.146	Reject H0
H0: There is no difference between lesser and more experienced farmers' perceptions of government's policies towards agriculture.	0.279	Accept H0
H0: There is no difference between lesser and more experienced farmers' perceptions of equal treatment from government.	0.078	Reject H0

The results from Table 4.9 show that two of the hypotheses are not rejected. Firstly, the hypothesis that there is no difference between the levels of satisfaction of the less experienced and the more experienced farmers is accepted. By implication, the significant correlation that was identified in Table 4.8 is caused by noise in the data and not the relationship between the experience of the farmers and their levels of satisfaction. Similarly, the hypothesis that there is no difference between lesser experienced and more experienced farmers' perceptions towards government's policies towards agriculture is also accepted. Again the correlation proves not to be caused by the relationship between the farmers' experience and their perception of the policies, but rather by noise in the data.

On the other hand, the Mann-Whitney tests show that there is a difference between lesser experienced and more experienced farmers in terms of their levels of optimism ($p<0.05$), the levels to which they get along with other members in the community ($p<0.15$), and the perception of equal treatment from government ($p<0.10$). Less experienced farmers are more optimistic about the future than the more experienced farmers. On the other hand, more experienced farmers tend to get along better with other members of the community, and they believe that government treats everybody equally more so than the farmers with less experience.

The discussion of the relationship between experience levels and the social capital of the respondents concludes the social capital analysis of the farmers from Eksteenskuil. Next follows a brief discussion and some conclusions that were drawn from the analysis of the social capital of the raisin producers from Eksteenskuil.

4.4   DISCUSSION AND CONCLUSIONS

The results from the quantification of the social capital levels of the farmers from Eksteenskuil show that the respondents have relatively high levels of social capital. The average levels of cognitive and structural social capital of the respondents are in excess of 70%. Interestingly, the standardised cognitive social capital levels of the farmers are higher than the standardised structural social capital levels of the farmers. Most of the respondents thus indicated higher levels of trust and associatedness with other people in their surroundings compared to their active participation in formal organisations. Although lower than the cognitive social capital, the structural social capital scores of the different groups of respondents still are high. Given the central role of collective action among the farmers from Eksteenskuil to access the incentives from the fairtrade initiative, the high levels of social capital of the respondents are comforting.

The relatively high levels of institutional trust of the farmers suggest that the farmers do trust the board of directors of EAC who is responsible for managing the transaction with the fairtrade buyer on their behalf. It is important to note that the individuals who serve on the board of directors are prosperous raisin producers with relatively high levels of education and experience in raisin production (human capital). The members of EAC thus prove to have trust and confidence in the ability of the board of directors to effectively manage the transaction on their behalf. Such high levels of trust contribute to a stable relationship between the farmers and the board members which allows the focus to be on maximising the returns from the fairtrade initiative instead of managing the relationship with the farmers. The high levels of social capital exhibited by the farmers also suggest that there is scope to enhance farmer-to-farmer skills transfer as recommended by NPC (2011) to improve the performance of the farmers who perform below standard. Incentives are necessary to convince the prosperous farmers to actively transfer skills to other farmers in the community.

When exploring the influence of the personal characteristics of the respondents on the social capital of the farmers a number of the significant correlations were found to be caused by noise in the data rather than the relationship between the characteristics and the social capital indicators. The farmers were divided into two groups based on the median value of the respective personal characteristics. The Mann-Whitney test was used to test the hypotheses that there is no

difference in the social capital indicators between the group that falls below the median value and the group that falls above the median value. Interestingly, the more educated group of farmers was found to be significantly more optimistic about the future. The more educated farmers may be in a better position to grasp the potential opportunities that exist for them to improve their performance. Higher levels of education contribute to the high levels of human capital that is required to adopt sophisticated new technology. Given government's commitment to invest in research and development of sophisticated technology (NPC, 2011), the more educated farmers may be in a better position to see potential opportunities that may arise from such investments.

The older and more experienced groups of farmers prove to have higher levels of institutional trust than the younger group of farmers. Compared to the younger, less experienced group of farmers, the older and more experienced farmers have a better perception that government treats everybody equally. The conclusion thus is that the older, more experienced farmers do not necessarily blame government as such for the poor conditions within which they operate. The negative perception of government among the younger generation of farmers may also be a symptom of a higher sense of entitlement. The older and more experienced farmers also prove to get along better with other members in the community and are more actively involved in formal group activities (i.e. church and activities associated with EAC). Overall, the older and more experienced raisin producers from Eksteenskuil thus prove to exhibit higher levels of social capital than their younger, less experienced counterparts.

Ultimately the conclusion is that the social capital levels of emerging farmers are definitely expected to influence their behaviour within a collective entity. Moreover, developing the social capital levels of emerging farmers may be more difficult than merely promoting active participation in collective activities. The social environment within which emerging farmers operate also has a major impact on their social capital levels. Again it is evident that a careful consideration of the social environment is crucial for any efforts that aim to support emerging farmers to improve their performance in order to contribute to rural development. Efforts to stimulate effective collective action (South African LED Network, 2012; NPC, 2011) and farmer-to-farmer skills transfer (NPC, 2011) should take cognisance of the role of social dynamics in the behaviour of emerging farmers. The only way to achieve the desired outcomes is to follow a participatory approach. The farmers also have to be included in the planning stages of such projects to ensure a comprehensive understanding of the social dynamics within the specific group of farmers under consideration.

Within Chapter 5 the focus of attention shifts to the analyses of the governance structures that are used by the raisin producers from Eksteenskuil.

ANALYSIS OF THE GOVERNANCE STRUCTURES

5.1   INTRODUCTION

A number of studies in southern Africa found that the high levels of transaction costs act as a barrier to entry that excludes emerging farmers from participating in commercial agri-food chains (Ortmann and King, 2010). Consequently, emerging farmers fail to earn the highest possible return from their farming activities. Sub-optimal performance on the small scale of operations leads to farmers struggling to improve their livelihoods through agricultural activities. The high levels of transaction cost thus have a major negative impact on the livelihoods of emerging farmers. Transaction cost economics (TCE) theory suggests that the optimal vertical coordination strategy would economise the transaction costs associated with the transaction (Williamson, 1998). Thus, it is crucial for emerging farmers to employ the optimal type of governance structure that will allow them to minimise the transaction cost they face.

The farmers from Eksteenskuil currently can employ two types of governance structures (vertical coordination strategies) when they market their raisins. The first type is the spot market, where farmers can sell their raisins to any of the processing companies in the region. Importantly, farmers who use the spot market as governance structure may act autonomously on market signals. The other type is a hybrid mode of governance where farmers can enter into a contractual relationship with the raisin processing company (SAD) that buys their raisins. The contract that is currently available to the farmers relates to the specifications type of contracting relationship as described by Peterson *et al.* (2001). All of the farmers from Eksteenskuil, however, do use the specifications contract when marketing their raisins in order to get access to the fair-trade initiative which pays a price premium for good quality raisins. The problem is that the farmers entered into the contractual relationship based on the requirements from the fairtrade initiative and not as a means to optimise transaction costs. Thus, it is not known whether or not the specifications contract type of governance structure actually minimise the transaction costs faced by the farmers from Eksteenskuil.

Recent studies within South Africa that applied TCE to investigate vertically coordination strategies include, amongst others, Jordaan and Kirsten (2008), Sartorius and Kirsten (2005), and Sartorius and Kirsten (2007). Jordaan and Kirsten (2008) use a decision making framework of Peterson *et al.* (2001) to qualitatively investigate the need for more vertical coordination in the mohair supply chain of South Africa. Their focus of attention was on the whole mohair industry in South Africa. Sartorius and Kirsten (2005) and Sartorius and Kirsten (2007) apply a decision-making framework of Sartorius and Kirsten (2005) to investigate contracting arrangements between small-scale farmers and agribusinesses in the sugar and timber industries in South Africa. While they have considered the relationship between small-scale farmers and their buyers, their focus of attention was more from the agribusiness' perspective. None of the studies focused on the transaction costs faced by the small-scale farmers, and the optimal vertical coordination strategy that will economise the transaction costs they face.

The objective of Chapter 5 is to investigate the transaction between the farmers from Eksteenskuil and SAD, with special attention to the farmers' perspective, to determine whether the farmers should change their current vertical coordination strategy to a strategy with even higher degree of vertical coordination (i.e. relation-based or equity-based alliances, or full vertical coordination) in order to economise the transaction costs. First, the transaction is assessed in terms of the specific attributes of the transaction, followed by the application of two different frameworks to identify the best type of governance structure based on the attributes of the transaction. The framework of Mahoney (1992) is used to get an idea of the intensity of coordination control that is needed given the attributes of the transaction. Thereafter the decision making framework developed by Peterson *et al.* (2001) is used to assess whether or not there is a need for changing the current governance structure. Although it is recognised that a firm needs to make this strategic decision for every vertical (forward and backward) exchange relationship that it must execute in the process of doing business (Peterson and Wysocki, 1997), the focus of this particular analysis is on the transaction between the Eksteenskuil farmers and their buyer (SAD).

Chapter 5 starts with a brief review of TCE theory, followed by a discussion of the procedures to perform a transaction cost analysis in order to identify the optimal type of governance structures. Thereafter the results from the analysis of the governance structure are presented and discussed. Chapter 5 then is concluded with a discussion of the conclusions that were drawn from the results.

5.2   TRANSACTION COST ECONOMICS THEORY

TCE is one of the "branches" of New Institutional Economics (Kerrelah and Kirsten, 2002) and can be used to analyse the governance structures at the third level of the NIE framework (Williamson, 1998; Milagrosa, 2007a). The fundamental argument in TCE is that economic governance is a prerequisite for using resources in an economic optimal manner, and thus also for enhancing economic efficiency. Within TCE, institutions are furthermore hypothesised to be transaction cost-minimising arrangements that may evolve, with changes in the nature and source of transaction costs (Kherallah and Kirsten, 2002). A firm is thus expected to choose that governance structure that will minimise the transaction costs associated with the specific transaction under consideration. Important also is that in TCE the transaction itself is the basic unit of analysis (Williamson, 1998; Milagrosa, 2007a; Kerrelah and Kirsten, 2002).

Hai (2003) states that marketing and transaction costs are "regularly mixed up" in the literature and thereby cause confusion. Hai (2003) cites North and Wallis (1994), who distinguish between transformation costs and transaction costs. Transformation costs refer to those costs that are used to physically transform inputs into outputs, while transaction costs on the other hand refer to the costs associated with the transfer of property rights from one person to another. Thus, by definition, North and Wallis (1994) consider transport, storage and processing costs as transformation costs, while costs associated with assembly, distribution, negotiation, payment, distribution of risk, financing, and enforcement are considered to be transaction costs. Compared to North and Wallis (1994), who distinguish between marketing and transaction costs, other researchers again include in their definitions of transaction costs all the costs involved in trade (e.g. marketing costs), costs of intangibles (e.g. search for exchange partners), contract, monitoring and enforcement (North, 1990 as cited by Matungul *et al.*, 2001; Kherallah and Kirsten, 2002; and Herrera, 2005). Although the definition that Kherallah and Kirsten (2002) attach to transaction cost differs somewhat from that of North and Wallis (1994), they too conclude that transaction cost is primarily concerned with the costs associated with the transfer of property rights. Since there is consensus that transaction costs do exist and relate to the transfer of property rights, Williamson (1985) argues that it is also important to understand what factors cause transaction costs.

Factors causing transaction costs

According to Williamson (1985), there are in general three main causes of transaction costs. Two of those causes relate directly to the behaviour of the human agents who participate in the transaction, while the third relates to the attributes of the transaction under consideration. At this

stage it is important to realise that transaction costs may result from adverse behaviour of either of the two transacting parties. As the first behavioural cause of transaction costs, Williamson (1985) argues that, although the intention of any agent who participates in a transaction is to behave rationally, the rationality of his/her behaviour is limited since participants in the transaction are not able to foresee all the possible things that may occur or affect the transaction. Thus, they can only act rationally based on the information that is available to them and within the limits of what they can foresee. Williamson (1998) refers to this limited rational behaviour as bounded rationality.

The second cause of transaction costs that relates to human behaviour is the fact that mankind tends to behave in an opportunistic manner (Williamson, 1985). In this regard, Williamson (1985) refers to opportunism as an agent's "self-interest seeking behaviour with guile". More specifically, opportunistic behaviour has to do with deliberately making available incomplete or distorted information in calculated efforts to purposefully mislead, distort, and disguise contractual specifications (Herrera, 2005). Such actions aim to increase own benefits from the transaction albeit at the expense of the transacting partner. In this regard, asymmetric information is a major cause for opportunistic behaviour and thus also transaction cost. Again, opportunistic behaviour may stem from either party who deliberately deceives and confounds the other party in the transaction. Bounded rationality and opportunism as discussed above are considered to be the two behavioural assumptions of Transaction Cost Economics (Milagrosa, 2007a).

As for the last cause of transaction costs, there are three attributes of transactions that determine transaction costs; asset specificity, transaction frequency, and transaction uncertainty (Hai, 2003). Asset specificity relates to the ability of the specific asset to be transferred to alternative uses (Williamson, 1996) or the opportunity costs that assets have for alternative use. Assets that are considered to be highly specific are those assets with comparatively low value elsewhere which consequently give the owner of the asset strong interest to continue with the transaction because of the high quasi-rents they receive (Hai, 2003). Higher levels of asset specificity, furthermore, give rise to a condition of bilateral dependence between the two transacting partners (Williamson, 1998).

Asset specificity itself, again, can take a variety of forms. Those forms include, amongst others, physical asset specificity, human asset specificity, site specificity, dedicated assets, brand name capital, and temporal specificity (Williamson, 1998). Physical asset specificity in this regard refers to the requirement of specialised physical assets to fulfil the transaction, while human asset specificity refers to the requirement of specialised human skills to perform the job. Increased requirement of specialised assets or specialised skilled labour implies higher physical asset

specificity and human asset specificity respectively. Whenever an asset needs a special location relative to the other factors that are necessary to fulfil the transaction, it is said to be site specific. Dedicated assets again refer to assets that have been invested in a certain manner when they also could have been used elsewhere, while brand name capital refers to the use of a specific name or logo for the firm to be distinguished from others. The last form of asset specificity is especially important in the context of agricultural production. Temporal specificity refers to the situation where the value of the product is constrained by time. The importance of temporal specificity for agricultural production centres around biological conditions that cause seasonality in production and the perishable nature of agricultural products. Thus, while timing of the production of an agricultural product is important, timing is just as important when selling the agricultural product. Selling activities must be timed in order to capture the highest possible profits for the product that is marketed (Milagrosa, 2007a).

As the second attribute of a transaction that causes transaction costs, transaction frequency refers to the number of times a transaction takes place. The more frequently transactions occur, the more justifiable it is to employ an expensive governance structure that is needed to reduce transaction costs (Hai, 2003). More frequent transactions furthermore require specific contract agreements in order to, amongst others, reduce risk, avoid opportunistic behaviour and prevent hold-ups (Milagrosa, 2007a).

The last attribute of a transaction that causes transaction costs is related to the uncertainty associated with the specific transaction under consideration. Again, different kinds of transaction uncertainty exist. Firstly, Hai (2003) distinguishes between primary and secondary uncertainty, while Milagrosa (2007a) cites Verhaegen and van Huylenbroeck (2002) and Rindfleisch and Heide (1997), who distinguish between exogenous and endogenous uncertainty. According to Hai (2003), primary uncertainty arises from "random acts of nature or unpredictable changes in consumers' preferences". Related to the definition of primary uncertainty, Milagrosa (2007a) refers to exogenous uncertainty as uncertainty in either the institutional environment (changes in market policy, practices and regulations), or the market environment (variation in demand, changes in the price of complementary of substitute products). Thus, from the definition of exogenous uncertainty, there seems to be a link between exogenous uncertainty and primary uncertainty as referred to by Hai (2003). With regard to secondary uncertainty, Hai (2003) argues that it is a result of the lack of communication or the fact that it is impossible to control whether tasks are carried out strictly as specified in the contract. Again, endogenous uncertainty as referred to by Milagrosa (2007a) relates to this definition of secondary uncertainty. According to Milagrosa (2007a), endogenous uncertainty refers to behavioural uncertainty and comes in the form of actions of key market players that affect how transactions are conducted (Milagrosa,

2007a). Such actions may refer to a lack of communication between transacting parties as a source of secondary uncertainty as defined by Hai (2003).

5.3   PROCEDURES

5.3.1   *MEASURING THE ATTRIBUTES OF THE TRANSACTION THAT CAUSE TRANSACTION COST*

Quantifying the level of asset specificity

When assessing the attributes of transactions Shelanski and Klein (1995) argue that, of all of the explanatory variables that cause transaction costs, the one that is the most difficult to measure is asset specificity. Due to the difficulty in measuring asset specificity, researchers mostly use proxies for the alternative types of asset specificity. Shelanski and Klein (1995) provide a brief discussion of the different proxies that have been used in the literature, which include, amongst others, a qualitatively coded component "complexity" (Masten, 1984) or expenditures on research and development to serve as a proxy for the degree of physical asset specificity; the need for worker-specific knowledge as a proxy for human asset specificity (Monteverde and Teece, 1982); and the physical proximity of the firm under consideration as a proxy for site specificity (Joskow, 1985; and Spiller, 1985). Information on all of the above proxies is obtained from survey data using Likert-type questions where the respondent has to rank a specific statement on a scale from one to seven. A limitation to such a method to elicit data is that the answer is "based on the respondent's stated beliefs rather than on their beliefs or valuations as revealed through choice" (Shelanski and Klein, 1995). A further criticism of this approach is that since such measurements are based on ordinal rankings, this makes it impossible to compare them between one industry to another (Shelanski and Klein, 1995).

Milagrosa (2007a) uses directly observable attributes to describe and estimate transaction costs. Directly observable specific asset attributes include physical and human asset specificity, site specificity, and temporal specificity. Again, due to the difficulty in measuring asset specificity the specific type of asset specificity is elicited using proxies. If the respondent, for example, owns a vehicle that is specific for the transaction under consideration it is an indication that the transaction exhibits a higher level of physical asset specificity. As a proxy for human asset specificity the number of years of experience in the specific activity can be used. Again, the higher the number of years of experience, the higher the level of human asset specificity is considered to be involved. Site specificity is also an observable characteristic and is very relevant when referring to agricultural production. Farmers invest, for example, in vegetable production on their farms, and in their particular municipalities, which indicates that there should be some level of site specificity. However, if farmers also reside on the farms where they produce the

vegetables, the level of site specificity is lower than initially expected. With regard to temporal asset specificity, Milagrosa (2007a) argues that the presence of physical assets that may have an effect on the timing of delivery and the value of the product that is sold may also be an indication of temporal asset specificity. The perishable nature of vegetables emphasises the importance of temporal asset specificity in the case of vegetable production and trade.

Quantifying transaction frequency

Transaction frequency refers to the number of transactions between the producer and a specific buyer (Milagrosa, 2007a; Hai, 2003). In order to quantify the transaction frequency, farmers are asked to indicate the number of times they have sold produce to the specific buyer during the past season.

Quantifying transaction uncertainty

The third attribute of the transaction relates to uncertainty associated with the transaction under consideration. Uncertainty can be divided into exogenous and endogenous uncertainty. Since exogenous uncertainty refers to uncertainty with regard to changes in demand for the underlying product and consumer preferences, exogenous uncertainty is observable without having to ask respondents about its level.

Endogenous uncertainty centres around uncertainty with regard to the possibility of receiving delayed payment and the fact that trading partners may withhold important transaction specific information from each other. The level of endogenous uncertainty needs to be elicited directly from the respondents (Milagrosa, 2007a). Respondents are asked whether they received delayed payments from their trading partners (Yes/No). The presence of delayed payments represents higher levels of endogenous uncertainty and therefore also higher levels of transaction costs. Similarly, respondents are asked whether or not they believe their trading partners are withholding important information from them (Yes/No). Withholding important information relates to opportunistic behaviour, which occurs when one of the transacting parties deliberately withholds important information in order to increase his/her own benefit from the transaction. Again, the perception that the other party withholds important information is associated with higher levels of endogenous uncertainty and thus also higher levels of transaction costs. Similar to exogenous uncertainty, the level of endogenous uncertainty is also influenced by the type of governance structure employed.

The next section covers the procedures that are used to select a type of governance structure base on the attributes of the transaction.

5.3.2   MATCHING THE TRANSACTION WITH AN APPROPRIATE GOVERNANCE STRUCTURE

Mahoney (1992) developed a framework to guide the choice of vertical coordination strategy (governance structure) based on the attributes of the transaction. Based on this framework of Mahoney's (1992) there are three conditions that have to be considered when deciding on a coordination strategy, namely, separability, asset specificity, and task progammability. Separability refers to the ability to determine and measure the value of the contribution of each of the parties, and hence the reward for each participant in the transaction. Asset specificity refers to the level to which the assets are specific to the transaction under consideration. Lastly, task programmability refers to the degree of uncertainty within the transaction. Based on these three conditions, the framework of Mahoney (1992) recommends a certain vertical coordination strategy to best fit the attributes of the transaction under consideration. Table 5.1 shows the recommended strategies for different transaction attributes.

Table 5.1 shows that a transaction where the output of individuals can easily be measured (low non-separability), and if the transaction is characterised by low levels of asset specificity (cases one and five in Table 5.1), there is no need for any form of vertical coordination, regardless of the levels of uncertainty associated with the transaction. On the other hand, when the output of the individual parties cannot be easily measured, and the transaction is characterised by high levels of asset specificity (cases four and eight), complete vertical integration (hierarchy) is required, regardless of the degree of uncertainty associated with the transaction. A transaction where the outputs of the individual parties can be measured and if the transaction is characterised by high levels of asset specificity, would require a long-term contract in the presence of low levels of uncertainty (case 2), while a joint venture may be needed in the presence of high levels of uncertainty (case 6). Lastly, a transaction where the output of individual parties cannot be measured and the levels of asset specificity are low, would require a relational contract if the transaction face low levels of uncertainty (case three), while an inside contract would be required in the presence of high levels of uncertainty.

Table 5.1:   Predicting the organisational form of vertical control

| | Low Task Programmability | | High Task Programmability | |
	Low Specificity	High Specificity	Low Specificity	High Specificity
Low non-separability	1: spot market	2:long-term contract	5: spot market	6: joint venture
High non-separability	3: relational contract	4: clan (hierarchy)	7: inside contract	8: hierarchy

Source   Mahoney (1992)

Definitions:

Low task programmability: Observed input (effort) is a poor measure for making rewards.

High non-separability: Observing output is a poor measure for making rewards.

High specificity: Human, physical and/or site firm-specific investments are high.

Spot market: The price system works smoothly.

Long-term contract: Obligations of principles and agents are specified and enforced by third parties (courts).

Relational contract: Obligations of principles and agents are specified and self-enforced.

Inside contract: A hybrid arrangement between contract and hierarchy that is best described as a "manager as monitor" setup.

Joint ventures: An equity agreement whereby a separate entity is created.

Hierarchy: A superior-subordinate relationship; financial ownership.

Clan: Organisation that is based on a vital sense of human solidarity.

After matching the attributes of the transaction with the recommended vertical coordination strategy using the Mahoney framework, another decision-making framework is used to determine whether or not there is a need to change the current vertical coordination strategy. The application of the second decision-making framework allows for the validation of the recommendations from the application of the framework by Mahoney (1992). The procedures to determine whether or not there is a need for more vertical coordination are discussed next.

5.3.3   *IS THERE A NEED FOR MORE VERTICAL COORDINATION?*

In the framework of Peterson *et al.* (2001), a decision maker will arrive at a specific vertical coordination strategy by answering five interrelated questions. The framework will only result in a changed coordination strategy if all of the respective questions are answered with a "yes" (Jordaan and Kirsten, 2008). A diagrammatic representation of the decision-making framework for changing vertical coordination strategies is shown in Figure 5.1.
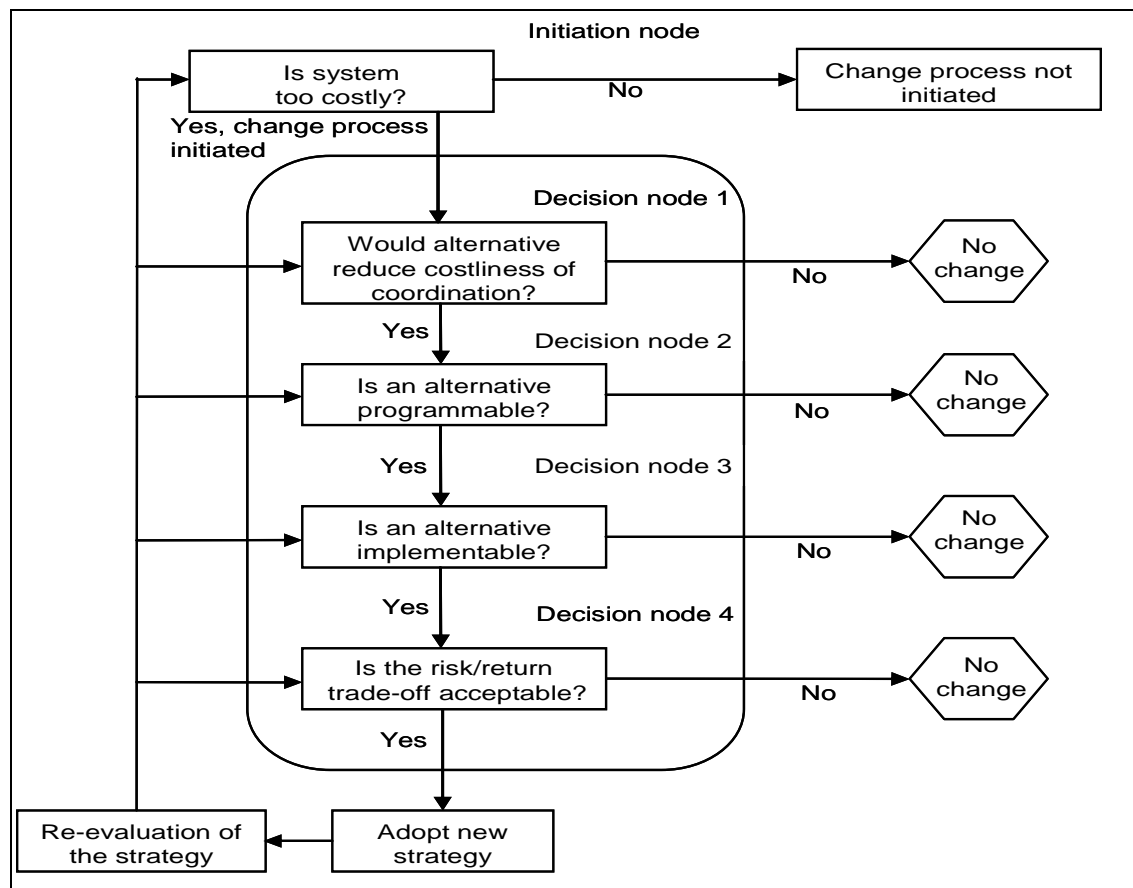
Figure 5.1:   A decision-making framework for changing vertical coordination strategies

Source: Peterson *et al.* (2001)

Question 1 – Is the current marketing system too costly?

According to Peterson *et al.* (2001), there are two main reasons for why a current marketing strategy may be too costly. Firstly, it may allow costly coordination errors by exposing the firm to the opportunistic behaviour of trading partners or it may result in chronic over or under production compared to demand. The second reason relates to a method of coordination control that creates more operating cost than the cost reduction in coordination errors that it is designed to control. If the current strategy is too costly, a process of changing the strategy is initiated, and one may go on to ask the second question.

Question 2 – Would an alternative strategy reduce the "costliness" of the marketing system?

The second question relates to whether or not another strategy would better match the intensity (and cost) of coordination control with the costliness of coordination errors. The match is judged better or worse on the principle that the more costly the errors the more intense the control

needed. Conversely, the less costly the coordination errors the less intense control is needed (Peterson *et al.*, 2001). The costliness of the coordination errors depends very much on the level of asset specificity, and complementarity (Williamson, 1973, 1975, as cited by Peterson *et al.*, 2001; Mahoney, 1992; and Milgrom and Roberts, 1992, as cited by Peterson *et al.*, 2001). As the level of asset specificity increases, the costliness of coordination errors increases, since the underlying asset value would be affected adversely by such errors. The presence of complementarity (also referred to as non-separability) implies that the output that is obtained from joining the two parties is larger than the sum of the outputs that would have been produced by the individual activities. Again, the costliness of coordination errors increases with an increase in complementarity. Peterson *et al.* (2001) argue that managers need to assess both of these variables relative to the specific transaction under consideration and then select that coordination strategy that matches the intensity of control with the costliness of coordination error.

Question 3 – Is an alternative programmable?

According to Peterson *et al.* (2001), the fact that a potentially better strategy for controlling coordination errors does exist is not a sufficient reason for adopting the alternative. Since the alternative strategy needs to be workable, the manager must determine whether effective, specific management routines do exist. Decision makers need to go beyond their own experience to search for effective coordination strategies used by others in similar settings. The presence of a programmable alternative allows one to move to the fourth question in the decision-making framework, which relates to the implementability of the proposed alternative(s).

Question 4 – Is an alternative implementable?

The fact that an alternative is available (programmable) does not necessarily implies that it can be implemented effectively (Peterson *et al.*, 2001). Peterson *et al.* (2001) further state that the implementability of a strategy is mainly influenced by the availability of capital, the existence of compatible partners, competence of control, and institutional acceptability. In order to be able to implement a new strategy, the decision makers need sufficient capital to finance the change. There needs to be a transacting partner who meets the requirements of the new strategy, and the decision maker himself also needs to exhibit the necessary competence required by the type of control of the underlying transaction. Finally, the change needs to be institutionally acceptable (legal). It needs to comply with formal laws, rules and regulations, and also social, cultural, industrial or group norms. Peterson *et al.* (2001) argue that the decision maker's overall assessment of the above four criteria will determine whether or not the strategy change is implementable.

Before one may finally conclude that more vertical coordination will be more efficient, one has to consider whether or not the risk or return trade-off for changing from contracting is acceptable.

Question 5 – Is the risk/return trade-off acceptable?

In addition to affecting the return, changing the coordination strategy will affect the risk to which transaction partners are exposed. The decision maker needs to balance the potential returns with the risk that will be incurred with changing the strategy. Only when the decision maker has answered "yes" to all five questions, will the current coordination strategy be changed.

The discussion of the decision making framework of Peterson *et al.* (2001) concludes the procedures section. Next the results from the analyses of the governance structures at the three case studies are presented and discussed.

5.4   RESULTS

5.4.1   ATTRIBUTES OF THE TRANSACTION BETWEEN THE RAISIN PRODUCERS FROM EKSTEENSKUIL AND SAD

The optimal choice of governance structure is influenced, amongst others, by the transaction cost associated with the transaction (Hobbs, 1996). The attributes of the transaction that affect the level of transaction cost within a transaction include the levels of asset specificity, the uncertainty within the transaction and the frequency of transactions (Milagrosa, 2007a).

- Asset specificity

For the purpose of assessing the level of **physical asset specificity** associated with the production of raisins, the different aspects considered include farmers' investment in a vehicle specifically for the production or transporting of raisins, drying infrastructure, storage facilities, and package material. At first glance there is evidence that the farmers from Eksteenskuil are well invested into physical assets that are specific to the production and marketing of raisins. About 50% of the farmers indicated that they have a vehicle that they use specifically to deliver their raisins to SAD. All of the respondents have laid cement slabs that are used for sun drying raisins (Thompson's Seedless), while about 23% of them indicated that they have also invested in drying trays (drying infrastructure) that are used to dry the golden raisins. Some farmers (about 12%) have also invested in storage facilities where they can store their raisins prior to delivering it to SAD. However, the level of physical asset specificity actually refers to the investment in physical assets that are specific to the transaction under consideration. The vehicles also can be used to

deliver raisins to other buyers, and also for other purposes on the farms. Similarly, the raisins that are dried on the cement slabs and/or on the trays can also be sold to other processing companies. Lastly, the storage facilities can also be used to store other products and raisins that are sold to other buyers. Since the assets can also be used for other transactions and/or purposes, the opportunity cost for those assets is high. The high opportunity cost of the physical assets implies that the levels of physical asset specificity for the farmers from Eksteenskuil who sell their raisins to SAD via the fair-trade initiative is in fact low.

When assessing the levels of **physical asset specificity** for the raisin processing company (SAD) that buys the raisins from the farmers from Eksteenskuil, it is evident that SAD does have some highly sophisticated machines that perform the washing, sorting and packing of raisins. SAD also uses sophisticated machinery to remove foreign objects from the raisins. Those machines are used exclusively for the processing of raisins. The requirement of such specific assets to process and pack raisins may suggest that raisin processing is associated with high levels of physical asset specificity. However, the level of physical asset specificity relates only to the transaction between the farmers from Eksteenskuil and SAD. SAD uses those same machines for the processing of raisins produced by non-members of EAC. The opportunity cost of the machinery is thus still high, which implies a low level of physical asset specificity. Overall, both the farmers and SAD face low levels of physical asset specificity in transactions with each other.

The level of formal education may be used as a proxy for the degree of **human asset specificity** (Milagrosa, 2007a). The higher the level of formal education of the participant in the transaction, the higher the level of human asset specificity is accepted to be. The average number of years of formal education of the respondents from Eksteenskuil is 8.88 years. Given that a person who has completed Grade 12 has completed 12 years of formal education, the average of 8.88 years means that most respondents have not completed grade 12. The relatively low levels of formal education of the farmers suggest that the level of human asset specificity associated with the production of raisins is not necessarily that high. It is important to note that, compared to commercial farmers the average education levels of the respondents are low. However, compared to other emerging farmers in South Africa, an average level of formal education of 8.88 years is actually relatively high. The relatively higher levels of education compared to other emerging farmers from South Africa may contribute towards the ability of the raisin producers from Eksteenskuil being able to participate in the sophisticated fairtrade value chain.

The level of **temporal asset specificity** is also relatively low. When assessing the level of temporal asset specificity, one is concerned with the level to which the value of the product is

constrained by time (Milagrosa, 2007a). The value of raisins is not directly influenced by time. Dried raisins can be stored for a considerable period of time with no influence on the value of the raisins. Similarly, the value of the raisins at the processing company is not constrained by time. The processing company normally receives all the raisins between February and April, and then they process them upon order throughout the remainder of the year. If the conditions in which the raisins are stored are acceptable, the quality (and hence the value) of the raisins is not negatively affected over a reasonable period of time. The production and processing of raisins thus face relatively low levels of temporal asset specificity.

Transactions between the Eksteenskuil raisin producers and their buyer do exhibit moderate **site specificity**. The raisin producers invest in the production of grapes on their farms, but they also live on their farms. Similarly, the raisin processing company also owns the processing plant that is located in the major raisin production area along the Orange River. Their investment in this infrastructure represents sunk costs because it is difficult to transfer the plant once it is erected.

Both the farmers from Eksteenskuil and their buyer also exhibit moderate to high levels of **dedicated assets**. Dedicated assets suggest that once the asset is being used for one purpose it cannot be used for another purpose. Since grapes are perennial crops, using land to produce grapes for raisins means that the land cannot be used for any other purposes for a considerable period of time. The economic lifespan of sultana grapevines is about 25 years (Laubscher, 2009). Similarly, the processing plant is of such nature that it is only be used to process and pack raisins. Some parts of the plant (i.e. storage facilities), however, can also be used for other purposes. The level of dedicated assets thus may be lower for the processing plant than is the case for the production of raisins.

Based on the aspects considered as proxies for the levels of physical asset specificity one may conclude that transactions between the raisin producers from Eksteenskuil and their buyer exhibit only moderate levels of physical asset specificity. Next the focus shifts to the levels of uncertainty associated with the transaction as a cause for transaction cost.

- Transaction uncertainty

Transactions between the Eksteenskuil raisin producers and their buyer also contain a moderate level of transaction uncertainty. Transaction uncertainty is divided into endogenous and exogenous uncertainty. Endogenous uncertainty is centred around uncertainty with regard to the possibility of receiving delayed payment, and the fact that trading partners may withhold important transaction specific information from each other. On the other hand, exogenous uncertainty is concerned with changes in the demand for the product, consumer preferences (Milagrosa, 2007a;

Verhaegen and van Huylenbroeck, 2002) and the ability of the farmers to produce the demanded volumes of the products.

When considering delayed payments as a source of uncertainty to the farmers, the processing company has a payment system whereby the farmers get paid for their raisins by the first Friday after the raisins were delivered for raisins delivered before Thursday, and by the next Friday for raisins that were delivered on Thursday or Friday. Despite the payment system about 19% of the respondents indicated that they had received delayed payments during the past year. In addition to the number of farmers who had received delayed payments, about 31% of the respondents also feel that the buyers are withholding important transaction specific information from them. The number of farmers who had received delayed payments and who feel that the buyer withhold important information suggest that the farmers do face moderate levels of endogenous uncertainty.

With regard to changes in demand and consumer preferences, the farmers from Eksteenskuil experience a moderate level of exogenous uncertainty. Since 2009, Traidcraft has stopped buying golden raisins from Eksteenskuil, mainly due to the global financial crisis (Kok, 2009). Moreover, while the farmers from Eksteenskuil were the sole suppliers of fair-trade raisins in the world prior to 2010 (Koch, 2010; Kok, 2010), raisin producers from Chile and India also obtained FLO accreditation in 2010 to export raisins via the fair-trade initiative. Since both Chile and India are able to meet all of the demand for fair-trade raisins in the world, the farmers from Eksteenskuil face some serious uncertainty with regard to the demand for their raisins.

In addition to the uncertainty in the demand for their raisins, the farmers from Eksteenskuil also face some uncertainty with regard to their ability to produce a large volume of good quality raisins that meet the requirements to be exported via the fair-trade initiative. The harvesting season for the grapes corresponds to the raining season in the Northern Cape. The fact that Thompson's Seedless raisins are sun dried implies that the longer the time they take to dry, the higher the risk of being rained upon. Rain during the time period while the raisins are lying in the sun negatively affects the quality of the raisins. The uncertainty in the ability of the farmers to deliver good quality raisins also serve as exogenous uncertainty for the fair-trade buyer.

Another source of exogenous uncertainty for the fair-trade affiliated buyer is that the farmers will sell their raisins to other processing companies. The processing capacity along the Orange River currently is about double the production capacity (Laubscher, 2009). Consequently there is strong competition for raisins among the five processing companies. Since the processing companies mainly compete in terms of prices, the different companies tend to contact farmers and offer them

better prices for the raisins. Since the Eksteenskuil farmers only receive the additional payment (from the fair-trade price) after the raisins are exported (around October each year), the timeliness associated with the marginally higher price when selling the raisins to a different processing company is a strong incentive for the farmers rather to sell to the other companies.

Based on the different types of uncertainty faced by the farmers and their buyer it is evident that the overall level of uncertainty associated with the transaction is high (from both sides). Next, the focus shifts to the frequency of transactions as a cause for transaction cost.

- Transaction frequency

Transaction frequency refers to the number of transactions between the farmers and the specific buyer (i.e. SAD in this case). Hai (2003) argues that the higher the frequency of the transactions it becomes worthwhile to employ a more expensive governance structure (i.e. a governance structure with higher intensity of coordination control). The farmers from Eksteenskuil indicated that, on average, they deliver about 4.5 loads of raisins to the buyer spread over the harvesting season. Although the transaction frequency thus proves to be relatively low, with each load the farmer has the opportunity to take the raisins to a different processing company.

- Search and information cost

Another type of transaction cost faced by the raisin producers from Eksteenskuil relates to the costs incurred by searching for information and for a transacting partner. Interestingly the average number of buyers the respondents indicated to have contacted before deciding on which company to sell the raisins to, is 1.54. Keeping in mind that the farmers actually are contracted to sell their raisins to SAD, it is evident that the farmers are shopping around before complying with the contract. The fact that the farmers are contacting other buyers provides more evidence of the exogenous uncertainty faced by their buyer in terms of the farmers selling all of their raisins to SAD.

The low levels of formal education highlighted under human asset specificity may contribute to higher information cost for the farmers. The farmers with lower levels of formal education may not have the necessary skills to search for strategic market information. Although searching for market information is the responsibility of the farmers themselves, SAD does provide market information to the farmers. Market information on international supply and demand is published in the Foodnews magazine. The magazine is subscription based with relatively high subscription fees. Again the limited amount of direct access to international market information (i.e. through the Foodnews magazine) contributes to the perception of opportunistic behaviour by the buyer.

Considered from the buyer's perspective, it is evident that the search and monitoring costs are high when transacting with a large number of small producers. The median yield for Thompson's Seedless produced by Eksteenskuil raisin producers is only 3.04 ton which suggests that the marginal benefit per farmer is not that high for SAD. Moreover, the monitoring cost to ensure that the farmers are selling all of their raisins to SAD is also high when dealing with the large number of small-scale farmers. Again the high levels of search, information, and monitoring cost from the buyer's perspective suggest the need for a more coordinated approach to the transaction.

- Negotiation cost

The low levels of formal education of the farmers from Eksteenskuil may also contribute to higher negotiation cost for them since they only have a limited capacity to negotiate for better terms of trade with a big company such as SAD. The respondents indicated that on average they take about 1.15 hours to negotiate the price. However, when asked the level to which they think they are able to influence the price, the average score for the respondents was two on a five point Likert scale (when they have no influence at all they scored one, and five if they have total control over the price). Thus, although the farmers are negotiating for better prices, the level to which they feel they are able to actually influence the price proves to be limited. The respondents from Eksteenskuil thus do face high negotiation cost. The higher the negotiation cost the higher is the transaction cost faced by the farmers who participate in the transaction.

From the above discussions it is evident that the raisin producers from Eksteenskuil do face relatively high levels of transaction cost, and hence are also exposed to one of the major barriers to entry that was identified in the literature to effectively exclude emerging farmers from participating in commercial agri-food chains. Although the levels of physical, human and temporal asset specificity are relatively low, the farmers do face high levels of uncertainty (both endogenous and exogenous), search and information cost, and negotiation cost. The high levels of transaction cost suggest that the raisin producers from Eksteenskuil do require a governance structure that may contribute to reducing the transaction cost they face. Within the next section the aim is to match the characteristics of the transaction to a specific type of governance structure that will minimise the transaction cost faced by the raisin producers from Eksteenskuil.

5.4.2 MATCHING THE TRANSACTION WITH THE OPTIMAL TYPE OF GOVERNANCE STRUCTURE FOR EKSTEENSKUIL RAISIN PRODUCERS

When assessing the transaction between raisin producers from Eksteenskuil and SAD in terms of the three conditions one may argue that there are two different points of view with respect to the level of separability (complementarity). Firstly, one may argue that there is a high degree of

separability. It is possible to distinguish between the contributions of the farmers and the processing company within the value chain hence both parties can be rewarded accordingly. The farmers produce the raisins, sell it to the processing company and get paid (rewarded) market related prices for the raisins. Similarly, the processing company grades, cleans and packages the raisins before selling it further downstream. Again the processing company is rewarded through the market related price it earns when selling the raisins downstream.

On the other hand, the nature of the transaction through the fair-trade initiative implies that the benefit of the combination of the activities by the raisin producers and SAD is greater than the sum of the benefits that could have been generated if the two groups of participants worked individually. In order to export raisins via the fair-trade initiative both the farmers and the processing company have to be FLO accredited. Neither party can participate in the fair-trade initiative on its own. From this point of view one may argue that the transaction exhibits a high degree of non-separability. Since one of the prerequisites for exporting raisins via the fair-trade initiative is that both parties have to be FLO-accredited, the conclusion is made that the transaction between raisin producers from Eksteenskuil and SAD actually exhibits a high degree of non-separability.

The transaction between the raisin producers from Eksteenskuil and their buyer exhibits a low degree of **task programmability** (or a high degree of uncertainty). Given that the production of grapes is a biological process the relative volumes and quality of raisins are influenced by a variety of external factors, such as environmental conditions over which the farmers have no control. Thus, although the farmers may apply the recommended levels of production inputs, they cannot be certain what yield and quality they will generate. The uncertainty in the production volumes of good quality raisins that can be exported via the fair-trade initiative also implies that the processing of the raisins for the fair-trade market exhibits low levels of programmability.

As discussed above, another source of uncertainty for the farmers from Eksteenskuil and SAD relates to the changes in demand for fair-trade raisins. While the total demand for fair-trade raisins proves to remain stable, the introduction of newly FLO-accredited producers means that the market has to be shared. Given the high transaction cost faced by the fair-trade affiliated company when dealing with the farmers from Eksteenskuil, there is a definite risk that the buyer may discontinue procuring raisins from Eksteenskuil. Similarly, the processing company and the fair-trade buyer face the uncertainty in whether or not the farmers will market all of their raisins via the fair-trade channel. Evidently there are high levels of uncertainty within the transaction, and consequently relatively low degree of task programmability in the transaction.

Of the three conditions that have to be considered, the level of **asset specificity** is least of a concern. The farmers from Eksteenskuil are not invested heavily in physical assets that are specific to the production and marketing of raisins mainly due to the very nature of being an emerging farmer. Moreover, none of the assets within which the farmers have invested are specific only to the transaction under consideration. Farmers who do not participate in the transaction via the fair-trade initiative can still produce and sell their raisins via the ordinary export market. The opportunity cost of the assets is thus high. The raisin processing company, on the other hand, have invested in physical assets that are specific to the processing of raisins. Again the processing company can (and do) use the assets in transactions other than the transaction under consideration, hence the opportunity cost of the assets is high. The fact that the opportunity cost of the assets is high suggests that the level of physical asset specificity is relatively low.

Other forms of asset specificity (i.e. temporal and site specificity and dedicated assets) are relatively high for the production and processing of raisins, however, it is not specific to the transaction between raisin producers from Eksteenskuil and SAD. One thus may conclude that the transaction between raisin producers from Eksteenskuil and SAD does not exhibit high levels of asset specificity.

When considering the transaction in terms all three conditions from the Mahoney framework it is evident that the transaction is associated with a low degree of programmability, a low degree of asset specificity, and a higher degree of non-separability. Given the three attributes of the transaction the Mahoney framework suggests a strategic alliance to be the appropriate level of vertical coordination (Mahoney, 1992). A strategic alliance as a governance structure is grouped within the hybrid mode of governance as identified by Williamson (1985). Interestingly, when speaking to the farmers from Eksteenskuil they do view SAD as their strategic partner. Note, however, that the relationship is not a formal strategic alliance. Compared to the current governance structure (specifications contracting) a strategic alliance lies further to the right on the vertical coordination continuum.

Based on the findings when applying the Mahoney framework to the case of Eksteenskuil, there is evidence that there is a need for a higher degree of vertical coordination. The decision making framework of Peterson *et al.* (2001) is used next to qualitatively investigate whether or not there is a need for more vertical coordination towards a strategic alliance.

5.4.3   IS THERE A NEED TO CHANGE THE CURRENT GOVERNANCE STRUCTURE USED BY EKSTEENSKUIL RAISIN PRODUCERS?

According to the decision making framework, a firm will only change its current coordination strategy if it answers yes to all of the following five questions.

Question 1 – Is the current marketing system too costly?

A firm may decide to change the current coordination strategy if costly coordination errors are present (Peterson *et al.*, 2001). An existing strategy may be considered to be too costly if coordination errors regularly expose the firm to the opportunism of trading partners or result in chronic over or under production versus demand, or if the existing strategy is more costly to execute than the coordination errors it is designed to control (Peterson *et al.*, 2001).

In the case of raisin production and marketing at Eksteenskuil, there may be a mismatch that contributes to the costliness of coordination errors. The farmers do feel that SAD withholds important market related information from them which allows the buyer to act opportunistically at the expense of the farmers. The farmers consequently are more open to negotiating with other processing companies who are willing to offer higher prices than SAD. From the buyer's side, the costliness of coordination errors may be even higher. Over the past five years, there has been a chronic under production versus demand. While the demand for choice grade Thompson's Seedless raisins via the fair-trade initiative is about 900 tonnes per annum (Kok, 2008), the total volume of Thompson's Seedless raisins delivered by Eksteenskuil farmers decreased substantially from about 600 tonnes in 2007, to only 220 tonnes in 2011. In none of the years since 2007 the total yield was more than one half of the 900 tonnes demanded. The export price via fair-trade is R2 496 per tonne higher than the ordinary export price for Thompson's Seedless raisins (R26 624/ton vs R24 128/ton). The failure to produce the total volume of raisins demanded through fair-trade during 2011 implies that a total value of R1 697 280 (680 tonnes multiplied by the difference in export price of R2 469/tonne) is foregone. The coordination errors in the case of Eksteenskuil evidently are more costly than the cost of coordination by means of specifications contracting.

With regard to the contractual relationship between Eksteenskuil raisin producers, SAD and Traidcraft, there is a high level of complementarity (non-separability). Neither Eksteenskuil raisin producers, nor SAD can benefit from marketing raisins through the fair-trade initiative without the contribution of the other party. Eksteenskuil does not have the processing and exporting capacity that is required by the fair-trade initiative, while SAD does not meet the fair-trade requirements to be a fair-trade producer of raisins. The combined benefit from Eksteenskuil and SAD thus

126

outweighs the sum of the individual benefits. The high level of complementarity contributes to the costliness of coordination errors (Wysocki, Peterson, and Harsh, 2003) along the raisin value chain and serves as an incentive for more intense control.

The presence of costly coordination errors initiates the change process (Peterson *et al.*, 2001) and leads to the consideration of the second question.

Question 2 – Would an alternative strategy reduce the "costliness" of the marketing system?

In essence the second question is concerned with whether or not another vertical coordination strategy would contribute to a better match between the intensity of control with the costliness of coordination errors for the transaction under consideration (Wysocki *et al.*, 2003; Jordaan and Kirsten, 2008).

The high level of complementarity (non-separability) and mixed levels of asset specificity that characterise the transaction between raisin producers and SAD imply that the cost of coordination errors may be higher than the cost of organising the contracting relationship between the farmers and SAD. According to Wysocki *et al.* (2003), such a situation requires a greater intensity of control through a higher level of vertical coordination (moving to the right along the vertical coordination continuum (Jordaan and Kirsten, 2008)).

The key characteristics of a relation-based alliance within the vertical coordination continuum are mutuality in identifying objectives, controlling the decision-making process, and also sharing in risks and benefits (Martin *et al.*, 1993, as cited by Peterson *et al.*, 2001). Mutuality in coordination control is thus the main characteristic of a relation-based alliance (Peterson *et al.*, 2001). Given the high level of non-separability and mixed levels of asset specificity, a relation-based strategic alliance that is built on mutual control may be a better match between the costliness of coordination errors and the intensity of coordination control. The answer to the second question is thus "Yes". Given the positive answer to the second question one may move to the third question, which is concerned with the level of programmability of the recommended vertical coordination strategy.

Question 3 – Is an alternative programmable?

With the third question, the decision maker has to determine whether or not effective, specific management routines exist for making the potential strategy workable (Wysocki *et al.*, 2003). When considering the farmers from Eksteenskuil individually, one may argue that, for the majority of farmers, effective, specific management routines do not exist. The low levels of human capital

(i.e. formal education) amongst the farmers negatively affect the ability of the farmers to manage transactions under higher degrees of intensity of control. On an individual basis, the relation-based strategic alliance thus will be considered not to be programmable.

In the case of Eksteenskuil, however, one has to take cognisance of the important role played by the management of EAC in the operations of raisin producers from Eksteenskuil. Currently the management of EAC negotiates the terms and conditions of the specifications contracts on behalf of the farmers. The contracts between the individual farmers and SAD are standardised for all farmers from Eksteenskuil. A similar service can also be performed by the management of EAC in the case of a relation-based alliance between the farmers and SAD. Within such a scenario one may argue that the relation-based alliance as vertical coordination strategy may be considered to be programmable, implying a "Yes" in answer to Question 3.

Given that the answer to Question 3 is "Yes", one should continue to the fourth question to determine whether or not the alternative is implementable.

Question 4 – Is an alternative implementable?

At this stage it is evident that a higher degree of vertical coordination (i.e. a relation-based strategic alliance) may be programmable and will reduce coordination errors. Question 4 is concerned with whether or not the relation-based alliance is implementable in the case of Eksteenskuil and SAD.

Peterson *et al*. (2001) list four conditions that determine whether or not an alternative strategy would be implementable: there should be sufficient capital available to implement the new strategy; there have to be compatible partners with whom to enter into the new relationship; the parties have to exhibit the required competence to control the new coordination strategy; and the arrangement has to be legal (institutionally acceptable).

The establishment of a relation-based strategic alliance between the farmers from Eksteenskuil and SAD requires only a limited amount of additional capital for the farmers and SAD. The farmers are already organised as a registered agricultural co-operative (EAC) and have the necessary facilities to produce the raisins. SAD already has a processing plant with state of the art technology that is required to process the raisins to meet the stringent requirements of the fair-trade buyer. Additional capital is mainly required for the legal fees to formalise the relation-based strategic alliance. The legal fees, however, will not be substantial amounts.

With SAD the farmers from Eksteenskuil do have a compatible partner that can enter into the relation-based alliance. The degree to which SAD and the farmers from Eksteenskuil are compatible, however, depends on the strategic direction of their businesses. According to Koch (2009), SAD does view their relationship with the farmers from Eksteenskuil as part of their corporate social responsibility, and SAD also benefits monetarily from exporting the raisins via the fair-trade initiative. The strategic direction of the business of SAD thus does include a relationship with the raisin producers from Eksteenskuil. From the farmers' perspective, they already consider SAD to be their strategic partner (although it is not formalised). The degree of compatibility between the farmers and SAD thus prove to be sufficient for the purpose of establishing a relation-based strategic alliance.

Although the farmers from Eksteenskuil individually do not necessarily exhibit the required competence of control, the management of EAC does have the required competence to control the relation-based alliance with SAD. If the farmers are willing to work collectively and to allow the management of EAC to control the relationship on their behalf (as they are currently doing), one may conclude that they do have the required competence of control to participate in the relation-based alliance as a vertically coordinated strategy.

Lastly, there is no law, nor any other rules and regulations that prohibit the formation of a relation-based strategic alliance between the farmers from Eksteenskuil and SAD. The alternative strategy (relation-based strategic alliance) thus can be considered to be institutionally acceptable. The case of Eksteenskuil thus does meet the four conditions for the strategy to be considered implementable, hence the answer to Question 4 is also "Yes". Before changing from the current strategy to a relation-based strategic alliance one has to assess whether or not the risk return trade-off is acceptable.

Question 5 – Is the risk/return trade-off acceptable?
Based on the discussions under Question 1 through Question 4, it is evident that the reduction in coordination errors will have a substantial increase in the value that can be extracted by the farmers from Eksteenskuil. The return associated with changing from the current specifications contracting relationship to a relation-based strategic alliance with SAD is thus substantial and sufficient to compensate for the increase in risk they face.

Since the answers to all five questions are "yes" for the case of Eksteenskuil, one may conclude that the farmers from Eksteenskuil and SAD should change their current coordination strategy to a relation-based alliance. The relation-based alliance is associated with higher intensity of control that will contribute to reducing the costliness of coordination errors (Peterson *et al.*, 2001). The

application of the framework of Peterson *et al.* (2001) thus confirms the outcome when applying the framework by Mahoney (1992). A comprehensive assessment is necessary to determine the conditions for the relation-based relationship that will maximise the benefits to the farmers, and also for SAD. The case of Eksteenskuil thus shows that the farmers do benefit from having identifying a partner in agro-processing as recommended by NPC (2011) and they would benefit even more if the relationship was to be formalised as a strategic partnership as recommended by CRDP (2010)

The conclusion that a more vertically coordinated strategy will benefit the farmers from Eksteenskuil and SAD concludes that analysis of the governance structures for the case of Eksteenskuil.

5.5   CONCLUSIONS

The objective of Chapter 5 was to comprehensively assess the transaction within which the raisin producers from Eksteenskuil participate in order to identify the transaction cost minimising type of governance structures for the farmers. Based on the results the farmers from Eksteenskuil will benefit from entering into a higher degree of vertical coordination (i.e. relation based strategic alliance) with their buyer. In accordance with TCE theory the results from Chapter 5 show that the optimal type of governance structure depends very much on the characteristics of the underlying transaction. The strategy of CRDP (2010) to form strategic partnerships between emerging farmers and other firms in the value chain thus may be over simplified and may lead to suboptimal solutions for the emerging farmers under consideration. It is important to note that higher degrees of vertical coordination imply an increase in the cost of coordination control. The benefits from the higher degree of vertical coordination should be sufficient to compensate for the increase in the cost of coordination control. A better strategy thus would be to emphasise the need to comprehensively assess the specific transaction within which the emerging farmers operate in order to identify the appropriate type of relationship that will yield the best results for all parties involved.

Given the potential benefits typically associated with higher degrees of vertical coordination (i.e. higher levels of support to the farmers), it is worthwhile to emphasise the aspect in the transaction that contributes to a higher degree of vertical coordination being required to minimise transaction costs in the case of Eksteenskuil. The high degree of complementarity that exists between the farmers from Eksteenskuil and their buyer means that neither party can benefit from the fairtrade initiative without the contribution of the other party. Both parties thus have a vested interest in the performance of the other party to maximise the benefit from the fairtrade initiative. SAD thus has

a strong incentivise to support the farmers to produce high volumes of good quality produce. Moreover, the benefit from working together in the vertical coordinated relationship proves to be sufficient to compensate for the increase in the cost of coordination control. A complementary relationship between emerging farmers and their buyer thus may convince the buyer to enter into a vertically coordinated relationship with the emerging farmers.

In Chapter 6 follows the analyses of the degree and determinants of efficiency with which the emerging farmers from Eksteenskuil use their production inputs.

EFFICIENCY ANALYSIS OF INPUT USE BY EKSTEENSKUIL FARMERS

6.1 INTRODUCTION

The last part of the application of the integrated conceptual framework is the analysis of the levels of efficiency with which the farmers from Eksteenskuil use their production inputs. The levels of efficiency give an indication of the performance of the farmers based on the way they behave within the social, physical and institutional environments. Recent literature shows that the two stage approach that is normally used where DEA efficiency scores are estimated in the first stage, followed by tobit regression analysis in the second stage to explain inefficiencies, is invalid since one of the main assumptions underlying regression analysis (no serial correlation) is violated (McDonald, 2009;. Simar and Wilson, 2007; Xue and Harker, 1999). Consequently, the inferences from such research are invalid. Although more appropriate procedures have been developed in recent years (Simar and Wilson, 2007) researchers in South Africa continue to use the inappropriate two stage approach (Khaile, 2012; Van der Merwe 2012; Speelman *et al.*, 2007). Thus, no reliable information is available on the determinants of efficiency of emerging farmers from South Africa.

The objective of Chapter 6 is to examine the levels of technical and allocative efficiency of a group of emerging raisin producers from Eksteenskuil. In order to overcome the severe limitations of the traditional two-stage approach, the double bootstrap approach of Simar and Wilson (2007) is used to examine the technical efficiency levels of the farmers and the determinants of technical efficiency. Since a double bootstrap approach has not yet been developed to examine allocative efficiency levels of farmers, a procedure recommended by McDonald is used to prevent the violation of the assumption of no serial correlation. The research in this study thus extends existing research by generating more reliable information on the technical and allocative efficiency levels of emerging farmers and the determinants of efficiency. Such information may contribute towards improving the efficiency levels of emerging farmers, and hence their financial performance, within their existing technology set.

The production function that is estimated in Chapter 6 is also used in a subsequent chapter to model the potential impact of recommended changes on the financial performance of the Eksteenskuil farmers.

For the purpose of discussion the remainder of Chapter 6 is divided into three more sections followed by the conclusions. The first is concerned with a motivation for the procedures that were used to meet the objectives. Thereafter follow the analyses of the technical efficiency and cost efficiency of the farmers respectively. The conclusions that were drawn from the analyses then conclude Chapter 6.

6.2   CHOICE OF TECHNIQUE FOR EXPLORING EFFICIENCY LEVELS

Studies that analyse efficiency levels and its determinants often use a two-stage procedure. Efficiency scores are estimated using the non-parametric DEA-approach in the first stage, followed by regression analysis of the estimated efficiency scores on factors hypothesised to influence efficiency in the second stage. Simar and Wilson (2007) list more than 50 studies where the two-stage approach is advocated, while a Google-search revealed "hundreds of unpublished working papers that use the two stage approach" (Simar and Wilson, 2007). Since the efficiency scores estimated using DEA often result in a number of efficiency scores of one, most researchers used tobit regression in the second stage to regress the efficiency scores on covariates. It is argued that the efficiency scores are censored because of the number of efficiency scores of one. Simar and Wilson (2007), however, argue that none of the studies offered any "coherent account of how the censoring arises". Simar and Wilson (2007) question whether the efficiency scores are censored and hence whether the tobit regression model specification is appropriate for the second stage analysis. Simar and Wilson (2007) raise the concern that they could not find in any of the studies that the authors describe the underlying data generating process (DGP). Consequently it rises "some doubt about what is being estimated in the two-stage approaches" (Simar and Wilson, 2007).

Another problem with the typical application of the two stage procedure is highlighted by Xue and Harker (1999). Xue and Harker (1999) argue that the above approaches to regress DEA-estimated efficiency scores violate a basic assumption of regression analysis: the assumption of independence within the sample (no serial correlation). They explain that, if DEA efficiency scores are the dependent variable (Y_i) in a regression model, $Y_i = \beta X_i + \varepsilon_i$, the error terms ($\varepsilon_i$) cannot be independent to each other. The methodology of DEA actually ensures that the efficiency scores are not independent to each other since the calculation of the DEA efficiency score for one decision making unit (DMU) involves all the other DMUs in the observation set. The inherent

dependency among the efficiency scores of the DMUs implies the violation of one of the basic assumptions required by regression analysis. By implication, inferences were made from invalid analyses. Xue and Harker (1999) propose a bootstrap approach to overcome the problem of dependency among the dependent variable. Simar and Wilson (1999a,b), however, prove that the bootstrap approach proposed by Xue and Harker (1999) is inconsistent in the context of non-parametric efficiency estimation and consequently argue that the procedure makes little sense. Simar and Wilson (2007) also argue that Xue and Harker (1999) too fail to describe the DGP for which the second stage regressions would be appropriate. Simar and Wilson (2007) provide a comprehensive description of a DGP that is logically consistent with regression of non-parametric, DEA-estimated efficiency scores on some covariates in the second stage. A double-bootstrap approach developed by Simar and Wilson (2007) is recommended to accurately analyse the determinants of technical efficiency.

A double bootstrap approach has not yet been developed to examine allocative efficiency and the determinants of allocative efficiency of farmers (Olson and Vu, 2009). McDonald (2009), however, argues that the linear unit interval model is a suitable DGP for efficiency scores. When transforming the estimated efficiency scores to the logarithm, the coefficients that are estimated with Ordinary Least Squares (OLS) regression are consistent and asymptotically normal under general conditions. Thus, the problem of serial correlation is better handled than through the tobit regression analysis.

Next follows the analysis of the technical efficiency levels of the raisin producers from Eksteenskuil.

6.3   TECHNICAL EFFICIENCY ANALYSIS OF THE RAISIN PRODUCERS FROM EKSTEENSKUIL

6.3.1   *DATA USED IN ANALYSIS OF TECHNICAL EFFICIENCY AND ITS DETERMINANTS*

Data that were gathered as part of the study by Jordaan and Grové (2012) is used in this study to explore the determinants of technical efficiency of the raisin producers from Eksteenskuil. Farm level production data and information on the characteristics of the farmers were collected through a questionnaire[1] survey in June 2009. All 60 members of EAC were invited to participate in the study. Forty-three of the members completed questionnaires while 28 completed questionnaires were justifiable for inclusion in this study.

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[1] A copy of the questionnaire is shown in Appendix A.

The data that was captured include information on the types and quantities of inputs that were used and volumes of raisins produced. The inputs that were considered for the purpose of analysing the technical efficiency of the raisin producers include nitrogen, phosphorus, and potassium as nutrients for the grape vines, and irrigation water and labour. The characteristics of the farmers of interest for which data was required include characteristics associated with human and social capital of the respondents, some farm and financial characteristics, and the degree to which the farmers comply with best management practices. The factors that were hypothesised to influence the level of technical efficiency of the raisin producers from Eksteenskuil are shown in Table 6.1.

Table 6.1: Factors hypothesised to influence technical efficiency of raisin producers from Eksteenskuil

Variable	Measurement index	Expected sign
Human and social capital		
Formal education	Number of years successfully completed	+
Farming experience	Number of years	+
Entrepreneurial skills	Entrepreneurial index (1-250)	+
Social capital	Social capital index (1-100)	+
Farm characteristics		
Specialisation in raisin production	Specialisation index (1%-100%)	+
Area harvested	Hectares	+
Land tenure	1 = Yes, 0 = No	+
Old vines	As percentage of total vines	-
Financial characteristics		
Off-farm income	As percentage of total income	+
Formal credit	1 = Yes, 0 = No	+
Informal credit	1 = Yes, 0 = No	+
Record keeping	Likert-type scale from 1-5	+
Compliance with best management practices		
Sufficient fertiliser	As percentage of recommended amount	+
Timely fertiliser	Timeliness index (1%-100%)	+
Leaf control	Likert-type scale from 1-7	+
Timely and sufficient irrigation	Likert-type scale from 1-7	+
Remove weeds	Likert-type scale from 1-7	+
Timely pruning	Likert-type scale from 1-7	+
Prevent soil compaction	Likert-type scale from 1-7	+
Same pruning team	Likert-type scale from 1-7	+

Source: Adjusted from Khaile (2012)

Table 6.1 shows that the factors that were hypothesised to influence the technical efficiency of the raisin producers from Eksteenskuil can be grouped into four main groups: human and social

capital; farm characteristics; financial characteristics; and compliance with best management practices. Human capital is hypothesised to have a positive impact on the technical efficiency of the raisin producers from Eksteenskuil. Higher levels of human capital are expected to increase the ability of the raisin producers to internalise technical information they receive through training sessions and extension in the technical aspects of raisin production. Human capital related factors were found to have a positive impact on technical efficiency levels by Khaile (2012), Begum *et al.* (2009), Dolisca and Jolly (2008), and Ogunyinka and Ajibefun (2003). Conradie *et al.* (2006), however, found the relationship to reduce technical efficiency. Despite the negative relationship found by Conradie *et al.* (2006), the hypothesis in this study still is that higher levels of human capital are expected to contribute to higher levels of technical efficiency. Human capital is represented by three different proxies: the number of years of formal education; the number of years of experience in raisin production; and the level of entrepreneurial skills possessed by the decision-maker. The level of entrepreneurial skills is represented by an entrepreneurial index that is calculated based on responses to questions in a questionnaire from the Business School at University of Stellenbosch (Section 8 in Eksteenskuil questionnaire). The procedure to calculate the entrepreneurial score for each respondent is shown in Appendix B. Social capital is also hypothesised to have a positive influence on the levels of technical efficiency of the farmers. Most of the training and information sessions are presented to the farmers from Eksteenskuil in groups. Farmers with higher levels of social capital are expected to more frequently attend such collective training sessions. Similarly, farmers with higher levels of social capital are expected to visit other farmers more regularly in quests to learn how the more prosperous farmers overcome the challenges they face (i.e. farmer-to-farmer skills transfer). Khaile (2012) on the other hand argues that more non-farm activities could negatively affect technical efficiency by diverting the farmers' focus away from their raisin production enterprises. For the purpose of this study, however, social capital is expected to contribute positively to higher levels of technical efficiency.

The farm characteristics that were hypothesised to influence the levels of technical efficiency of the farmers from Eksteenskuil include the area harvested, secure land tenure, and the proportion of the vines from which raisins were harvested that are older than 25 years of age. Land size is expected to have a positive influence on the level of technical efficiency of the raisin producers from Eksteenskuil. Larger farm sizes would allow the farmers to benefit from scale advantages. The poor comparison of the median farm size at Eksteenskuil (4.6ha) to an economic unit of 20ha (Visser, 2009) suggests that the majority of farmers will benefit from increasing their scale of operations. Secure land tenure is also expected to have a positive impact on the technical efficiency of the farmers. Secure land tenure provides an incentive for the farmers to properly invest in their raisin enterprises. Secure land tenure also means that farmers can list their land as collateral to source formal credit to supplement their cash flow. Secure land tenure was also

found to have a positive impact on technical efficiency by Speelman *et al.* (2007) and Khaile (2012). The proportion of vines that is older than 25 years is hypothesised to have a negative impact on the technical efficiency of the farmers. The economic life span of the sultana variety is about 25 years (Brink, 2008). The level of productivity of the vines deteriorates substantially once the vines reach 25 years of age, causing yields to decline.

The financial characteristics that are hypothesised to influence the levels of technical efficiency include the proportion of total income coming from off-farm economic activities, access to formal and informal credit, and financial record keeping. Khaile (2012) hypothesised a positive influence of off-farm economic activities on the level of technical efficiency of the raisin producers. The reason for the positive expected relationship was that the farmers with substantial off-farm income would be able to supplement their farm cash flow with the off-farm income. Farmers with a larger percentage of income coming from off-farm economic activities thus are expected to be more able to apply timely and sufficient quantities of production inputs. A similar positive relationship was also hypothesised by Wollni (2007) and Haji (2006). Access to formal and informal credit is also expected to contribute positively to the technical efficiency levels of the farmers. Farmers who have access to credit are expected to be more able to ensure the timely and sufficient application of important production inputs. Lastly, a positive relationship is also expected between financial record keeping and technical efficiency levels of the farmers. Khaile (2012) and Wollni (2007) also expected a positive relationship between record keeping and technical efficiency.

The last group of factors that are hypothesised to contribute to higher levels of technical efficiency relate to the farmers' compliance with best management practices. Best management practices were identified through personal discussions with individuals who are knowledgeable in the production of raisins. The knowledgeable individuals include some of the prosperous farmers from Eksteenskuil and surrounding commercial raisin producers in the region, input suppliers, the previous governmental extension officer who was heavily involved with the farmers from Eksteenskuil, and the technical advisor from South African Dried Fruits (SAD) who is the main buyer of raisins from Eksteenskuil farmers. Based on discussions with the knowledgeable individuals, the identified best management practices include: timely and sufficient fertiliser application; timely and sufficient irrigation; leaf control to allow sufficient sunlight to the grapes; removing weeds that compete with the vines for available nutrients in the soil; timely pruning to ensure optimal vegetative growth; preventing soil compaction; and using the same pruning team who know how to correctly prune the vines. The degree to which farmers comply with these best management practices is expected to contribute positively to higher levels of technical efficiency.

Next follows a discussion of the double bootstrap approach that was used to explore technical efficiency levels and its determinants as proposed by Simar and Wilson (2007).

6.3.2 DOUBLE BOOTSTRAP APPROACH TO ANALYSE TECHNICAL EFFICIENCY AND ITS DETERMINANTS

The double bootstrap approach to analyse technical efficiency and its determinants is performed using Algorithm #2 of Simar and Wilson (2007). The regression analysis within Algorithm #2 is performed within the principal component regression framework to reduce the number of explanatory variables relative to the number of observations. The procedures for the principle component regression are discussed comprehensively by Khaile (2012) and Magingxa (2006) and hence are not discussed in detail here. Algorithm #2 consists of the following seven steps (Simar and Wilson, 2007):

Step1.

Estimate output-oriented DEA efficiency scores, $\hat{\delta}_i$, using the original data. The output-oriented DEA approach is as follows:

$$\max \quad \hat{\delta}_i$$

$$Subject \quad to \quad :$$

$$x_{ijo} \geq \sum_{j=1}^{n} x_{ij} \lambda_j ; \qquad (i = 1, ..., \quad I)$$

$$\delta_i y_{pjo} \leq \sum_{j=1}^{n} y_{pj} \lambda_j ; \qquad (p = 1, ..., \quad P)$$

$$\sum_{j=1}^{n} \lambda_j \leq 1 \qquad (j = 1 ......, \quad J)$$

$$\lambda_j > 0 ;$$

Where x_{ij} define the amount of input, i, used by decision-making unit (DMU) *j*. Y_{pj} is the amount of product *p* produced by DMU *j* and j_0 refers to the reference DMU for which the efficiency is calculated. λ_j indicates the non-negative weights that are optimised for each DMU. The weights measure the location of an inefficient DMU if it was to become technically efficient. The restriction, $\sum_{j=1}^{n} \lambda_j \leq 1$, specifies variable returns to scale. δ_i is greater or equal to one and represents the efficiency score that measures the technical efficiency of the i-th DMU as the distance to the efficiency frontier. The efficiency frontier is a linear combination of

best practice observations. DMUs with $\delta_i = 1$ are on the efficiency frontier and are considered to be technically efficient. DMUs with $\delta_i > 1$ are inside the efficiency frontier and are considered to be inefficient.

The production inputs that were used to estimate the DEA-technical efficiency scores (X (i x j)) include the amount of Nitrogen (N), Phosphorus (P), Potassium (K), water, and labour. N, P, and K were measured as the amount of kilogramme that was applied per hectare during the season. The farmers from Eksteenskuil use flood irrigation to irrigate their crops. The farmers do not measure the actual volumes of irrigation water they apply, hence the number of applications of irrigation water during the season is used as a proxy for the water that was used. Labour was measured as the number of labour days that were used per hectare during the season. The farmers from Eksteenskuil produce mainly two types of raisins: Thompson Seedless and Golden Sultanas. Both types of raisins are produced from the same grape variety, sultana. It is only the drying process that differs between the two. The volumes of Thompson's seedless and golden sultana raisins are used as the multiple outputs (Y (p x j) in Step 1) in the DEA analysis.

Step 2

Use the maximum likelihood method to obtain an estimate $\hat{\beta}$ of β and also an estimate $\hat{\sigma}_\varepsilon$ of σ_ε from the truncated regression of the estimated efficiency scores ($\hat{\delta}_i$) on environmental variables (z_i) using the observations when $\delta_i > 1$.

The environmental variables (z_i) are principal components that were extracted from the original variables that were hypothesised to influence the technical efficiency levels of the farmers. The procedure to extract the principal components starts with the standardisation of the hypothesised explanatory variables. All of the standardised variables have means of zero and standard deviations of one. The standardised explanatory variables then are used in a principle component analysis to calculate eigen vectors that are used to construct the principle components. Following the Kaiser-Gutman Rule only principal components with eigen values greater than one are included in the regression analysis. Table 6.2 shows the eigen values of the principal components of the variables that were initially hypothesised to influence the technical efficiency of the raisin producers from Eksteenskuil. A summary of the factor loadings is presented in Appendix C.

Table 6.2: Summary of eigenvalues of principal components to identify the number of principle components to include in the analysis of the determinants of technical efficiency of raisin producers from Eksteenskuil

Principal component	Eigen value	Individual percent	Cumulative percent
1	2.60	12.40	12.40
2	2.49	11.85	24.25
3	3.66	17.42	41.67
4	1.74	8.30	49.97
5	1.95	9.31	59.28
6	1.65	7.86	67.14
7	1.63	7.77	74.92
8	0.99	4.69	79.61
9	0.78	3.72	83.33
10	0.72	3.42	86.75
11	0.69	3.31	90.05
12	0.47	2.24	92.30
13	0.43	2.07	94.37
14	0.36	1.70	96.07
15	0.21	1.01	97.07
16	0.20	0.95	98.02
17	0.16	0.75	98.77
18	0.11	0.50	99.27
19	0.08	0.37	99.64
20	0.04	0.19	99.83
21	0.04	0.17	100.00

Table 6.2 shows that seven of the 21 principal components have eigen values greater than one. Since the eighth principal component has an eigen value of 0.99 while contributing another 4.7% to explaining the variation in the include variables, it was decided to include the eighth principal component. Cumulatively the eight principle components explain almost 80% of the variation in the explanatory variables that are included in the principle components. Based on the eigen values in Table 6.2, eight principal components are included in the truncated regression analysis in Step 2 to obtain estimates $\hat{\beta}$ of β and $\hat{\sigma}_\varepsilon$ of σ_ε.

Step 3

Loop over the next four steps ([3.1]-[3.4]) L_1 times to obtain n sets of bootstrap estimates $\left\{ \hat{\delta}_{ib}^* \right\}_{b=1}^{L_1}$:

3.1) For each $i = 1, \ldots , n$, draw ε_i from the $N(0, \hat{\sigma}_\varepsilon^2)$ distribution with left truncation at $(1 - z_i \hat{\beta})$.

3.2) Again for each i =1, ... , n, compute $\delta_i^* = z_i\hat{\beta} + \varepsilon_i$.

3.3) Set $x_i^* = x_i$ and $x_i^* = y_i\hat{\delta}_i / \delta_i^*$ for all i =1, ... , n.

3.4) Compute $\hat{\hat{\delta}}_i^*$ using the bootstrap samples of x_i^* and y_i^* from step [3.3].

According to Simar and Wilson (2007)100 bootstrap replications prove to be sufficient to estimate the bias-corrected technical efficiency scores ($\hat{\hat{\delta}}_i$) in Step 4. L_1 in Step 3 thus is set to 100.

Step 4

Compute the bias-corrected efficiency scores, $\hat{\hat{\delta}}_i$, for each i =1, ... , n using the bootstrap estimates in step [3.4] and the original estimate $\hat{\delta}_i$. The bias-corrected efficiency score is calculated as follows:

$$\hat{\hat{\delta}}_i = \hat{\delta}_i - bi\hat{a}s_i$$

Where $bi\hat{a}s_i$ is the bootstrap estimator of bias obtained by the formula (Simar and Wilson, 2000):

$$bi\hat{a}s_i = \left(\frac{1}{L_1}\sum_{b=1}^{L_1} \delta_{ib}^*\right) - \hat{\delta}_i$$

Step 5

Use the maximum likelihood method to estimate the truncated regression of $\hat{\hat{\delta}}_i$ on z_i to obtain estimates ($\hat{\beta}, \hat{\sigma}$). Again the principal components of the explanatory variables are used as z_i in the truncated regression.

Step 6

Loop over the next three steps L_2 times to obtain a set of bootstrap estimates $\left\{(\hat{\beta}_b^*, \hat{\sigma}_b^*)|b=1,...,L_2\right\}$

6.1) For each i =1, ... , n, draw ε_i from the N(0, $\hat{\sigma}$) distribution with left truncation at (1- $z_i\hat{\beta}$).

6.2) Again for each $i = 1, \ldots, n$, compute $\delta_i^{**} = z_i \hat{\hat{\beta}} + \varepsilon_i$.

6.3) Use maximum likelihood method to estimate the truncated regression of δ_i^{**} on z_i to obtain $(\hat{\hat{\beta}}^*, \hat{\sigma}^*)$. The principal components of the explanatory variables are used as z_i in the truncated regression of δ_i^{**} on z_i to obtain $(\hat{\hat{\beta}}^*, \hat{\sigma}^*)$.

Simar and Wilson (2007) set L_2 to 2 000 bootstrap replications, but mention that more accurate results may be obtained with larger number of replications. Diminishing returns, however, arise slowly in the case of confidence interval estimation. Moreover, an increase in the number of replications increases the waiting time. Simar and Wilson (2007) suggest that one needs to balance the concern of a higher number of replications with the increase in waiting time.

The results from the truncated regression are shown in Table 6.3.

Table 6.3: Truncated regression results of the bias-corrected technical efficiency scores on the eight principal components with eigen values greater than one

Variable	Coefficient		Standard Error	z-statistic	Prob(z)
Intercept	0.749	***	0.115	6.528	0.001
ZPC1	-0.229	*	0.106	-2.169	0.073
ZPC2	-0.079		0.144	-0.553	0.600
ZPC3	0.275		0.173	1.593	0.162
ZPC4	0.411	**	0.137	3.003	0.024
ZPC5	-0.054		0.172	-0.317	0.762
ZPC6	-0.226		0.170	-1.331	0.232
ZPC7	-0.256		0.188	-1.366	0.221
ZPC8	-0.163		0.118	-1.391	0.214

Note: ***, **, and * indicate statistical significance at 1%, 5% and 10% respectively.

The regression results in Table 6.3 show that two of the principle components are significant in explaining the variation in the bias-corrected technical efficiency scores of the raisin producers from Eksteenskuil. Following the procedures discussed by Khaile (2012) and Magingxa (2006) the coefficients $(\hat{\hat{\beta}}^*)$ and standard errors $(\hat{\sigma}^*)$ from the truncated regression analysis are used to calculate the coefficients of the individual standardised variables that were included in the principal components and the standard errors of the coefficients of the

standardised variables. The coefficients of the standardised variables are divided by the standard deviations of the original explanatory variables in order to obtain un-standardised coefficients. Similarly, un-standardised standard errors are also obtained by dividing the standard errors of the standardised coefficients by the standard deviations of the original explanatory variables. The un-standardised coefficients and standard errors then are used to calculate z-values and the probabilities of the z-values to determine the levels of significance of the respective un-standardised explanatory variables as determinants of technical efficiency.

Step 7

Use the bootstrap values ($\hat{\hat{\beta}}^*, \hat{\hat{\sigma}}^*$) to construct ($1-\alpha$) confidence intervals for each element of β and $\hat{\sigma}_\varepsilon$ as follows:

$\text{Prob}\,(Lower_{\alpha,j} \leq \beta_j \leq Upper_{\alpha,j}) = 1 - \alpha$

Where $Lower_{\alpha,j}$ and $Upper_{\alpha,j}$ are calculated using the empirical intervals obtained from the bootstrap values

$\text{Prob}\,(-\hat{b}_\alpha \leq \hat{\hat{\beta}}_j^* - \hat{\hat{\beta}}_j \leq -\hat{a}_\alpha) \approx 1 - \alpha$

And $Upper_{\alpha,j} = \hat{\hat{\beta}}_j + \hat{b}_\alpha; Lower_\alpha = \hat{\hat{\beta}}_j + \hat{a}_\alpha$

Next follows the results from the technical efficiency analysis for the case of raisin producers from Eksteenskuil.

6.3.3   *TECHNICAL EFFICIENCY OF THE RAISIN PRODUCERS FROM EKSTEENSKUIL*

The bias-corrected technical efficiency scores of the raisin producers from Eksteenskuil are shown as a cumulative probability distribution (CDF) in Figure 6.1.
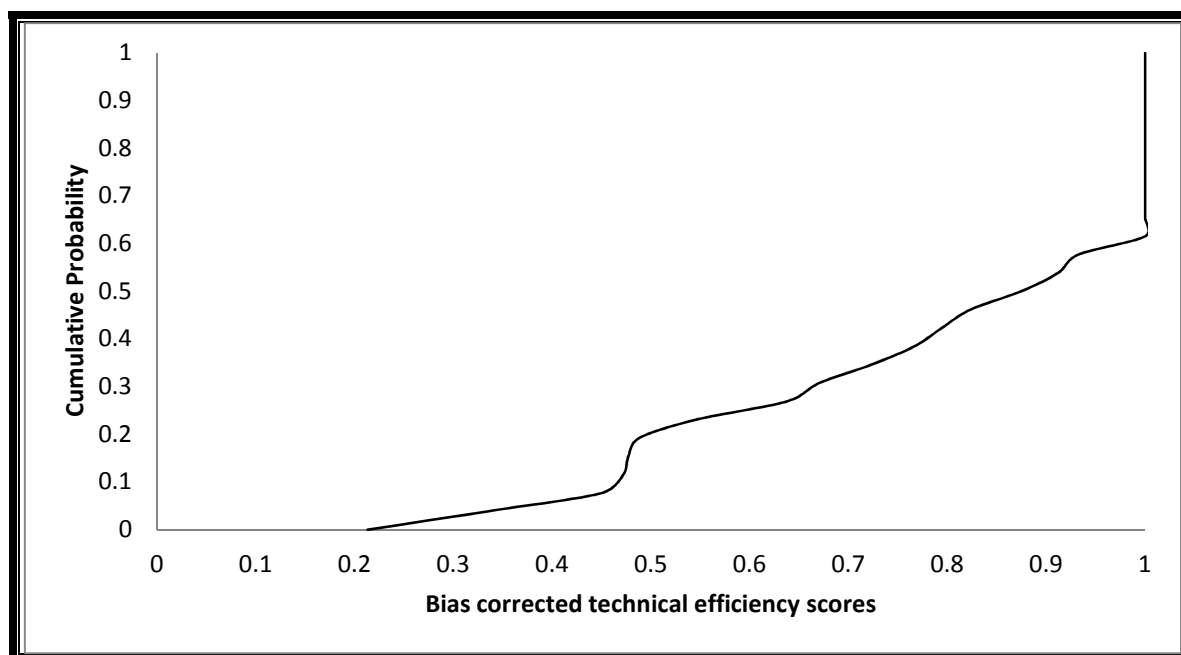
Figure 6.1: Cumulative probability distribution of the bias-corrected technical efficiency scores of the raisin producers from Eksteenskuil

The raisin producers from Eksteenskuil perform relatively well in terms of the levels of technical efficiency with which they use their production inputs. The average bias-corrected technical efficiency score of 0.78 is relatively high. Figure 6.1 shows that about 40% of the respondents scored technical efficiency scores of one. Those 40% of the farmers operate on the efficiency frontier and are considered to be technical efficient. Thus, only the 60% of farmers who obtained technical efficiency scores of less than one are considered to be technical inefficient and hence should be able to expand their output at current input levels and within their existing technology set. The lowest technical efficiency score of 0.21 implies that the particular farmer should be able to expand his output by 376% (((1/0.21)-1)*100%) if he was to improve his technical efficiency to one.

Figure 6.1 also shows that there are no major changes in the distribution of the efficiency scores of the respondents who obtained efficiency scores less than one. In order to get a better understanding of the distribution of the technical efficiency levels of the raisin producers from Eksteenskuil the farmers were divided into three groups (top, middle and bottom third) based on their bias-corrected technical efficiency scores. Since 40% of the respondents achieved technical efficiency scores of one, the average of the top third group of farmers is one. Thus, the farmers in the group that represents the top third group of farmers are not able to expand their output at current input levels and within the existing technology set. However, if the farmers were to

increase their input levels and to adopt new technology, they may be able to expand their output. The average technical efficiency score of the respondents who comprise the middle third group of farmers is still high at 0.87. On average, the middle third group of farmers should be able to expand their output by about 15% if they were to increase their technical efficiency level to one. Based on the lower and upper bound of the 95% confidence interval, the middle third group of farmers should be able to expand their output between 10% and 20%. The bottom third group of farmers achieve an average technical efficiency score of only 0.48. On average, the farmers in the bottom third group thus should be able to expand their output by 108% if they were to improve their technical efficiency levels to one, or between 43% and 116% according to the 95% confidence intervals. Keep in mind that the expansion should be possible without incurring additional costs since it should be possible at current input levels and within the existing technology set. Improving the technical efficiency levels of the middle and bottom third groups of raisin producers thus may have a substantial impact on their financial performance.

Thus, while the top third group of raisin producers prove to be performing relatively well in terms of converting their production inputs into raisins, there is major scope to improve the performance of the remaining two thirds of farmers who do not use their inputs efficiently. Next follows a discussion of the determinants of technical efficiency to identify characteristics that are associated with higher levels of technical efficiency.

6.3.4   DETERMINANTS OF TECHNICAL EFFICIENCY OF THE RAISIN PRODUCERS FROM EKSTEENSKUIL

The results from the regression analysis of the bias-corrected technical efficiency scores on the factors that were hypothesised to influence the technical efficiency levels of the farmers are shown in Table 6.4. It is noted that, since the dependent variable in the regression analysis is the inefficiency index that is the reciprocal of the technical efficiency score, a negative sign of a coefficient implies a positive relationship between the particular variable and the technical efficiency levels of the raisin producers from Eksteenskuil.

Table 6.4: Regression results from the truncated regression of the bias-corrected technical efficiency scores on its determinants in the double-bootstrap approach

Variable	Coefficient[1]		Standard error	z-statistic	Prob(z)
Human and social capital					
Formal education	-0.047	***	0.013	-3.695	0.010
Farming experience	0.001		0.001	0.798	0.455
Entrepreneurial skills	-0.010	***	0.003	-3.671	0.010
Social capital	0.003		0.003	1.050	0.334
Farm characteristics					
Specialisation in raisin production	-0.092		0.080	-1.157	0.291
Area harvested	-0.021	**	0.006	-3.462	0.013
Land tenure	-0.546	**	0.160	-3.407	0.014
Old vines	0.221	*	0.095	2.321	0.059
Family labour	0.366	**	0.138	2.659	0.038
Financial characteristics					
Off-farm income	-0.004	**	0.001	-3.417	0.014
Formal credit	-0.183	***	0.050	-3.673	0.010
Informal credit	-0.361	**	0.106	-3.412	0.014
Record keeping	-0.070	**	0.023	-3.053	0.022
Compliance with best management practices					
Sufficient fertiliser	0.135	**	0.040	3.359	0.015
Timely fertiliser	-0.022	**	0.006	-3.481	0.013
Leaf control	-0.057	**	0.017	-3.353	0.015
Timely and sufficient irrigation	0.009		0.030	0.303	0.772
Remove weeds	0.026		0.035	0.735	0.490
Timely pruning	0.019		0.025	0.746	0.484
Prevent soil compaction	-0.006		0.032	-0.199	0.849
Same pruning team	0.033		0.017	1.920	0.103

Note:

1: Since the dependent variable is the inefficiency index (reciprocal of the technical efficiency score), a negative sign of the coefficient implies a positive relationship between the explanatory variable and the level of technical efficiency of the raisin producer.

***, **, and * indicate statistical significance of 1%, 5% and 10% respectively.

The results presented in Table 6.4 show that a number of the characteristics in all four groups that were hypothesized to influence the technical efficiency levels of the farmers from Eksteenskuil do contribute to higher levels of technical efficiency. The negative signs of formal education ($p<0.01$) and Entrepreneurial skills ($p<0.01$) imply that the higher the levels of education and entrepreneurial skills of the farmers, the higher are their technical efficiency levels. The results thus confirm the initial hypothesis and the findings of Khaile (2012), Begum *et al.* (2009), Dolisca and Jolly (2008), and Ogunyinka and Ajibefun (2003). Interestingly, the levels of social capital and farming experience of the respondents were found not to be significant. It is noted that the fact that the variable is insignificant in the regression model does not necessarily imply that the particular characteristic does not contribute to higher levels of technical efficiency. It

only means that in this particular sample of raisin producers, one cannot distinguish between the technical efficiency levels of the farmers based on that characteristic (i.e. farming experience) of the respondents.

The results of the influence of the farm characteristics on the technical efficiency levels of the raisin producers show that larger farm sizes ($p<0.05$) and secure land tenure ($p<0.05$) are positively associated with the technical efficiency levels of the sample of raisin producers. Again the positive relationships confirm initial hypotheses. The larger farm sizes allow the farmers to benefit from scale advantages. Secure land tenure provides the farmers with an incentive to invest in their farms, and also to gain access to credit to supplement their limited cash flow. On the other hand, the larger proportion of vines that is older than 25 years of age and the larger the proportion of labour being performed by family members, the lower are the technical efficiency scores of the respondents. The negative relationships again confirm initial hypotheses. Grapevines that are older than 25 years of age face a substantial decline in productivity (Myburgh, 2007) which implies that the older vines will be less efficient in transforming production inputs into grapes for raisins.

All of the financial characteristics of the respondents that were hypothesized to be positively related to higher levels of technical efficiency were found to be significant ($p<0.05$). The positive influence of off farm income, and access to formal and informal credit allow the respondents to supplement their cash flow to allow for the timely application of sufficient levels of the necessary production inputs. The results thus show that emerging farmers' performance may be improved through initiatives that will reduce the cash flow constraints they face. The respondents who are more active in terms of financial record keeping also prove to obtain higher technical efficiency scores than the respondents who do not keep records. Sound record keeping ensures that the decision maker knows the different periods when cash flow may be more limited than others. Such information enable the farmer to allocate the scarce funds such to ensure that he/she will still be able to apply the necessary inputs in a timely manner.

Interestingly, only three of the eight best management practices that were hypothesized to be related to higher levels of technical efficiency were found to be significant. Leaf control ($p<0.05$) and the timely application of fertilizer ($p<0.05$) were found to contribute positively to the technical efficiency levels of the raisin producers. On the other hand, sufficient fertilizer ($p<0.05$) was found to have a negative influence on the technical efficiency scores of the respondents. The negative influence of sufficient fertilizer shows that the mere application of sufficient levels of fertilizer is not the answer to improve the performance of the farmers from Eksteenskuil. The application of the recommended quantities of fertilizer occurs in combination with a number of other management

decisions. Farmers need to make the correct management decisions to ensure that they benefit optimally from applying sufficient quantities of fertilizer to produce their raisins. The timeliness of applying fertilizer is important in this instance. Baard (2009) argues that the timeliness of fertilizer application has a major impact on the productivity of the fertilizer that was applied. Thus, applying sufficient quantities of production inputs by itself is not the answer to improve the performance of emerging farmers. The farmers have to use the inputs according to recommendations to ensure that they earn the optimal amount of benefit from using the particular production inputs.

The discussion of the influence of compliance with best management practices concludes the analysis of the technical efficiency levels of the raisin producers from Eksteenskuil. Within the next section the focus of attention shifts to the levels of allocative efficiency with which the farmers from Eksteenskuil use their production inputs to produce their raisins.

6.4 ALLOCATIVE EFFICIENCY ANALYSIS OF THE RAISIN PRODUCERS FROM EKSTEENSKUIL

6.4.1 DATA USED TO EXPLORE ALLOCATIVE EFFICIENCY AND ITS DETERMINANTS

The original data that was collected by Jordaan and Grové (2012) in June 2009 does not allow for the analysis of allocative efficiency levels of the farmers from Eksteenskuil. A second survey thus was conducted to collect the necessary data. The data was collected by means of a questionnaire survey during June 2011. Again all 60 members of EAC were invited to participate in the study. While 53 raisin producers completed questionnaires, 40 questionnaires were completed to a satisfactory level to justify inclusion in the analysis of the cost efficiency of the farmers.

The data that was gathered include farm level production data and socio economic characteristics of the respondents. More specifically, the production data include the quantities and prices of production inputs that were used to produce the raisins during the 2010/11 season, and the volumes of Thompson's Seedless and golden sultana raisins produced during the 2010/11 season. The production inputs that were used to estimate the cost efficiency scores include nitrogen, phosphorus, and potassium as nutrients for the grapevines, and labour. Although it is recognised that irrigation water is a crucial production input for producing raisins, the fact that the farmers from Eksteenskuil do not pay for their irrigation water, makes it unnecessary to include water in the analysis. The socio-economic characteristics of the farmers that are considered as potential determinants of cost efficiency include the age, levels of formal education, and experience of the farmers; the area of grapes harvested; the degree of specialisation in raisin

production; and off-farm income that can supplement cash flow; the attendance of farmers' days and a course in financial record keeping; and the degree to which the skills that were obtained through the record keeping course was applied in decision-making activities during the 2010/11 production season.

Next follows a description of the procedures for estimating the cost efficiency levels of the raisin producers from Eksteenskuil.

6.4.2 ESTIMATING ALLOCATIVE EFFICIENCY LEVELS OF EMERGING RAISIN PRODUCERS FROM EKSTEENSKUIL

According to Van der Merwe (2012), there are three different measures of allocative efficiency: profit efficiency; revenue efficiency; and cost efficiency. Profit efficiency is defined as the ability of a firm to maximise its profit by producing the optimal amount of output with the minimum possible inputs given the prices for the inputs and the product that is produced (Ali & Flinn, 1989). Revenue efficiency is the ratio of the current revenue (price x current output level) to the maximum revenue (price x optimal output level) (Van der Merwe, 2012; Cooper, Seiford and Tone, 2006). Lastly, cost efficiency refers to the ability of a firm to produce the current output levels at minimum cost. Cost efficiency thus is expressed as the ratio of the minimum possible costs to produce a certain amount of output to the incurred costs to produce the output (Van der Merwe, 2012; Maudos *et al.*, 1999). According to Van der Merwe (2012), the choice of the appropriate measure to express allocative efficiency depends on the characteristics of the transaction under consideration. Whenever the product and input prices differ for different decision making units, profit efficiency is the appropriate measure of allocative efficiency. Revenue efficiency is more appropriate when producers receive different prices for their output while paying the same prices for inputs. Lastly, cost efficiency is the appropriate measure when decision making units receive the same price for their produce while the prices paid for their inputs differ from one decision making unit to the next.

At Eksteenskuil the raisin producers receive the same prices for the produce while the prices they pay for their production inputs differ. Thus, the appropriate measure of allocative efficiency for the case of the raisin producers from Eksteenskuil is the cost efficiency approach. Cost efficiency scores are calculated in two steps. In the first step the minimum cost to produce the current output level is calculated. The cost efficiency score is calculated in the second step by calculating the ratio of the minimum cost to the incurred costs. The minimum cost is calculated though the following linear programming model (Rosenthal, 2011):

$$cx^{*} = \min \quad cx$$

Subject to :

$$x_{ijo} \geq \sum_{j=1}^{n} x_{ij} \lambda_{j} ; \qquad (i = 1,........, \quad I)$$

$$y_{pjo} \leq \sum_{j=1}^{n} y_{pj} \lambda_{j} ; \qquad (p = 1,......, \quad P)$$

$$\sum_{j=1}^{n} \lambda_{j} \leq 1 \qquad (j = 1 ......, \quad J)$$

$$\lambda_{j} > 0 ;$$

Where c is the price of the inputs used, cx^{*} is the minimum possible cost to produce the current output level and cx is the incurred cost. x_{ij} define the amount of input, i, used by decision-making unit (DMU) j. Y_{pj} is the amount of product p produced by DMU j and j_{0} refers to the reference DMU for which the efficiency is calculated. λ_{j} indicates the non-negative weights that are optimised for each DMU.

In the second step the minimum possible cost that was calculated in the first step is divided by current costs to get the cost efficiency score. Cost efficiency thus is calculated as follows:

$$\theta = \frac{cx^{*}}{cx}$$

where θ is the cost efficiency score, cx^{*} is the minimum possible cost to produce the current output level and cx is the incurred cost.

A DMU that has incurred the minimum possible cost thus scores a cost efficiency score of one. DMUs who have incurred costs higher than the minimum costs score cost efficiency scores between zero and one. In the next section the focus of attention shifts to the analysis of the determinants of allocative efficiency.

6.4.3 *EXPLORING THE DETERMINANTS OF ALLOCATIVE EFFICIENCY OF EMERGING RAISIN PRODUCERS FROM EKSTEENSKUIL*

6.4.3.1 Regression model specification

Simar and Wilson (2007) and McDonald (2009) provide comprehensive explanations why efficiency scores that are estimated with the non-parametric, DEA approach are not censored, but fractional. Given the fact that the efficiency scores are not censored the tobit model is inconsistent and is inappropriate to regress the estimated efficiency scores on hypothesised explanatory variables to explore the determinants of efficiency (McDonald, 2000; Simar and Wilson, 2007). No double bootstrap procedures have yet been developed to analyse allocative efficiency levels and its determinants (Olson and Vu, 2009). McDonald, however, argues that the linear unit interval model is a suitable DGP for efficiency scores. The linear unit interval model is presented as follows:

$$y_i = x_i \beta + u_i \qquad\qquad (1)$$

where the u_i / x_i are independently distributed with zero means, $0 \le y_i \le 1$, with the limit point $y_i = 1$ possessing positive probability.

McDonald (2009) argues that the properties of OLS, given that the data is generated by (1), parallel those of Ordinary Least Squares (OLS) in the linear probability binary discrete choice model. OLS estimates of β is consistent and asymptotically normal under general conditions.

Based on the discussions of McDonald (2009) it was decided to use DGP (1) to explore the determinants of cost efficiency of the raisin producers from Eksteenskuil. Following the recommendation of McDonald (2009), the dependent variable, y_i, is the logarithm of the estimated cost efficiency scores that were estimated in Section 6.3.2 above. Given the relatively small sample of 40 respondents, bootstrap estimates of the coefficients are calculated to provide more accurate inferences (Mooney and Duval, 1993). The factors that were hypothesised to influence the cost efficiency of the farmers from Eksteenskuil are presented and discussed next.

6.4.3.2 Hypothesised explanatory variables

The factors that were hypothesised to influence the levels of cost efficiency of the raisin producers from Eksteenskuil (x_i) are summarised in Table 6.4.

Table 6.5:   Factors hypothesised to influence the levels of cost efficiency of raisin producers from Eksteenskuil

Variable	Measurement scale	Expected sign
Personal characteristics		
Age	Number of years	+
Experience	Number of years	+
Education	Number of years successfully completed	+
Financial characteristics		
Off-farm income	Access to income coming from off-farm economic activities (Yes = 1, No = 0)	+
Farm characteristics		
Farm size	Size of land harvested (ha)	+
Specialised raisin production	Specialisation index (0 - 100%)	+
Human capital development		
Farmers' days attendance	Percentage of farmers' days attended (0-100%)	+
Record keeping course attendance	Binary choice (Yes = 1, No = 0)	+
Record keeping course application	Likert scale from 1 - 5 (1 if not at all, 5 if completely)	+

Table 6.4 shows that the factors that were hypothesised to influence the cost efficiency of the farmers can be grouped into four groups. In general, it is hypothesised that the cost efficiency of the raisin producers is influenced by the personal characteristics of the farmers, some of the financial and farm characteristics of their farming enterprises, and farmers' participation in human capital development activities. The personal characteristics of the farmers that were hypothesised to influence the cost efficiency of the farmers from Eksteenskuil include the farmers' age, the number of years of farming experience and the number of years of formal education successfully completed. All three characteristics were hypothesised to have a positive influence on the cost efficiency of the farmers. The older, more experienced farmers are expected to have more experience to be able to better allocate their production inputs to produce their raisins at the lowest costs. Higher levels of formal education imply higher levels of human capital. Higher levels of human capital are expected to contribute to the ability of the farmers to select the input combinations that will produce their raisins at a minimum possible cost. Human capital related

factors were also found to contribute positively to allocative efficiency in recent studies among small farmers in Ethiopia (Haji and Andersson, 2006).

Off-farm income was hypothesised to contribute positively to cost efficiency since it allows the farmers to supplement their cash flow to buy the necessary inputs. The fact that the farmers are able to supplement their cash flow effectively shifts the cash constraint outwards and enable the farmers to make timely purchases of the necessary production inputs (Okoye, Onyenweaku, and Asumgha, 2007). Given the positive impact of the timely application of the necessary inputs on the raisin yields, comparatively, the cost of production is reduced.

The cost efficiency levels of the farmers from Eksteenskuil are also expected to be influenced by the farm size and the level of specialisation in the production of raisins. The positive influence of the farm size is expected because of the scale advantages that may results from larger farm sizes. Larger farm sizes were also found to be positively related to allocative efficiency levels by Haji and Andersson (2006), but Okoye *et al.* (2007) found the relationship to be negative. Specialising in raisin production implies that the farmers are completely dependent on the income they earn through their raisin production enterprises. Van der Merwe (2012) argues that such a scenario is expected to cause farmers to pay more attention to select the cost minimising combination of inputs.

Lastly, it is hypothesised that the higher the level to which the farmers from Eksteensuil participate in human capital development activities (i.e. attending farmers' days and the record keeping course), the higher their levels of cost efficiency would be. By contributing to higher levels of economic literacy, Van der Merwe (2012) also expected such activities to positively contribute to cost efficiency.

Next, the estimated cost efficiency scores are presented and discussed.

6.4.3   COST EFFICIENCY OF EMERGING RAISIN PRODUCERS FROM EKSTEENSKUIL

The estimated cost efficiency scores of the raisin producers from Eksteenskuil are presented as a cumulative probability distribution (CDF) in Figure 6.2 below.
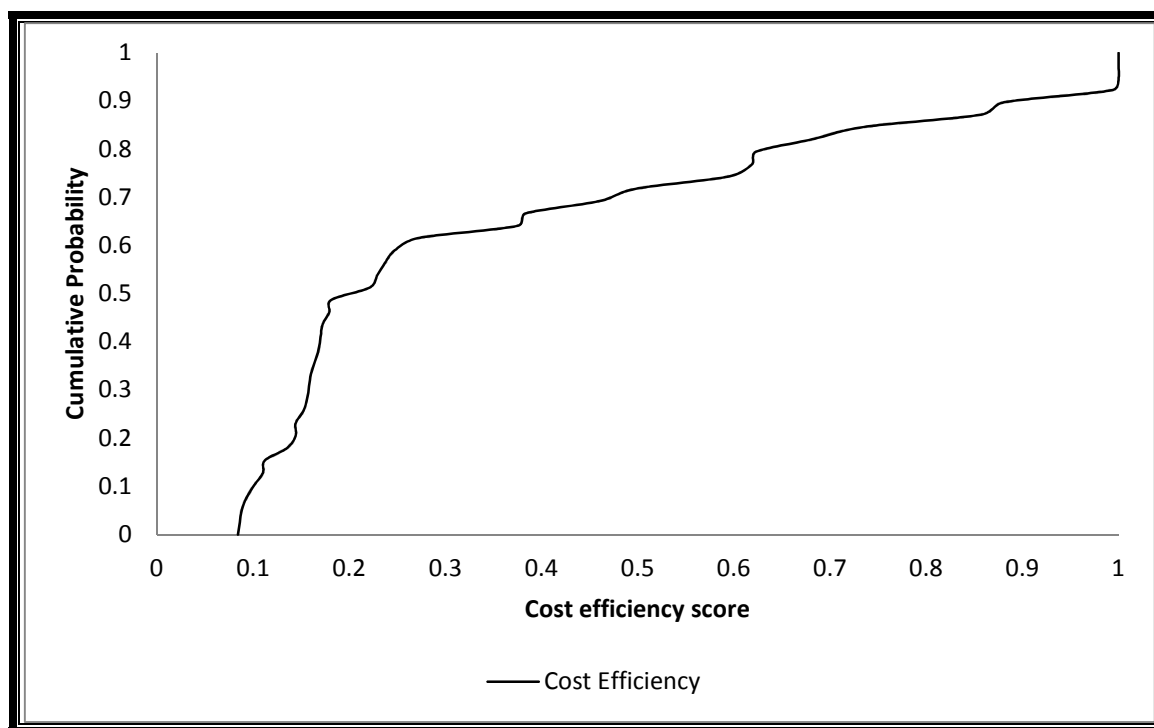
Figure 6.2: Cumulative probability distribution of cost efficiency scores of raisin producers from Eksteenskuil

Figure 6.2 shows that the cost efficiency levels of the raisin producers range from 0.084 to a maximum of one. There are three respondents who obtained cost efficiency scores of one. Three of the respondents thus have produced their output at minimum costs. The remaining 37 respondents are considered to be cost inefficient and thus could have produced their output at lower costs by selecting the cost minimising combination of production inputs. The cost efficiency score of 0.084 of the farmer who performed the worst in terms of cost efficiency implies that the farmer could have produced his/her raisins at only 8.4% of his current costs.

The slope of the CDF in Figure 6.2 suggests that there is a steep decline in the cost efficiency scores of the respondents for those respondents who were found to be cost inefficient. Only 30% of the respondents achieved cost efficiency scores between 0.3 and one. About 62% of the respondents achieved cost efficiency scores of less than 0.3. By implication, more than 60% of the respondents could have produced their current raisin yields at 30% or less of the cost they have actually incurred. The slope of the CDF changes drastically for the range of cost efficiency scores between 0.08 and 0.3. The steeper slope suggests that the decrease in cost efficiency scores is much smaller from one respondent to the next compared to the drop in the range of efficiency scores between one and 0.3. Thus, there proves to be major scope to improve the

financial performance of the raisin producers from Eksteenskuil by supporting them to use their production inputs in a cost efficient manner.

When examining the distribution of the cost efficiency scores in more detail, the average cost efficiency score of the top third group of respondents is about 0.76. Thus, even the top third group of farmers (in terms of cost efficiency scores) could, on average, have reduced their costs substantially by selecting the correct combination of inputs to minimise costs. Compared to the relatively high average cost efficiency score of the top third group of farmers, the groups of farmers forming the middle and lower third groups achieved average scores of 0.23 and 0.12 respectively. The middle third group of farmers thus could have produced their outputs at an average of 23%, and the bottom third at an average of 12% of their current costs. Given the fact that limited cash flow is often listed as a major stumbling block that contributes to the exclusion of emerging farmers from participating in commercial agri-food chains, the poor performance of the farmers in terms of cost efficiency is a major cause for concern. By reducing production costs through selecting the optimal combination of inputs, more cash flow can be released to allow the farmers to apply the necessary production inputs closer to the recommended levels. Increasing the ability of the farmers to apply the recommended levels of production inputs may also have a positive influence on the technical efficiency of the farmers and hence further increase the benefit from improving the cost efficiency levels of the raisin producers from Eksteenskuil. Thus, clearly there is major scope to support the raisin producers from Eksteenskuil to improve their financial performance by selecting the cost minimising combinations of production inputs to produce their raisins. In the next section the focus shifts to the analysis of the determinants of cost efficiency to identify the characteristics of raisin producers that are associated with higher levels of cost efficiency.

6.4.4 DETERMINANTS OF COST EFFICIENCY OF EMERGING RAISIN PRODUCERS FROM EKSTEENSKUIL

The results from the regression analysis to identify the socio-economic characteristics of the raisin producers from Eksteenskuil that influence their cost efficiency levels are shown in Table 6.3. Following the recommendation of McDonald (2009), the dependent variable is the log of the estimated cost efficiency scores. It is noted that, since the aim is not to predict the cost efficiency of the farmers but rather to identify characteristics that may influence cost efficiency levels, a probability of 15% is still considered significant.

Table 6.6: Ordinary Least Squares (OLS) regression results of socio-economic factors affecting cost efficiency of emerging raisin producers from Eksteenskuil[1]

Variables	Coefficient	Bias	Std. Error	Sig. (2-tailed)
Intercept	-1.703	0.063	1.236	0.181
Age	-0.021	-0.005	0.018	0.187
Farming experience	0.029*	0.003	0.021	0.103
Formal education	0.015	0.000	0.078	0.837
Off-farm income	-0.181	0.072	0.368	0.620
Farm size	-0.032***	-0.003	0.027	0.048
Specialised raisin production	0.923	0.045	0.802	0.245
Attend farmers' days	0.487	0.098	0.515	0.328
Attend record keeping course	-0.389	-0.087	0.564	0.459
Apply skills from record keeping course	0.602	0.127	0.866	0.434
F-statistic				1.485
Prob (F-statistic)				0.198
Adjusted R-squared				0.101

Note:

[1]: Results are based on 10 000 bootstrap samples

***, **, and * represent statistical significance at 5%, 10% and 15% respectively

The results in Table 6.3 show that the model is not a good fit to predict the variation in the cost efficiency levels of the farmers from Eksteenskuil. The probability of the F-statistic is greater than 10%, while the adjusted R-squared value (0.101) suggest that the model explains only 10.1% of the variation in the cost efficiency levels of the farmers from Eksteenskuil. Thus, there are other important factors that influence the cost efficiency of the farmers that are not included in the model. The variance inflation factors for all of the variables are less than four with only two variables ("Attend record keeping course" and "Apply skills from record keeping course") having variance inflation factors greater than two. Thus, there is no multicollinearity problem in the estimated regression model.

Of all of the variables that were initially hypothesised to influence the cost efficiency levels of the farmers only the levels of experience of the farmers and the size of their land under raisins were found to be significant at a 15% level of significance. The positive sign of the coefficient of farming experience (p <0.15) suggests that the higher the level of experience of the farmer, the higher is his cost efficiency level. The positive relationship is in accordance with the initial hypothesis. On the other hand, the negative sign of the coefficient of farm size (p <0.05) implies that larger farm sizes are associated with lower levels of cost efficiency. The negative influence of farm size on the cost efficiency levels of the farmers from Eksteenskuil is opposite from initial expectations. However, the negative relationship corroborates the findings by Okoye *et al.* (2007). Given the relatively low levels of human capital exhibited by the farmers from Eksteenskuil, the

smaller scale of operations may improve the ability of the decision-maker to make better decisions with regard to the allocation of their production inputs. Thus, the negative relationship may actually be as a result of the characteristics of being small scale farmers with little experience of operating on larger pieces of land.

None of the other variables are statistically significant in explaining the variation in the cost efficiency levels of the farmers from Eksteenskuil. The results may be an indication that the low levels of cost efficiency documented in Section 6.3.3 above are not necessarily the result of poor selection of input combinations. The farmers are resource poor with limited means to ensure timely and sufficient application of important production inputs. The farmers' main concern thus is being able to apply the necessary inputs at all rather than selecting combinations of inputs that will minimise their cost of production. Further research is necessary to better understand the dynamics of the process through which the farmers make their decisions regarding input use.

The discussion of the potential reasons for the limited number of significant variables to explain the variation in the cost efficiency levels of the farmers from Eksteenskuil concludes this section. Next follows a discussion of the conclusions that were drawn from the analysis of the levels of efficiency with which the farmers from Eksteenskuil use their production inputs.

6.5   CONCLUSIONS

The objective of Chapter 6 was to explore the determinants of technical and allocative efficiency of the raisin producers from Eksteenskuil to gain insight into the prospects of improving the financial performance of the farmers within their existing technology set. Overall, the results from Chapter 6 suggest that there is definitely scope to improve the performance of the raisin producers from Eksteenskuil by improving their technical and cost efficiency levels. The results from the double bootstrap approach show that there is some bias in the un-corrected technical efficiency scores of the respondents, especially for the respondents that obtained low technical efficiency scores. By bootstrapping the technical efficiency estimates as recommended by Simar and Wilson (2007) the bias is removed and hence valid inferences could be drawn from the efficiency estimates. The results from the analysis of the technical efficiency levels suggest that the farmers from Eksteenskuil are performing relatively well in terms of converting their production inputs into raisins. However, there still is some room for improvement. Especially the bottom half of farmers can substantially expand their output at current input levels and within their existing technology set. Since about 40% of the respondents obtained technical efficiency scores of one, there proves to be good prospects for farmer-to-farmer skills transfer, as recommended

by NPC (2011), to improve the technical efficiency of those farmers who are lagging behind in terms of their performance.

The main finding from the analysis of the determinants of technical efficiency is that higher levels of technical efficiency are associated with higher levels of human capital, and farm and financial characteristics that are associated with potentially higher cash flow levels. While the positive relationship between human capital and technical efficiency was expected, the significant contribution of the entrepreneurial skills of the respondents on their technical efficiency levels show that it is more than merely the education and experience levels of farmers that allow them to perform well. The changes in the agri-food systems that were caused by the global forces of globalisation and liberalisation (Louw, Kirsten and Madevu, 2005) created opportunities for entrepreneurship by individual farmers. Care should be taken by initiatives that promote collective action among emerging farmers (i.e. NPC, 2011; CRDP, 2010) not to remove incentives for entrepreneurship. Rather, correctly aligned incentives that can be accessed through doing business may convince the individuals who exhibit higher levels of entrepreneurship to take the lead in collective endeavours, which likely will also result in the less entrepreneurial farmers benefitting. Such incentives may also reward entrepreneurial farmers for transferring skills to other farmers, thereby meeting the objective of NPC (2011) to promote farmer-to-farmer skills transfer.

While secure land tenure was found to contribute significantly to higher levels of technical efficiency, it has to be recognised that secure land tenure per se will not necessarily improve the technical efficiency levels of the farmers. Secure tenure only contributes to an enabling environment for the farmers. The farmers still have to utilise the advantages that accompany secure tenure (i.e. access to credit) in such a manner that will allow their raisin enterprises to benefit from them having secure tenure. As discussed in Chapter 3, the issue on land tenure at Eksteenskuil is very complex. While the completion of the TRANCRAA process lead to the majority of farmers from Eksteenskuil waiting for government to transfer the title deeds into their names (which has not happened since the end of 2005), some of the farmers took the initiative to get the title deeds themselves. Through legal action some of the farmers from Eksteenskuil managed to get the title deeds for their land. Interestingly, a significant positive correlation was found between the entrepreneurial skills of the farmers and secure tenure. Such a relationship may be an indication that the farmers with higher levels of entrepreneurial skills would better understand the possible advantages of having the title deeds for their land. Consequently, the more entrepreneurial farmers are more proactive in their endeavours to getting their title deeds to get access to such advantages.

The positive influence of the financial characteristics of the respondents that relate to higher levels of cash flow proves that limited cash flow is a major stumbling block that constrains the performance of emerging farmers. Without sufficient cash flow the farmers are unable to comply with any of the best management practices that are associated with higher yields of good quality raisins. The significant contribution of active record keeping again proves the value of record keeping to the performance of emerging farmers. Sound record keeping will allow the farmers to better plan for periods of low cash flow. The nature of raisin production is such that income is only earned once a year while inputs are applied throughout the year. The mismatch in the periods of cash in and out flows substantially increases the pressure on raisin producers to manage their finances effectively. The conclusion is that much more emphasis needs to be placed on sound record keeping and planning to allow the farmers from Eksteenskuil to operate efficiently in an environment of limited cash flow.

The results showed that the mere compliance with best management practices will not necessarily improve the technical efficiency of the farmers. The timeliness with which it is done has a major impact on the actual effect of complying with best management practices. The conclusion is that the timeliness of the application of best management practices has to be emphasised to emerging farmers to ensure that they benefit from complying. It is, however, recognised that sufficient cash flow is necessary to allow farmers to comply with such practices in a timely manner. Again the need for effective cash flow management by the raisin producers from Eksteenskuil is evident.

The results from the cost efficiency analysis show that the raisin producers from Eksteenskuil perform very badly in terms of selecting the cost minimising combination of production inputs to produce their raisins. The vast majority of farmers could have produced their raisins at a fraction of their current costs. The fact that only two of the variables that are normally found to influence allocative efficiency are significant in the case of Eksteenskuil may be an indication that the poor performance of the raisin producers in terms of cost efficiency is more associated with being small scale start-up farmers than with problems with their decision-making. Except for labour, the production inputs that were considered in the analysis of the cost efficiency of the farmers are nutrients for the grape vines that are applied as fertiliser or manure. The only way in which the farmers can decide to substitute one type of nutrient for another is by changing the fertiliser mixture or the type of manure (i.e. sheep or cattle) that is applied to the grapevines. Farmers who apply manure are very much restricted to the type of manure that is available to them. Most of the farmers who apply manure have some livestock for household consumption. Depending on the types of animals that are kept, the type of manure that is applied is relatively fixed. The type of fertiliser mixtures to apply, on the other hand, normally is recommended by input suppliers based

on the nutrient requirements of grapevines. The problem is that very few of the raisin producers from Eksteenskuil actually test the nutrient contents in their soil. The farmers thus have no idea of the true nutrient requirements for their soils. One way to ensure that the correct quantities and mixtures of fertiliser and the correct quantities of the specific type of manure are recommended is to support the farmers to get their soils tested. Knowing the true nutrient requirements to produce optimal volumes of grapes will enable the farmers to select a fertiliser mixture that may decrease their costs without having a substantial negative impact on the yields obtained. As such the farmers may be able to improve their cost efficiency levels and hence their financial performance. Ultimately, the conclusion is that very little is known about the factors that contribute to higher levels of allocative efficiency of emerging farmers in South Africa. More information is required to better understand the decision making process through which emerging farmers decides on the specific combinations of inputs to use. Only if such information is available will it be possible to effectively improve the allocative efficiency levels of emerging farmers. What is clear at this stage is the fact that consciously selecting input combinations that will minimise costs requires substantial amounts of skills (i.e. human capital) from decision makers. Support structures should pay attention to transferring such skills to the farmers to allow them to benefit from improving their allocative efficiency levels.

Given the scope for improving the financial performance of the raisin producers from Eksteenskuil by improving the technical and allocative efficiency of the farmers, the next chapter contains an analysis of the potential financial gains associated with improving the respective types of efficiency. A cash flow optimisation model is also used to model the potential impact of recommended changes on the net cash flow of the farmers from Eksteenskuil.

MODELING THE POTENTIAL IMPACT OF RECOMMENDED CHANGES ON THE FINANCIAL PERFORMANCE OF EKSTEENSKUIL FARMERS

7.1   INTRODUCTION

The conclusion of Chapter 6 means the completion of the application of the developed conceptual framework for the case of emerging raisin producers from Eksteenskuil. Based on the conclusions from the application of the conceptual framework in the preceding chapters, a number of recommendations were made that may contribute towards improving the financial performance of the respondents. Other researchers that investigate ways through which emerging farmers can be linked to commercial agri-food chains also normally conclude with recommendations that may contribute to linking the farmers to the market. Although the recommendations normally make intuitive sense, none of the researchers quantified the potential impact of their recommendations on the performance of the emerging farmers under consideration. Thus, no information is available on the actual impact of such recommendations on the financial performance of the farmers.

The objective of Chapter 7 is to investigate the potential impact of the recommendations from earlier chapters on the financial performance of the farmers from Eksteenskuil. The first step is to calculate the financial gains associated with improving the levels of technical and cost efficiency with which emerging farmers use their production inputs. Chapter 7 extends existing research that investigates the levels and determinants of efficiency with which inputs are used by also quantifying the potential financial gains from improving efficiency levels. In essence the financial gains represent the potential returns from actions to implement the recommendations as a means to improve the performance, and hence the livelihoods of the farmers. Such information will also show whether the focus of existing research on technical efficiency of emerging farmers is sufficient, or should a greater emphasis be placed on the use of inputs in least cost combinations. After the analysis of the financial gains, the impact of recommended solutions on the net cash flow of the farmers is explored with a cash flow optimisation model. The modelling of the net cash

flow of the farmers also extends existing research that stops at recommending potential solutions that may contribute to the successful participation by emerging farmers in commercial agri-food chains. Emerging farmers typically are severely cash flow constrained which negatively affects their ability to implement recommendations from researchers and other support structures. Solutions that prove to be profitable thus are not necessarily viable for emerging farmers due to insufficient cash flow. By considering the cash flow of the farmers under consideration, the results from this analysis will also reflect the viability of recommended solutions, and also the impact of recommended solutions on one of the major constraints faced by emerging farmers.

The remainder of Chapter 7 is divided into four sections followed by the conclusions. The next section provides a brief summary of the main findings and recommendations from the application of the conceptual framework in the earlier chapters. The data that was used to meet the objectives of Chapter 7 are discussed thereafter, followed by the analysis of the financial gains from improving the technical and cost efficiency levels of the farmers from Eksteenskuil. After the analysis of the financial gains follow the analysis of impact of the recommended changes on the net cash flow of the respondents. Chapter 7 then is concluded by a discussion of the conclusions that were drawn from the results.

7.2 RECOMMENDATIONS FOR CHANGE TO IMPROVE FINANCIAL PERFORMANCE OF THE RAISIN PRODUCERS FROM EKSTEENSKUIL

From the characterisation of the social, institutional and physical environment within which the farmers operate (Chapter 3), it is evident that the environment within which the farmers operate influence their behaviour and performance. The history of Eksteenskuil and the social dynamics within the community affect the behaviour of the farmers. The relatively high levels of social capital (Chapter 4) suggests that the Eksteenskuil community gets along relatively well with each other and trust each other. From the analysis of the institutional environment in Chapter 3 it is evident that the lack of secure tenure has a major constraining affect on the farmers. The lack of title deeds means that the farmers have no incentive to invest in their farm land, nor are they able to use their land as collateral to source credit to replace old vines, and to supplement their cash flow to finance production activities. The analysis of the institutional environment also showed that the farmers are willing to comply with strict rules and regulations (from fairtrade) if the incentives are correctly aligned. The poor conditions of the physical environment (i.e. road and water distribution networks) negatively affect the behaviour and performance of the farmers by contributing to higher levels of transaction costs. The results from the analysis of the transaction between the farmers from Eksteenskuil and SAD (Chapter 5) showed that the high level of complementarity between the farmers and SAD that was created through institutional innovation

by the fairtrade initiative made it worthwhile for both parties to enter into a vertical coordinated relationship with each other. Through the vertical coordinated relationship the farmers from Eksteenskuil receive substantial levels of support from SAD, especially in terms of the technical aspects of raisin production and on servicing the niche market. Ultimately, all of the above influence the levels of efficiency with which the farmers use their production inputs (Chapter 6). By influencing the efficiency with which the inputs are used, it also influences the financial performance of the farmers, and hence the level of success with which they operate in the commercial agri-food chain as a means to improve their livelihoods through raisin production.

The results from Chapter 6 suggest that there is definite scope to improve the performance of the farmers by improving their efficiency levels. Recall that the dynamic nature of the conceptual framework allows for feedback from the lower levels (performance and resource allocation) to the higher levels to facilitate change that may manifest in improvements in the performance of the farmers. Based on the findings in the earlier chapters of this thesis a number of recommendations have been made for changes at the higher levels. In Chapter 3 it was recommended that government meets its promise to provide emerging farmers with an enabling environment by improving the road and communication infrastructure, transfer the title deeds for the land to the individual farmers, and to provide emerging farmers with access to a financing scheme (i.e. Mafisa). The positive relationship between technical efficiency and the farmers' characteristics that are associated with higher levels of cash flow (Chapter 6) provides evidence of the potential impact of such initiatives on the performance of the farmers from Eksteenskuil. The results from Chapters 3 and 5 highlight the role of support structures to assist the farmers to produce good volumes of raisins. It was recommended that incentives should be aligned in such a way to get the private sector involved with emerging farmers in a supportive capacity. Through institutional innovation private sector role players in the value chain may be incentivised to enter into vertical coordinated relationships with emerging farmers. The benefits associated with such a vertical coordinated relationship (i.e. support) have a valuable contribution to make in improving the performance of emerging farmers. The results from the analysis of the social capital levels of the farmers from Eksteenskuil (Chapter 4) lead to the conclusion that farmer-to-farmer skills transfer, as recommended by NPC (2011), may have good prospects to improve the performance of the farmers. Institutional innovation to incentivise collective action (Chapter 3) may convince the prosperous farmers to actively transfer their skills to other farmers in the community to gain access to such incentives. Thus, based on the findings from the earlier chapters, a number of changes are recommended in the higher levels to guide the behaviour and hence the performance of emerging farmers that may ultimately lead to improved financial performance.

7.3 DATA USED TO MODEL THE POTENTIAL FINANCIAL IMPACT OF RECOMMENDED CHANGES

In order to quantify the potential financial gains from improving the technical and allocative efficiency levels of the raisin producers from Eksteenskuil farm level production and marketing information is required. More specifically, information is required on the quantities and prices of the production inputs that were used in the production process, and also the volumes of raisins and the prices that were received for the raisins that were sold. The production and marketing information is also required to model the net cash flow of the raisin producers from Eksteenskuil. In addition to the production and marketing information, the cash flow modelling also require information on other income (i.e. grants, off-farm income, etc.) and other cash expenditures (i.e. living expenditures). Given the data requirements the original data that was collected in 2009 is insufficient for the purpose of analysis in Chapter 7. Consequently the new data set that was collected in June 2011 is used to meet the objectives of Chapter 7. It has to be noted that the Orange River that was in flood in the beginning of 2011 damaged some of the grapes at Eksteenskuil. The raisin yields consequently were negatively affected.

Next follows the analysis of the potential financial gains that can be achieved by improving the levels of technical and cost efficiency with which the farmers use their production inputs.

7.4 ANALYSIS OF POTENTIAL FINANCIAL GAINS FROM IMPROVING EFFICIENCY WITH WHICH FARMERS USE THEIR PRODUCTION INPUTS

7.4.1 PROCEDURES FOR CALCULATING EFFICIENCY GAINS

7.4.1.1 Calculating financial gains from improving technical efficiency

The technical efficiency levels of the different groups of farmers were calculated in Chapter 6 by using the output oriented DEA-approach. The output oriented approach calculates the maximum amount of output that the farmers could have produced at their current input levels and within their existing technology set. The potential financial gains from improving the bias-corrected technical efficiency levels of the farmers were calculated as the difference between the revenue earned at the current output levels, and the revenue that could have been earned if the decision-makers used their inputs in a technical efficient manner. Given the assumption of the output oriented approach that the decision-makers use the same amounts of inputs, all of the gains will be achieved through increasing output levels.

The technical efficiency gains are calculated using the following formula:

$$TE\_Gains = p_y \times y^* - p_y \times y$$

Where *TE-Gains* represent the potential financial gains from producing the optimal level of output at current input levels, p_y is the price of the output, y^* is the optimal amount of output that should have been produced to operate on the technical efficiency frontier, and *y* is the current amount of output produced by the decision maker.

7.4.1.2 Calculating financial gains from improving cost efficiency

Cost efficiency is used as the measure of allocative efficiency for the purpose of this study. The level of cost efficiency is the ratio of the minimum cost to produce a certain amount of output to the actual costs incurred to produce that amount of output. Cost efficiency thus is achieved by selecting the optimal (least cost) combination of variable inputs to produce a certain amount of output. The potential gains from improving the cost efficiency levels of the different groups of farmers are calculated as the difference between the actual costs that were incurred by the farmers and the minimum costs that should have been sufficient to produce their current output levels:

$$CE\_Gains = cx - cx^*$$

Where *CE_Gains* represents the potential financial gains from improving the cost efficiency of the decision-makers, *cx* is the current cost incurred to produce the output, and cx^* is the minimum costs that should have been sufficient to produce the current output. Given the fact that cost efficiency is concerned with the minimum cost to produce the current output level, all financial gains from improving cost efficiency levels of the decision-makers are presented by the decrease in the costs of production that result from choosing the least cost combination of variable inputs.

Next follows the results from the analysis of the potential financial gains from improving the technical and cost efficiency levels of the raisin producers from Eksteenskuil.

7.4.2 *RESULTS FROM ANALYSIS OF POTENTIAL FINANCIAL GAINS FROM IMPROVING EFFICIENCY LEVELS*

The potential gains from improving the technical efficiency levels of the farmers represent the increase in income (in 2011 prices) per hectare that can be achieved if all of the farmers were to operate on the technical efficiency frontier. On the other hand, the potential gains from improving cost efficiency levels represent the reduction in cost per hectare that could have been achieved if all of the farmers were to select the least cost combination of production inputs to produce the current amounts of output. The potential financial gains from improving the technical and cost efficiency of the farmers from Eksteenskuil are shown as a cumulative probability distribution (CDF) in Figure 7.1.
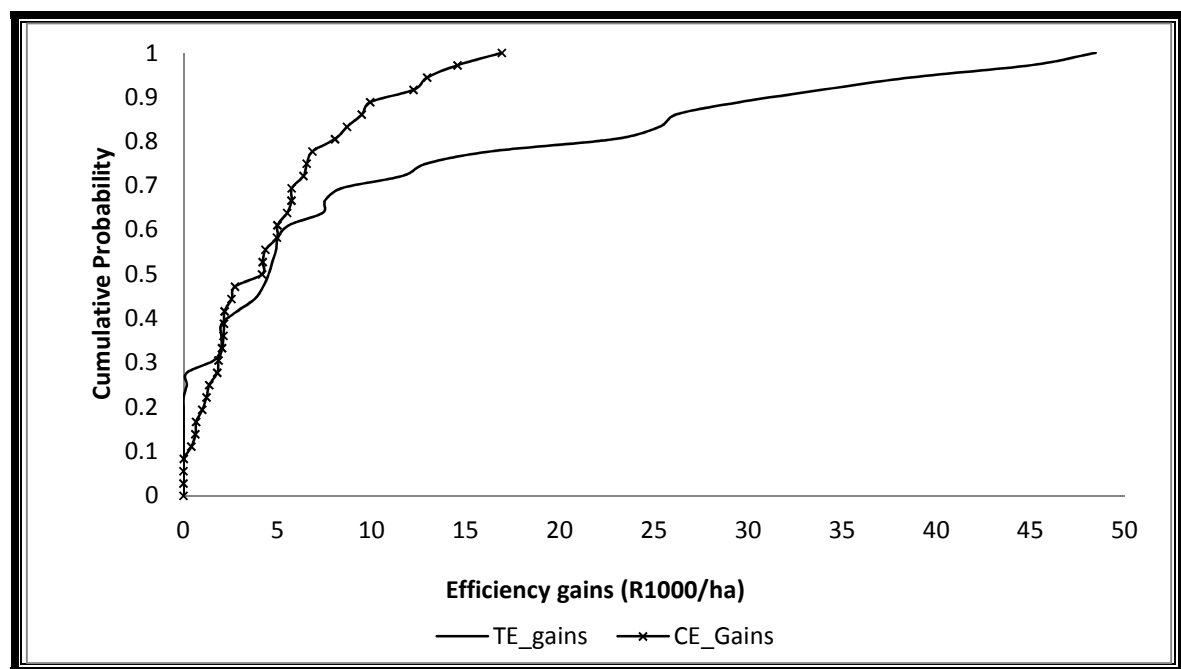
Figure 7.1: Cumulative probability distribution of potential financial gains (in 2011 prices) from improving technical and allocative efficiency of raisin producers from Eksteenskuil

Figure 7.1 shows that the potential financial gains from improving efficiency levels range from zero to about R17 000/ha to improve cost efficiency levels, and to about R48 000/ha to improve technical efficiency levels. It is noted from Figure 7.1 that the 22% of the respondents who will not gain financially from improving technical efficiency levels are the farmers who are currently operating on the technical efficiency frontier. Those farmers already use their inputs in a technical efficient manner. Similarly, the six percent of respondents who will not benefit financially from

improving cost efficiency levels are already using their inputs in the least cost combination. Changing their input combinations thus will not result in lowering their costs.

Figure 7.1 shows that there is great potential to improve the financial performance of the farmers by supporting them to use their inputs efficiently. CE_Gains in Figure 7.1 shows that 50% of the respondents could have gained more than about R4 000/ha if they were to use the least cost combination of inputs. Similarly, 50% of the respondents could have increased their income with more than about R4 500/ha if they were to use their inputs in a technical efficient manner (TE_Gains). When considering the fact that the average cost currently is about R7 486/ha, a reduction of R4 728/ha to produce the current output levels represents a decrease of 63%. Similarly, a R4 500 increase in revenue represents an increase of about 28% in the average current revenue of R16 142 per hectare. Thus, given the current financial performance of the farmers from Eksteenskuil, the gains that can be achieved by improving efficiency levels will have a major impact on the financial performance of the farmers.

When considering the distribution of the efficiency gains in more detail, it is evident that the maximum gain from improving technical efficiency (TE_Gains) is substantially higher than the maximum gain from improving cost efficiency (CE_Gains). Moreover, the potential gains from improving technical efficiency outperform the gains from improving cost efficiency about 68% of the time. It is interesting to note, however, that it is mainly for the bottom third group of farmers that the gains from improving technical efficiency is substantially greater than the gains from improving cost efficiency. For the top two-thirds of farmers the gains from improving the two types of efficiency resemble each other relatively well. In fact, the difference in the average gains from improving the technical and cost efficiency for the middle group of farmers is not statistically significant. Thus, the vast majority of raisin producers from Eksteenskuil will benefit to a similar extent from initiatives to improve technical and cost efficiency levels. The technical efficiency levels of the bottom third group of farmers are so low that they should be able to expand their production levels substantially at their current input levels. Consequently, the potential gains for the bottom third group of farmers, if they were to increase their technical efficiency level to one are also substantial. Overall, the results show that while the farmers may be benefiting more from initiatives to improve their technical efficiency levels, it definitely is worthwhile to also consider the cost minimising combinations of inputs. The gains from improving both types of efficiency may have a major impact on the contribution of raisin production to the livelihoods of the farmers from Eksteenskuil.

Next, the focus of attention shifts to the modelling of the potential impact of recommended changes on the cash flow positions of the producers from Eksteenskuil.

7.5 OPTIMISING NET CASH FLOW AS A RESULT OF IMPLEMENTING RECOMMENDED CHANGES

7.5.1 *PROCEDURES FOR OPTIMISING CASH FLOW*

In order to model the impact of recommended changes on the net cash flow position of the raisin producers from Eksteenskuil, a cash flow optimisation model developed by Grové (2010) was used as the basis. However, the model was developed further to accurately represent the case of raisin producers from Eksteenskuil.

The cash flow model consists of a bank (cash) account with a credit (i.e. co-operative) account that is linked to it. The model allows for fund transfers between the cash and credit accounts on specified dates. Funds are transferred from the bank account to the credit account to service the credit, while positive balances in the credit account are transferred to the bank account. The bank account captures all cash outflows (i.e. input purchases, fixed cash expenditures, transport costs, living expenditures, and payments to credit account) and cash inflows (i.e. receipts from crop sales, other income, and transfers from positive credit account). Fixed cash expenditures are allocated to the crop, *pro rata*, based on the proportional use of land by each crop. Other income is also allocated to the crop, *pro rata*, but based on the proportional contribution of the crop to total farm income. The objective of the cash flow model is to maximise the end-of-the-year net cash flow per hectare.

The cash flow model was developed further through the development of procedures to incorporate the DEA production frontier into the cash flow model to specify the technology set of the farmers from Eksteenskuil. The last developments were to allow for the modelling of the potential impact if the decision-makers were to improve the degrees of technical and cost efficiency with which they use their inputs. The bias-corrected technical efficiency scores from Chapter 6 are used to test the impact from improving technical efficiency levels. In order to test the impact of improving cost efficiency levels the model was developed to select the least cost combinations of inputs to produce the current output levels.

Other modifications include a restriction in the model to prohibit a negative bank balance; a parameter allowing the farmers access to credit; and a parameter that represents a price premium to reflect the impact of the price premium received through the fairtrade initiative. Emerging farmers typically do not have access to overdraft facilities, hence the need to impose the non-negative bank balance. While most of the farmers currently do not have access to credit, the inclusion of the parameter that allows farmers access to credit allows for testing the potential

impact of a scenario where the farmers were to obtain access to credit to supplement their cash flow. The inclusion of the parameter that represents the price premium allows for testing the degree to which the raisin producers from Eksteenskuil are dependent on the price premium for financial survival. The poor performance of raisin producers from Eksteenskuil contributes substantially to the transaction costs faced by the fair-trade buyers, which creates incentives for such buyers rather to procure raisins from other producers. Newly FLO-accredited producers from Chile and India have the capacity to meet all of the demand for fair-trade raisins internationally. Consequently, there is a definite possibility that the farmers from Eksteenskuil may lose their market share and consequently will have to compete with other commercial farmers in the normal export market.

Next follows a brief summary of the assumptions underlying the cash flow optimisation model that is used to model the potential impact of recommended changes on the cash flow position of the raisin producers from Eksteenskuil.

7.5.2 *ASSUMPTIONS UNDERLYING THE CASH FLOW OPTIMISATION MODEL*

For the purpose of modelling the cash flow of raisin producers from Eksteenskuil the following assumptions were made:

- The cash flow model optimises the net cash flow for a period of one year.
- The year under consideration starts at the first of January.
- The price premium for choice grade raisins exported via the fair-trade initiative is 4% of the price.
- The farmers do not have access to overdraft facilities from the bank.
- The farmers do not have access to formal credit since they do not have credible credit records with formal lending institutions, nor do they have the title deeds for their land to allow them to use the land as collateral for obtaining credit.
- Farmers start the first period with R2 500 cash since they have to pay for all of their living expenditures and production inputs prior to the first harvest.
- On average, the living expenditure of raisin producers from Eksteenskuil is R1 750 per month. Given the median farm size of 3ha, the average living expenditure per hectare amounts to R583.
- Other income (i.e. grants, off farm economic activities, and income from other household members) add up to R350 per hectare per month.

Next follows the different scenarios that are to be modelled with the cash flow optimisation model.

7.5.3   NET CASH FLOW OPTIMISATION SCENARIOS

For the purpose of this study, the base scenario is modelled, together with four different scenarios. Given the fact that most of the recommendations in earlier chapters are expected to positively contribute to the technical and/or cost efficiency levels of the farmers from Eksteenskuil, Scenario's 1 and 2 represent situations where the farmers use their inputs in technical and cost efficient manners respectively. Scenario 3 is concerned with intensifying the production activities at Eksteenskuil to get the farmers to apply inputs closer to the recommended levels. In Scenario 3 the input use is increased with 50% while farmers also get access to credit to supplement their cash flow to finance the additional inputs. The last scenario aims to determine the degree of dependence of the farmers from Eksteenskuil on the price premium they receive through the fairtrade initiative.

7.5.3.1   Base scenario

The base scenario represents the current situation at Eksteenskuil. In this scenario, the farmers are assumed to have a positive bank balance of R2 500 in order to be able to finance living expenditures prior to selling the raisins. The farmers receive a price premium of 4% for their choice grade raisins exported via the fair-trade initiative. The farmers are not allowed to have a negative bank balance at any time, and do not have access to any form of formal credit.

7.5.3.2   Scenario 1 – Improve technical efficiency levels to one

Given the potential to increase the levels of technical efficiency of the farmers in order to improve their performance, the first scenario that was modelled is a situation where the farmers use their production inputs in such a manner that all of them are operating on the technical efficiency frontier. By implication, Scenario 1 represents the case where farmers use their inputs in a technically efficient manner.

7.5.3.3   Scenario 2 – Improve cost efficiency levels to one

The results in Chapter 6 also showed the scope for improving the cost efficiency levels of the farmers from Eksteenskuil. In order to model the impact of improving the cost efficiency levels of the farmers from Eksteenskuil, Scenario 2 represents a case where the farmers from Eksteenskuil were to produce their raisins at a minimum cost by selecting the least cost combination of production inputs.

7.5.3.4 Scenario 3 – Increase input use by 50% while having access to credit

The median levels of nutrients (N, P and K) applied by raisin producers from Eksteenskuil is less than 30% of the recommended levels. During the interviews, farmers indicated that a lack of cash flow was the main reason for applying such low volumes of inputs. According to Baard (2009), the timely application of sufficient levels of fertiliser (including other sources of nutrients) is crucial to producing a high volume of good quality grapes. The low levels of input use by the farmers from Eksteenskuil suggest that there is scope to improve the performance of the farmers by intensifying their production. In Scenario 3 the input use is increased by 50% from the base. While the majority of farmers are operating at increasing returns to scale, their yields are expected to increase more than proportionally with a proportional increase in the amounts of inputs used. However, the increase in yield is assumed to be proportional to the increase in input levels (50%) in order to get a conservative estimate of the potential benefit associated with intensifying production.

7.5.3.5 Scenario 4 – Cancel the fairtrade premium received by the farmers from Eksteenskuil for their choice grade raisins exported via the fairtrade initiative

In the last scenario, the price premium that farmers from Eksteenskuil receive for exporting their raisins via the fair-trade initiative is removed to determine the degree to which the farmers are dependent on the premium they receive. Scenario 4 thus models the potential impact if the farmers from Eksteenskuil were to lose their market share in the fair-trade market. All scenarios are modelled in 2011 prices.

Next follows the results from the cash flow modeling of the different scenarios.

7.5.4 *RESULTS FROM CASH FLOW OPTIMISATION MODEL*

7.5.4.1 Base scenario

The average net cash flow for 2011 is only R3 496/ha. It is noted that the net cash flow is the cash that is left after all of the production and marketing costs, and living expenditures of the respondents have been paid. Given the median farm size of about 3ha, the net cash flow per farm is on average R10 488. The low net cash flow suggests that, although the majority of farmers were able to make some money from raisin production, there may be limited scope for the farmers from Eksteenskuil to significantly improve their livelihoods through raisin production in the current situation.

Figure 7.2 shows a stoplight graph for the base scenario. The lower limit for the purpose of the graph is zero in order to list the percentage of the total number of respondents who do not generate positive net cash flows under the red light. The upper limit is set to R16 037/ha, which is the estimated direct allocable cost per hectare to produce raisins at the recommended input levels. Respondents who generate net cash flows in excess of R16 037/ha are able to pay in cash for 100% of the recommended input levels during the following season, and are listed under the green light. All respondents who generate net cash flows between the two limits are listed under the yellow light.
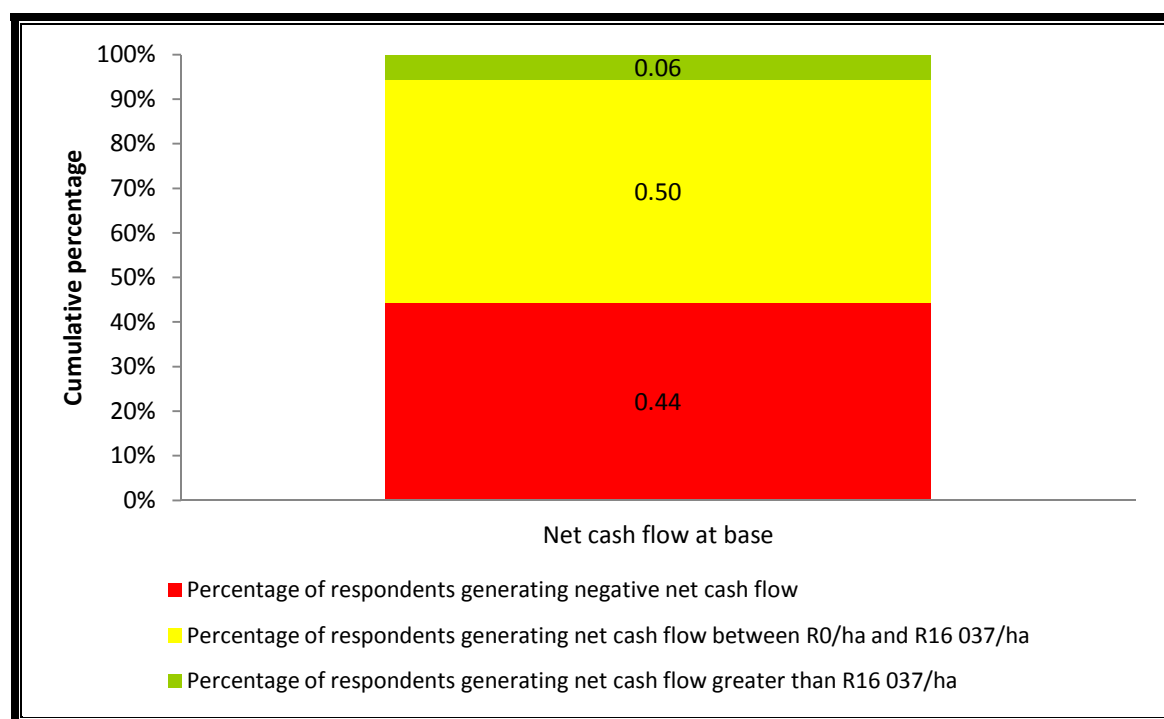
Figure 7.2: Stoplight chart of the net cash flows (in 2011 prices) per hectare within the base scenario

Figure 7.2 shows that 44% of the respondents did not generate positive net cash flows over the year under consideration. On the other hand, only six percent of the farmers generated sufficient net cash flow to be able to finance the application of the recommended input levels during the next season. Given that the farmers do not have access to credit to supplement their cash flow, the 94% of the respondents who did not generate sufficient net cash flow to be able to finance the recommended levels is a cause for concern. Those respondents will again not be able to apply the recommended input levels in the next year, nor will they be in the position to expand their production activities if opportunities arise. Most problematic, however, is the fact that they will also not be able to replace their old, unproductive vines. Thus, although the majority of the

farmers are able to cover their costs in the current situation, most of the respondents may remain trapped in the current situation with very limited prospects to really get themselves out of poverty. Next follows a discussion of the potential impact on the net cash flow positions of the farmers from Eksteenskuil if they were supported to use their inputs in a technical efficient manner.

7.5.4.2 Scenario 1 – Improve technical efficiency levels to one

Scenario 1 represents the situation where the farmers are supported to use their production inputs at current levels, but in a technical efficient manner. The idea is to model the potential financial implications if the respondents were able to produce the maximum amount of output from their current input levels and in their existing technology set.

The average net cash flow of the respondents in Scenario 1 amounts to R7 637/ha. Thus, by using their production inputs in a technical efficient manner, the farmers should be able to increase their net cash flow with about 118% from the current situation. Again it is noted that the gain in net cash flow is at current input levels and in the existing technology set. The potential benefit from support services to get the emerging farmers from Eksteenskuil to use their inputs in a technical efficient manner thus is substantial. Figure 7.3 provides a stoplight chart to demonstrate the impact on the distribution of net cash flows of the respondents.

Figure 7.3 shows that 28% of the respondents will still generate negative net cash flow if all of the farmers were to use their production inputs in a technical efficient manner. Thus, by using their inputs in a technical efficient manner, another 16% of the respondents should now be able to generate a positive net cash flow if he/she was to use the production inputs in a technical efficient manner. Interestingly, the number of respondents who generate sufficient net cash flow to be able to pay in cash for the recommended levels of inputs in the next year increased from six percent in the base scenario to 14% if they use their inputs in a technical efficient manner. Thus, the raisin producers are expected to benefit substantially from support to use their inputs efficiently.
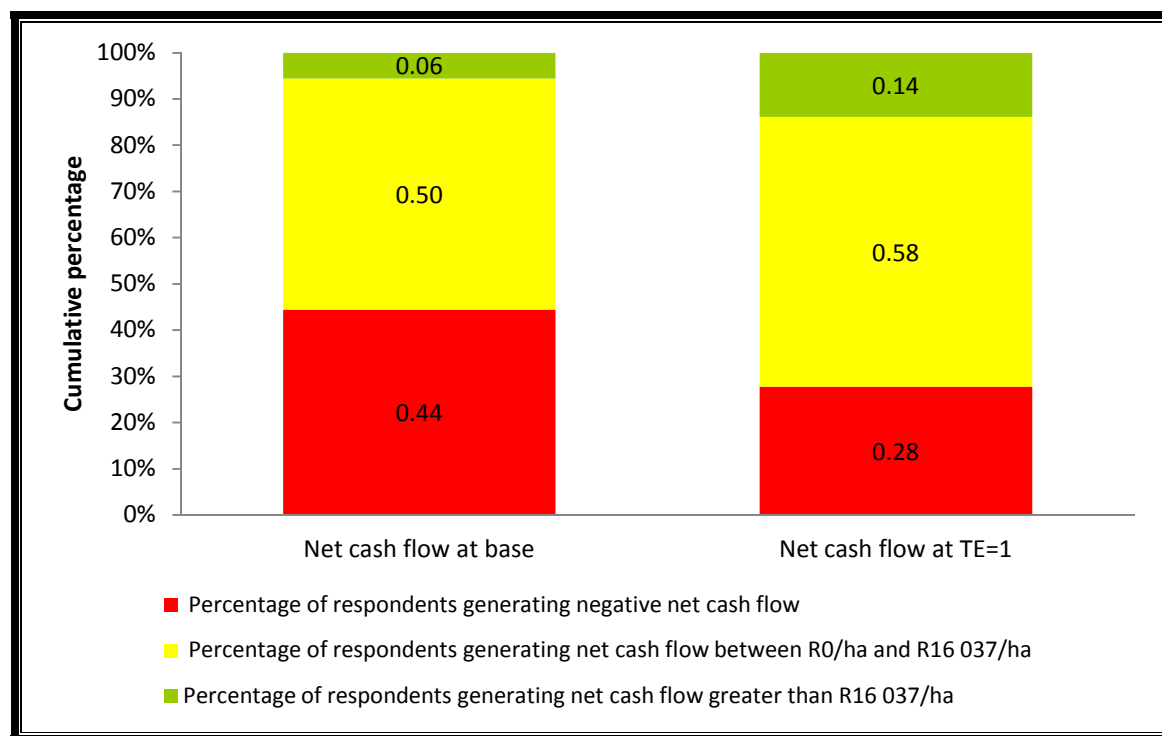
Figure 7.3: Stoplight chart for the net cash flow (in 2011 prices) generated in the base line scenario and given an improvement in technical efficiency levels

The second scenario represents the case if all of the respondents were to use their production inputs in a cost efficient combination.

7.5.4.3 Scenario 2 – Improve cost efficiency levels to one

The second scenario models the potential impact if the farmers from Eksteenskuil were to use the least cost combinations of production inputs to produce their raisins. The average net cash flow in Scenario 2 increased by 69% from the base scenario. While the average net cash flow in the base category was R3 496/ha, the model shows that the respondents would have been able to increase their net cash flow to an average of R5 909/ha if they were to use their inputs in the least cost combinations. The distribution of the net cash flows for Scenario 2 is presented as a stoplight chart in Figure 7.4.

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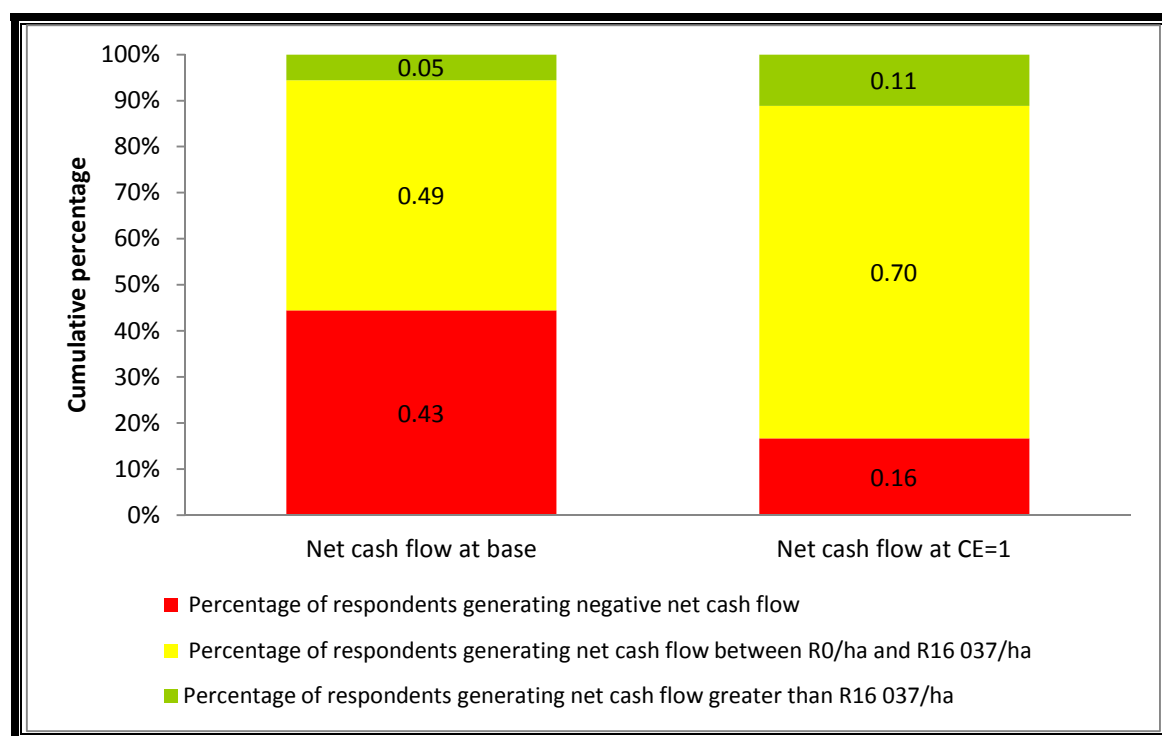
Figure 7.4:   Stoplight chart for base line and Scenario 2 where farmers use the cost minimising combination of inputs

Figure 7.4 shows that there is a substantial decline in the number of respodents who generate negative net cash flow if the farmers use least cost combinations of inputs. If all of the farmers selected the least cost combination of inputs, only 16% of them would have generated a negative net cash flow by the end of the year. On the other hand, 11% would have generated a net cash flow in excess of the upper threshold of R16 037/ha. The results thus show that there is a substantial benefit for farmers to use their inputs in least cost combinations, especially in years when the harvests are lower than normal. The substantial decrease in the percentage of respondents that produce negative net cash flows when using the least cost combinations of inputs correspond to the region in Figure 7.1 where the gains from improving cost efficiency (CE_Gains) outperform the gains from improving technical efficiency (TE_Gains). Keeping in mind that the farmers from Eksteenskuil do not really consider the combinations of inputs as a strategy to reduce production costs, the results from Scenario 2 suggest that the farmers need to be informed about the potential gains associated with such a strategy.

Next follows the potential impact if the farmers were allowed access to credit and forced to intensify their production activities by using 50% more inputs.

7.5.4.4 Scenario 3 – Increase input use by 50% while having access to credit

The average net cash flow in Scenario 3 is R5 673/ha at current technical efficiency levels. Thus, even at current levels of technical efficiency, the farmers should be able to increase their net cash flow by 62%. If the farmers were also supported to use their inputs in a technical efficient manner, the average net cash flow increases even further to R12 008/ha. The net cash flow of R12 008/ha represents an increase of 244% from the base. Thus, while the respondents are expected to benefit from intensifying their production activities, the benefit is substantially amplified if the farmers were also to use the inputs efficiently.

A stoplight chart of the distributions of the net cash flows is shown in Figure 7.5. Figure 7.5 contains the distribution of the net cash flow in the base scenario (Net cash flow at base), the net cash flow if Scenario 3 was to be implemented at current levels of technical efficiency (Net cash flow at current TE), and the net cash flow if Scenario 3 was to be implemented in combination with efforts to support the farmers to use their inputs in a technical efficient manner (Net cash flow at TE=1).
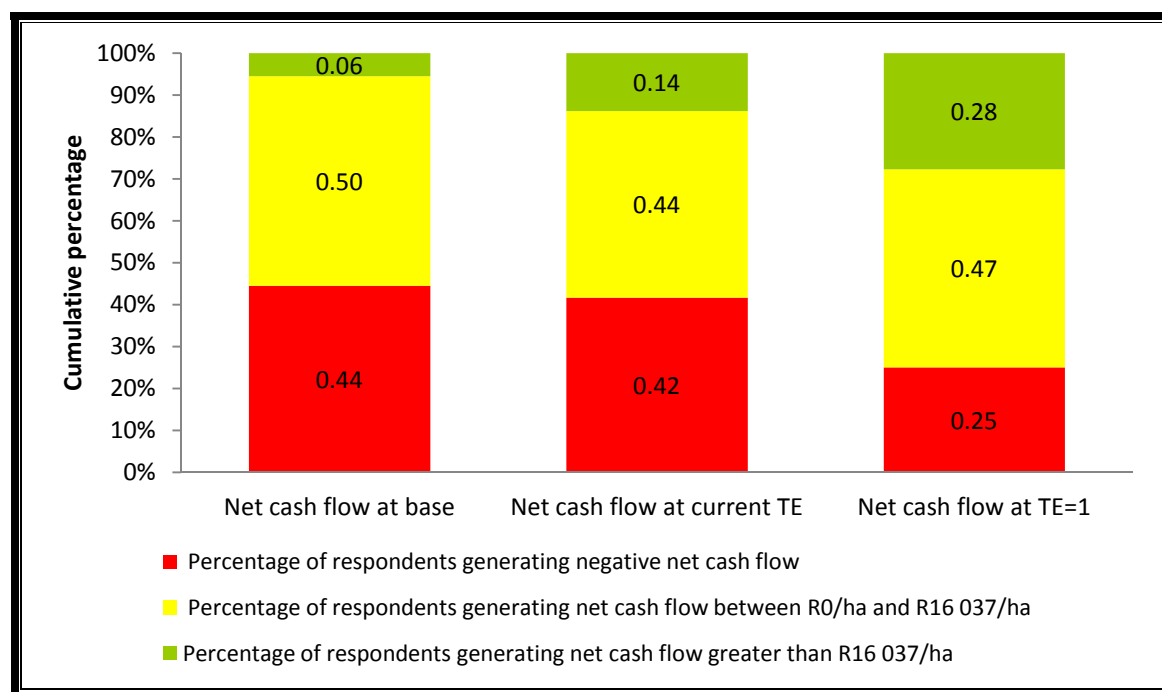
Figure 7.5:   Stoplight chart to compare base scenario with a scenario where Eksteenskuil farmers get access to credit and intensify by 50%

The results in Figure 7.5 shows that, at current levels of technical efficiency, the benefit from intensifying is greater for the respondents on the higher end of the spectrum. While the reduction in the number of respondents generating a negative net cash flow decreased only marginally from 44% to 42%, the number of respondents who would be able to generate in excess of R16 037/ha increased more considerably from six percent to 14%. Thus, even at current levels of technical efficiency, the farmers from Eksteenskuil will benefit from intensifying their production. The number of respondents who generate a negative net cash flow decrease even further to 25% if they use their inputs efficiently. Similarly, the number of respondents who earn net cash flow greater than R16 037/ha increases to 28% if the respondents also operate on the technical efficiency frontier. Thus, the stoplight chart shown in Figure 7.5 provides additional evidence of the amplifying effect of improved technical efficiency levels on the benefits associated with intensified production activities.

Given the problem discussed earlier with regard to the farmers from Chile and India obtaining FLO accreditation that may threat the position of the farmers from Eksteenskuil in the fairtrade market for raisins, Scenario 4 aims to model the potential implications if the fairtrade buyer was to discontinue the procurement of raisins from the farmers from Eksteenskuil.

7.5.4.5 Scenario 4 – Cancel the price premium the raisin producers from Eksteenskuil receive for their choice grade raisins that are exported via the fairtrade initiative

Scenario 4 represents the case where the farmers from Eksteenskuil do not receive the price premium ("fair price") for their raisins that are exported via the fairtrade initiative. Scenario 4 thus is similar to the base scenario, except for the fact that the price premium of 4% is removed from the export price. As expected, the average net cash flow declined by cancelling the price premium. The average net cash flow in the absence of the price premium is about R3 267/ha which represents a decrease of about 7% from the net cash flow in the base scenario. Thus, although the farmers from Eksteenskuil will face a reduction in the net cash flow, the impact is not necessarily that bad. Interestingly, however, if the farmers were able to use their inputs in a technical efficient manner, they would still be able to increase their net cash flow with an average of about 105% (to R7 168/ha) from the base scenario despite losing out on the price premium.

Figure 7.6 provides a stoplight chart of the distributions of net cash flow for Scenario 4 under current technical efficiency levels (Net cash flow at current TE) and under technical efficient levels (Net cash flow at TE=1). The distribution of the net cash flow from the base scenario is also included to allow for easy comparison.
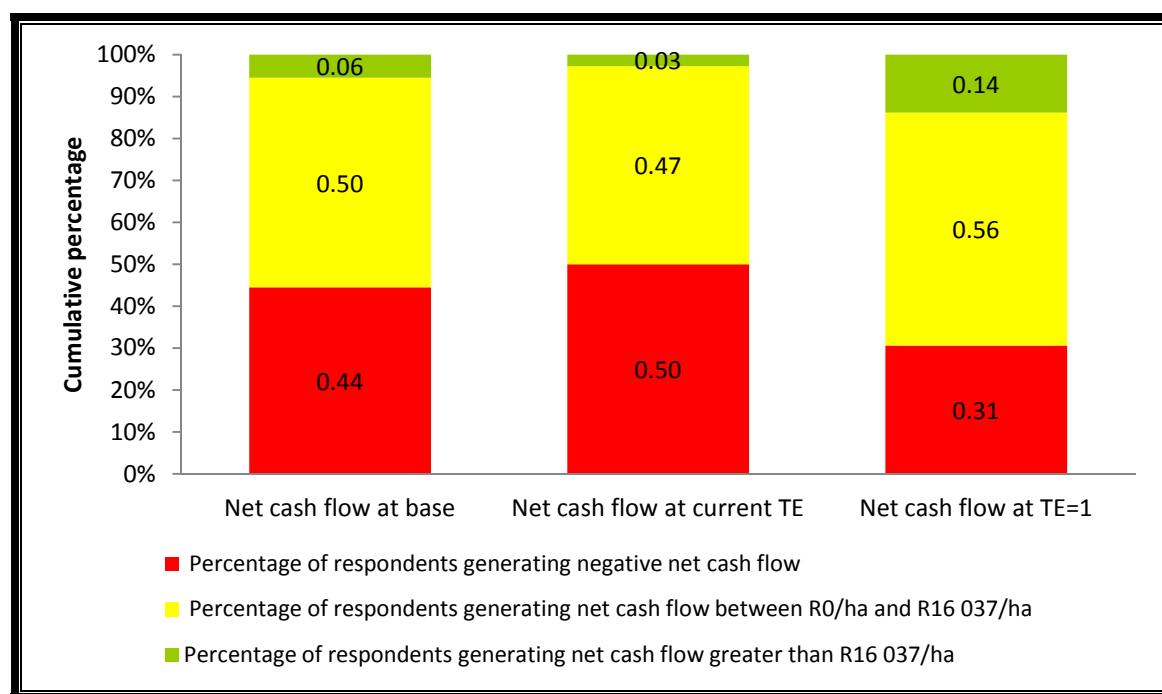
Figure 7.6: Stoplight chart to compare base scenario with a scenario where Eksteenskuil farmers do not get the price premium for choice grade raisins

Under current levels of technical efficiency an additional six percent of respondents fail to generate positive net cash flow. Three percent of the respondents who generated in excess of R16 037/ha in the base scenario failed to do so in the absence of the price premium. Thus, under the current levels of technical efficiency there are some respondents who are more severely influenced by the cancelation of the price premium than others. If the farmers were operating on the technical efficiency frontier, they would still be able to outperform the base scenario even in the absence of the price premium. Only 31% of the respondents would fail to generate positive net cash flow, while 14% would generate net cash flow that are sufficient to pay for recommended quantities of inputs for the next season in cash. The results thus again show the potential returns from support to the farmers from Eksteenskuil to use their inputs efficiently.

It has to be noted, however, that Scenario 4 only considered the direct impact of the cancelation of the price premium on the cash flow positions of the farmers. As discussed earlier, EAC uses the fairtrade premium to finance the bulk of the training sessions and support services provided to the farmers from Eksteenskuil. SAD also provides support to the farmers because it benefits financially through the fairtrade initiative based on the performance of the farmers from Eksteenskuil. If the farmers from Eksteenskuil were to lose their share in the fairtrade market, a

major incentive for SAD to provide the support services will be removed. It may be questionable whether SAD would continue providing support once the incentive is cancelled. The indirect impact of losing the fairtrade market thus may be considerable.

The discussion of the results from the application of the cash flow optimisation model to model the potential impact if the raisin producers from Eksteenskuil were to lose their share in the fairtrade market concludes this section. Next follows some conclusions that were drawn from the analysis of the potential financial gain from improving efficiency levels of the farmers and the impact of recommended solutions on the cash flow positions of the farmers.

7.6   CONCLUSIONS

The objective of Chapter 7 was to model the potential financial gains from improving the technical and cost efficiency levels of the farmers from Eksteenskuil, and to model the impact of recommended changes on the net cash flow positions of the farmers. The results show that there is definite scope to improve the financial performance of the Eksteenskuil farmers by improving the levels of efficiency with which they use their inputs. The results from the analysis of the efficiency gains show that there may possibly be justification for current efforts to focus on improving the ability of emerging farmers to maximise their output from their current input levels. However, the results also show that most of the emerging farmers from Eksteenskuil will benefit substantially from initiatives to support the farmers to select cost minimising combinations of production inputs. The fact that the current body of knowledge is still unable to explain the determinants of cost efficiency of the raisin producers from Eksteenskuil suggests that more research is urgently needed to find solutions to allow the farmers to benefit from improving their allocative efficiency levels. The role of economic literacy as a determinant of cost efficiency (Van der Merwe, 2012) suggests that the requirement from emerging farmers in terms of human capital is substantial to make cost efficient decisions. Thus, the need for external support in selecting optimal combinations of production inputs may be greater than the need for external support in the technical aspects of raisin production.

The results from the cash flow optimisation model show that the potential benefit of all of the recommended solutions are amplified when the farmers are also using their production inputs in a technical efficient manner. The best outcome is when the farmers intensify their production practices and use their inputs in a technical efficient manner. The conclusion thus is that the starting point to improve the performance of emerging farmers should be to support and train the farmers to use their inputs in an efficient manner. Importantly, improving the efficiency levels of the farmers does not require substantial capital investments in physical infrastructure. The

approach that was used to measure the efficiency levels of the farmers benchmark the farmers with each other. The results show the scope for improving the performance of the farmers within their current technology set. Once the farmers have the necessary skills to use their inputs efficiently capital investments to improve the technology set of the farmers will yield the highest possible returns.

While the small scale of operations is often documented as a major stumbling block that exclude emerging farmers from participating in commercial agri-food chains, the results from the cash flow optimisation model also show that there is major scope to improve the performance of the farmers by intensifying their production practices. The results from the cash flow model show a substantial increase in the percentage of farmers that will generate sufficient cash flow to be able to buy a large proportion of the required inputs in cash. Thus, before one tries to find ways to increase the scale of operations of emerging farmers, the farmers first have to utilise their available land at full capacity. As mentioned earlier, if the farmers were also to use their inputs in a technical efficient manner, the benefit from intensifying the production activities is maximised. The conclusion thus is that there is major scope to support and train emerging farmers in the efficient use of their production inputs, and in terms of the recommended levels of production inputs that are required to produce good crops. Thus, despite all of the stumbling blocks that are documented to exclude emerging farmers from participating in commercial agri-food chains, there is major scope to improve the livelihoods of emerging farmers even in their current environments. Effective extension has a crucial role to play in this regard. Importantly, extension is not necessarily the responsibility of government. Key role-players in value chains often already have the necessary skills that are required to produce large volume of good quality produce. Government should rather explore ways to incentivise such role-players from the private sector to get involved in supporting emerging farmers.

The conclusions from the modelling of the cash flow positions of the emerging farmers from Eksteenskuil conclude Chapter 7. Within Chapter 8 follows a brief summary and conclusions from the respective chapters of this thesis, and some recommendations for policy makers and further research on the topic of linking emerging farmers to markets.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

8.1   INTRODUCTION

8.1.1   *BACKGROUND AND MOTIVATION*

Poverty is a major cause for concern in South Africa where 48.5% of the population lives below the poverty line (UNDP, 2003). Agriculture is widely argued to have an instrumental role to play to improve the livelihoods of the rural poor (WRC, 2008). Backeberg and Sanewe (2010) argue that agriculture contributes to economic development and rural livelihoods by providing food products, and a range of opportunities for earning income. In addition to employment opportunities in production, agriculture also contribute to creating job opportunities in food processing, distribution and retailing phases of the food value chain. The role of agriculture thus extends the mere provision of food to rural communities. The new democratic government of South African also recognises the potential role to be played by agriculture as is evident from the prominence of agriculture in recent policy documents of government (i.e. the National Development Plan and the Comprehensive Rural Development Programme). Government is of the view that small-scale farmers can contribute significantly to the reduction of food insecurity (Molewa and Doidge, 2010). Since the beginning of democracy in South Africa in 1994, government has committed itself to working towards decreasing rural poverty through the implementation of policies that include initiatives to link emerging farmers to commercial agricultural value chains (Letsoalo and van Averbeke, 2005). Government has also spent a large amount of money on research projects on ways to successfully link emerging farmers to commercial agri-food chains, and on the revitalisation of smallholder irrigation schemes (Denison and Manona, 2006).

8.1.2   *PROBLEM STATEMENT AND OBJECTIVES*

Despite the commitment from government and the huge investments made to help emerging farmers from smallholder irrigation schemes to be integrated into commercial agri-food chains, actual success stories where emerging farmers are successfully operating in commercial agri-food chains are scarce. The small number of success stories means that the objective to allow

farmers to improve their livelihoods through irrigated agriculture is not met. Various researchers in South Africa and southern Africa have endeavoured research on the topic of linking emerging farmers to markets. Most of those researchers focused on the stumbling blocks that exclude emerging farmers from participating in commercial agri-food chains and made recommendations how the stumbling blocks should be overcome. Alarmingly, the stumbling blocks that were documented by researchers in the early 2000's are very much similar to those identified by researchers even in 2010 and 2012. The behaviour of the farmers and other role-players thus prove not to have changed considerably despite the recommendations from the volume of research.

Other researchers have reported success stories in recent years where emerging farmers from South Africa are successfully participating in commercial agri-food chains. Success stories are reported as case studies explaining how the farmers successfully function in their value chains. The success stories provide good descriptions of the way in which the role-players behave in the successful operations of the farmers in commercial agri-food chain. Based on the behaviour of the role-players in the success stories other emerging farmers are recommended to form co-operatives and to enter into vertical coordinated relationships with their transacting partners.

Both groups of research thus focus mainly on the way in which the farmers and other role-players behave and make recommendations for change in the behaviour that likely will contribute to the level of success with which the farmers operate in commercial agri-food chains. The theory of NIE, however, suggests that the behaviour of economic agents is influenced by the social and institutional environments within which they operate. The social environment includes the social dynamics within the communities of farmers under consideration. The degree of success with which a group of emerging farmers will operate collectively is influenced by the social capital of the individuals (Putnam, 1993) and the social dynamics (i.e. customs, norms and traditions) within the community. Moreover, the influence of social dynamics within different communities mean that no single model exists that can be replicated in different regions (Louw *et al.*, 2006). The institutional environment contains the rules and regulations that aim to create order to protect individuals against opportunistic behaviour, but also the incentives that guide the behaviour of economic agents under consideration (Milagrosa, 2007a). Importantly, the incentives guide the behaviour of the farmers, but also the behaviour of the transacting partners and the individuals/organisations that can support the farmers to overcome the stumbling blocks. The social and institutional environments thus have a major influence on the behaviour of all of the parties that may contribute to emerging farmers successfully overcoming the stumbling blocks. By ignoring the social and institutional environment the researchers make recommendations for change without considering the existing incentive structure that caused the current behaviour in

the first place. The failure to consider the existing incentive structure when making recommendations to change behaviour may be a reason for the failure to change the behaviour effectively to allow the farmers to successfully participate in commercial agri-food chains.

The main objective of this study is to develop and apply an integrated framework that will allow researchers to comprehensively investigate small-scale farmers' agri-food chains with the aim to identify potential leverage points that will contribute to improving the financial performance and hence the level of success with which the farmers participate in their agri-food chain. Special attention is awarded to the social and institutional environments within which the farmers operate to comprehensively understand the existing incentive structure for current behaviour. Such information is crucial when making recommendations for change that will effectively guide the behaviour of all parties involved in such a way to contribute to improving the financial performance.

The aim will be achieved through the following objectives:

Objective 1: To develop an integrated framework that can be used to analyse the agri-food chains within which emerging farmers operate with the aim to improve the financial performance of the farmers, and hence the level of success with which they operate in their value chains.

Objective 2: To apply the integrated VC-NIE-SCP framework to characterise the agri-food chain within which the group of emerging raisin producers from Eksteenskuil operate in order to get a comprehensive understanding of the way in which the farmers behave and perform within their social, physical and institutional environment.

Objective 3: To explore the social capital levels of the farmers from Eksteenskuil as part of the social environment within which the farmers operate to understand the social dynamics within the group of farmers that affect the functioning of Eksteenskuil Agricultural Cooperative (EAC). The farmers from Eksteenskuil can only access the incentives from fairtrade through collective action. The social capital of the farmers thus affects their access to the incentives, and hence their financial performance.

Objective 4: To assess the transaction between the farmers from Eksteenskuil and SAD to identify the type of governance structure (vertical coordination strategy) that will minimise the transaction costs faced by the emerging farmers from Eksteenskuil. All of the raisin producers from Eksteenskuil currently are in (specifications) contracting relationships with SAD as required by the fairtrade initiative. The farmers, however, entered into the contractual relationship based

on requirements from the fairtrade initiative and not as a means to optimise transaction costs. Thus, it is not known whether or not the specifications contract type of governance structure actually minimise the transaction costs faced by the farmers from Eksteenskuil.

Objective 5: To evaluate the performance of the farmers by quantifying the degree of technical and allocative efficiency with which the raisin producers from Eksteenskuil use their production inputs in order to get an understanding of the scope for improving the farmers' performance within their existing technology set. The determinants of technical and allocative efficiency are also explored to identify the factors that are associated with higher levels of efficiency to guide recommendations that will ultimately contribute to improved financial performance of the raisin producers from Eksteenskuil.

Objective 6: To model the potential financial impact from improving efficiency levels of the raisin producers from Eksteenskuil, and to model the potential impact of the implementation of other recommendations on the cash flow positions of the farmers.

8.1.3 RESEARCH AREA

The research is conducted among a group of emerging raisin producers from Eksteenskuil in the Northern Cape Province of South Africa. Eksteenskuil is located along the Orange River near Keimoes, about 50km west of Upington. The production of raisins serves as the main source of livelihood to the farmers. Some cash crops and livestock are grown, but mainly for home consumption. The raisin producers from Eksteenskuil operate on small plots of land with a median size of three hectares. The plots are separate from each other and most of the farmers also reside on their farms. The individual farmers have complete autonomy in terms of decision-making on their farmers. Each farmer produces his/her raisins autonomously and delivers it to SAD under the name of the EAC. As EAC the raisin producers from Eksteenskuil collectively export their choice grade raisins via the fairtrade initiative. Thus, they are actively participating in a highly sophisticated niche market.

8.2 LITERATURE REVIEW AND DEVELOPMENT OF THE CONCEPTUAL FRAMEWORK

A literature review was conducted to better understand the typical challenges that are faced by emerging farmers from South Africa that exclude them from participating in commercial agri-food chains. Special attention was also paid to success stories to identify potential key success factors that contribute to the farmers in the success stories overcoming the stumbling blocks they face. In

general the stumbling blocks that are documented in the literature can be grouped according to three broad themes. Those groups are stumbling blocks caused by institutional failure; high transaction cost; and lack of support. The stumbling blocks that are caused by institutional failure include the small scale of operations and the lack of access to credit that are caused by the failure to provide emerging farmers with secure land tenure. The high levels of transaction costs faced by emerging farmers are caused by the poor condition of physical infrastructure (i.e. road and water distribution networks); lack of market information; lack of trust among transacting partners; and the relative far distance emerging farmers typically are from the market. The last major stumbling block relates to the lack of effective support structures that can help the farmers to meet the stringent requirements associated with supplying buyers in commercial agri-food chains.

In the success stories there are some emerging farmers who are in vertically coordinated relationships with their buyers. Other farmers supply their produce directly to retail stores, albeit not under contract. In both types of success stories the buyers had a significant financial incentive to procure from the emerging farmers under consideration. It is also important to note that the emerging farmers in the success stories receive substantial amounts of support from their transacting partners. In some of the cases the farmers even received soft loans to finance their production activities. The relationships between the farmers from the success stories with their transacting partners contribute significantly towards the farmers overcoming some of the major stumbling blocks that normally exclude emerging farmers from the formal market. The substantial levels of support to the farmers are justified for the private sector buyers since the financial incentive created a vested interest for them in the performance of the emerging farmers.

Based on the typical stumbling blocks and the key success factors that were identified in the literature a conceptual framework was developed. The conceptual framework was developed to allow for a comprehensive analysis of potential support structures, the social, physical and institutional environments that influence the behaviour and performance of the farmers, and the relationships between the farmers and their transacting partners that affect the levels of transaction costs faced by the farmers. An integrated value chain and New Institutional Economics (NIE) – Structure-Conduct-Performance (SCP) framework was developed to allow for a comprehensive analysis of the production and marketing of raisins by the raisin producers from Eksteenskuil.

The extended definition of a value chain that is recommended by Roduner (2007) is used in the conceptual framework. In addition to the actors who are directly involved with moving the physical product from input suppliers to the end consumers (value chain players), the extended definition

also include the actors that provide the rules and regulatory framework that have to be complied with (value chain influencers), and the support structures (value chain supporters) that can support the value chain players to comply with rules and regulations specified by the influencers. The literature review, however, showed that it is not only the rules and regulations (institutional environment) that influence the behaviour and performance of the farmers, but also the social and physical environment. The integration of the NIE-SCP framework of Milagrosa (2007) into the value chain framework of Roduner (2007) allows for extending the value chain influencers to also consider the social and physical environment within which the players operate. The NIE-SCP framework also allows for a comprehensive analysis of the behaviour (conduct and governance structures) of the value chain players and the support structures. Special attention is paid to the relationship between the farmers and their transacting partners to identify the optimal type of relationship that will minimise the transaction costs faced by the farmers under consideration. Lastly, the framework extends the analysis of the performance of the role players in terms of yields and production costs to also include a comprehensive analysis of the levels of efficiency with which inputs are used. The efficiency analysis provides useful insight into the degree with which the farmers should be able to improve their performance within their existing technology set. Given the recommendation of NPC (2011) to focus the attention of research and development on sophisticated technology, emerging farmers likely will be excluded from benefiting from such investments. Thus, it is crucial to have a comprehensive understanding of the prospects to improve the performance of the farmers within their existing technology set.

It is important to note that each of the documented stumbling blocks and key success factors are considered in one or another way through the application of the conceptual framework. The conceptual framework takes cognisance of the influence of the environment (upper levels) on the behaviour and performance of the actors. Importantly, the framework also allows for feedback from the lower levels (behaviour and performance) to the upper levels to initiate changes in the environment that again may manifest in adjusted behaviour and ultimately improved performance of the actors under consideration. The final outcome of the application of the developed conceptual framework is recommendations for change in the social, physical and institutional environment that will cause the behaviour of the farmers and other role-players to change to ultimately contribute towards improving the performance of the farmers under consideration. Thus, instead of concluding with recommendations to farmers how they should adjust their behaviour, the focus of attention is to adjust the environment within which the farmers operate to change the incentive structures that determine the behaviour of the farmer. Through the incentives the behaviour of the farmers can be adjusted to ultimately yield in the desired outcome of improved performance of the farmers.

8.3   CHARACTERISATION OF THE VALUE CHAIN WITHIN WHICH THE FARMERS FROM EKSTEENSKUIL OPERATE

The objective of Chapter 3 was to qualitatively describe the production and marketing of raisins by the farmers from Eksteenskuil through the application of the newly developed conceptual framework. The application of the conceptual framework ensured that the value chain was comprehensively described at all three levels: the actors who are involved with moving the physical product from the input suppliers to the end consumer; the social, physical and institutional environments that influence the behaviour of the value chain players; and the support structures that are available to support the farmers to operate within the environment that was created by the influencers.

8.3.1   VALUE CHAIN INFLUENCERS

The raisin producers from Eksteenskuil are heavily influenced by the social, physical and institutional environment within which they operate. The farmers from Eksteenskuil are not that much influenced by cultural activities and traditions in their community. None of the role-players or respondents mentioned any cultural activities that influence their behaviour. The main influence of the social environment relates to the internal political conflicts among the group of farmers, and the bad experiences that the farmers had with government in recent years. The poor conditions of the road and water distribution infrastructure at Eksteenskuil, and the small plots of land allocated to the farmers without secure tenure, mean that the physical environment constrain the behaviour and performance of the farmers. While the region is very much conducive to the production of good quality raisins, the physical infrastructure substantially increase the cost of production and the transaction costs for the farmers from Eksteenskuil. However, despite the constraining impact of the physical environment, there are sophisticated marketing channels available to the farmers to distribute their raisins to the end consumers. SAD has a depot where the farmers can deliver their raisins at Keimoes. Keimoes is only about 5km from Eksteenskuil. The distance from the farms to the market thus is not too far.

The institutional environment has a major influence on the behaviour of the farmers from Eksteenskuil. One of the most important institutions that influence the behaviour of the respondents relates to land tenure. Since Eksteenskuil was historically an Act 9 Area (a Rural Coloured Settlement) the land at Eksteenskuil is held in Trust by the Minister of Agriculture, Forestry and Fisheries with the farmers only having lease agreements for their land. None of the respondents, however, could show the lease agreement. The transfer of secure tenure to individual farmers through the land tenure reform programme of government faced additional

187

turmoil when the legislation on which the programme is based (CLARA) was declared to be unconstitutional by the Constitutional Court in 2011. Thus, the prospects of the farmers receiving the title deeds for their land in the near future seem bleak. The lack of secure tenure has a major negative impact on the behaviour of the farmers. Insecure tenure means, amongst others, that farmers have little incentive to invest in their land; emerging farmers are unable to source credit from commercial credit providers to supplement their limited cash flow; farmers are unable to sell or legally rent their land to the prosperous farmers who want to expand their raisin production enterprises. Insecure tenure thus contributes significantly towards an environment that is not considered to be enabling for the farmers from Eksteenskuil.

Other important institutions that influence the behaviour of the raisin producers form Eksteenskuil relate to their participation in the fairtrade market. The fairtrade initiative has a number of strict rules and regulations that have to be met by producers. It is important to note that the institutions associated with the fairtrade initiative are strictly enforced. The failure to comply leads to the suspension of FLO-accreditation. Thus, if the farmers fail to comply with the rules and regulations they are unable to benefit from the fairtrade initiative. Interestingly, the strict rules and regulations from the fairtrade initiative caused the farmers from Eksteenskuil to convert their collective entity from a farmers' association to a registered agricultural co-operative since they believed the co-operative is a more appropriate vehicle for collective action to access the fairtrade incentives. Thus, the incentives that were created for the farmers from Eksteenskuil caused the farmers to adjust their own rules and regulations to improve their access to the incentives from the fairtrade initiative.

The conclusion from the analysis of the value chain influencers is that, despite the fact that the raisin producers from Eksteenskuil operates in a highly sophisticated niche market, they do not operate in an enabling environment. They face very similar constraints that are documented in the literature to exclude emerging farmers from the formal market. However, the incentive that was created through the fairtrade initiative was sufficient to convince the farmers to comply with the strict rules and regulations, and not see the stringent requirements and the poor condition of the physical infrastructure as fatal stumbling blocks that cannot be overcome. The farmers even use institutional innovation themselves to improve their ability to access the incentives.

8.3.2 *VALUE CHAIN PLAYERS*

The actors who are directly involved with moving the raisins from the input suppliers to the end consumers include the input suppliers, farmers, SAD as the primary processor and exporter of choice grade raisins, secondary processors that use raisins as ingredients in baked products,

retails stores, and the consumers. The farmers from Eksteenskuil are mainly involved with other actors at the nodes adjacent to the production node, such as the input suppliers and SAD who buys their raisins. Only through EAC and SAD the farmers are also involved with the fairtrade company that imports the raisins from them.

The farmers use mainly traditional farming techniques and irrigate their land through flood irrigation. The nature of the product (raisins) produced by the farmers from Eksteenskuil is such that the farmers can relatively easily produce a crop of good quality compared to other high value products (i.e. vegetables). The nature of the product thus may have a significant influence on the ability of the farmers to participate in a sophisticated value chain with strict requirements. The vast majority of respondents do not have access to formal credit since they do not have the title deeds for their land. A high value is placed on technical training and service at Eksteenskuil. EAC uses some of the funds earned through the fairtrade premium to finance the bulk of the training sessions and support services to the farmers. There currently are six raisin processing companies along the Orange River which collectively have the capacity to process double the volume of raisins that are currently produced along the Orange River. The competition for raisins thus is strong hence causing upward pressure on the raisin prices in recent years. Only SAD has FLO-accreditation. Farmers who want to benefit from the fairtrade initiative thus have to sell their raisins through SAD. All of the farmers from Eksteenskuil are in contractual relationships with SAD. The raisin producers from Eksteenskuil thus are in a vertical coordinated relationship with their buyer. Through their relationship with SAD the respondents have relatively easy access to market information.

Despite the support and initiatives to improve the performance of the raisin producers from Eksteenskuil, there is a steady decline in the volumes of raisins produced at Eksteenskuil from 2006 to 2011. Except for 2006, EAC failed to meet even 50% of the demand for fairtrade raisins from Eksteenskuil. The decline in volumes threatens their position as a fairtrade supplier of raisins. A major contributor to the problem faced by the farmers from Eksteenskuil is that the bulk of the vines are in excess of 25 years of age. Twenty five years are regarded as the economic lifespan of the sultana variety that is produced at Eksteenskuil. The lack of access to credit means that the farmers are unable to replace the old vines. The failure to replace the old vines may ultimately lead to a situation where the farmers from Eksteenskuil would be unable to make ends meet through raisin production despite having access to a sophisticated niche market and substantial levels of support.

8.3.3   *VALUE CHAIN SUPPORTERS*

The raisin producers from Eksteenskuil have a well developed support system. The raisin producers receive support from EAC, SAD, and input suppliers. EAC provides a number of support services to the farmers. The board of directors of EAC manages the transaction between the farmers and the fairtrade buyer on behalf of the individual farmers. EAC thus has a direct influence on financial reward earned by the individual farmers from complying with the strict rules and regulations of the fairtrade initiative. EAC also organise a number of training sessions for the farmers from Eksteenskuil to improve their skills in raisin production and financial record keeping. As the Premium Committee, EAC uses funds that were earned through the fairtrade premium to finance such training sessions for the farmers. There are also two fulltime assistants who work in the office of EAC. The assistants are also available to support the farmers with administrative tasks. It is important to note that government has no influence in the functioning of EAC. In fact, EAC was established as a response to market incentives that were created by the fairtrade initiatives and not because of government incentives for establishing co-operatives.

SAD provides the farmers with technical support and is involved in a number of the training sessions that are held for the farmers. Given the fact that SAD too is a major exporter of raisins, they have the necessary facilities and skills that are required to meet the requirements from the international buyers. SAD performs the primary processing of the raisins for EAC, and exports the raisins on behalf of EAC. It is important to note that the fairtrade initiative has created a strong incentive for SAD to actively support the farmers from Eksteenskuil to comply with the fairtrade requirements. SAD, however, only gains access to the incentive through the good quality raisins from Eksteenskuil that are exported under the fairtrade brand. SAD thus has a vested interest in the performance of the raisin producers from Eksteenskuil. The analysis of the support services thus show that, if incentives are correctly aligned, private sector firms are more than willing to provide the necessary support to emerging farmers to meet the stringent requirements that typically exclude emerging farmers from the formal market. The case of Eksteenskuil also proves that there is merit in the question in NPC (2011) whether extension services are appropriately located at provincial government levels. Government should rather focus on providing emerging farmers with an enabling environment while incentivising private sector companies to get involved with the training and extension services for the farmers.

Input suppliers support the farmers by providing information with regard to the crop nutrient requirements to ensure good crops, and typical programmes for pest and weed control.

8.4   SOCIAL CAPITAL ANALYSIS OF THE FARMERS FROM EKSTEENSKUIL

Given the role of collective action in the successful participation by the farmers from Eksteenskuil in the fairtrade value chain, and the fact that the lack of trust among market participants is documented as a stumbling block faced by emerging farmers, Chapter 4 aimed to explore the social capital levels of the raisin producers from Eksteenskuil. The social capital of emerging farmers have been considered in research in South Africa only to the extent where a proxy variable was used for social capital to test the influence of social capital on marketing behaviour of small-scale farmers. According to social capital theory, however, social capital consists of different dimensions. Structural social capital refers to the active participation in formal organisations. Cognitive social capital, on the other hand, refers to the degree to which individuals trust one another and get along with one another. Chapter 4 thus extends existing research in South Africa by considering the different dimensions of social capital in the compilation of a social capital index for each respondent. A procedure of Milagrosa (2007) was used to measure the levels of structural and cognitive social capital of the respondents. The structural social capital score was calculated based on the level of active participation in formal organisations (i.e. church, co-operative, political parties, etc.). The cognitive social capital score was calculated based on respondents' answers to a number of questions on a five point Likert scale. The structural and cognitive social capital scores were standardised to range to 50. The social capital index then was calculated as the sum of the structural and cognitive social capital scores of each respondent. The social capital index thus ranges between zero and 100.

The results from the analysis of social capital of the respondents show that the raisin producers from Eksteenskuil have relatively high levels of social capital. The respondents are actively involved in formal organisations (structural social capital). The respondents also prove to get along relatively well with one another, and to trust one another (cognitive social capital). The average scores for both structural and cognitive social capital are in excess of 70% (35/50). The relatively high levels of institutional trust of the farmers suggest that the farmers do trust the board of directors of EAC who is responsible for managing the transaction with the fairtrade buyer on their behalf. It is important to note that the individuals who serve on the board of directors are prosperous raisin producers with relatively high levels of education and experience in raisin production (human capital). The members of EAC thus prove to have trust and confidence in the ability of the board of directors to effectively manage the transaction on their behalf.

After the analysis of the social capital levels of the respondents, the focus of attention shifted to the determinants of social capital. The relationships were explored between the characteristics of the respondents and the social capital indicators that were used to estimate the social capital

levels of the respondents. The Mann-Whitney test was used to test whether the characteristics of the respondents could explain some of the variation in the social capital indicators. The results showed that the more educated farmers were found to be more optimistic about the future. It was concluded that the more educated individuals may be in a better position to grasp the potential opportunities to improve their performance. Higher levels of human capital are required to adopt sophisticated new technology. Given government's commitment to invest in research and development of sophisticated technology (NPC, 2011) the more educated farmers may see the potential opportunity that may arise from such investments. Interestingly, the results also show that the older, more experienced raisin producers have higher levels of trust in government than their younger counterparts. The conclusion is that the older farmers do not necessarily blame government for the lack of an enabling environment. On the other hand, the younger generation of farmers may have a higher sense of entitlement. The failure of government to meet the promises made by politicians in the media may contribute to the lower levels of trust by the younger generation of farmers.

Ultimately it was concluded that the social capital levels of the raisin producers from Eksteenskuil are expected to influence the way they behave. It was also recognised that the complexity of social capital makes is difficult to implement initiatives that will contribute to developing the social capital levels of the farmers. Efforts to stimulate effective collective action (South African LED Network, 2012; NPC, 2011) and farmer-to-farmer skills transfer (NPC, 2011) should take cognisance of the role of social dynamics in the behaviour of emerging farmers. The only way to achieve the desired outcomes is to follow a participatory approach. The farmers also have to be included in the planning stages of such projects to ensure a comprehensive understanding of the social dynamics within the specific group of farmers under consideration.

8.5   ANALYSIS OF THE GOVERNANCE STRUCTURES USED BY THE FARMERS FROM EKSTEENSKUIL

Constraints that relate to high levels of transaction costs are widely documented to be major stumbling blocks that contribute towards the exclusion of emerging farmers from participating in commercial agri-food chains. Transaction cost economics (TCE) theory suggests that higher degrees of vertical coordination may decrease the transaction costs (Williamson, 1998). The aim of Chapter 5 was to comprehensively assess the transaction within which the raisin producers from Eksteenskuil participate to determine whether or not an alternative type of governance structure (vertical coordination strategy) may reduce the transaction costs faced by the respondents. While some research was done in South Africa that considered the transaction costs associated with a transaction between emerging farmers and a agro-processing company,

their focus of attention was on finding the optimal type of governance structure that will minimise the transaction cost faced by the processing company. To the author's knowledge, no research was done to identify the best type of governance structure that will minimise the transaction costs faced by the emerging farmers in the transaction. Through Chapter 5, this research thus extends existing research by focusing the attention on the type of governance structure that will minimise the transaction costs faced by emerging farmers.

In order to assess the transaction within which the respondents operate an approach of Milagrosa (2007) was used to assess the characteristics of the transaction that contribute to higher levels of transaction costs. Based on the characteristics of the transaction a decision making framework of Mahoney (1992) is used to identify the optimal type of governance structure by matching the characteristics of the transaction with an appropriate vertical coordination strategy. A decision making framework of Peterson *et al.* (2001) then is used to determine whether or not there is a need to change the current coordination strategy to better match the characteristics of the transaction. The framework of Peterson *et al.* (2001) consists of five interrelated questions that have to be answered affirmatively before a change in coordination strategy is recommended. Importantly, the starting point is the characteristics of the transaction in relation to the current governance structure. Before initiating change, the analysis starts with the question whether or not the current type of governance structure allows costly coordination errors. Only if it is determined that the current governance structure actually does allow costly coordination errors, the rest of the questions are considered. If the answer to any of the questions is no, the current governance structure is accepted as the optimal type. In a sense the application of the Peterson *et al.* (2001) model is used to validate the recommendation from the Mahoney (1992) model.

Currently the transaction between the respondents and SAD is governed by a specifications type of contract. The characterisation of the transaction between the respondents and SAD showed that the raisin producers from Eksteenskuil do face considerable amounts of transaction costs. Although the transaction does not exhibit substantial levels of physical, human and temporal asset specificity, the farmers do face high levels of uncertainty, search and information costs, and negotiation costs. The high levels of transaction costs suggest that the farmers require a relatively high level of vertical coordination to minimise the transaction costs they face. In addition to the levels of asset specificity and uncertainty, the framework of Mahoney (1992) also considers the level of complementarity between transacting partners. The transaction between the respondents and Eksteenskuil does exhibit a high degree of complementarity. Neither party can benefit from the fairtrade initiative without the contribution of the other party. Thus, the combined reward they earn is greater than the sum of the individual rewards that would have been earned if the two parties were to operate independent from each other. Based on the low levels of asset specificity

and the high degree of uncertainty and complementarity, the Mahoney (1992) framework recommends a strategic alliance as the appropriate type of governance structure. A strategic alliance is more to the right on the vertical coordination continuum than the specifications contract that is currently used by the farmers from Eksteenskuil.

The application of the framework of Peterson *et al.* (2001) showed that the specifications contract that is currently used to govern the transaction between the respondents and Eksteenskuil does allow costly coordination errors to occur. It was found that a higher degree of vertical coordination (i.e. a relation based strategic alliance) would reduce the costliness of coordination errors. The relation based alliance as a governance structure seems to be workable and implementable for the case of Eksteenskuil if EAC continues to perform some of the management routines. Lastly, the risk return trade-off of changing from a specifications contracting relationship to a strategic alliance also seem to be favourable. Thus, the framework of Peterson *et al.* (2001) suggests that a change from the specifications contract to a relation based strategic alliance may be more appropriate to govern the transaction between the raisin producers from Eksteenskuil and SAD. The finding from the application of the framework of Peterson *et al.* (2001) thus confirms the recommendation from the Mahoney (1992) framework. The conclusion thus is that using a relation based strategic alliance will minimise the transaction costs faced by the raisin producers from Eksteenskuil.

The influence of the characteristics of the transaction on the optimal type of governance structure implies that the recommendation of a specific type of relationship, such as a strategic partnerships recommended by CRDP (2010), should be handled with great caution. Based on the characteristics of the transaction a strategic partnership is not necessarily the optimal type of relationship to minimise the transaction costs for the emerging farmers. A careful analysis of the transaction is necessary to identify the optimal type of governance structure.

8.6   EFFICIENCY ANALYSIS OF INPUT USE BY THE FARMERS FROM EKSTEENSKUIL

The last level of the analysis in the application of the conceptual framework is concerned with the way decision-makers use their resources within the environment that is provided by the value chain influencers. The objective of Chapter 6 was to comprehensively analyse the levels of efficiency with which the raisin producers from Eksteenskuil use their inputs. More specifically, Chapter 6 aimed to explore the levels and determinants of technical and cost efficiency.

8.6.1 TECHNICAL EFFICIENCY ANALYSIS OF THE RAISIN PRODUCERS FROM EKSTEENSKUIL

Recent literature shows that the two stage approach that is normally used where DEA efficiency scores are estimated in the first stage, followed by tobit regression analysis in the second stage to explain inefficiencies, is invalid since one of the main assumptions underlying regression analysis (no serial correlation) is violated. Researchers in South Africa, however, continue to use the flawed approach when exploring technical efficiency of emerging farmers. Thus, no reliable information is available on the determinants of technical efficiency of emerging farmers from South Africa. The objective of the first section in Chapter 6 was to explore the technical efficiency levels and its determinants for the raisin producers from Eksteenskuil by using a more appropriate procedure that was developed by Simar and Wilson (2007).

Simar and Wilson (2007) developed a double bootstrap procedure to investigate technical efficiency and its determinants. In essence the double bootstrap procedure corrects the estimated technical efficiency scores for bias. The bias-corrected technical efficiency scores then are used as the dependent variable in a truncated regression to explore the determinants of technical efficiency in the second stage of the analysis. The double bootstrap approach is used in this study to explore the determinants of technical efficiency of the raisin producers from Eksteenskuil. Given the relatively small number of respondents compared to the number of covariates, the regression analysis was done within a principal component regression (PCR) framework. The PCR framework allows for a reduction in the number of explanatory variables by grouping related variables in principal components. The procedure also allows for manually calculating the contribution of each variable within a principal component to the variation in the bias-corrected technical efficiency scores of the respondents. The procedure also eliminates any possible multicollinearity problem that may decrease the level of consistency of the estimated regression model.

The results show that there is some bias in the uncorrected technical efficiency scores of the respondents which needs to be corrected. About 44% of the respondents were found to operate on the technical efficiency frontier. The remaining 56% should be able to expand their output at current input levels and within their existing technology set. The conclusion from the analysis of the technical efficiency levels is that there may be scope for farmer-to-farmer skills transfer as recommended by NPC (2011). The farmers who are operating on the efficiency frontier are peers for the inefficient farmers. Government should incentivise such farmers to actively transfer their skills to the farmers who have not produced the maximum amount of output from their input levels. Such incentives may include, for example, incentives for collective action that are only accessible by producing good quality crops. Such incentives will create a vested interest for the

prosperous farmers to transfer their skills to the other farmers who are members of their collective entity.

The results from the analysis of the determinants of technical efficiency show that technical efficiency levels of the raisin producers are positively influenced by higher levels of human capital, farm and financial characteristics that are typically associated with higher levels of cash flow, and compliance with some best management practices. The conclusion from the analysis of the determinants of technical efficiency is that sufficient cash flow is central to improving the technical efficiency levels of the raisin producers from Eksteenskuil. The environment has to be adjusted in such a way to give emerging farmers access to the necessary means to supplement their cash flow.

8.6.2   COST EFFICIENCY ANALYSIS OF THE RAISIN PRODUCERS FROM EKSTEENSKUIL

Cost efficiency is a measure of allocative efficiency and refers to the ability of a decision maker to produce the current output levels at a minimum cost. Allocative efficiency is a field of research that is very much neglected, especially in South Africa, hence little information is available on the determinants of allocative efficiency. The objective of this section in Chapter 6 was to explore the cost efficiency levels of the raisins producers and the socio-economic characteristics of the respondents that contribute to higher cost efficiency levels.

The cost efficiency score for each respondent was calculated in two steps. The first step was to determine the least cost input combination for each decision maker using DEA. The minimum cost was calculated by multiplying the optimal quantities of inputs with their prices. In the second step, the cost efficiency scores were calculated as the ratio between the minimum cost and the costs that were actually incurred by the respondents. Respondents who used the least cost combination of inputs thus obtained a cost efficiency score of one, while the others obtained cost efficiency scores between zero and one. Since a double bootstrap approach has not yet been developed to analyse cost efficiency, an approach recommended by McDonald (2009) was used to explore the determinants of cost efficiency of the raisin producers form Eksteenskuil. The cost efficiency scores were transformed to logarithms to better handle the problem of serial correlation when exploring the determinants of cost efficiency in the second stage of the analysis. Ordinary Least Squares (OLS) then was used to regress the transformed cost efficiency scores on the socio-economic characteristics that were hypothesised to influence cost efficiency levels.

The results from the analysis of the cost efficiency levels of the respondents show that only three of the respondents used the least cost combinations of inputs to produce their raisins. Alarmingly,

about 60% of the respondents should have been able to produce their current raisin yields at 30% or less of their current costs. Given the role of limited cash flow as one of the major constraints for emerging farmers, the fact that the farmers use input combinations that unnecessarily increase the pressure on their cash flow positions is a cause for concern. Training sessions should extend the focus on input-output relationships to also consider the selection of the least cost combinations of inputs to produce their crops.

The results from the regression analysis of the cost efficiency scores on the socio-economic characteristics of the respondents show that the socio economic characteristics do not explain the variation in cost efficiency scores of the raisin producers from Eksteenskuil. Only the size of the farms was found to significantly influence the cost efficiency levels of the respondents. The way in which the raisin producers from Eksteenskuil select their input combinations are not really as a strategy to minimise production costs. The main inputs considered for the purpose of estimating the cost efficiency levels include the nutrients, N, P, and K, and labour. The combination of N, P, and K, however depends on the specific fertiliser mixture, or the type of animal manure that is applied to the vines. The fertiliser mixtures are recommended by input suppliers based on the nutrient requirements of the plants, while the manure depends on the type of animal that is kept by the households. No information on actual nutrient contents in the soil is considered in the selection of the fertiliser mixtures to apply. Testing the nutrient contents in the soil may allow the respondents to select fertiliser mixtures that will allow them to lower their cost of production.

Ultimately, the conclusion is that very little is known about the factors that contribute to higher levels of allocative efficiency of emerging farmers in South Africa. Allocative efficiency is influenced by a complex decision making process. More research is required to better understand the decision making process through which emerging farmers decides on the specific combinations of inputs to use. Only if such information is available will it be possible to effectively improve the allocative efficiency levels of emerging farmers. What is clear at this stage is the fact that consciously selecting input combinations that will minimise costs requires substantial amounts of skills (i.e. human capital) from decision makers. Support structures should pay attention to transferring such skills to the farmers to allow them to benefit from improving their allocative efficiency levels.

8.7 MODELING THE POTENTIAL IMPACT OF RECOMMENDED CHANGES ON THE PERFORMANCE OF THE FARMERS FROM EKSTEENSKUIL

The conceptual framework that was used in this study allows for feedback from the lower levels (performance and resource allocation) to the upper levels (social embeddedness; institutional

environment; farm and market structure; farm and market conduct; and governance structures). The feedback has the purpose to initiate possible changes in the upper levels that may contribute towards changing the behaviour of the role-players, and hence manifest in improved performance. Recommendations that were made in the earlier chapters are expected to adjust the behaviour of the farmers and other role-players in the value chain to ultimately contribute towards improving the levels of efficiency with which the respondents use their inputs. The aim of Chapter 7 was to extend existing research by also modelling the potential impact of the different recommendations that were made in the earlier chapters on the financial performance of the raisin producers from Eksteenskuil. Since the bulk of the recommendations are expected to improve the levels of efficiency with which the respondents use their inputs, the first step was to model the potential gains from improving the levels of technical and cost efficiency of the respondents. Importantly, the implementation of all of the recommendations comes at a cost. Thus, if the gains from improving the levels of efficiency are too small, it will not be justifiable to implement the recommendations. On the other hand, if the gains are significant, it may be worthwhile investing in initiatives to implement the recommendations.

Given the assumption that the recommendations will improve the performance of the farmers, the second section in Chapter 8 is concerned with the impact of recommended solutions on the cash flow positions of the farmers. The lack of cash flow is widely documented to be a major stumbling block faced by emerging farmers that exclude them from participating in commercial agri-food chains. The impact which the recommendations may have on the net cash flow positions of the farmers may be a better indication of the real impact of the recommendation on improving the livelihoods of the farmers.

8.7.1   ANALYSIS OF POTENTIAL FINANCIAL GAINS FROM IMPROVING EFFICIENCY LEVELS OF THE RAISIN PRODUCERS FROM EKSTEENSKUIL

Since the technical efficiency levels of the farmers were estimated in Chapter 6 using the output-oriented DEA approach, the potential financial gains from improving the technical efficiency levels relate only to the increase in income from the increased output levels. In the output-oriented DEA approach the input levels and technology set remain constant. The technical efficiency gains thus are estimated as the difference between the revenue at technical efficient output levels and the current revenue. It is noted that gains from improving the technical efficiency levels of the farmers from Eksteenskuil are calculated based on the bias corrected technical efficiency scores. The potential financial gains from improving cost efficiency levels of the respondents are calculated as the difference between the actual cost and the minimum cost that should have been sufficient to produce the current amount of raisins.

The results show that there are substantial gains possible from improving both technical and the cost efficiency levels of the raisin producers from Eksteenskuil. The average gains from improving technical and cost efficiency levels are in excess of R4 000/ha each. The large gains imply substantial returns from efforts to support the farmers to use their inputs efficiently. The main conclusion from the analysis of the gains from improving the farmers' efficiency levels is that the current focus on the technical side of production (input-output relationships) when supporting emerging farmers should be extended to also consider the combinations of inputs that will allow the farmers to produce their raisins at least cost. The starting point for the farmers from Eksteenskuil should be to get their soils tested to ensure that they apply the best fertiliser mixture given the nutrient contents of their soils. The relatively large number of farmers who are considered to be technical efficient suggest that there is good prospects for farmer-to-farmer skills transfer (NPC, 2011) in terms of producing the maximum amount of output from their available inputs. Extension officers and other training organisations then can focus their attention more on developing the skills of the farmers to select the least cost combinations of production inputs.

8.7.2   MODELLING THE IMPACT OF RECOMMENDED SOLUTIONS ON THE NET CASH FLOW OF THE RAISIN PRODUCERS FROM EKSTEENSKUIL

A cash flow optimisation model that was developed by Grové (2010) was used as the basis to model the impact of recommended changes on the cash flow positions of the raisin producers from Eksteenskuil. The model of Grové (2012) was developed further in order to accurately represent the case of raisin producers from Eksteenskuil. The basic cash flow model of Grové (2010) models the net cash flow over a period of one year. The model combines a bank (cash) account and a credit (i.e. co-operative) account and allows the transfer of funds between the two accounts. Funds are transferred from the bank account to the credit account to service the credit account on specified dates. Similarly, positive balances in the credit account are transferred to the bank account on specified dates. The objective of the cash flow optimisation model is to maximise the end of the year net cash flow per hectare.

Procedures were developed to incorporate the DEA production frontier into the cash flow model of Grové (2010) to specify the technology set for the farmers from Eksteenskuil. The model was also developed further to allow for modelling the potential impact if the decision-makers were to improve the degrees of technical and cost efficiency with which they use their inputs. Other modifications include a restriction in the model to prohibit a negative bank balance; a parameter allowing the farmers access to credit; and a parameter that represents a price premium to reflect the impact of the price premium received through the fairtrade initiative. Such modifications were

necessary to model the potential impact of the recommended changes on the cash flow positions of the farmers from Eksteenskuil.

The results show that a number of the farmers from Eksteenskuil fail to make positive net cash flows under the current conditions. The conclusion from the base scenario is that the bulk of the farmers will remain in a poverty trap if conditions do not change considerably in the near future. The results from the different scenarios show that the farmers should be able to expand their net cash flow considerably within their existing technology set. Except for the scenario that represents the cancelation of the fairtrade premium, the average increase in net cash flow for all of the scenarios is in excess of 60% at current technical efficiency levels. The improvements in net cash flow of all of the scenarios are in excess of 100% when the inputs are used in a technical efficient manner. The best outcome in terms of net cash flow was achieved for the scenario where the farmers increase their input usage by 50%, and using their inputs in a technical efficient manner. The net cash flow in that scenario is 244% higher than the base scenario. The technical efficient use of inputs thus has an amplifying effect on the potential benefits from each of the recommended solutions.

The main conclusion from the modelling of the net cash flow of the respondents is that there is great potential to improve the financial performance of the raisin producers from Eksteenskuil even in their current technology set. Efforts to improve the performance of emerging farmers should include initiatives to improve the technical and cost efficiency of the farmers.

8.8   RECOMMENDATIONS

Based on the findings that were made in this thesis a number of recommendations can be made. For the purpose of discussion the recommendations are divided into two sections. The first section contains some recommendation for policy makers that may contribute towards uplifting emerging farmers. Thereafter follows some recommendations for further research.

8.8.1   *POLICY RECOMMENDATIONS*

- Policies are required to facilitate government to meet its responsibility to provide emerging farmers with an enabling environment. A number of the stumbling blocks that contribute to the exclusion of emerging farmers from participating in commercial agri-food chains relate to the absence of an enabling environment. The recommendation that government needs to meet its responsibility to provide emerging farmers with an enabling environment is also echoed in current policy documents of government. Through CRDP (2009) government

pledges, amongst others, to improve road infrastructure and transport networks. NPC (2011) also recommends a substantial increase in investment in water resource and irrigation infrastructure. Although government pledges to recognise its role as is evident from its strategic plans (NPC, 2011; CRDP, 2009) compliance to the pledge proves to be too slow. The performance criteria of the relevant governmental departments need to be adjusted to put more emphasis on meeting the commitments. Sanctions for failure to meet the commitments need to be clearly specified and strictly enforced.

- Policies are required to facilitate the transfer of secure tenure to emerging farmers who operate on communal land. Secure tenure contributes to an enabling environment and also proves to contribute to farmers using their inputs more efficiently. Government already recognises the need for transferring secure tenure as is evident from NPC (2011) that emphasises the need to, and CRDP (2009) that pledges to transfer secure tenure to emerging farmers. New policies and legislation are required to replace CLARA (CLARA was declared invalid in its entirety in 2011 by the Constitutional Court of South Africa) to speed up the process of transferring secure tenure to emerging farmers. Again, the performance criteria of the relevant governmental departments need to be adjusted to put more emphasis on the successful transfer of secure tenure to emerging farmers. Incentives for success and sanctions for failure need to be clearly specified and strictly enforced.

- Policies are required that incentivise commercial credit providers to develop financing products that are tailor made for emerging farmers. The very nature of being an emerging farmer normally excludes emerging farmers from having access to commercial credit. Access to credit will allow emerging farmers to supplement their cash flow, and hence to overcome a major stumbling block that contributes to the exclusion of emerging farmers from the formal market. Government also realise the need for tailor made financing products as is evident from the Mafisa financing scheme through CRDP (2009) to provide emerging farmers with access to credit.

- Given the nature of emerging farmers in South Africa collective action has great potential to allow emerging farmers to benefit from economies of scale, and to reduce transaction costs faced by buyers who deal with emerging farmers. Policies are required to incentivise the establishment of collective entities among emerging farmers. The incentives, however, should not force farmers to establish an agricultural co-operative per se, but rather to establish an appropriate collective entity as a vehicle that will allow them to gain access to incentives through increased production of good quality produce. The recommendation of incentivising collective action corroborates with the objectives of government to establish more co-operatives. NPC (2011) promotes the formation of agricultural co-operatives for emerging farmers to allow the farmers to benefit from economies of scale. DTI also places a lot of emphasis on the formation of agricultural co-operatives as is evident from the fact that

they plan to increase funds for the Co-operative Incentive Scheme (South African LED Network, 2012). Implementing appropriate incentives as recommended by this study thus may help government to meet its objective to get more farmers organised in collective entities (not necessarily co-operatives).

- Relationships between emerging farmers and lead firms in agri- food chains (i.e. agro-processing companies) have great potential to facilitate the necessary support that emerging farmers lack to overcome the stringent requirements that typically exclude them from the formal market. Inconsistent volumes and poor quality of produce from emerging farmers, however, cause lead firms generally to be reluctant to enter into formal relationships with emerging farmers. Policies are required to incentivise such lead firms to enter into vertically coordinated relationships with emerging farmers. Incentives may include i.e. tax benefits to organisations that can prove that they support and deal with emerging farmers thereby creating a complementary relationship between such organisations and the farmers. Again, the recommendation corroborates current thinking by government as is evident from NPC (2011) which recommends the identification of potential partners in agro-processing value chains to support smallholder development and promoting preferred procurement mechanisms, and CRDP (2010) that has a strategy to form strategic partnerships between emerging farmers and key role-players in value chains. The results from this study, however, show that a strategic alliance will not necessarily be the optimal type of relationship. Government policies should not strictly recommend a specific type of relationship, but rather an appropriate type of relationship that will optimally benefit both parties. Once the appropriate type of relationship has been identified and instituted, the farmers are likely to also benefit from increased access to the necessary support and strategic market information as spin-offs from the relationship. The spin-offs again relate to further recommendations by NPC (2011) to improve the distribution of strategic market information to emerging farmers, and to improve and extend skills development and training in agriculture.

- Policies (i.e. price incentives) that incentivise emerging farmers to increase the production of good quality produce will also incentivise the farmers to improve the levels of efficiency with which they currently use their production inputs. It is, however, recognised that such incentives will mainly attract the attention of those farmers that exhibit relatively high levels of entrepreneurial skills. CRDP (2009) also emphasises increased production through the optimal allocation of resources. Support and training are crucial to help farmers increasing their technical efficiency levels. By creating a complementary relationship between emerging farmers and key role-players in their value chains the necessary support can be provided by private sector companies instead of governmental extension officers. Government then can focus its attention on creating and maintaining an enabling environment for the farmers.

- Policies are required to stimulate research and development in types of technology that will allow emerging farmers to also benefit from investments in research and development. The very nature of being emerging farmers (i.e. low levels of financial and human capital) means that emerging farmers typically do not exhibit the necessary means to adopt sophisticated new technology. The current recommendation of NPC (2011) to focus the attention of research and development on sophisticated new technology thus will mean that emerging farmers are excluded from benefiting from such investments. While it is recognised that there is scope for research and development to focus on new technology, the focus of attention should be broader to allow emerging farmers to also benefit from investments in research and development.

- Policies are required to facilitate more effective extension and education. Extension and training are crucial to capacitate emerging farmers to increase the levels of efficiency with which they use their production inputs to produce agricultural products. Training sessions, however, have to specifically address challenges faced by the farmers in their day-to-day decision-making activities. Incentives and sanctions associated with the performance of extension officers and trainers should be clearly specified and enforced.

8.8.2 RECOMMENDATIONS FOR FURTHER RESEARCH

- Given the potential role to be played by leading firms in a value chain to support emerging farmers, further research is necessary to investigate the incentives and conditions that are required to convince such leading firms to get involved with groups of emerging farmers.

- A double bootstrap procedure needs to be developed to comprehensively analyse the allocative efficiency of emerging farmers in order to generate knowledge that may contribute towards improving the levels of allocative efficiency with which emerging farmers use their inputs.

- Research is needed to assess the prospects of transforming communal tenure to individual tenure. Research is also needed to assess the impact of the social dynamics of communal tenure and the way people organise themselves on the communal land on the prospects for transition from subsistence farming to emerging and commercial farming.

- The modelling of the optimal cash flow of the farmers in this study was based on the assumption that the farmers' sole objective is to maximise profit. By implication it was assumed that the farmers would use any gains in cash flow to increase production in order to increase their profits. Such an assumption is not necessarily justified. More research is necessary to better understand the decision making behaviour of emerging farmers. Agent Based Modelling may have some potential in this regard.

- The potential of transitioning from communal farmers to individual farmers through the establishment of efficient land rental markets for emerging farmers also needs to be investigated. Given the challenge associated with the transfer of title deeds to individual farmers there may be scope for a rental market to secure tenure for individual farmers in the transition period. The rental market may even be sufficiently viable to decrease the need for transferring the title to all individual farmers.

- The role of part time farming in the transition from communal farming to individual farming also needs to be investigated. Part time farming may put less pressure on profit margins since the livelihoods of part time farmers are not completely dependent on the income generated from their farm activities. Part time farmers thus may be able to reinvest a larger proportion of their profits into their farms.

- A common occurrence within rural communities is the fact that the more dynamic members of the community leave the rural areas with the prospects to improve their livelihoods in the urban regions. Community members are also often reluctant to allow outsiders to enter their communities as new land users. Further research is necessary to investigate the impact of such social dynamics on land use in rural areas.

- Lastly, the developed net cash flow optimisation model needs to be extended to allow for proper modelling of the net cash flow of perennial crops over their entire lifespan.

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QUESTIONNAIRE FOR THE CASE OF EKSTEENSKUIL

A.1   DEVELOPMENT OF THE QUESTIONNAIRE

The development of the questionnaire started with a comprehensive literature review to get insight into the theoretical foundation on which this research is based. The literature most important in the development of the questionnaire was, amongst others, literature on the theories of Structure-Conduct-Performance (SCP), NIE, and efficiency analyses. The literature on SCP was useful to formulate questions to capture information on the physical environment (production and marketing) in which the farmers operate. It also shaped questions about the current behaviour of the role-players in the value chain. Literature on the theory of NIE provided insight into the capturing of information on the cultural aspects (i.e. norms and traditions), social capital, and the formal and informal rules and regulations that are hypothesised to influence the behaviour of the actors in the market. NIE theory also contributed to capturing information on the characteristics of the transactions between the farmers and their buyers to allow for a transaction cost analysis of the transactions to determine whether or not the current governance structure is minimising the transaction costs faced by farmers. In addition to the literature, a questionnaire developed by Milagrosa (2007a) was used as the basis to capture information that is necessary to conduct a NIE analysis at the respective study areas.

Efficiency theory provided insight into the types of questions to ask to obtain the necessary information that would allow for quantifying the levels of technical and allocative efficiency with which emerging farmers use their production inputs. Literature on efficiency analysis also contributed to the inclusion of questions related to the determinants of efficiency, which might provide suggestions for improving the performance of the farmers through more efficient use of their resources. Lastly, questions were also included in the questionnaires to capture information on the personal characteristics of the respondents. The personal characteristics of interest include the age, experience and education of the farmers, and risk attitudes exhibited by the farmers.

After the theoretical content underlying the questionnaire was included the questionnaire had to be adjusted to fit the production and marketing of raisins at Eksteenskuil. Key role-players were interviewed to gain insight into the activities that have to be considered to ensure a questionnaire that accurately represent the production and marketing of raisins by the farmers from Eksteenskuil. The literature review also formed the basis for the discussions with such key role-players in the respective value chains. Key role-players included some of the prosperous farmers in the study areas, the chair person of EAC, a previous governmental extension officer who was closely involved with the farmers from Eksteenskuil, and some representatives from South African Dried Fruit Company (SAD) who process and export the raisins from Eksteenskuil

farmers. With the theoretical framework in mind, discussions with the key role-players aimed at gaining insight into the functioning of the value chain, with a special interest in the physical and institutional environments within which the actors operate. The discussions also aimed at gathering information on the technical aspects of production (i.e. key success factors) that are believed to contribute to the production of high volumes of good quality produce.

A preliminary questionnaire was compiled based on the literature review and personal discussions with the key role-players in the raisins value chain. The preliminary questionnaire was discussed comprehensively on a one-on-one basis with the key role-players to get their feedback on the questionnaires and to make sure that all important aspects were covered. After the preliminary questionnaires were updated according to the recommendations from the role-players it was again discussed with the role-players to ensure that they are satisfied. Once the key role-players agreed that the questionnaire covers all the important aspects, the next step was to determine whether or not the questionnaire was understood by farmers, and that questions would be interpreted correctly. A pilot survey was conducted where four emerging farmers and four commercial raisin producers in the area were interviewed. The interviews were conducted in a similar fashion than the actual survey would be conducted, but respondents were asked to be super-critical of the questions to ensure that all questions were clear. Once the questionnaire was again updated based on the additional recommendations from the role-players, the questionnaire was considered to be acceptable and finally ready for the actual survey.

A.2   THE SURVEY

The native language spoken by the farmers from Eksteenskuil is Afrikaans. There were no linguistic problems associated with the interviews during the survey. Four research assistants and two senior researchers from the Department of Agricultural Economics of the University of the Free State were contracted as interviewers to assist with the survey. A training session was held for the interviewers to ensure that they all had a common understanding of the meanings of the questions in the questionnaire and of the purpose of the survey.

The chairperson of the board of directors of EAC suggested that it would make more sense logistically to conduct the interviews at central points on the different groups of islands. Given that he has had experience with a number of projects that conducted surveys among the farmers, it was decided to follow his recommendation. Farmers from the North and Middle groups of islands were interviewed at the offices of EAC, while the farmers from the South group of islands were interviewed at a community hall on the South Island. Although the farmers were interviewed at a central location, farmers still were interviewed separately. Care was taken to keep a sufficient

distance between interview stands to ensure that farmers' information remained confidential and could not be overheard by other interviewees.

The survey was conducted from the 17th to 23rd June 2009. All 60 members of EAC were invited to participate in this study. A total of 42 respondents from Eksteenskuil completed questionnaires and 31 of these questionnaires were deemed usable for further analysis. A second survey was conducted at Eksteenskuil with more emphasis on economic literacy as a factor influencing allocative efficiency. The data from the second survey was used this study to explore the determinants of allocative efficiency of the raisins producers from Eksteenskuil. The second survey was conducted from 20th to 22nd June 2011. Again interviewers were trained comprehensively to ensure that the questions are understood correctly. Interviews were conducted at central locations and a braai was held for the farmers as a token of appreciation. In the second survey 53 farmers completed questionnaires while 40 completed questionnaires were deemed useable for the purpose of this study.

DEPARTMENT OF AGRICULTURAL ECONOMICS
UNIVERSITY OF THE FREE STATE

FARMER QUESTIONNAIRE:2009

TO BE COMPLETED BY THE RESEARCHER ON BEHALF OF THE PRINCIPAL DECISION MAKER ON THE FARM. INFORMATION WILL BE STRICTLY CONFIDENTIAL

Respondent number _____

Date of interview _____

1   Socio economic questions

1.1   Age   _____ years

1.2   Years of formal education (Matric = 12 years)?   _____ years

1.3   Years in farming   _____ years

1.4   How far is your farm from the market?   _____ km

1.5   If farmer is from Eksteenskuil, on which island is the farm?

North Island	1
Middle Island	2
South Island	3

1.6   Please indicate the proportion of your **total** income (farm + off-farm) coming from the following activities:

Income generating activities	%
Off-farm economic activities	
Raisin production	
Wine/juice production	
Table grapes	
Crop rotation	
Livestock	
Other	
	100%

2   Land ownership and tenure

2.1   Which of the following best describes your form of land ownership or tenure?

1	I own my land and have title deeds or a land letter from government
2	I own my land and lease **additional** land from another farmer
3	I lease my land from another farmer who does have title deeds
4	I lease my land from government waiting for the transfer of title deeds to me
5	Other (please specify) _____

If 4, would you be willing to sell or lease all or part of your land once you receive the title deeds?

	Yes	No
Sell	1	0
Lease	1	0

2.2 Would you like to expand the size of the land you are currently cultivating?

Yes	No
1	0

3 **Production activities**

3.1 Please complete the following table with regard to the size of your farm (own + lease) and the scale of your **raisin** production activities.

	Total farm size (ha)	Total area used for raisin production (ha)		Area harvested (ha)	
		Sultana	Merbein	Sultana	Merbein
2008/9					

3.2 **As at 2008/9**, what size (in ha) of your total established vineyards is:

Between 0 and 4 years old? _____

Between 5 and 10 years old? _____

Between 11 and 24 years old? _____

Older than 25 years? _____

3.3 Please complete the following table with regard to production during the 2008/9 season.

		Volume delivered (kg)	Choice grade		Standard grade		Industrial grade	
			%	Price (R/kg)	%	Price (R/kg)	%	Price (R/kg)
	Thompson							
2008/9	Golden							
	OR							

3.4 Please indicate which of the following extraordinary activities took place during the 2008/9 season that negatively affected your yield.

Season	None	Hail	Extreme cold at blooming stage	Other
2008/9	0	1	2	3

3.5 Please indicate which of the following organisations normally provide you with advice and/or assistance with regard to raisin production

Actor	No	Yes
Input suppliers	0	1
Buyers	0	1
Government	0	1
Other farmers	0	1
Cooperative	0	1
Research institutes	0	1
Private consultants	0	1

-

If you have received assistance/training, please indicate on a scale from 1 to 5 the level to which you agree with the following statements:

Statement	Strongly disagree		Neutral		Strongly agree
I attend **all** of the training sessions that are held in the region.	1	2	3	4	5
I **fully** understand the advice and/or training I receive from the above organisations.	1	2	3	4	5
I implement **all** the advice I receive from the above organisations	1	2	3	4	5

3.6 Please indicate what type of irrigation technology you use for **raisin** production.

Flood irrigation	1
Drip irrigation	2
Other	3

3.7 Please indicate whether you use manual or mechanic labour when performing the following activities.

Activity	Manual	Mechanic	
		I borrow/lease the implement	I own the implement
Weeding	0	1	2
Applying pesticide	0	1	2
Pruning/Harvesting	0	1	2

3.8 Do you have access to the following sources of credit?

	YES	NO
Formal (Formal lending institutions)	1	0
Informal (i.e. Family and friends)	1	0

If **NO**, please indicate the level to which the following factors prevent you from having access to credit.

Factor preventing access to credit	Not at all				Main reason
I do not have title deeds of my land and thus I do not have the required collateral	1	2	3	4	5
I do not have a credit record at credit providers	1	2	3	4	5
I do not have family members with sufficient surplus money to fund me	1	2	3	4	5
Other	1	2	3	4	5

3.9 Please indicate on a scale from 1 to 5 the level to which you agree with the following statements:

Statement	Strongly disagree		Neutral		Strongly agree
In general the road network in the region is of a good quality	1	2	3	4	5
In general the water distribution network is in a good condition	1	2	3	4	5
In general the infrastructure at the input suppliers is of good quality	1	2	3	4	5
In general the infrastructure at the market is of good quality	1	2	3	4	5

3.10 Please indicate the amount of the respective inputs you've used for your 2008/9 **raisin** crop and how much you spent on the respective inputs.

Items	# units		Amount spent on specific input
Fertilizer (granular) (specify NPK)		kg	R
Fertilizer (liquid) (Specify NPK)		l	R
Kraal manure (specify type & unit)			R
Semi-organic fertilizer (specify NPK)		kg	R
Pesticide		l	R
Water (Sultana)		Irr	R
Water (Merbein)		Irr	
Labour: Full time		# days	R
Labour: Seasonal		# days	R
Number of family members providing family labour for the production of raisins (older than 15 years)		# days	R
Fuel (used specifically for raisin production)		l	R
Leaf feed		kg	R
Number of times you weed (manual/mechanic/ chemical) per year		#	R
Other			R

3.11 What was your total cost (variable +fixed) for raisin production during the 2008/9 season?   R _____

3.12 In your opinion, did you apply a sufficient amount of inputs to obtain an optimal yield?

Yes	No

If **NO**, please indicate the level to which the following factors prevent you from applying a sufficient amount of input.

Reasons	Not at all				Main reason
Input costs are too high	1	2	3	4	5
I don't have sufficient cash flow by the time I need to apply the inputs	1	2	3	4	5
There isn't a sufficient amount of inputs available by the time I need to apply the inputs	1	2	3	4	5
	1	2	3	4	5

3.13 In your opinion, to what level did the general health status of your farm workers **deteriorate** over the last five years (0=not at all; 5=very much)?

Not at all				Very much
1	2	3	4	5

4   Marketing behaviour
The following questions relate to the marketing of **raisins**

4.1 Which marketing channel best describes the channel within which you participate?

Farmer --- Processor --- Retail --- Consumer	1
Farmer --- Transporter (middle man) --- Processor --- Retail --- Consumer	2
Farmer --- Processor --- **Fairtrade** --- Retail --- Consumer	3

4.2

Which of the following statements best describes the fairtrade initiative (choose only one of the available alternatives)?	
Everybody gets treated equally and in a fair manner	1
Previously marginalised producers get a better price	2
Emerging farmers get the same price and treatment as commercial farmers	3

4.3 Please indicate the level to which the following reasons influence your decision to participate in the specific channel as mentioned in 4.1?

Reasons	Not at all				Main reason
I obtain higher prices	1	2	3	4	5
I incur lower marketing costs	1	2	3	4	5
I obtain more market information	1	2	3	4	5
It is more convenient than other alternatives	1	2	3	4	5
It is the only available marketing channel that I can use	1	2	3	4	5
The specific channel is less risky than the other	1	2	3	4	5
Other (Specify)	1	2	3	4	5

4.4 Please indicate which of the following best describes the way you deliver your raisins to your buyer, and the cost of transporting raisins.

Means of transporting raisins to buyer	
I transport my raisins to the buyer with my own truck	1
I pay someone else to transport my raisins to the buyer	2
The buyer comes to my farm to collect my raisins	3

4.5 If you sold your raisins to a **processor**, please indicate to which processor did you sell your raisins?

Carpediem	Fruits du Sud	Kalahari Raisins	Redsun raisins	SAD	TRC
1	2	3	4	5	6

If you sold your raisins to SAD, did you participate in the risk sharing scheme?

Yes	No
1	0

4.6 Please indicate on a scale from 1-5 the level to which you are able to influence the price you receive for your raisins through negotiation (1=not at all; 5=100%)

Not at all				100%
1	2	3	4	5

4.7 Please indicate the level to which the following reasons influence your decision to sell your raisins to the specific processor

Reasons	Not at all				Main reason
I obtain higher prices	1	2	3	4	5
I have a long term relationship with the specific processor so I feel loyal towards them	1	2	3	4	5
I obtain more market information from the specific processor compared to other	1	2	3	4	5
They come and collect my raisins from my farm	1	2	3	4	5
I can negotiate with the specific processor for a better price for my raisins	1	2	3	4	5
Other (Specify)	1	2	3	4	5

4.8 Do you have a preferred processor to which to like to sell your raisins?

Yes	No
1	0

If YES, please indicate the level to which the following reasons will convince you to sell your raisins to another processor.

Reasons	Not at all				Main reason
If the price of the other processor is higher than the current price I can receive	1	2	3	4	5
If the other processor provides more information/assistance/training	1	2	3	4	5
If the other processor is willing to collect my raisins from my farm	1	2	3	4	5
If the trust relationship between my preferred processor and myself is compromised	1	2	3	4	5
If the other processor is willing to negotiate for a better price for my raisins	1	2	3	4	5
If the other processor provides better services	1	2	3	4	5
If the other processor will grade my raisins a larger percentage choice grade	1	2	3	4	5
Other (Specify)	1	2	3	4	5

4.9 In your opinion, which of the processing companies has got the most power in the market?

Carpediem	Fruits du Sud	Kalahari Raisins	Redsun raisins	SAD	TRC
1	2	3	4	5	6

4.10 Where do you get your price information?

Other farmers	1
Buyers (via sms/telephone call)	2
Buyers (you visit them for price information)	3
Other: _____	4

4.11 How many buyers do you consult before you sell your raisins?

1	2	3	4	5	>5

How long did it take you to determine which buyer to sell to?

<1h	1-2h	2-3h	>3h

How many transactions do you engage with buyers (i.e. How many loads do you deliver)?

<3	4-6	7-9	10-12	13-15	>15

4.12 Which of the following best describes your relationship with your buyer:

No formal agreement	0
Short term relationship	1
Long term relationship	2

4.13 If you do have a formal agreement with your buyer, do you write down what you agreed upon

Yes	No
1	0

If YES, what are the main specifications of the written agreement?

Price	1
Price and volume	2
Price, volume and quality	3
Price and quality	4
Volume	5
Volume and quality	6

4.14

Please answer **YES** or **NO** to the following questions	**YES**	**NO**
Do you plan to have future transactions with your current buyer?	1	0
Have you ever experienced delayed payment from buyer?	1	0
Do you receive financial support/credit from buyer?	1	0
Have you ever had conflicts with the buyer?	1	0
Do you always know current raisin prices?	1	0
Do you own a vehicle/implements that are **specifically** used for raisins production and/or transporting raisins to the market?	1	0
Have you invested in storage facilities for raisins?	1	0
Have you invested in packaging facilities for raisins?	1	0
Have you invested in processing facilities for raisins (trays, mats)?	1	0
Do you agree that the buyer withhold important information?	1	0
Do you sometimes tend to withhold information from buyers?	1	0

- If important information was withheld, it would most likely be about:

Withheld information	**By buyer**	**By You**
prices	1	1
chemicals used	2	2
quality (true reflection of my grade, etc.)	3	3
volumes	4	4
what other farmers are doing / are not doing	5	5
market demand	6	6
other:	7	7

4.15 On a scale from 1 to 5 please indicate the level to which you agree with the following statements

	Not at all				**Agree 100%**
I am willing to cooperate with other farmers to **buy inputs**	1	2	3	4	5
I am willing to cooperate with other farmers to **sell my raisins**	1	2	3	4	5
I am willing to work with other farmers to process raisins in order to **add value** ourselves	1	2	3	4	5

-

If scoring 2 or less, please rank the level to which the following factors prevent you from cooperating with other farmers.

Reasons	Not at all				Main reason
I do not trust the other farmers	1	2	3	4	5
I like to make my own decisions and do things the way I want to do it.	1	2	3	4	5
I am afraid that the quality of the other farmer's produce is poor which will cause my grading to be lower than it should.	1	2	3	4	5
Other (Specify)	1	2	3	4	5
	1	2	3	4	5

5   Product Control

5.1   **Compared to other farmers in the region** please indicate on a scale from 1-7 the level to which you **use** the following activities to ensure the highest possible **yield.**

Activity	Not at all						Always
Timely and sufficient irrigation	1	2	3	4	5	6	7
Remove weeds below the vineyards	1	2	3	4	5	6	7
Timely pruning	1	2	3	4	5	6	7
Preventing soil compaction	1	2	3	4	5	6	7
Use same pruning team every year	1	2	3	4	5	6	7
Use same harvesting team every year	1	2	3	4	5	6	7
Use enough fertiliser	1	2	3	4	5	6	7
Use leaf feed	1	2	3	4	5	6	7
Ensure presence of organic ground cover	1	2	3	4	5	6	7

5.2   Please indicate when you have applied fertilizer during the following stages:

After harvest	Did not apply	Feb	Mar	Apr
After blooming	Did not apply	Aug	Sep	Oct
At fruit bearing (met set)	Did not apply	Sep	Oct	Nov

5.3   **Compared to other farmers in the region** please indicate on a scale from 1-7 the level to which you use the following activities to ensure a high proportion of Choice grade raisins.

Activity	Not at all						Always
Timely irrigation	1	2	3	4	5	6	7
Remove weeds	1	2	3	4	5	6	7
Timely pruning	1	2	3	4	5	6	7
Leaf management for exposure to sunlight	1	2	3	4	5	6	7

Testing maturity of the grape before harvest	1	2	3	4	5	6	7
Wait until the whole block is ready to be harvested before starting to harvest	1	2	3	4	5	6	7
Removing damaged/ contaminated grapes	1	2	3	4	5	6	7
You oversee all activities to ensure that harvested grapes are handled with care	1	2	3	4	5	6	7
Cleanliness of drying trays	1	2	3	4	5	6	7
Avoid over stacking when drying	1	2	3	4	5	6	7
Turning over raisins when drying	1	2	3	4	5	6	7
Cover when raining	1	2	3	4	5	6	7
Use same pruning team every year	1	2	3	4	5	6	7
Use same harvesting team every year	1	2	3	4	5	6	7

5.4 Please indicate which of the following methods is the **final** method you use to test whether or not your grapes are ready to be harvested

I squash the grape between my fingers to see whether it is sticky	1
I taste the grapes to determine whether it is sweet enough	2
I take a sample to another farmer who test the sugar content with a test kit	3
I take a sample to the buyer who test the sugar content with a test kit	4
I have a test kit to test the sugar content	5
Other (Specify):	6

6 Social Capital

6.1 Please indicate on a scale from 1 to 5 the level to which you agree with the following statements:

	Strongly disagree		Neutral		Strongly agree
Optimism and Expectation of equal treatment					
My life will get even better in the future	1	2	3	4	5
Local government treats everyone equally	1	2	3	4	5
I would not be farming if I have an alternative source of income.	1	2	3	4	5
Satisfaction					
I am happy and satisfied with my life	1	2	3	4	5
I am willing to take more risk than other farmers in my community	1	2	3	4	5
I am willing to forgo a profit opportunity in the short run for the ability to benefit from potential profit opportunities in the long run.	1	2	3	4	5

Trust					
Generally speaking, do you agree most people could be trusted	1	2	3	4	5
I can safely say I am trustworthy	1	2	3	4	5
I trust my family	1	2	3	4	5
I trust my friends	1	2	3	4	5
I feel safe in my neighborhood	1	2	3	4	5
I trust the church and its people	1	2	3	4	5
I trust other farmers	1	2	3	4	5
I trust the municipal government and its policies towards agriculture	1	2	3	4	5
I trust the legal system	1	2	3	4	5
I trust the police	1	2	3	4	5
I trust the board members of the cooperative	1	2	3	4	5
Networks					
I get along well with my family	1	2	3	4	5
I get along well with my friends	1	2	3	4	5
I get along well with people in my community	1	2	3	4	5
I get along well with other farmers	1	2	3	4	5
I am willing to start a **cooperative** with other farmers which can process raisins to add value	1	2	3	4	5

6.2   Please indicate whether you are a member of the following types of organisations

Membership in organisations	Non member	Inactive member	Active member
Religious / Church group	1	2	3
Political party or group	1	2	3
Farmers' cooperative	1	2	3
Local government	1	2	3
Farmer study group	1	2	3

6.3   If you are a member of EAC, please indicate which of the following statements best describes you with regard to being a member of the board of EAC/EFA?

I have never served on the board of EAC/EFA	1
I have served on the board of EAC/EFA in the past	2
I am currently member of the board of EAC	3

7   Financial records

7.1   On a scale from 1 - 5, please rate the following statements with regard to financial record keeping

Statement	Not at all				100%
I make sure that my financial statements are kept up to date	1	2	3	4	5

7.2   What is the debt:asset ratio of your farm business?   _____

8   Entrepreneurial characteristics

Compared to other farmers in the region please indicate on a scale from 1 to 5 the level to which you agree with the following statements:

	Statement	Strongly disagree				Strongly agree
1	I look for things that need to be done	1	2	3	4	5
2	When faced with a difficult problem, I spend a lot of time trying to find a solution	1	2	3	4	5
3	I complete my work on time	1	2	3	4	5
4	It bothers me when things are not done very well	1	2	3	4	5
5	I prefer situations in which I can control the outcome as much as possible	1	2	3	4	5
6	I like to think about the future	1	2	3	4	5
7	When starting a new task or project, I gather a great deal of information before going ahead	1	2	3	4	5
8	When I plan a large project, I break it into smaller tasks	1	2	3	4	5
9	I get others to support my recommendations	1	2	3	4	5
10	I feel confident that I will succeed at whatever I try to do	1	2	3	4	5
11	No matter whom I'm talking to, I'm a good listener	1	2	3	4	5
12	I do things that need to be done before being asked to do so by others	1	2	3	4	5
13	I try several times to get people to do what I would like to do	1	2	3	4	5
14	I keep the promises I make	1	2	3	4	5
15	My own work is better than that of other people I work with	1	2	3	4	5
16	I don't try something new without making sure I will succeed	1	2	3	4	5
17	It's a waste of time to worry about what to do with one's life	1	2	3	4	5
18	I seek the advice of people who know a lot about the tasks I'm working on	1	2	3	4	5
19	I think about the advantages and disadvantages or different ways of accomplishing things	1	2	3	4	5
20	I do not spend much time thinking about how to influence others	1	2	3	4	5
21	I change my mind if others disagree strongly with me	1	2	3	4	5
22	I feel resentful when I don't get my way	1	2	3	4	5
23	I like challenges and new opportunities	1	2	3	4	5
24	When something gets in the way of what I'm trying to do, I keep on trying to accomplish what I want	1	2	3	4	5
25	I am happy to do someone else's work if necessary to get the job done on time	1	2	3	4	5

26	It bothers me when my time is wasted	1	2	3	4	5
27	I weigh my chances of succeeding or failing before I decide to do something	1	2	3	4	5
28	The more specific I can be about what I want out of life, the more likely I am to succeed	1	2	3	4	5
29	I take action without wasting time gather information	1	2	3	4	5
30	I try to think of all the problems I may encounter and plan what to do if each problem occurs	1	2	3	4	5
31	I get important people to help me accomplish my goals	1	2	3	4	5
32	When trying something difficult or challenging, I feel confident that I will succeed	1	2	3	4	5
33	In the past I have had failures	1	2	3	4	5
34	I prefer activities that I know well and with which I am comfortable	1	2	3	4	5
35	When faced with major difficulties, I quickly go on to other things	1	2	3	4	5
36	When I'm doing a job for someone, I make a special effort to make sure that the person is happy with my work	1	2	3	4	5
37	I'm never entirely happy with the way in which things are done; I always think there must be a better way	1	2	3	4	5
38	I do things that are risky	1	2	3	4	5
39	I have a very clear plan for my life	1	2	3	4	5
40	When working on a project for someone, I ask many questions to be sure I understand what the person wants	1	2	3	4	5
41	I deal with problems as they arise rather than spend time to anticipate them	1	2	3	4	5
42	In order to reach my goal, I think of solutions that benefit everyone involved in the problem	1	2	3	4	5
43	I do very good work	1	2	3	4	5
44	There have been occasions when I took advantage of someone	1	2	3	4	5
45	I try things that are very new and different from what I have done before	1	2	3	4	5
46	I try several ways to overcome things that get in the way of reaching my goals	1	2	3	4	5
47	My family and personal life are more important to me than the work deadlines I set for myself	1	2	3	4	5
48	I do not find ways to complete tasks faster at work and at home	1	2	3	4	5
49	I do things that other consider risky	1	2	3	4	5
50	I am as concerned about meeting my weekly goals as I am about my yearly goals	1	2	3	4	5
51	I go to several different sources to get information that will help me with tasks or projects	1	2	3	4	5
52	If one approach to a problem does not work, I think of another approach	1	2	3	4	5
53	I am able to get people who have strong opinions or ides to change their minds	1	2	3	4	5

54	I stick with my decisions even if others disagree strongly with me	1	2	3	4	5
55	When I don't know something, I don't mind admitting it	1	2	3	4	5

9   **Business model**

Please list the factors you consider when deciding:

9.1　　　　To produce raisins rather than wine/juice.

_____

_____

_____

_____

9.2　　　　What type of raisin to produce (Thompson/Golden/OR):

_____

_____

_____

_____

9.3   **SWOT-analysis**

Please list the strengths, weaknesses, opportunities, and threats to your raisin enterprise.

Strong points	**Relative importance**

Weak points	**Relative importance**

Opportunities	**Relative importance**

Threats	**Relative importance**

INSTRUCTRUCTIONS FOR CALCULATING
ENTREPRENEURIAL SCORES

PEC SCORING SHEET
INSTRUCTIONS[2]

1 Enter the ratings from the completed questionnaire in the blocks above the
   item numbers. You will notice that the item numbers in each column below
   are consecutive, that is, if you look at the first column, you will see that item
   nr 1 is followed by item nr 2, which is followed by item nr 3, etc.
2 Do the additiona and subtraction in each row to calculate eac PEC score.
3 Add all the PEC scores to calculate the total PEC
   score

SCORE

(1) + (12) + (23) - (34) + (45) +6=					Opportunity seeking
(2) + (13) + (24) - (35) + (46) +6=					Persistence
(3) + (14) + (25) - (36) + (47) +6=					Commitment to work contract
(4) + (15) + (26) - (37) + (48) +6=					Demand for quality and efficiency
(5) + (16) + (27) - (38) + (49) +6=					Risk taking
(6) + (17) + (28) - (39) + (50) +6=					Goal setting
(7) + (18) + (29) - (40) + (51) +6=					Information seeking
(8) + (19) + (30) - (41) + (52) +6=					Systematic planning and monitoring
(9) + (20) + (31) - (42) + (53) +6=					Persuasion and monitoring
(10) + (21) + (32) - (43) + (54) +6=					Self confidence

TOTAL PEC SCORE =

(11) + (22) + (33) - (44) + (55) +6=					Correction factor

PEC CORRECTION FACTOR

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[2] The instructions are to be used for the answers to the questions in Section 8 of the
questionnaire presented in Appendix A.

1 The CORRECTION FACTOR is calculated in the scoring sheet, is used to determine whether or not a person tries to present a very favorable image of him- herself. If the CORRECTION FACTOR is 20 or greater, the PEC scores must be corrected to give a more accurate assessment of the strengths of the various characteristics for the specific individual.

2 Use the following numbers when calculating the corrected score:

If the correction factor is:	Then subtract this correction number from each PEC score:
24 or 25	7
22 or 23	5
20 or 21	3
19 or less	0

3 Make the necessary corrections on the following score sheet,:

CHARACTERISTIC	ORIGINAL SCORE		CORRECTION NUMBER		CORRECTED TOTAL
Opportunity seeking		LESS		=	
Persistence		LESS		=	
Commitment to work contract		LESS		=	
Demand for quality and efficiency		LESS		=	
Risk taking		LESS		=	
Goal setting		LESS		=	
Information seeking		LESS		=	
Systematic planning and monitoring		LESS		=	
Persuation and monitoring		LESS		=	
Self confidence		LESS		=	

ROTATED COMPONENT MATRIX OF FACTOR LOADINGS OF PRINCIPAL COMPONENTS

Table C.1: Rotated component matrix to demonstrate the dimensions of the principal components of the variables hypotesised to influence technical efficiency

	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8
Time_suff_irr	0.855	0.166	-0.115	0.088	0.091	0.119	-0.228	0.062
Weed_control	0.845	0.206	-0.070	-0.075	0.031	0.132	0.266	-0.050
Prevent_soil_compact	0.839	-0.108	0.017	0.176	0.082	0.160	0.131	-0.079
Timely_prune	0.772	-0.005	0.151	-0.048	0.144	-0.268	-0.149	0.057
Leaf_management	0.482	0.351	0.475	0.152	0.093	-0.110	-0.466	-0.074
Same_prune_team	-0.261	-0.836	0.086	-0.004	-0.113	-0.129	-0.049	0.190
Size	-0.038	0.821	-0.264	0.127	-0.066	-0.085	-0.081	0.321
Old_vine	-0.008	0.233	-0.817	-0.042	-0.116	0.185	-0.143	-0.094
Family_labour	-0.285	-0.436	0.626	-0.429	-0.061	0.045	-0.127	-0.081
Sufficient_fert	-0.242	0.179	-0.583	-0.419	-0.012	-0.050	0.494	0.085
Private_property	0.090	-0.069	0.236	0.823	0.187	-0.202	0.040	0.065
Education	-0.005	0.211	-0.242	0.599	0.446	0.227	0.316	0.210
Informal_credit	-0.161	0.414	-0.085	0.587	-0.103	-0.007	0.121	-0.407
Fin_record_keep	0.379	0.201	-0.171	0.512	-0.403	0.315	-0.030	0.050
Off_econ	0.082	0.004	0.092	0.076	0.783	0.338	0.042	-0.157
Entrepreneur	0.163	0.269	0.268	0.199	0.675	0.192	0.055	0.140
Specialised_raisin	-0.288	0.222	0.471	0.075	-0.665	0.031	-0.151	0.042
Social_capital	0.107	0.189	-0.113	-0.144	0.113	0.778	0.136	0.303
Experience	-0.022	0.131	0.042	-0.046	-0.324	-0.750	0.061	0.139
Formal_credit	0.069	-0.003	0.053	0.193	0.149	0.033	0.847	0.047
Timely_Fert	-0.038	0.037	0.030	0.042	-0.062	0.063	0.079	0.914

NEW INSTITUTIONAL ECONOMIC ANALYSIS OF EMERGING IRRIGATION FARMERS' FOOD VALUE CHAINS

H Jordaan