

**The Contribution of Dairy Credit Guarantee Scheme to Household Food
Security among the Beneficiaries in Swaziland**

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ABSTRACT

More than 60% of the dairy products consumed in Swaziland are imported from South Africa. The Swaziland Dairy Board had established the dairy credit guarantee scheme with Swaziland Finance Development Cooperation to improve local dairy production and boost the livelihoods of smallholder dairy farmers. Unfortunately, the scheme was terminated without its effectiveness being evaluated. Therefore, the study set out to investigate the contribution of the dairy credit guarantee scheme to household food security. A total of 30 beneficiary households participated in the study. The data were collected through a structured questionnaire and analysed using the Statistical Package for Social Sciences (SPSS version 18.0). The households were compared in terms of the mean number of cows, milk production and volume of sales using the Duncan Multiple Range Test (DMRT).

The dairy scheme was open to all qualifying smallholder dairy farmers, but most (86.7%) beneficiaries were male. The beneficiary households owned, on average, between one and eight cows between 2006 and 2009, and produced 188079 litres of milk on average per year. The highest income generated from milk sales was R74137.00 per year between 2006 and 2009. The lowest income from milk sales was R1020.00, from a household with the lowest number of dairy cows on average per year between 2006 and 2009. Beneficiaries reported that the increase in income enabled them to accumulate agricultural assets, increased food purchases and the diversification of livelihoods. Over 56.7% of the households were able to diversify their livelihoods by engaging in other income-generating projects such as poultry and pig production, horticulture, selling groceries and block (brick) making. With improved income especially milking households were able to increase food supply and this is indicated by their higher average Food Consumption Scores (75.58) than non-milking households (59.65). However, all the average Food Consumption Scores were above 42 which is a threshold level for acceptable nutrient intake, dietary diversity and this implies that the dairy production scheme led to improved dietary intake.

In conclusion, the dairy credit scheme has the potential to improve local milk production and household food security. It is, therefore, recommended that the dairy scheme be revived, with better accessibility. The establishment of dairy development

policy should be considered, in order to create a favourable environment for dairying and the promotion of cooperation among dairy development partners. This cooperation would help to avoid duplication of efforts among development partners and create a platform for interaction, sharing of information and exchange of ideas.

DECLARATION

I, Nicholus Paul Nhleko declare that:

- (i) The research reported in this mini-dissertation, except where otherwise indicated is my original research.
- (ii) This mini-dissertation has not been submitted for any degree or examination at any other university.
- (iii) This mini- dissertation does not contain other person's data, pictures, graphs or other information, unless specifically acknowledged as being sourced from those persons.
- (iv) The mini- dissertation does not contain other authors' writing, unless specifically acknowledged as being sourced from other authors. Where other written sources have been quoted, then:
 - a) Their words have been re-written but the general information attributed to them has been referenced.
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Signed.....Date.....

As research supervisor, I agree to submission of this mini-dissertation for examination.

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As co-supervisor, I agree to submission of this mini-dissertation for examination

Signed.....Date.....

Prof Shemelis Hussein

DEDICATION

God is real. This piece of work is dedicated to Almighty God, who has given me the mind to carry out this work.

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Chapter 1

Research problems and setting

1.1 Introduction to the research problem

Achieving household food security is a problem for many low income countries. As a result, reducing hunger and poverty has become one of the Millennium Development Goals (MDG) endorsed by 192 states of the United Nations (United Nations, 2000). The Food and Agricultural Organizations (FAO) reports that governments, donors, international aid agencies and multi-lateral development bodies have put millions of dollars into food security projects to solve problems of food insecurity, malnutrition and hunger (FAO, 2006). Despite these initiatives, there are still millions suffering from food insecurity and malnutrition, especially in developing countries and particularly in Africa (FAO, 2006). For example, over 350 million women and children in Africa suffer from iron, vitamin A and folic acid deficiencies (Gadaga et al., 2009). The World Food Programme (WFP) indicates that these deficiencies are ranked among the top ten leading causes of death in the least developed countries (WFP, 2006).

Likewise, household food insecurity remains a problem in Swaziland. In the year 2000, 69% of the population was estimated to live in extreme poverty making them to be vulnerable to food insecurity (United Nations Development Programme, 2006). Currently, two-thirds of the Swaziland population live on less than one United States (US) dollar per day (International Monetary Fund, 2010). A recent survey of household income expenditure on food and non-food items established that 33% and 51% of the population living in urban and rural areas respectively survive on 29 US dollars per month per adult equivalent (Ministry of Economic Planning, 2010). This indicates that poverty is a reality among the rural people of Swaziland. Furthermore, the survey found that one in two people who are poor are also food poor, meaning that half of the poor people do not have enough to eat, or meet a nutritionally adequate balanced diet. In 2005, the Vulnerability Assessment Committee (SVAC), estimated that over 21% of the Swazi population was food insecure (SVAC, 2005). In 2004, the United Nations International Children's Emergency Fund (UNICEF) indicated that

about 12% of Swazi children were underweight and 31% were stunted in growth (Mason et al., 2005).

The country's population (76%) live in the rural areas and depend mainly on traditional crop-livestock systems for their livelihoods (Minjauw and McLeod, 2003). Crop production is combined with communal herding of livestock which is valued for draught power and manure to improve soil fertility (FAO/WFP, 2007; Minjauw and McLeod, 2003). Rural households experience problems ranging from small fragmented landholdings, poor access to agricultural inputs, unreliable rainfall, market inefficiencies, high unemployment rates and high HIV prevalence (FAO/WFP, 2007). These problems have weakened their livelihoods and made people vulnerable to food insecurity.

In 2003, the Ministry of Agriculture (MOAC) reported that as a result of HIV and AIDS, households experienced 44% reduction in the area of land cultivated, 54% reduction in maize production, 31% diversion of labour to care for the sick, 22% increase in the health care costs and 39% loss in regular remittances (Ministry of Agriculture (MOAC), 2003). The impact of drought has increased the food insecurity of households already affected by AIDS (WFP, 2008a). The lack of adequate food threatens adherence to and efficacy of the national treatment programmes for AIDS and the growth of children (WFP, 2008a). Even small shocks to agriculture compromise the ability of the Swazi rural households to sustain their food security (FAO/WFP, 2005). Recently, the SVAC has reported that agricultural production had increased- an increment attributed to reduction of farm inputs prices and better rainfall across the regions of the country (SVAC, 2010). This is presumed to have encouraged more people to engage in agricultural production.

Despite this improvement in agriculture performance, Swaziland has remained a net importer of agricultural products (SVAC, 2010). Swaziland imports maize, wheat, dairy products and other food commodities from neighbouring countries (FAO/WFP, 2005). In a normal year, roughly 60% of the food consumed in the country is imported (FAO/WFP, 2005). Milk imports have been rising rapidly, mainly as a consequence of declining domestic production and increasing demand for milk and milk products (FAO/WFP, 2007). To improve the socio-economic and nutrition status of the rural communities, the Swaziland government established a poverty reduction fund and several agricultural projects (SVAC, 2010).

Agricultural sector in Swaziland is perceived to be the most viable route to improve the socio-economic situation. In 2005, the New Partnership for Agriculture Development (NEPAD) and FAO reported that the sector provided over 20% of all formal sector employment (NEPAD/FAO, 2005). Realizing the potential and the importance of the agriculture sector, the government has invested millions of dollars in water harvesting facilities to promote sugar cane production, maize production, vegetable production, and feed and fodder production to sustain and intensify livestock production (SVAC, 2010). Within the livestock sector, a great deal of effort has been put into the dairy sector which boasts of over 5000 pure dairy animals (Dlamini and Khumalo, 2000; Mavuso, 2005). Despite these efforts and favourable climatic conditions, the dairy sector has been under-performing for the past four decades (NEPAD/FAO, 2005). Therefore, the government had decided to re-explore the potential of local dairy production with the aim of reducing milk and dairy imports and increasing milk consumption to improve dietary intake especially among the rural poor.

Dairy products, especially milk, are a rich source of a wide range of essential micronutrients, including iron, zinc and vitamins (Lokuruka, 2007). Dairy projects can address the problems of malnutrition and food insecurity through increasing milk consumption (Tefera, 2007; Walingo, 2009). In Tanzania, for example, households with dairy production systems enjoy higher protein consumption rates (22g/person/day) compared to households that are not involved in dairy production (1g/person/day) (Eik et al., 2008). At the household level, dairy production improves food availability, generates regular cash income and creates employment (Kabumbuli and Phelan, 2003; Tangka et al., 2002; Walingo, 2009). Increased cash income can help provide clothing, health care and education and enable purchases of inputs for crop production, thereby increasing food availability (Tangka et al., 2002; Tefera, 2007).

Realizing the potential of local dairy production to improve household food security and reduce imports of milk and dairy products, the government of Swaziland restructured the Swaziland Dairy Development Board (Mavuso, 2005). The main functions of the Board are to develop and regulate the dairy industry by providing

extension services to the dairy farmers and regulating the importation and exportation of dairy products (Malima, 2005; Mavuso, 2005).

In 2005, the Swaziland Dairy Development Board (SDDB), in a joint venture with the Swaziland Development Cooperation (FINCORP), launched the dairy credit guarantee scheme for smallholder dairy farmers (Mavuso, 2005; NEPAD/FAO, 2005). The dairy credit scheme was established to benefit the small scale dairy farmers. Such farmers could not meet the terms and conditions of formal financial institutions because they were involved in projects seen to be un-bankable - without proper records and vulnerable to economic change - which made financing them a high risk (Ahlin and Jiang, 2008). The specific purpose of the scheme was to improve local milk production and household food security through the consumption and sale of milk, and provide rural employment (Mavuso, 2005). Through milk sales, households were expected to improve their dietary intake, diversify their livelihoods and accumulate assets to cushion them against shocks. Unfortunately, as a consequence of poor loan repayments to the scheme, it was suspended in 2007 without its effectiveness having been measured. A question remains concerning the contribution of the dairy credit scheme to local milk production and household food security. This study seeks to address this question. Addressing this question would help generate information to facilitate decision making among dairy development partners and policy makers regarding reviving or re-establishing credit facilities for smallholder agricultural farmers including dairy farmers.

1.2 The statement of the research problem

This study set out to investigate the contribution of the Swaziland Credit Guarantee Scheme, a joint venture of the SDDB and FINCORP, to household food security among its beneficiaries between 2006 and 2009. The research problem was investigated through the following sub-problems and questions.

Sub-problem one: How much milk was produced and sold as a result of the scheme over the four year period?

Sub-problem two: Did dairy production contribute to increased milk consumption and food consumption scores among the beneficiaries?

Sub-problem three: Were the livelihoods of beneficiaries improved after implementation of the scheme?

Sub-problem four: Did extension services contribute to the success of the dairy credit scheme?

1.3 Study limits

The study was limited to the 33 available dairy project beneficiaries, spread across the country. However, only 30 beneficiaries ended up participating in the study, the other three had passed on and the information about their dairy projects was not available. Therefore, the findings of this study may not be general to other situations as the study was restricted to the SDDB/FINCORP joint venture dairy scheme beneficiaries. Poor record-keeping and the absence of a baseline survey limited the study to use recall methods by beneficiaries, which have limitations and implications.

1.4 Assumptions of the study

It was assumed that all the dairy projects were still operating at the time of the study, their records were up-to-date and the conditions were favourable for milk production. Furthermore, it was assumed that the research participants understood the purpose of the study and provided honest and accurate information.

1.5 Structure of the mini-dissertation

This mini- dissertation is presented in six chapters. In chapter one, the introduction to the research problem is presented, highlighting in particular the main problem and the sub-problems investigated towards the solution of the problem statement. Chapter two presents relevant literature on food security and livestock production in the context of supporting the assets of the livelihood system, thereby promoting food security. Chapter two focuses on ways in which dairy production improves household food security in African countries, the overview of the Swazi dairy industry and description of the joint venture dairy credit scheme. Chapter three presents the methodology of the study. Chapter four presents the results and discussions. In chapter five, the study conclusions and recommendations are presented.

Chapter 2

Review of related literature

2.1 Introduction

The United Nations (2000) has reported that achieving household food security is problematic for many developing and low income countries. Most developing countries are dominated by high levels of malnutrition and Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome (HIV/ AIDS), inaccessible health care services, poor education facilities, poor agricultural expenditure and development, low economic growth and high poverty rates (Messer et al., 2006). The combination of these factors, especially in Africa, undermines the potential of many countries to achieve food security (Okalebo et al., 2007). Poverty is the underlying factor behind these factors. Poverty limits the capacity for individuals, households, communities and nations to meet their needs and obligations to ensure a healthy and prolonged life (Devereux and Maxwell, 2001; Holt-Gimenez and Patel, 2009; Jabbar et al., 2002).

The African Union (AU) had reported that more than half of the population in sub-Saharan Africa live below the poverty line, set at one United States dollar a day (AU, 2005a). This limits households' access to health services, agricultural inputs and improved farming methods. As a result, households do not harvest enough food for the year, making it difficult for them to consume diversified diets and meet their minimum daily dietary requirements (AU, 2005b; Southgate and Graham, 2006). Low dietary intake coupled with poor access to health services, leads to household vulnerability to food insecurity, malnutrition and infections. Diseases such as malaria, and HIV and AIDS erode the potential of poor and sick families to increase agricultural production, especially during times of peak agricultural activity, because diseases decimate the work force and reduces productivity.

The Comprehensive Africa Agriculture Development Programme (CAADP), FAO and the World Bank (WB) have acknowledged that investing in agricultural production can ensure food security and drive economic growth both at national and community levels (NEPAD, 2009; World Bank, 2007). This chapter reviews the commitment of the African governments to improve food security through agricultural production, the food security situation in the world and Africa. The chapter argues that dairy production schemes in particular can contribute to household food security and drive economic development. The chapter also reviews methods of

measuring food security but mainly argues that due to complexity nature of the subject there is no single measure that embraces all the aspects of food security

2.2 The food security situation in the world

Millions of people suffer from hunger and malnutrition (FAO, 2006), and the number of hungry people has been rising worldwide, especially in Africa and South East Asia (Grebmer et al., 2010). In 1996, there were approximately 800 million hungry people, with numbers rising to 826 million in 2005 (FAO, 2005). Approximately 792 million of these people were in the developing countries, while 34 million were in the developed countries (FAO, 2006). In 2009, the FAO reported that the number of hungry and malnourished people had increased to 1.02 billion as a result of the worldwide economic recession (FAO, 2009a). This situation has further compromised the ability of Governments to achieve the goal of halving the proportion of hungry people between 1990 and 2015 (FAO, 2009b).

In 2000, the FAO reported a reduction of only about 8 million hungry people per year since the early 1990's (FAO, 2000). These figures indicate that the 2015 target of reducing the number of hungry people will only be achieved, if at all, after 2030 (FAO, 2009b). The food and economic crises in 2008 have made it more difficult for low income countries, particularly in Africa, to achieve the target of halving the number of hungry people (FAO, 2009a; International Food Policy Research Institute, 2008). Furthermore, the global economic crisis has resulted in developing countries experiencing a decline in remittances, export earnings, foreign direct investments and foreign aid, leading to the loss of employment and income (FAO, 2009b). The loss of income was compounded by high food prices in the domestic markets of many poor countries. As a result, poor households had no alternative other than to reduce consumption, consume fewer meals (already of poor nutritional value), cut back on health and education expenses, and sell off their assets.

2.3 The prevalence of food insecurity in Africa

Food insecurity exists when people do not have adequate physical, social or economic access to food; therefore food insecurity and poverty are inseparable. Poverty deprives people from accessing farm inputs to increase agricultural production even food in the

market. Hunger, poverty and poor health are widespread, but more severe among rural African communities (Okalebo et al., 2007). These communities are characterised by poor economic growth, low agricultural growth, an agricultural sector that is mainly dominated by smallholders and subsistence households, and a large population of hungry people (NEPAD, 2009). Efforts to reduce hunger on the African continent have been compromised by a range of natural and human induced disasters including ethnic conflicts, the spread of HIV/AIDS and the worldwide financial food, fuel and feed crisis especially in the SADC region (Zunckel, 2010). As a result of this situation, a third of Africa's people had remained hungry and food insecure, the highest ratio in the World (Zunckel, 2010). Table 2.1 presents the trend of populations vulnerable to food insecurity and poverty from 2004/05 to 2011 consumption period.

Table 2.1: Population vulnerable to food insecurity and poverty in SADC from 2004/05 to 2010/11 consumption period

Country	Consumption period						
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Lesotho	948300	541000	245700	553000	353000	450000	200000
Malawi	1340000	5055000	833000	632000	673498	147492	1061000
Mozambique	659000	801655	240000	520000	302700	281300	450000
Namibia	-	-	-	-	-	224795	106297
Swaziland	600400	634400	465900	345000	238600	262000	160989
Tanzania	686356	848019	995433	581974	780416	420000	717896
Zambia	39300	1232700	380537	440866	444624	110000	53629
Zimbabwe	2300000	2884800	1392500	4100000	5100000	1400000	1287937
Total	6573356	11997574	4553070	7172840	7892838	3295587	4037748

Source: (SADC, 2011)

Nb: Only countries with national availability assessment committees included in this Table.

Table 2.1 indicates that the number of food insecure people was high in the 2005/2006 consumption period in these countries reaching 11997574 people. This was the beginning of the food price crisis. However, in 2009/2010, the estimated number of food insecure people reduced to 3295587 but increased in 2010/2011 to 4 037748. The high level of malnutrition (poor intake of essential nutrients) continued

ranging between 42 and 53% in countries like Malawi, Zambia, Swaziland, Tanzania, Lesotho and Mozambique (SADC, 2011).

Malnutrition is one of the major health and social challenges in Africa (AU, 2005a). Over 800 million people are not consuming diets adequate in essential vitamins and minerals required for optimum and health productivity (NEPAD, 2008). More than 90% of the world's children are stunted, children whose height is low for age and live in Africa and Asia (Grebmer et al., 2010). In 2004, the UNICEF reported that 36 million children in Africa are undernourished (UNICEF, 2004). Protein and energy malnutrition is common among children under five years; children aged six to nine and women in the reproductive age groups (25-40 years). Between 30- 40% of children under five years of age are stunted and 10% are wasted (AU, 2005a).

Malnutrition associated with food insecurity is attributed to poor caring practices, unhealthy environments and inadequate health care services. However, the major immediate cause is the low dietary intake of various nutrients including iodine, vitamin A, and iron (AU, 2005b; Southgate and Graham, 2006). The lack of these micronutrients threatens the lives of millions of African children and women. About 10-40% of the population in Africa suffer from Iodine Deficiency Disorders, 25% have vitamin A deficiency and over 600,000 children under the age of five die annually in Africa because of vitamin A deficiency (AU, 2005a). Besides causing disease and death, the shortages of these nutrients in the body result in retardation of physical and mental development, and increased morbidity and mortality among pre-school children (AU, 2005a; Southgate and Graham, 2006). Furthermore, these shortages affect development of children at all stages of life leading to poor social development (AU, 2005a; Southgate and Graham, 2006; World Resources Institute, 2006).

2.4 Overcoming the state of food insecurity in Africa

Through the New Partnership for Agricultural Development, the African Union has established the Comprehensive African Agricultural Development Programme (CAADP) to drive the African Green Revolution (NEPAD, 2009). CAADP has four

pillars namely: extending the area under sustainable land management and reliable water control systems; improving rural infrastructure and trade-related capacities for improved market access; increasing food supply and reducing hunger and improving agricultural research, technology dissemination and adoption (NEPAD, 2009)

CAADP has attracted the interest of the international community since its inception, including politically and economically influential nations (AU /NEPAD, 2009; Flora, 2010). The AU Heads of States met in Mozambique in 2003 and endorsed the Maputo Declaration which demanded that all African governments align and formulate their policies in conjunction with CAADP principles. The Head of States and governments agreed to increase national budget allocations to agriculture by 10% by 2015, to increase agricultural growth by 6% per year (AU, 2005b). Table 2.2 illustrates the budget allocation to agriculture between 2003 and 2007.

Table 2.2: Budget allocation to agricultural sector in the SADC region from 2003 to 2007

Country	2003/04 (%)	2004/05 (%)	2005/06 (%)	2006/07 (%)
Angola	2.2	6.5	5.3	3.6
Botswana	2.8	2.7	3.2	3.3
DRC	n.s	n.s	n.s	n.s
Lesotho	4.8	5.0	4.0	3.5
Madagascar	n.s	n.s	n.s	4.2
Malawi	6.6	12.7	11	13.2
Mauritius	3.9	2.9	2.6	n.s
Mozambique	6.2	4.4	3.4	3.9
Namibia	7.3	6.9	8.2	8.0
S. Africa	n.s	n.s	n.s	n.s
Swaziland	4.9	6	4.7	3.7
Tanzania	5.7	4.7	5.8	5.8
Zambia	7.0	4.0	5.0	n.s
Zimbabwe	11.0	n.s	n.s	n.s
SADC Average	3.8	5.3	5.3	5.4

Source: (SADC, 2009)

n.s: stands for not submitted.

Table 2.2 indicates that the member states have not lived up to the commitment of increasing budget allocation to 10%. Therefore, the prevalence of hunger,

malnutrition and food insecurity in the SADC member states can be partially attributed to under-investment in agriculture. Malawi is the only country that has allocated more than 10% of its budget to agriculture. Through this, the Malawian government has managed to provide fertilizer subsidies to its farmers, including smallholder agriculture (Banerjee, 2007).

Smallholder agriculture has been overlooked for a long time and considered to be a hindrance to the development and progress of developing countries (Dillon and Delaby, 2009). However, smallholder agriculture is slowly regaining its importance (Dillon and Delaby, 2009). The recent food crises have highlighted the need to boost smallholder agriculture because, as has been demonstrated in some parts of the world, smallholder agriculture has the potential to fight food insecurity and malnutrition (Bello and Baviera, 2009; FAO, 2008). Hendriks et al. (2009) identify the following direct effects of smallholder agriculture on people's livelihood: increased agricultural productivity stimulates demand for agro-processing and non-agricultural services - including education, construction and transport - further stimulating demand for local products and higher investment in agriculture. The World Bank and International Monetary Fund have noted that the only way out of poverty is to improve the productivity, profitability and sustainability of smallholder farming (Banerjee, 2007; World Bank, 2007).

Also, the World Bank has noted that the international agricultural economy and its markets fail to accommodate smallholder agriculture farmers (Mooney and Hunt, 2009). Therefore, the World Bank is now putting pressure on governments and international agencies to help poor farmers in terms of access to land, credit, water, education and health care to improve the productivity of smallholders (Mooney and Hunt, 2009). The need to support smallholder agriculture, and in the process improve household food security, has resulted in the implementation of agricultural projects, particularly livestock projects (Tangka et al., 2002; Tefera, 2007; Walingo, 2006; Walingo, 2009). This is because the high prevalence of under nutrition in Africa is associated with poor consumption of animal source foods. For example, consumption of meat in some African countries is below 15kg/ capita/year and in some cases below even 5 kg and this is far below the world average of 38 kg (Speedy, 2003). There is a need to promote production and consumption of animal source foods as they contain

high amounts of available micro nutrients. Besides increasing consumption of animal products, livestock can be a valuable asset, serving as a store of wealth, collateral for credit and an essential safety net during times of crisis (Alexandru et al., 2010).

Over 85% of sub-Saharan Africa's poor people depend on livestock–crop farming for their livelihoods (Mwakalile et al., 2002). Livestock projects are becoming increasingly important in many developing countries for improving household food security (Tefera, 2007; Walingo, 2009). For example, depending on credit or cash availability, rural people prefer to invest in livestock over other income-generating projects such as crops, vegetables and forestry (Kabumbuli and Phelan, 2003; Miller, 2001; Tangka et al., 2002). This is because livestock production is more effective in contributing to food security through increased consumption of animal products and providing a higher share of income compared to other agric projects (von Braun, 2010). Therefore, livestock projects can have lasting results in the health and social development of poor households (Walingo, 2009). In addition, livestock projects can be an entry level for other types of group-based interventions concerning health, sanitary education and land rights (Kabumbuli and Phelan, 2003; Miller, 2001; Mwakalile et al., 2002).

2.5 The contribution of livestock production to livelihoods in developing countries

Livestock production systems occupy over 45% of the global surface area, and are a major global asset estimated to be worth 1.4 trillion US dollars. Livestock directly supports the livelihoods of over 600 million poor smallholder farmers in the developing world (Herrero et al., 2009; Thornton and Herrero, 2001). The developing countries account for 50% of the beef, 41% of the milk, 72% of the lamb, 59% of the pork and 53% of the poultry produced globally (Herrero et al., 2009; Rosenberg, 2009). As a share of the global production, 65%, 75% and 55% of bovine meat, milk and lamb, respectively, come from mixed extensive and intensive crop livestock systems in the developing countries (Herrero et al., 2009).

In Southern Africa over 70% of farming households derive their livelihood from livestock production (Muenstermann et al., 2010). However, due to ineffective

extension services and erratic weather/climatic conditions, poor veterinary services livestock production has declined in Southern Africa. This has weakened the livelihoods and limited the dietary intake of animal products (Misra et al., 2009; Southgate and Graham, 2006). For example, recent statistics by SADC indicate that animal protein supplies have decreased to 49g per person per day against a requirement of 68g in the last ten years (SADC, 2009).

Also, livestock production faces the following challenges: stresses stemming from prolonged and recurrent droughts; expansion of smallholder crop cultivation; creation of protected areas such as game reserves; and opening up of large scale farms that do not directly benefit the poor (Yanda and William, 2010). These activities have denied livestock smallholder farmers access to land previously perceived as traditional grazing lands (Herrero et al., 2009; Yanda and William, 2010). Elimination of these problems can help the livestock production sector to contribute better to the livelihoods of the 1.3 billion people that are already employed in the livestock industry globally (Herrero et al., 2009; Minjauw and McLeod, 2003).

Despite these challenges, livestock production has remained very important among the rural poor as it contributes to the capital assets (natural, social, capital, human, physical and financial) (Ellis, 2000; Minjauw and McLeod, 2003). Livestock production contributes to the livelihoods of the livestock keepers in the following way:

- Livestock are a form of natural capital and can be used to improve soil fertility that can result in the increase of crop yields (Kabumbuli and Phelan, 2003; Minjauw and McLeod, 2003; Walingo, 2009).
- Livestock create income directly or through cropping systems. They are often referred to as a “living savings bank” that may be used throughout the year, and they can be used as collateral for obtaining credit (Kristjanson et al., 2010).
- Livestock contribute to human health and development through improved consumption of animal products such as meat, milk, eggs. In addition, through the sales of livestock and their products, households are able to buy

school uniforms and pay educational expenses of their children (Eik et al., 2008).

- Livestock can provide transport or draught power. For example, livestock can be used to carry cash crops to the market or to raise water from wells or plough the land (Minjauw and McLeod, 2003; Mwakalile et al., 2002).
- Ownership of livestock can create social structures that strengthen the voice of an individual within the community. Conversely, failure to manage the livestock may result in loss of status and influence within social networks (Kabumbuli and Phelan, 2003; Minjauw and McLeod, 2003).

Within the livestock sector, there are large livestock production options (dairy, beef, poultry, camel and goats) (Kristjanson et al., 2010; Miller, 2001) and small livestock production options which include guinea pigs, silk worms, snails, honey bees and rabbits (Miller, 2001). Small livestock are important because it is easier to operate a productive enterprise with small animals since the initial costs are lower. However, the majority of poor farmers in developing countries, especially women's self-help groups, prefer dairy production because of its profitability or higher contribution to income compared to other related projects, as well as its effectiveness in improving dietary intake thus curbing malnutrition (Miller, 2001; Minjauw and McLeod, 2003; von Braun, 2010). In addition, dairy production holds greater status in society than other forms of livestock production (Kabumbuli and Phelan, 2003; Kristjanson et al., 2010). Dairy production contributes to food security, rural development through creation of employment and reduces poverty (Kabumbuli and Phelan, 2003; Misra et al., 2009; Walingo, 2009).

2.6 The contribution of dairy credit schemes to household food security and dairy development.

The depth of poverty, malnutrition and poor dairy development in Africa have attracted international organizations such as Send a Cow, Heifer Project International and Botha to intervene by donating dairy animals to groups of smallholder dairy farmers (Kabumbuli and Phelan, 2003). In East Africa, the donation of dairy cows and bulls has led to the upgrading of local breeds and the evolution of several revolving schemes, mainly targeting the marginalised poor of the communities. For example, before 1998, in countries like Kenya, Tanzania and Uganda, the smallholder dairy sector has grown to include approximately 2.55 million crossbred and exotic animals

kept by over 625,000 households; that of Tanzania consists of 250,000 animals kept by 50,000 households, and in Uganda these international organizations had benefited over 6000 households (Kabumbuli and Phelan, 2003; Minjauw and McLeod, 2003).

These organizations used the bull loan and heifer approach to upgrade local breed and increase milk production to improve the frequency of milk consumption (von Braun, 2010; Mwakalile et al., 2002). Through the bull loan scheme a group of farmers with a local breed with a potential of producing milk were given dairy bulls for crossbreeding purposes in order to increase milk among the offsprings. And the heifer approach refers to a situation whereby a well prepared (in terms of pasture production, water availability, milking structure and crush pen) deserving group or individual farmers (Kabumbuli and Phelan, 2003) were allocated pregnant heifers. They were expected to pass on the female calf to the rest of the group members or the community. However, the bull loan schemes had little impact; asset accumulation at household level was not convincing and extension packages accompanying the livestock improvement were lacking (Mwakalile et al., 2002). With this approach, farmers have not been happy with the size of the calves born and the waiting period before getting milk from the upgraded offsprings (Mwakalile et al., 2002; Nicholson et al., 2004). However, with the heifer approach, milk production improved in Kenya, Uganda, Tanzania and other countries in which it was adopted (Kabumbuli and Phelan, 2003; Mwakalile et al., 2002). However, with the removal of the subsidy on the heifers, the rural farmers, could not afford to purchase the heifers (Mwakalile et al., 2002). Therefore, dairy production started to decline again in countries like Kenya, Uganda and Tanzania.

Next governments started introducing another form of the heifer approach known as Heifer in Trust (Kabumbuli and Phelan, 2003; Mwakalile et al., 2002). Again, deserving farmers, based on their food security and poverty status, received in-calf heifers but this time they were expected to pass on a female offspring of the same quality to a fellow group member (Kabumbuli and Phelan, 2003; Mwakalile et al., 2002; von Braun, 2010). This asset creation was accompanied by an intensive extension package on how to produce surplus milk, in order to generate rural employment and income. With the strengthening of farmer groups, increased milk production was realised. The need for market development then became a priority so

that the schemes could shift from dairy production to a dairy sector approach (Kabumbuli and Phelan, 2003; von Braun, 2010).

Unfortunately, the beneficiary governments of these international heifer schemes have not put enough effort into investing in marketing and processing infrastructures to add value to the raw milk and promote domestic and international dairy markets accessibility (Gautam et al., 2010; Mwakalile et al., 2002). Also, the free trade policy of the World Trade Organization (WTO) has opened up global competition in the dairy sector, exposing the smallholder producer to unfair competition (von Braun, 2010; Mwakalile et al., 2002; Ndambi et al., 2007). Most developing countries have not provided their farmers with the level of protection and support measures that promote the capacity of smallholder producers to compete equally in the global dairy market (Minjauw and McLeod, 2003; Mwakalile et al., 2002). The developing countries lack the legal and regulatory frameworks, or their frameworks have not kept pace with changes in the economic environment and WTO (Kabumbuli and Phelan, 2003; Mwakalile et al., 2002; Staal et al., 2008). This situation has prevented African farmers from participating in international dairy markets and kept smallholder farmers in subsistence farming (Ndambi et al., 2007; Staal et al., 2008).

However, there is still an opportunity for African dairies to grow as demand (4%) for dairy products exceed supply (3.1%) in most parts of sub-Saharan Africa (FAO, 2009b; Ndambi et al., 2007). The global demand for dairy products is growing at an annual rate of 3% (15% China alone) (Moore, 2009). Table 2.3 presents the per capita milk consumption across the world indicating a potential market for dairy production.

Table 2.3: Per capita milk consumption, milk equivalents (kg), 1981-2007

Countries	1981	1990	2000	2007
Developed countries	222	180	235	248
Developing countries	35	40	56	68
China	3	6	11	22
India	50	63	79	Na
US	271	274	287	295
EU	Na	363	469	382

Source: (FAO, 2009a), Na: Not applicable

Table 2.3 shows that the per capita consumption of dairy products has been increasing worldwide over the years, implying increased demand for dairy products together with other livestock products. The demand for animal products in general has been driven by a change in population size, increase in income and changing taste and consumer preferences (von Braun, 2010). Dairy products, among other livestock products such as meat, eggs, wool, hides and skins, on average account for 28% of the agricultural GDP of sub-Saharan African countries (Jabbar et al., 2002). Therefore, the increased per capita consumption of dairy products presents an opportunity for the dairy industry to grow, even in Africa (Beyene and Melesse, 2009).

Countries like Kenya and Uganda for example, have tried to develop their dairy market from within (Mwakalile et al., 2002) by establishing milk collection centres to facilitate distribution and processing of milk. This made dairy production a viable option for smallholder farmers in terms of income generation as compared to other agricultural activities (Minjauw and McLeod, 2003). In both urban and semi-urban areas, there was high demand for the processed dairy products and the farmers made more money through dairying in these areas (Minjauw and McLeod, 2003; Mwakalile et al., 2002). In contrast, in rural communities the milk demand was lower and there are corresponding less well-established infrastructure and marketing network (Minjauw and McLeod, 2003). This means that rural smallholder farmers cannot access market opportunities and other services. However, the spill-over effects of developments in semi-urban areas of Kenya and Uganda led to the rural employment of non-farmers as milk vendors, permanent or casual farm labourers and traders of farm inputs (Kabumbuli and Phelan, 2003; Mwakalile et al., 2002). This resulted in the improvement of food security at household level (Kabumbuli and Phelan, 2003).

2.7 The socio-economic and nutritional contribution of milk to household food security

The Heifer International dairy production schemes have enabled beneficiaries to support their livelihoods from the sale of milk and animals, especially after fulfilling their loan obligations such as transferring the first female calf to other group members (Minjauw and McLeod, 2003). Literature in the field illustrates that dairy schemes have enabled the beneficiaries to achieve the following: an increase in the purchasing power of families, enabling them to afford more goods and services for themselves

and their family members (such as investment in housing, savings, and social needs like school expenses and medicines); improvement of soil fertility through kraal manure, yielding more crops and leading to food availability; increased knowledge of dairying (improving people's capacity to make a living through dairying and contributing to the country's development efforts); and helped in fighting undernourishment through improved milk consumption and dietary intake (Flora, 2007; Flora, 2010; Jabbar et al., 2002; Kabumbuli and Phelan, 2003; Minjauw and McLeod, 2003; Nyangweso et al., 2007; Ogunsumi and Ogbosuka, 2009; Tefera, 2007; von Braun, 2010; Walingo, 2006; Walingo, 2009).

Between 1990 and 2000, the average contribution of milk and dairy products to dietary protein intake rose slowly (by an average of 1.9% per year in sub-Saharan Africa (FAO, 2004). In addition, the percentage of undernourished people fell from 20% in 1990-1992 to 16% in 2004-2006 (IFPRI, 2010). Matshe (2009) attributed this decline in the sub-Saharan Africa to increased milk consumption and improved dietary intake. Milk contains iron, folic acid, vitamin A and many micro-nutrients including fatty acids that are lacking in the diets of many African cultures (Lokuruka, 2007; Southgate and Graham, 2006). Therefore, an increase in milk consumption helps in the fight against micronutrient deficiencies and the resulting negative impacts of such deficiencies on the social, economic and intellectual development of individuals and communities (Gadaga et al., 2009). Likewise, dairy production has contributed towards the fight of malnutrition in the lives of many people in Swaziland especially in the rural areas, although the performance of the dairy sector nationally is not convincing.

2.8 Overview of the dairy industry in Swaziland

In this section, the Swaziland dairy industry is presented, in particular, the importance of dairy to the Swazi people. The government's efforts and commitment to develop the dairy industry dates back to the 1930's (Mavuso, 2005). Recently, as an initiative to develop the industry, the government has restructured the SDDDB to spearhead the transformation of the dairy sector. Despite these efforts, Swaziland has continued to be a net importer of 60% of the food consumed in the country, including milk and dairy products (NEPAD/FAO, 2005). This is a challenge for the government. The

high percentage of food that is imported rather than domestically produced, threatens national food self-sufficiency, and this raises questions about the sustainability of food production systems regarding national food security. Furthermore, the high imports of dairy products raise questions about the contribution of the dairy sector to household food security, especially among the 76% of the population in the rural areas who form 86.2% of the dairy farmers in Swaziland (Mavuso, 2005; NEPAD/FAO, 2005). In an attempt to understand the Swazi dairy industry and its development, this chapter is divided into seven main sections, namely country background, description of the dairy production system by types of land tenure in Swaziland, milk production and marketing systems, the contribution of dairy and other livestock to the Gross Domestic Product (GDP) in Swaziland, the organizational structure of the Swazi dairy industry, constraints in milk production, and the SDDB and its functions.

2.9 Country background

Swaziland is located in the South-Eastern part of Africa between latitudes 25⁰30' and 27⁰30'S and longitude 30⁰45' and 32⁰07'E. It is almost entirely surrounded by South Africa, save for the eastern portion that borders Mozambique. The country has four major agro-ecological zones; namely the Highveld, Middleveld, Lowveld, and the Lubombo, and all of them are favourable for dairy production (Sweet and Khumalo, 1994).

Swaziland has a subtropical climate with 75% of summer rains falling between October and March each year. All regions receive distinct seasonal rainfall between September and March, whilst little or no rain is expected over the other months. The climatic conditions range from a sub-humid and temperate climate in the Highveld to a semi-arid climate in the Lowveld (NEPAD/FAO, 2005). Swaziland has fairly good soils and a variety of agro-ecological zones and great potential for agriculture (Sweet and Khumalo, 1994). Also, Swaziland has a favourable environment for dairy production, characterised by warm temperatures, low risk of diseases across the country, cordon fences for trans-boundary disease control, and good rainfall patterns that support high biomass production for forage-based dairy production systems (Bebe, 2003).

2.10 Dairy production and marketing by land tenure system

There are two production systems in Swaziland that relate to two kinds of land tenure, namely commercial Title Deed Land (TDL) tenure and the traditional Swazi Nation Land (SNL) tenure (Mavuso, 2005; Minjauw and McLeod, 2003). Under the traditional system, each rural household is allocated a plot of land in which it practices crop and livestock farming. In this land tenure system, cattle are of paramount importance, having both social and economic value (including milk production). About 60-80% of smallholder dairy farmers are located in the traditional land system in the developing countries and account for 30 to 80% of the milk produced and sold (Bebe et al., 2002; Muriuki et al., 2001).

In Swaziland, smallholder dairy farmers represent 86.2% of the total dairy farmers (Mavuso, 2005). They produce milk mainly from beef herds, cross breeds (Jersey x Nguni, Friesian x Nguni or Jersey x Friesian x Nguni), and a few pure Jersey and Friesian breeds. The smallholder dairy system produces milk primarily during the summer season, when the cows have freshly calved and the grass is abundant. While there are no current figures of milk production from this sector, figures from 1999 recorded that about 26 million litres were produced in that year (Mavuso, 2005). It is unlikely that this figure would have increased because there has been a reduction in land available for communal grazing areas, poor rainfall, and a reduction in the number of livestock (NEPAD/FAO, 2005). Table 2.4 presents recent livestock population in Swaziland. The number of dairy animals is included in the cattle figures. In the year 2000, a draft livestock census report by the Ministry of Agriculture and Co-operatives (MOAC) reported that 84.3% of the total cattle population was owned by smallholder producers who also practise dairy farming (MOAC, 2005). This indicates the importance of milk production in Swaziland. Besides cattle farming being a business, it is a way of life and has high cultural value (NEPAD/FAO, 2005). Cattle are the predominant type of livestock held in Swaziland (Table 2.4).

Table 2.4: Livestock populations in Swaziland

Census year	Cattle	Sheep	Goats
2007	637,718	18,770	480,000
2008	618,620	17,657	458,196
2009	608538	22,680	509,495

Source: (SVAC, 2010)

The commercial sector, primarily located on the title deed land, dominates in terms of local milk production. The records on local milk production in Table 2.6 refer to this sector. Farmers on SNL rarely keep records (Malima, 2005), therefore, it is difficult to quantify the amount of milk produced in this sector.

Smallholder dairy producers are encouraged to graze their stock privately in their own back yards, to avoid problems such as breed degradation through uncontrolled breeding by traditional bulls, and extensive travelling to look for feed and water. The ideal of the Swazi smallholder dairy production system is for each farmer to have at least one hectare of planted pasture per dairy cow. In Swaziland, a smallholder is defined by the size of herd ownership. Farmers owning less than 10 dairy animals are considered small, mid-scale farmers own from 10 up to 48, and above 48 is defined as a large-scale farmer (Dlamini and Khumalo, 2000). Both mid- and large-scale farmers are found on the commercial farms or Title Deed Land (TDL). Medium- and large-scale farmers usually graze their animals on cultivated pastures and supplement with concentrates to boost the animal's milk production potential, while the majority of smallholders graze their animals on the veld and do not provide supplements to their animals because concentrates are expensive. Even if they supplement, they usually dilute the concentrates with hominy chop (coarsely ground maize formed when making a maize meal) to increase the quantity without clearly understanding that by so doing they compromise the quality of the concentrate. As a result, they constantly obtain low volumes of milk (Dlamini and Khumalo, 2000; NEPAD/FAO, 2005). An additional factor contributing to smallholder farmers not cultivating quality pastures and nor providing supplements to their animals is the ever-increasing costs of farm inputs (Dlamini and Khumalo, 2000; Malima, 2005).

Most milk produced by smallholders is sold at the farm gate and in informal markets. Informal markets offer a better price per litre than formal markets, usually ranging from R6.00 to R10.00 per litre, depending on the geographic location of the farmer, the number of competitors, the season of the year and the breed (Mavuso, 2005). For example, smallholders who keep Jerseys generally get a better price per litre of milk as compared to those who keep Friesians, because of its greater demand and quality (Dlamini and Khumalo, 2000). Milk from Jerseys is believed to be more nutritious and makes better traditional sour milk, a staple of the Swazi diet, because it contains more fat than milk from Friesians (Malima, 2005; Mavuso, 2005).

The problem associated with the informal market is its unpredictability and unreliability in terms of availability and price offer both in winter and summer. For example, in winter the milk producers make more money through milk sales as milk becomes one of the most affordable and available source of nutritious foods to the public. In summer, there are alternative sources that people opt for such as wild vegetables because they are naturally available and this affect milk sales and farmer's profit. While the formal market is always available, the price offered per litre (R3.50) is less than the cost of production which ranges from R3,60-R4.00 (Mavuso, 2005). Table 2.5 presents a profile of dairy farmers in Swaziland, and their distribution according to land tenure systems between 2000 and 2007.

Table 2.5: Profile of the dairy farmers in Swaziland

Year	Number of dairy farmers			Number of dairy cattle		
	SNL	TDL	TOTAL	SNL	TDL	TOTAL
2000	657	140	797	3502	3935	7437
2001	679	139	818	3477	3789	7266
2002	673	129	802	3445	3710	7155
2003	474	88	563	2839	3484	6323
2005	387	76	463	2257	3136	5393
2006	426	73	499	2481	3275	5756
2007	474	76	550	2732	3348	6080

Source: (SDDDB, 2000-2007)

Table 2.5 shows a fluctuating trend in the population of the farmers in both land tenure systems, as well as in the number of the dairy cows. This can be attributed to a number of factors including farmers leaving dairy farming in some parts of the country. Some farmers leave because of increases in milk production costs which make milk production very expensive (Dlamini and Khumalo, 2000). Other reasons include losing dairy cows through diseases. In some parts of the country, dairy production is seen as a business opportunity to generate income, especially for those farmers who are within reach of the potential markets of densely populated townships and close to the feed manufacturing industries (Dlamini and Khumalo, 2000). In such cases it becomes cheaper to produce and sell milk. Also, they access veterinary and extension services easier as compared to some smallholders who are found in rural areas (Malima, 2005). This situation either encourages or discourages people from dairying and accounts for the fluctuation in the number of farmers and dairy cows on a yearly basis (Mavuso, 2005).

While the Swazi population has continued to grow, milk production has not increased significantly in recent years, mainly due to economic constraints (FAO/WFP, 2005). In 1996, the FAO reported that 60% of the milk consumed in Swaziland came from neighbouring countries. Table 2.6 indicates that even in recent years, Swaziland is still importing dairy products (deficit column). This makes the industry vulnerable to the dumping of foreign and cheap dairy products (von Braun, 2010; Gautam et al., 2010). However, even though this is a threat, it also presents a potential market for local producers if good policies promoting the development of the industry can be put in place (NEPAD/FAO, 2005). Table 3.3 presents the demand, supply and deficit of milk and dairy products in Swaziland between 2002 and 2009. The table indicates that before 2005, the demand was almost constant while local dairy production decreased sharply and these can be attributed to drought leading to poor feeding and death of some dairy animals. This shortfall in local dairy production was met through imports especially in 2003. However, from 2006 to 2007 local dairy production improved and this can be attributed to the dairy credit scheme, as it was introduced in 2005. Towards the end of 2007, the credit scheme was terminated and this impacted negatively on local production as a result dairy imports (deficit) started increasing in 2008 as it is indicated on Table 2.6.

Table 2.6: Milk demand and supply in Swaziland

Year	Demand (LME'S) (Litres)	Supply (LME's) (Litres)	Deficit (LME's) (Litres)
2002	61.5*10 ⁶	11.6*10 ⁶	49.9*10 ⁶
2003	61.0*10 ⁶	8.0*10 ⁶	53.0*10 ⁶
2005	54.1*10 ⁶	7.1*10 ⁶	47.2*10 ⁶
2006	56.6*10 ⁶	8.39*10 ⁶	48.21*10 ⁶
2007	56.6*10 ⁶	8.93*10 ⁶	48.21*10 ⁶
2008	50*10 ⁶	7.35*10 ⁶	42.65*10 ⁶
2009	50*10 ⁶	7.35*10 ⁶	42.65*10 ⁶

Source: (SDDB, 2002-2009)

2.11 The contribution of livestock including dairy to the Gross Domestic Product in Swaziland

According to NEPAD/FAO (2005) the livestock sector contributes 2% to the Gross Domestic Product (GDP), including dairy. However, the actual figure may be higher because the measure of GDP does not account for livestock activities happening in the rural areas (Mavuso, 2005; NEPAD/FAO, 2005). These are not captured because of poor record keeping (NEPAD/FAO, 2005). Currently, the agricultural sector (commercial sector only) accounts for 10% of the country's GDP, yet before independence in 1968, it accounted for 40%. This indicates a decline in agricultural production, and challenges researchers to investigate the reasons behind this downward spiral. However, agriculture remains the backbone of the Swazi economy as it also provides the raw material for the manufacturing sector, textile industries and employs 70% of the working population (Ministry of Economic Planning, 2010; NEPAD/FAO, 2005). Agricultural production is especially important to the people who live in the rural areas (76% of the population) because it is the foundation of their livelihood (NEPAD/FAO, 2005).

Dairy has a twin impact on the country's GDP, contributing through both the livestock sector and the manufacturing sector. Dairy is considered under the livestock sector in terms of production, and is considered under the manufacturing sector in terms of processing. The latter contributes 29.3% to the GDP. The contribution of

dairy to the GDP from both sectors is not satisfactory. Statistics indicate that local production is slightly above 8 million litres when demand is above 56 million liquid milk equivalents (a measure of the quantity of fluid milk used in a processed dairy product) a huge deficit. While these problems invite more attention and understanding of their causes, they are beyond the scope of this study. At this stage it is important to look at interaction of the major players in the industry in order to understand the organization of the Swazi dairy industry.

2.12 The organisational structure of the Swazi dairy industry

The organogram in Figure 2.1 indicates that the SDDB is mandated to develop and regulate the dairy industry by the MOAC. Both MOAC and SDDB provide developmental extension services to the dairy farmers, especially to the small scale dairy farmers (Malima, 2005). In addition, the MOAC provides veterinary services to all the categories of farmers. The structure also shows that smallholder dairy producers rely heavily on informal rural markets (uncoordinated in terms of milk collection centres network to facilitate milk distribution), in which they compete with both mid-and large-scale dairy farmers. Uncoordinated informal markets deprive smallholders an opportunity to penetrate the formal market as well as the densely populated urban areas where they could get a good price for their product (Bebe, 2003). The informal market in Swaziland is made up of both urban and rural consumers, but only a few rural farmers reach urban consumers. This is because of poor development of both infrastructure and market networking (Dlamini and Khumalo, 2000).

Figure 2.1 presents the complex framework linking major role players in the dairy industry.

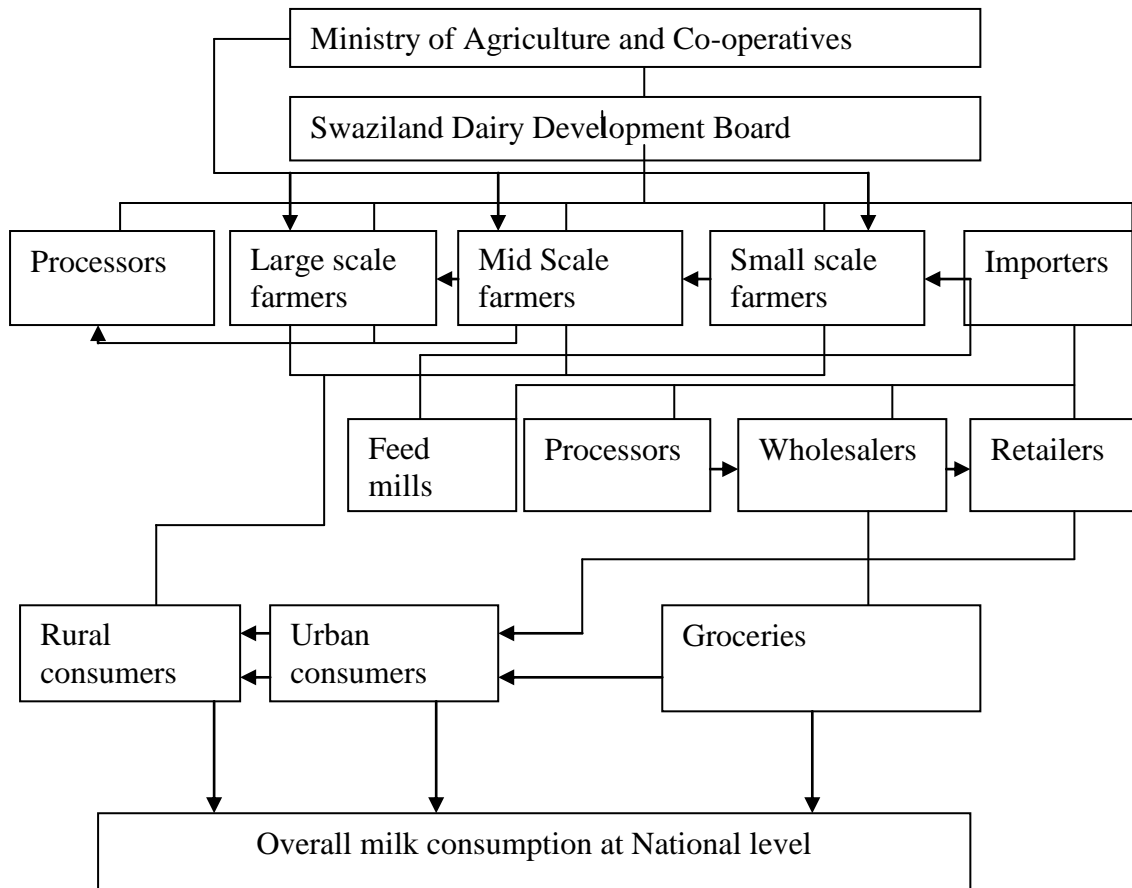


Figure 2.1: The organisational structure of the Swazi dairy industry

Adapted and modified from: (Muriuki et al., 2001).

The direct distribution of milk to the rural consumers by the farmers poses a great danger to the public as most farmers sell unpasteurised milk which may compromise public safety. Also, this is not good for the development of the dairy industry as a whole because unfair competition is created for the processors as are also supplied with milk by the same farmers who compete with them in the market (Figure 2.1). This suggests that a sound comprehensive dairy policy is needed to create an even ground for the entire role players in the Swazi dairy industry.

2.13 Constraints faced by the dairy farmers in Swaziland

As already stated, livestock keepers, especially smallholder farmers, experience similar constraints in sub-Saharan Africa. The constraints include lack of good animals with good genetic makeup, inadequate animal feed and water, poor control of

diseases, uncontrolled livestock movement, poor animal husbandry skills, and distorted marketing and processing infrastructure (Misra et al., 2009; Mwakalile et al., 2002; Ndambi et al., 2007; Pandian et al., 2010). These problems have contributed to the underdevelopment of the dairy sector in many developing countries, although each country has its own specific constraints. In Swaziland, smallholder farmers face numerous challenges including lack of credit facilities; poor access to agricultural equipment; land; unreliable water supply; poor knowledge of appropriate dairy husbandry practices; inadequate extension services; inadequate veterinary services; poor animal nutrition; high cost of feed; poor pasture and fodder production; lack of locally bred dairy stock; poor detection of cows on heat; poor breeding schemes; poor calf rearing practices; unfavourable milk prices in the formal market and poor organization of the informal market.

These and other related factors have kept the Swazi dairy industry underdeveloped for a long time (Malima, 2005). Milk producers have constantly produced far below the local demand, which is met through the importation of over 60% of dairy products from neighbouring countries (NEPAD/FAO, 2005). The performance of the dairy sector is continuing to decline, despite the fact that the Government has set apart SDDB to specifically transform the dairy industry. This raises questions about the efficiency and the capacity of SDDB to develop the dairy industry.

2.14 Swaziland dairy development Board

The Swaziland Dairy Board was restructured in 1999 and the new Board was known as Swaziland Dairy Development Board to emphasize the developmental aspect. Before restructuring, the Board mainly concentrated on commercialization functions instead of developmental activities. As a result the development of the Swazi dairy industry lagged behind and its poor performance was evident through the constant increase in dairy imports and low local dairy production. Therefore, the new Board was given the primary mandate of developing and regulating the dairy industry. In the developmental aspect, the Board was to put more effort into activities promoting milk production through training on the following activities;

- Techniques of detecting cows on heat or ready for breeding
- Pasture establishment and management
- Dairy cattle feeds and feeding

- Proper milking and clean milk handling
- Record keeping
- Dairy herd health and its application
- Milk processing and marketing
- Winter pasture establishment and management
- Procurement of hay and dairy cattle from RSA to address local deficit
- General farm management
- Formation of farmer groups /resource assessment among potential farmers
- Coordination of activities for dairy farmer groups
- Preparation of dairy business plans

In this section, the overview of the Swazi dairy industry has been presented in terms of production systems, local milk production and size of imports, milk marketing channels, role players of the dairy industry and problems encountered by local milk producers. This section presents that local milk production has not increased to meet the local demand of milk and dairy products. This is attributed to a number of factors including lack of credit facility. Access to credit would help poor farmers to access dairy cows of good genetic makeup, and purchase farm inputs and milk cooling facilities that would increase the shelf life of milk and encourage bulking of milk by farmer groups through establishment of collection centres.

2.15 The description of the joint venture dairy credit scheme between Swaziland Dairy Development Board and Swaziland Development Finance Corporation

As already discussed, dairy credit schemes have contributed to the development of dairy sectors in many countries especially in Eastern Africa (Kabumbuli and Phelan, 2003; Minjauw and McLeod, 2003). In addition, dairy credit schemes have facilitated rural development and improved the livelihoods of many households (Herrero et al., 2009; Kabumbuli and Phelan, 2003).

Based on this general concept about dairy credit schemes, Swaziland has implemented its own kind of dairy credit scheme. In this section, the description of the dairy credit

scheme is described. It begins with the purpose, implementation process and importance of the scheme.

2.16 The importance of the dairy credit scheme

In 2004, SDDDB and FINCORP entered into an agreement to increase dairy production through provision of credit to the smallholder dairy farmers (Mavuso, 2005). After the signing of the memorandum of understanding, the credit guarantee scheme was officially launched (NEPAD/FAO, 2005). Management and officers from both SDDDB and FINCORP conducted awareness-raising workshops about the credit scheme in all the regions of the country. The workshop explained the logistics of sourcing the scheme and its purpose (NEPAD/FAO, 2005).

The purpose of the scheme was to provide credit to the small scale dairy farmers in order to promote dairy production and processing, and to establish collection centres to facilitate milk marketing. Through the scheme, farmers were expected to acquire dairy cattle, building material, dairy equipment, pasture seeds and any other material directly associated with dairy production. Individual farmers were eligible to apply for the loan up to the maximum of R100000 to establish or expand their dairy enterprises. For a group, the limit was up to R300,000 (Mavuso, 2005). The farmers were to show commitment by building a cowshed, planting the pastures and maintaining the animals until the milk production stage.

The farmers were not given cash, but were benefiting in kind (dairy farming inputs). This was not a grant but the beneficiaries were expected to repay the loan so that in the next phase other farmers could also benefit. All the farmers who were establishing a dairy project for the first time were expected to have finished repaying the loan by the sixth year (Mavuso, 2005; Mhlanga, 2005). When expanding a dairy project, the maximum period for settling the loan was five years.

In both cases the interest was 13 % per annum and the first year was regarded as a grace period, so they were expected to start repaying the loan in the second year (Mavuso, 2005). The scheme was open to all existing and potential farmers as long as they qualified. The terms and conditions of the credit scheme were as follows;

- Loans were restricted to the smallholder dairy farmers.
- The maximum loan sizes for individuals were up to R100, 000 and R300, 000 for a group of farmers. A group was made up of 10 people and above and they were expected to be registered and legally recognized.
- Loans were issued at an interest rate of 13% per annum and were reviewable from time to time.
- The loan repayment period was up to 72 months.
- Loans were repayable on a monthly basis. However, all loan beneficiaries were given a grace period of one year.
- Loan disbursements were not paid to the beneficiary's accounts but directly to the suppliers of farm inputs.
- Where necessary, beneficiaries were expected to take business insurance cover.
- All loan applicants were required to submit an acceptable business proposal.
- It was imperative that both SDDB and FINCORP undertake to ensure that strict control measures were in force to monitor the financed projects. SDDB was expected to offer extension services and FINCORP was expected to disburse and ensure loan recovery by the beneficiaries.

To ensure that the credit was being received by deserving bona fide Swazis, especially those who resided in the rural areas, the beneficiaries had to meet eligibility criteria as follows;

- Be a bona fide Swazi citizen.
- A person of reputable character and known by traditional and community leaders. Be a person who has never been implicated in any unjustified social unrest.
- Be a person who has never been blacklisted because of failure to meet personal financial obligations.
- Be engaged in a dairy enterprise which has the potential to create new jobs either for the entrepreneur's family or third parties thus raising the income levels.
- Be a farmer whose dairy enterprise complies with all legal, regulatory, licensing and other registration formalities required by the Swazi law.

- Be one whose dairy enterprise is compliant with current environmental legislation and regulations.

The farmers who were interested in participating in the credit scheme were to indicate this by visiting the offices of SDDDB for a verbal interview. The interview verified the farmers' potential to handle dairy projects, in terms of resources they had. Thereafter, the processing of loan applications followed.

2.17 Resource assessment exercise

A resource assessment exercise was carried out by qualified and competent officers from SDDDB and MOAC to determine the capacity of the natural resources (such as land availability and reliability of water supply) to handle a profitable dairy production project. After completion of the resource assessment, they were expected to develop a resource assessment report that would provide valuable information in developing a business plan. The resource assessment exercise involved the verification of the following resources;

- Enough land for the size of the dairy project the farmer was intending to establish. This was measured by allocating a hectare to each dairy cow. The land was expected to be arable for the purposes of pasture establishment. The right to use the land was verified through the community leaders; that it indeed belonged to the farmer and there were no disputes over it.
- Water availability and reliability. The farmers were encouraged to develop their own reliable sources of water such as boreholes.
- Verify whether or not dangerous plant species that may be poisonous to dairy cows were present, such as *Lantana camara*.
- Location of the farmer. This influenced the type of breed recommended. The climate of Swaziland varies from one ecological zone to another, as described in section 3.2. Dairy breeds prefer different climatic conditions and this influences their performance.

Once the farmer had passed the resource assessment phase, the next stage was the business plan proposal development stage which was solely the responsibility of the loan applicant. The farmer was expected to hire the services of a professional consultancy firm in business plan and proposal development. The business proposal

plan was expected to be developed according to the recommendations of the resource assessment report.

2.18 Loan acquisition, disbursement and sourcing of dairy cows

The developed business plans were taken to the Dairy Development Committee (DDC) for screening and approval purposes. The business plans were checked to see that they had been developed according to the recommendations of the resource assessment report and viability. In addition it was verified that all the supporting documents were attached. The supporting documents included personal track records, birth certificates, national identity documents, a graded tax number and certificates of training related to dairy. After passing this phase, they were taken to FINCORP for final verification and loan allocation purposes (Mavuso, 2005).

There were four batches of loan disbursements. In the first batch, there were 22 loan applications, but only seven farmers were successful. In the second batch, there were 30 loan applications, and 8 were successful. In the third phase, there were 41 loan applications and only 13 were successful, and in the last batch over 50 applications received but only 5 were successful (Mhlanga, 2005). The loan was not allocated all at once. The loan was given in stages depending upon the farmer's needs and level of operation. For example farmers who were in the pasture establishment phase were given pasture seeds, fertilizers, herbicides while those who had already established pastures received the milking dairy cows.

With the help of SDDB officers, the farmers purchased dairy cows from reputable registered sources in South Africa. After purchase, the animals were quarantined by the Swaziland government for a period of 30 days. After that, the farmers were expected to collect their animals. Since the farmers were advised to buy animals that were at the point of milking, most farmers started milking, consuming milk and selling both milk and *emasi* (*sour milk*) and the level of income started to increase. It was expected that through the increased income levels, households would be able to improve dietary diversity, finance social development, diversify their livelihoods and repay the loan.

Although livestock production schemes are contributing to improvement of household food security, measuring their impact has been difficult because often they have been used as a tool to canvass votes, especially when they are implemented by the government (Kabumbuli and Phelan, 2003; Obamuyi, 2009). Livestock production and other related schemes usually benefit the executors (project facilitators) than the targeted poor people (Obamuyi, 2009). This is because the Projects are often not implemented according to the plan, which then makes it difficult to monitor and evaluate. Yet, evaluation is important to generate good quality and appropriate information about the strengths, weaknesses, opportunities and threats of the schemes in order to inform the policy makers and project funders (Obamuyi, 2009). In the following section, several methods of measuring food security are presented.

2.19 Measurement of food security

Food security is a complex and a multi-dimensional concept intertwined with poverty (Obayelu and Abiodun, 2010). To account for this complexity, analysts measure distinct aspects or facets of food security depending on the objectives and purpose of the investigation (Hoddinott and Yisechac, 2002; Obayelu and Abiodun, 2010). The World Food Programme reports that there is no single way of measuring food security (WFP, 2008b).

This study has adopted the Food Consumption Scores (FCS) as a measure of food security. The FCS is a composite score based on dietary diversity, food frequency and the relative nutritional importance of different food groups (WFP, 2005). FCS has been used in over 20 countries including Swaziland (WFP, 2008b). Studies to validate the FCS method have been carried out in three different countries (Burundi, Haiti and Sri Lanka) under the auspices of International Food Policy Research Institute (International Food Policy Research Institute, 2008; WFP, 2008b). The findings of these studies support the use of World Food Programme's FCS for food security assessments (Wiesmann et al., 2009). However, the cut off points established by WFP to define poor, borderline and adequate food consumption groups were low when the FCS classification was compared to estimates of deficiency from surveyed data and other sources (Wiesmann et al., 2009). Further discussion of FCS is presented in detail in the methodology section of the study as they were used to classify the beneficiary households according to their food security status.

Chapter 3

Methodology

3.1 Research design

The overall objective of this study was to determine the contribution of the dairy credit scheme to the wellbeing of the beneficiaries in terms of household food security. A structured questionnaire and food items list were used to collect data. The survey questionnaire was pre-tested by conducting interviews among five non-beneficiary dairy farmers before conducting the study. Pretesting of the questionnaire was done to ensure that the instrument was user friendly and able to capture the needed information. The target population was 33 participants, the same number as the beneficiaries of the scheme (Mavuso, 2005). However, due to the death of some beneficiaries and poor record keeping only 30 beneficiaries eventually participated in the study

3.2 Data collection

Primary data were collected through personal interviews over a period of nine weeks. A structured questionnaire with partially open-ended questions was used to guide the study. Secondary data were obtained from the Swaziland government Ministries' unpublished documents, SDDB and FINCORP's annual reports. The structured questionnaire had five main sections, namely demographic, project performance (milk production and sale records between 2006 and 2009), food groups, food frequency and Food Consumption Score (FCS), socio-economic benefits of the project and perception of the beneficiaries on the extension services. The researcher visited each household by appointment and interviewed either the project beneficiary or the person hired to operate the project on a daily basis. In relation to the collection of the data on dietary diversity, the number of food items across eight food groups with a reference period of seven days was used, and the researcher was careful to ignore diets for special occasions such as weddings (WFP, 2009). Such diets can influence the food consumption scores positively and lead to the misinterpretation of results to indicate that the households are consuming nutritionally balanced foods when they are not (WFP, 2009). Table 3.1 presents food items and food groups for which data were collected.

Table 3.1: Food groups and frequency to determine Food Consumption Scores

Food item	Food group	Frequency of the food group eaten (in seven days)	Nutrient density of the food group	Food Consumption Group Score
Maize, maize porridge, bread and cereals	Cereals and tubers		2	
Cassava, potatoes and sweet potatoes				
Beans, pigeon peas, groundnuts and cashew nuts	Pulses		3	
Vegetables and leaves	Vegetables		1	
Fruits	Fruits		1	
Beef, mutton, pork, eggs and fish or any meat	Meat and Fish		4	
Milk, yoghurt and other dairy	Milk		4	
Sugar and sugar products or sweets	Sugar		0.5	
Oil, fats and butter	Oil		0.5	
Condiments (coffee, tea, spices and salt)	Condiments		0	
Household Food Consumption Score				

Adapted and modified from: (WFP, 2009).

The Food Consumption Scores (FCS) were calculated from the eight food groups (cereals and tubers, pulses, vegetables, fruits, meat and fish, milk, sugar and condiments) and subjected to the adjusted threshold levels as outlined in Table 3.2. The threshold levels had to be adjusted according to the World Food Programme (WFP) procedure because the households had consumed sugar and oil almost on daily basis in the past seven days (WFP, 2009). The basic thresholds were raised by adding seven as per the WFP procedure to account for the daily consumption of oil and sugar, which adds seven points to the FCS, as illustrated in Tables 3.2.

Table 3.2: Thresholds for creating food consumption groups

Basic threshold levels		
Food Consumption Score	Calorie consumption in kilocalories/capita/day	Profile
0- 21	<1, 470	Poor
21.5- 35	≥1, 470- <2, 100	Borderline
>35	≥2, 100	Acceptable
Adjusted threshold levels		
Food Consumption Score	Calorie consumption in kilocalories/capita/day	Profile
0- 28	<1, 470	Poor
28.5- 42	≥1, 470-<2, 100	Borderline
>42	≥2, 100	Acceptable

Source: (WFP, 2005; WFP, 2009)

Table 3.2 under adjusted threshold levels indicates that a household with a food consumption score less than 28 was considered as having poor nutrient intake and dietary diversity, consumption of 28.5-42 was considered as moderate nutrient intake and dietary diversity, and consumption of above 42 was considered as acceptable nutrient intake and dietary diversity (WFP, 2009).

3.3 Data analysis and treatment

The data analysis was carried out using the Statistical Package for Social Scientists (SPSS) version 18.0. Frequencies, means and percentages were used to describe and organize the data in tables. A one way analysis of variance was conducted to detect significant differences among households on number of dairy cows, total milk production, milk and *emasi* (sour milk) sales and income using the data from 2006 to 2009. The analysis showed significant differences for all variables studied (Anova table presented in the Appendix). Therefore, the means were compared using the Duncan Multiple Range Test (DMRT). The DMRT was used at $p=0.05$ to compare the households in terms of the mean number of dairy cows, total milk production, milk and *emasi* sales and income generated. The DMRT was used because 30 households were compared and it is a suitable procedure when comparing means that are above six (Gomez and Gomez, 1984). The Pearson's correlation analysis was

conducted to investigate the degree of relationship between household size, milk consumption level, ownership of dairy cows and frequency of milk consumption. The investigated sub-problems and method of analysis are presented in Table 3.3.

Table 3.3: Study sub-problems and analysis

Sub-problems	Data collected	Analysis
How much milk was produced and sold as result of the scheme?	Volumes of milk and <i>emasi</i> produced and sold.	Analysis of Variance and the Duncan's Multiple Range Test to compare and separate the means of milk and <i>emasi</i> produced and sold.
Did dairy production contribute to increase in milk consumption and Food Consumption Scores?	Frequencies of milk and food groups' consumption.	Food Consumption Scores (Threshold levels poor, borderline and acceptable) and Pearson's correlation coefficient (r).
How were the livelihoods affected after the implementation of the scheme?	Areas in which the dairy project has benefitted the farmer, e.g. education, investing in other businesses, list of assets accumulated as a result of the project.	Descriptive Statistics.
What were beneficiaries' perceptions of the extension services?	Ranking of the extension services going with the scheme.	Descriptive Statistics.

Chapter 4 Results and discussions

4.1 Introduction

The study set out to assess the contribution of the SDDB and FINCORP dairy credit scheme to household food security among the beneficiaries in Swaziland. The findings of the study are presented in the subsequent sections, particularly answering the research questions outlined in chapter one. This chapter begins by describing the demographic and geographical distribution characteristics of the beneficiaries as presented in Tables 4.1 and 4.2.

4.2 Socio-demographic characteristics of the beneficiaries and their households

Demographic results for the study are presented in Table 4.1. The results indicate that almost one third (30.0%) of the beneficiaries were between 51 and 60 years. A few (16.7%) were younger beneficiaries between 30 and 40 years. This could be attributed to the criteria adopted in selecting the beneficiaries. Beneficiaries were expected to contribute to the project by constructing a milking shed, a cow handling facility and providing at least one hectare of land for pasture establishment. Therefore, these criteria were mostly met by older beneficiaries who had accumulated enough capital and land for dairy production.

Table 4.1: Demographic characteristics of beneficiaries across the four regions

Demography	Beneficiaries	
	Number	Percentage (%) of beneficiaries
Gender		
Male	26	86.7
Female	4	13.3
Age of beneficiary		
18-29	0	0
30-40	5	16.7
41-50	8	26.7
51-60	9	30.0
Above 60	8	26.7

Most beneficiaries were males (86.7%) as indicated in Table 4.1. However, it may not be true that the majority were males. According to the Swazi law and custom, all family projects and assets including land are registered under the head of the household, who is often the male. Also land ownership in the Swazi cultural context is determined by marital status. Younger people do not typically qualify for an allocation of land until they are married and this limits them from participating in agricultural production. As a result older people (above the age of 50 years) were in dairy production compared to the youth as indicated in Table 4.1. However, this is not a good environment for improving milk production, as younger farmers are often more efficient than older farmers (Ogunsumi and Ogbosuka, 2009). The fact that the proportion of older people engaged in dairy production is high as compared to younger ones could be the reason behind Swaziland's inefficiency in milk production, resulting in the situation where over 60 % of milk and dairy products consumed in Swaziland are imported from neighbouring countries (NEPAD/FAO, 2005).

The beneficiaries were spread over the country, but not evenly distributed across the regions as shown by the results in Table 4.2.

Table 4.2: Number and percentage of beneficiaries across four regions

Regions	Beneficiaries	
	Number	Percentage (%) of beneficiaries
Hhohho	1	3.3
Manzini	16	53.3
Lubombo	11	36.7
Shiselweni	2	6.7

The majority of beneficiaries (53.3%) were located in the Manzini region while the lowest number (3.3%) was in the Hhohho region. This could be attributed to the socio-economic and political differences existing between and within the regions. For example, Hhohho is regarded as the powerhouse of the leadership of Swaziland, with sustainable sources of income as compared to the other regions other than Lubombo region. The non-governmental organizations (NGO's), big companies and some factories are mostly located within the Hhohho region. That there were few

beneficiaries from the Hhohho region suggests that households from this region either did not regard dairy as something adding value to their lives, or rather they were not well-sensitized about the dairy credit scheme. The Manzini region is fairly developed with the upper wet middleveld most favourable for dairy production (Mavuso, 2005; NEPAD/FAO, 2005). The favourable climatic conditions for dairying and the market proximity of Manzini could possibly have attracted more participants to the dairy scheme. The education level of the beneficiaries and the characteristics of their household composition are presented in Table 4.3 and 4.4.

Table 4.3: Level of education of the beneficiaries

Level of education	Beneficiaries	
	Number	Percentage (%) of beneficiaries
Never been to school	2	6.7
Primary school	1	3.3
Secondary school	2	6.7
High school	8	26.7
Tertiary school	17	56.7
Total	30	

The beneficiaries (56.7%) had reached tertiary level of education which was an added advantage for the success of the dairy scheme. Increases in the level of education improves the skill and entrepreneurial ability of a dairy farmer to organize and integrate inputs for maximum performance of the dairy project (Walingo, 2006). However, general education should not be overvalued to an extent that it replaces specific education for any particular project as this may compromise the efficiency of the farmers leading to poor performance and failure of that particular agricultural project.

The beneficiaries had nine people on average per households. This suggests that labour was likely available provided the households were not mainly composed of children. The household composition results are presented in Table 4.4. Each household had members between three and twenty, adults between two and ten and children between zero and 12. The high number of family members especially those

households with many children suggest that more milk was consumed at household level and family labour was likely available for milk production activities. Therefore, there was no need for a hired labour that could have increased the milk production costs.

Table 4.4: Household composition of the beneficiaries across the four regions

Household composition	Mean	Minimum	Maximum
Household size	8.50	3	20
Adults (>18 years)	4.57	2	10
Children (\leq 18 years)	3.83	0	12

4.3 The contribution of the dairy credit scheme to milk production and income

The results of the survey indicate that the 30 beneficiaries received 101 dairy cows when the scheme started in 2006. Through these animals the beneficiaries were able to produce and sold milk from 2006 to 2009 as presented in Table 4.5

Table 4.5: The number of cows reared, milk and emasi sales and income averaged from 30 households during 2006-2009

Year	Number of cows	Milk produced (ℓ)	Milk sold (ℓ)	Milk income (ℓ)	Emasi sold (R)	Emasi income (R)
2006	101	207976	146822.5	754225	48479	417829
2007	100	211372	136552	845205	48756	435119
2008	83	179770	127607	822539	39230	377625.5
2009	83	153198	110450	761850	50742	579408
Total		752316	521431.5	3183819	187207	1809981.50

The figures in Table 4.5 indicate that between 2006 and 2009, the number of animals had been declining and this has resulted in a reduction in milk production. The beneficiaries had attributed the reduction of the number of animals to death through tick-borne diseases due to poor veterinary services. Other causes of loss include theft, poisoning and ineffective extension services. These affected milk production

negatively as indicated in Table 4.5 and the summarised aggregate performance of the dairy scheme is presented in Table 4.6

Table 4.6: Mean number of cows, milk and *emasi* production, sale and income per household during 2006 to 2009

Households	Number of cows	Milk production (ℓ)	Milk sales (ℓ)	Milk income (R)	<i>Emasi</i> sales (ℓ)	<i>Emasi</i> income (R)
1	1.50abc	2533.75ab	690.00a	1925.00ab	120.00a	1200.00a
2	2.75abcd	8555.00bcd	6912.50ab	35412.50def	1025.00ab	11280.00abc
3	1.25abc	1753.75ab	1350.00ab	7725.00abc	0.00a	0.00a
4	2.00abcd	3385.00abc	2250.00ab	12750.00abcd	600.00a	5100.00ab
5	5.75fg	18328.75e	13125.00bc	61312.50hi	4050.00cde	32400.00abcd
6	1.75abcd	3375.00abc	1825.00ab	10475.00abc	740.00a	7270.00ab
7	2.00abcd	3337.50abc	2212.500ab	13937.50abcd	885.00a	8320.00ab
8	4.00def	4287.50abc	2850.00ab	16912.50abcde	1120.00ab	11090.00abc
9	2.75abcd	6475.00abc	5962.500ab	34762.50def	2385.00abcd	21052.50abc
10	3.75cde	2773.50ab	1750.00ab	11856.25abcd	702.500a	6152.50ab
11	1.5abcd	7167.50abc	6237.50ab	29050.00cdef	0.00a	0.00a
12	0.5a	500.00a	237.500a	1020.00a	0.00a	0.00a
13	3.25bcd	6721.25abc	5362.50ab	38812.50efg	412.50a	4125.00ab
14	1.5abcd	2397.50ab	1575.00ab	11400.00abcd	1080.00ab	12322.50abc
15	2.25abcd	5312.50abc	3468.75ab	19181.25abcde	1387.500abc	12322.50abc
16	6.25fgh	6975.00abc	5150.00ab	25293.75bcde	1471.00abc	10753.75abc
17	4.00def	7575.00bc	4912.50ab	28050.00cdef	1965.00abc	17055.00abc
18	4.00def	10150.00cd	6737.50ab	45475.00fgh	2690.00abcde	25565.00abc
19	1.00ab	8681.25bcd	1275.00ab	8175.00abc	510.00a	4590.00ab
20	2.00abcd	3732.50abc	2362.50ab	12506.25abcd	825.00a	7650.00ab
21	2.00abcd	5750.00abc	4005.38ab	23338.50abcdef	1602.75abc	16558.52abc
22	7.75gh	16989.25e	11789.25bc	74137.50i	4485.00de	42570.00cd
23	8.00h	14087.50de	9453.75ab	59835.00ghi	3781.50bcde	36448.50bcd
24	3.75cde	5975.00abc	3825.00ab	29475.00cdef	1530.00abcd	15060.00abc
25	2.00abcd	3225.00ab	2212.50ab	17550.00abcde	885.00a	9000.00ab
26	2.25abcd	5900.00abc	3925.00ab	28812.50cdef	5215.00e	59005.00d
27	3.00abcd	8046.25bcd	5375.00ab	28862.50cdef	2348.00abcd	22112.00abc
28	3.00abcd	7380.00abc	5137.50ab	35087.50def	1755.00abc	17950.00abc
29	3.25bcd	8046.25bcd	5610.00ab	45067.50fgh	1896.00abcd	22095.00abc
30	2.50abcd	5212.50abc	3337.50ab	26231.25cdef	1335.00abc	15000.00abc

*Means in a column with similar letters are not significantly different at p=0.05 level of probability using the Duncan Multiple Range Test.

The mean number of cows between 2006 and 2009 varied from one to eight per household (Table 4.6). Household number 23 had the highest number of cows which was significantly different (p<0.05) from other households except households five, 16

and 22. The lowest mean numbers of cows were recorded for households three, 12 and 19 with one cow per household.

The highest mean milk production from 2006 to 2009 was noted in household five at 18328ℓ of milk from six cows. However, there is no significant difference between household five and households 22 and 23 that had between 14087.50 and 16989.25ℓ of milk from eight cows per household. This suggests that the dairy animals in household five were both well fed and managed or were in the early stage of lactation which also has influence in milk production level. The lowest mean milk production was 500ℓ and was recorded by household number 12 that had one cow. However, there was no significant difference in milk production between household 12 and the households who owned between one and four cows.

The highest mean milk sale between 2006 and 2009 was noted with household five which recorded 13125.00ℓ of milk. Although household five sold more milk compared to the rest of the households, the difference in milk sales was not significant different from the other households. This implies that household five consumed more milk compared to the other households suggesting that dairy production led to increased milk consumption.

Although, there were no significant differences in milk sales, there were significant differences ($p < 0.05$) in income generated by the households. Household 22 generated the highest mean income of R74137.50 but it was not significant different from income made by households five, 18, 23 and 29. Also, these households generated similar income through *emasi* sales and there were still no significant differences. Household 12 generated a least mean income of R1020.00 probably owing to the least number of cows kept by the household. The household (12) including other households such as three and 11 had not sold *emasi* between 2006 and 2009. This implies that the neighbouring community members either bought all the milk such that there was no milk left to make *emasi* or the milk was only enough for family consumption. The variation in income from both milk and *emasi* sales could be explained in terms of differences in geographical locations of the households and milk price per litre which depended on the informal market opportunities which varied from region to region.

This section has established that the dairy credit scheme had contributed 752316 litres to overall national milk volumes and generated R4993800.5 through the sales of milk. This implies that the purpose of the dairy scheme in improving local milk production was partially achieved. The dairy production scheme has not only contributed to total national milk production but it has also increased national dairy herd by 101 dairy cows in 2006 and probably increased milk consumption and income through milk sales among the beneficiaries.

The beneficiary households owned between one and eight cows. Those households that owned between five and eight cows produced significantly better than households who owned between one and four. However, in terms of milk sales the difference was not significant implying more milk consumption in households who kept between five and eight cows. Through milk sales, the households generated between R1020.00 and R74137.50 mean income per year between 2006 and 2009. Tables 4.11, 4.12, 4.13 and 4.14 present the items and activities on which the income was spent and these include food supply, accumulation of assets and livelihoods improvement through diversification of sources of income.

4.4 Improvement of milk consumption and dietary diversity

The analytical results suggest that the dairy production scheme has directly contributed to food security among the households in various ways. First, through milk consumption and this has probably improved the dietary intake of essential nutrients and nutritional quality of food eaten by members of the households. Table 4.7 presents the frequency of milk consumption of households who were found to be milking at a time of conducting the study.

Table 4.7: Household's frequency of milk consumption from own production

Frequency of milk consumption	Beneficiaries	
	Number	Percentage (%) of beneficiaries
Seven times a week	15	50.0
Three times a week	4	13.3
Two times a week	1	3.3

Half the households consumed milk seven times a week; 13.3% consumed milk three times a week and 3.3% two times a week. As the households had access to milk, milk consumption and sales increased resulting in better dietary intake and food supply. The households had better food supply compared to non-milking households and this is suggested by the differences in averaged Food Consumption Scores in Table 4.8.

Table 4.8: The Food consumption scores, current milking cows, current milk production and milk consumption level

Parameter	Mean± Standard error
The FCs for milking households cows (20)	75.58± 3.279
The FCs for non milking householdscows (10)	59.65± 5.084
Current milking cows	1.93± 1.721
Current milk production (Litres)	17.23± 16.179
Current milk consumption (Litres)	1.67± 1.8545

Comparing the households on the basis of the Food Consumption Scores, those households who were found to be milking during the survey had higher mean Food Consumption Scores (75.58) compared to non-milking households (59.65) and this suggests that dietary intake was better among the milking households probably because of increased milk consumption level and income to improve dietary diversity. Therefore, milking households were more food secure than non-milking households. These findings are similar to other studies carried out in countries such as Kenya and Tanzania where change in the level of income through dairy production led to improvement in dietary diversity (Ekesa et al., 2008; Tefera, 2007).

The Food Consumption Scores of the food groups that had been consumed by the households seven days before interviews were subjected to the food group's threshold levels. Table 6.9 presents the households according to the profile of the quality of food group they had consumed seven days before the survey.

Table 4.9: The grouping of households according to the threshold levels of food groups

Adjusted threshold levels			Households	
Food Consumption Score	Calorie consumption in kilocalories/capita/day	Profile	Number	Percentage of households
			0- 28	<1, 470
28.5- 42	≥1, 470-<2, 100	Borderline	2	6.7
>42	≥2, 100	Acceptable	28	93.3

Most households (93.3%) consumed food groups that were of acceptable quality as their Food Consumption Scores were above 42 and 6.7% households consumed a borderline diet with Food Consumption Scores ranging from 28.5 and 42. There was no household that had consumed low quality food groups as classified in the poor profile in Table 4.9. This suggests that there is a likelihood that the dairy production scheme might have contributed to the improvement of the household food security because milking households had better average Food Consumption Scores (75.58) than non-milking households (59.65). In terms of milk consumption on average basis, each household consumed 1.67 ± 1.8545 litres/day. This indicates an annual milk consumption of 71.76 litres/capita/year, which is an improvement in the level of milk consumption among the beneficiaries because this is above (58.2 litres/capita/year) the national average milk consumption (Beyene and Melesse, 2009). This is also above the 62.5 litres per capita per year that is recommended by the Food and Agricultural Organization (FAO, 2000).

Statistical associations were performed to determine the relationship between consumption level, household size, ownership of dairy cows and frequency of milk consumption and the results are presented in Table 4.10. The results in Table 4.10 indicate a non-significant negative relationship between consumption level and household size ($r = -0.12$). This suggests that as the household size increases, less milk was consumed per capita. However, there is a strong positive relationship (r

=0.71) between ownership of dairy cows and milk consumption level and this implies that dairy production led to improved milk consumption level.

Table 4.10: Pair-wise correlation between household size, milk consumption level, ownership of dairy cows and frequency of consumption (N=30)

Variables	Household size	Milk consumption level	Ownership of dairy cows	Frequency of milk consumption
Household size	1	-0.12 (ns)	-0.12 (ns)	-0.03(ns)
Milk Consumption level		1	0.71**	-0.69**
Ownership of cows			1	-0.81**

**Correlation is significant at the 0.01 level (2-tailed)

But ownership of dairy cows did not increase the frequency of consumption of milk ($r = -0.812$) among the beneficiary households. This suggests that the households were concerned about income generation than milk consumption. This is justified by the fact that the households were expected to repay the loan. However, these findings were not in conformity with other similar studies reported in Kenya, where dairy ownership increased the consumption frequency and level of consumption of dairy products by 1.0 litre per week (Nicholson et al., 2004). This probably has to do with the differences in nature and purpose of the dairy production schemes. Dairy production schemes that are designed specifically to improve household food security without expecting the households to repay the loan would probably result to improved milk consumption level and frequency than households that are expected to repay the loan. Therefore, it is not an anomaly that the SDDB and FINCORP dairy scheme did not increase frequency of milk consumption but at least it improved the consumption level as indicated in Table 4.10.

Almost all the seven food groups were consumed on a daily basis by the households as presented in Table 4.11. Cereals and tubers were consumed by all the households on a daily basis. Vegetables were consumed by 66.7% of households, meat and fish by 43.3%, sugar by 90%, oil by 40% and milk by 50% of households (Table 4.11).

Some households (20%) had not consumed milk, while 13.3% had consumed milk once in the past seven days and this is presented in Table 4.11. This suggests that these households were from non-milking category as milking households had consumed milk at least twice in the past seven days as indicated in Table 4.7. However, the extent of impact of the dairy production scheme in terms of frequency of food group's consumption cannot be estimated as there was no baseline survey established when the project was initiated. The results of the frequency of consumption of food groups established by this study are presented in Table 4.11.

Table 4.11: The frequency of consumption of food groups by the households expressed in percentages (%) in seven days

Food groups	Percentage (%) of households and frequency of consumption of each food group in seven days							
	Not eaten	Once per week	Twice per week	Three times per week	Four times per week	Five times per week	Six times per week	Seven times per week
Cereal/tubers	0	0	0	0	0	0	0	100
Pulses	20	13.3	40	16.7	10	0	0	0
Fruits	90	3.3	0	3.3	3.3	0	0	0
Vegetables	0	6.7	3.3	6.7	3.3	10	3.3	66.7
Meat/Fish	0	3.3	3.3	0	26.7	16.7	6.7	43.3
Milk	20	13.3	3.3	13.3	0	0	0	50
Sugar	6.7	0	0	0	3.3	0	0	90
Oil	20	3.3	3.3	16.7	3.3	13.3	0	40

The results in Table 4.7 show that the dairy credit production scheme could have contributed to increased milk consumption as the frequencies of milk consumption among milking households were between two and seven times a week compared to those of the non-milking households which were between zero and one per week. This implies that milking households had better access to milk leading to improved milk consumption and income through milk sales. The increased in income led to the

transformation of the socio-economic status of the households in various aspects and the results are presented in Table 4.12.

4.5 The contribution of the dairy production scheme to the socio-economic status and livelihoods of the beneficiary households

The dairy production scheme did not only lead to improved milk consumption but also led to the diversification of sources of income, spending on assets and social development like education as indicated in Tables 4.12 and 4.13. Table 4.12 presents the socio-economic benefits in which the households were able to participate in after benefiting from the dairy production scheme.

Table 4.12: Direct socio-economic benefits of the dairy production scheme among the beneficiary households between 2006 and 2009

Benefits of the dairy scheme	Beneficiaries	
	Number	Percentage (%) of beneficiaries
Education	22	73.3
Bought food	27	90.0
Paid debts	25	83.3
Home electrification	3	10.0
Investments (poultry, piggery) and groceries and block yard making	17	56.7
Stokvel schemes	8	26.7
Life improvement	29	96.7
Status in society	24	80.0

Households (73.3 %) were able to finance education expenses such as school fees and school uniforms. The households have also indicated that they have used income generated from milk sales to invest in more capital and non-farm activities leading to the diversification their livelihoods. Households (57%) indicated that they were able to invest in agricultural projects such as poultry, piggery, horticultural farming and non-agricultural projects (groceries and block yard making) as shown in Table 4.12.

The majority of households (80%) indicated that their dairy projects had made them popular among their community members as a result some heads of the households were elected or voted into traditional leadership positions. Also, households (90%) acknowledged that through the increased in income emanating from milk sales they were able to increase food supply. The majority (90%) acknowledged that their

standard of living improved after participating in the dairy credit scheme. The dairy credit scheme enabled some of the households to accumulate agricultural and productive assets between 2006 and 2009 as presented in Table 4.13.

Through access to the dairy credit scheme, households were able to accumulate assets estimated to the mean value of R566.70 in 2006, R5186.66 in 2007, R2672.00 in 2008 and R2156.66 in 2009. Notably, many assets were accumulated in 2007 and few assets accumulated in 2006 implying that more money was put into operation and capital costs in 2006 than in 2007. This further suggests that in 2007, the households were able to spend money in asset items as the dairy projects were already established.

Table 4.13: Asset accumulation and economic improvement among the beneficiary households between 2006 and 2009

Year	Assets	Mean income (R)	Minimum income (R)	Maximum income (R)	Percentage (%) of beneficiaries
2006	Borehole/ milking machine	566.66	0.00	12000.00	6.6
2007	Farming tools/ fencing material	5186.66	0.00	26000.00	43
2008	Milk/maize storage facility, poultry equipment	2672.00	0.00	50,000.00	26.4
2009	Bailing material/ beef herd	2156.66	0.00	27000.00	16.7

The assets were mainly agricultural equipment (Table 4.13). Evidence from the survey results also indicates that through increase in income and asset accumulation, the households have been able to diversify their sources of income as indicated in Table 4.14.

Table 4.14: Various sources of income on monthly basis among beneficiary households

Income sources	Mean (R)	Minimum (R)	Maximum (R)	Percentage(%) of households
Piece jobs	120.00	0.00	3000.00	6.7
Self employment	805.00	0.00	20,000.00	10.0
Elderly grant	200	0.00	3400.00	20.0
Employment	5071.61	0.00	20500.00	56.7
Other farming	711.93	0.00	8000.00	53.3
Dairy	2280.33	0.00	6000.00	66.7

A few (6.7%) of households were engaged in informal jobs, while the majority were engaged in employment, farming and dairy production. The results indicate that 56.7% beneficiaries were employed with an average monthly income of R5071.61 while 66% generated R2280.33 per month through dairy production. Evidence from the results indicates that dairy production had increased the level of income by up to R6000.00 per month per household (Table 4.14). As already stated, the improvement in the level of income increased the household's purchasing power and diversification of livelihoods leading to reduction in income variability. This indicates that the dairy scheme contributed to the wellbeing of the households.

However, the beneficiaries acknowledged that had the dairy scheme not been supported by both SDDB and MOAC in terms of technical advice on animal husbandry and dairy production skills, the dairy scheme could not have been successful. Table 4.15 presents the aspects of dairying and extension services on which the households were supported. The beneficiaries were asked to rank the extension services according to the order of importance to the support and success of the dairy credit scheme.

Table 4.15: Ranking of the extension services of SDDB and MOAC by the beneficiary households

Activities	Rank	Percentage (%) of households
Extension services	2	53.3
Market organization	3	73.3
Credit provision	1	73.3
Artificial insemination	1	66.7
General farm management	1	76.6
Farmer organization	1	70.0
Veterinary services	3	70.0

Rank: 1=good; 2=fair; 3=poor

Generally the extension services supporting the dairy credit scheme were fair. However, both SDDB and MOAC were ranked poor by 73.3% of the households, in terms of coordinating the milk market through establishment of collection centres. This could have facilitated the marketing of milk in a more organized way and opened opportunities of adding value to their milk through processing. In the other activities such as dairy management, credit provision, artificial insemination and farmer organization, both SDDB and MOAC were good in delivering those services (Table 4.15). However, over 70% of the households ranked veterinary services as poor. The households had indicated that poor response from veterinary officers has resulted in losing animals through poor treatment of tick-borne diseases and calving difficulty.

Chapter 5

Summary, conclusion and policy related recommendations

5.1 Summary

This study was undertaken to verify the contribution of a dairy credit scheme to household food security among the beneficiaries and the study was investigated through the following sub-problems;

- How much milk was produced and sold as a result of the dairy production scheme between 2006 and 2009?
- Did dairy production contribute to increased milk consumption and Food Consumption Scores (FCS) among the beneficiaries?
- Were their livelihoods improved after implementation of the scheme?
- Did extension services contribute to the success of the dairy credit scheme?

The investigation of these study questions provided evidence that the dairy credit scheme was able to partially improve local milk production and household food security of the dairy credit scheme beneficiaries. Therefore, the study was important to generate information for project funders, development partners and policy makers to make proper decision based on scientifically verified information other than presumed information that resulted in the scheme prematurely terminated.

The dairy credit scheme was expected to enable the smallholder dairy farmers to have access to quality dairy animals, dairy equipment and improved dairy infrastructure. This was anticipated to make beneficiaries effective and efficient in dairy activities and increase local milk production and household's food security. Unfortunately, the dairy scheme was terminated in 2007 without its impact being evaluated in terms of contribution to household food security among the beneficiaries. Therefore, there was a need to investigate the contribution of the scheme to household food security in order to generate information that would then facilitate the decision making process among the stakeholders. The study used primary data collected from the 30 beneficiary households. The overall study was constrained by the poor record keeping, death and lack of cooperation of some beneficiaries. Also, the unavailability

of a baseline survey limited the study to a recall method. The Statistical Package for Social Scientists (SPSS version 18.0) was used to analyze the data.

The households kept between one and eight cows but most households (26) kept between one and four cows. A few kept between five and eight dairy cows between 2006 and 2009. Those households that kept between one and four dairy cows obtained between 500 and 10150 litres of milk on average per year, while those owning between five and eight got between 6975 and 18328.75 litres per year. Households owning one to four cows sold up to 6737 litres of milk per year, while those owning between five and eight sold up to 13125 litres of milk per year. The households sold either raw milk or as *emasi* and more income came from milk (up to R74137.7) compared to *emasi* (up to R42570.00). In total the households obtained 752316 litres of milk and generated income of R4993800.50 between 2006 and 2009. The results indicate that the households were able to boost local milk production by 752316 litres of milk and generated income through milk sales. Therefore, the dairy credit scheme partially contributed to the local milk production and increased the purchasing power of the beneficiary households.

The study established that milking households consumed 1.67 litres per day from two cows producing 17.25 litres/ day/cow on average. Half of the households consumed milk seven times a week and 20% did not consume milk at all. The households indicated that before the dairy scheme they never had access to 1.67 litres of milk/day and they were not consuming milk on daily basis. This indicates that the dairy credit scheme led to increased access to milk and improvement in dietary intake of essential nutrients and health. When the averages of Food Consumption Scores of milking and non-milking households were compared, milking households had higher Food Consumption Scores (75.58) than non milking households (59.65) implying that milking households had better access to quality food groups. Higher Food Consumption Scores indicate high nutrient intake and dietary diversity which means the dairy scheme contributed to the increased Food Consumption Scores and increased milk consumption. The households (90%) indicated that through milk sales, they were able to purchase food and accumulated assets leading to improvement and diversification of their livelihoods.

Dairy production increased the households' income by R2280.33 on average per month and this improved household's purchasing power and ability to diversify their livelihoods. Asset accumulated include farming tools, milk equipment and boreholes development. Over 56.7% of the households were able to diversify their livelihoods by engaging in other agricultural projects such as poultry, piggery and non-agricultural projects (groceries and block yard making). This means the households became more resilient to shocks than they were before engaging in dairy production.

Although most of the beneficiaries had reached tertiary level of education, they were required to participate in the dairy production workshop which covered a wide range of topics. Follow up extension services were executed to ensure that the beneficiaries were more efficient in their dairy activities. The households were asked to rank the effectiveness of both SDDB and MOAC in terms of extension services delivery according to scale. Both SDDB and MOAC were fair to good in terms of artificial insemination, general farm management (farm visits, animal husbandry skills) and farmer organization. However in terms of the level of assistance in formal market organization and veterinary services were ranked poor. Both institutions need to improve mechanism through which they deliver the extension services to the farmers in order to improve local milk production and support the livelihoods of smallholder through dairying.

5.2 Conclusions

In conclusion, it has been pointed out in the discussions that the joint venture dairy credit scheme had improved local milk production and contributed to the household food security status of the beneficiaries. Most beneficiaries through the dairy production scheme were able to increase their food supply, accumulate agricultural assets and diversified their livelihoods. This made them to be resilient to shocks and reduced their vulnerability to food insecurity. However, the prematurely termination of the scheme compromised the beneficiaries' food security status and increased their chances of being poor and food insecure again. The beneficiaries were not able to replace the death animals and the extension officers were no longer as vigilant as they used to be when the dairy scheme was still functional. This also led to a decrease in

local milk production and consumption of milk by the beneficiaries and probably even the surrounding community members who were purchasing the milk. Lastly, the milk was sold through informal market which threatens public health and deprived the beneficiaries the reliable guaranteed market of their produce and the profits.

5.3 Recommendations

The findings of this study show that the joint venture dairy credit scheme improved national milk production and the household food security among the beneficiary households.

- Therefore, it is recommended that the joint venture dairy credit scheme be revived or similar credit facility schemes be put in place with improvements in terms of the accessibility criteria. Dairy schemes to encourage youth and women participation in dairying should be encouraged to increase their employment and transformation of livelihoods opportunities.
- Since the beneficiaries did not have access to the formal market for their milk, it is therefore recommended that milk collection centres be established to facilitate milk distribution and adherence to health standards in order to protect public safety. If milk collection centres are established and farmers are encouraged to use them, there would be no risk to public health and also this would facilitate access to reliable formal market.
- The provision of extension and veterinary services should be strengthened as most of the farmers who were not milking at time of conducting this study had lost their dairy animals from diseases that could have been treated.

5.4 Policy related recommendations

Although the analytical results indicate that the SDDB and FINCORP dairy production scheme has contributed to local milk production and household food security among beneficiary households, Swaziland still faces food insecurity and a challenge in achieving self sufficiency in milk production. The study, therefore

recommends the following policy oriented interventions to boost food security and milk production.

- There is a need to multiply the dairy production schemes at community level in the regions to promote regional credit accessibility and loan recovery. The group membership normally exerts pressure on members to adhere to the agreed stipulated standards which most times promote the success of the project and loan repayment.
- Swaziland Dairy Development Board as a pioneer and a custodian of the development of the dairy industry should consider partnering with other developmental agents or organizations in order to enhance the delivery of extension and veterinary services to smallholder farmers. This calls for a comprehensive dairy development policy that would integrate the development partners and coordinate the dairy activities. This would help the smallholders to be effective and efficient in the dairy production activities and lead to the improvement of the household's livelihoods and total transformation of the dairy sector.

5.5 Recommendations for further research and improvement of the study

- The absence of baseline survey and poor record keeping by some participants limited data collection to the recall method and descriptive method of analysis. Since this was a revolving scheme and more farmers were expected to apply once the scheme is revived, it is recommended that the baseline be established and sample size for future studies be increased. These will help to conduct the in-depth and comparative analysis in order to come up with the exact extent of contribution of the dairy credit scheme to household food security.
- Further studies are recommended to track the food security status of the beneficiary households. This would further help to gain insights in understanding the impact of dairy production on the wellbeing of the beneficiary households. Therefore, proper policy interventions and programmes will be proposed and properly targeted.

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Appendix: Analysis of variance table

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
# cows	Between Groups	388.842	29	13.408	6.228	.000
	Within Groups	193.750	90	2.153		
	Total	582.592	119			
Milk volumes	Between Groups	1.997E9	29	6.886E7	4.369	.000
	Within Groups	1.419E9	90	1.576E7		
	Total	3.415E9	119			
Milk sales	Between Groups	3.624E9	29	1.250E8	2.418	.001
	Within Groups	4.651E9	90	5.167E7		
	Total	8.274E9	119			
Milk income	Between Groups	3.648E10	29	1.258E9	6.448	.000
	Within Groups	1.756E10	90	1.951E8		
	Total	5.403E10	119			
Emaas sales	Between Groups	2.093E8	29	7216402.684	2.687	.000
	Within Groups	2.417E8	90	2685981.142		
	Total	4.510E8	119			
Emasi income	Between Groups	2.103E10	29	7.253E8	2.062	.005
	Within Groups	3.166E10	90	3.518E8		
	Total	5.269E10	119			

Appendix: Survey questionnaire



The information captured in this questionnaire is strictly confidential and will be used for research purposes by staff and students at University of Kwazulu Natal to estimate the contribution of SDDB and FINCORP joint dairy credit scheme to household food security.

Instructions

- (1) Please tick in the box where is necessary.
- (2) Mark with a cross in the box where it's not applicable to you.
- (3) Give reasons for your answer where it's necessary.

1. Demographic information

(a) Region..... Date

(b) Name of Respondent

(c) Age in years: Under 30 30-40 41-50 51-60 Above 60

(d) Gender: Male Female

(e) Marital status

Single Married Divorced

Widow Widower

(f) Education level

Never been to school

Primary school

Secondary school

High school

Tertiary level

(g) Number of individuals currently living in this household

(h) Number of adults (> 18)

(i) Number of children (\leq 18)

(2) Information on Training in relation to dairy project establishment

(a) Did you receive any training before starting the project? Yes No

(b) Did you receive any training after starting the Project? Yes No

(c) Did you have any tour to any dairy farm? Yes No

(d) Were there any demonstrations done to your farm either by SDDB or Government? Yes No

(e) List them

.....
.....
.....
.....

(3) What motivated you to start the dairy project?

(a) Unemployment (b) Easy access to the credit (c) To utilize my experience

(d) To utilize my skills (e) Size of imports (f) To keep myself busy

(g) Old age (i) To have a business

(g) Other specify.....

(4) How are your repayment terms with FINCORP?

(a) Up to date: Yes No

(b) In arrears: Yes No

(c) If in arrears, how long are the arrears (in months)? 1-6m 7-12m 13-24m above 24m

(d) Are you repaying through the dairy project? Yes No

(f) If not repaying, through the dairy project, Specify the means you are repaying through.....
.....
.....

(e) When was your first instalment.....?

(6) How does FINCORP get her money from you?

(a) Through stop orders

(b) I deposit in FINCORP account

(c) I used to use Stop orders

(d) I used to deposit in FINCORP account

(7) What are the problems of you not repaying?)

(a) Installment unaffordable

(b) Low Profits

(c) No market for milk

(d) The death of the animals

(e) Poor repayment procedures

(f) Other (Specify).....

(8) Information on the dairy animals?

(a) Were you expanding? Yes No

(b) If yes, how many animals did you have before?

(c) If no, how many dairy cows did you obtain through the loan?

(d) How many animals were milking?

(e) How many animals were not milking?

(f) If the animals were not milking, Why were they not milking?

.....
.....

(9) Infrastructure development

Did you have the following things in place for the dairy cows?

(a) Resource assessment was done: Yes No

(b) Milking shed was constructed: Yes No

(c) Pastures were established: Yes No

(d) Crush pen was constructed: Yes No

(e) Dipping authority acquired: Yes No

(f) Water was developed and was reliable: Yes No

(10) Performance of the dairy project in the past five years

Year	# milking cows	Milk volumes (L)	Volume of sales (L)	Price/L	Emasi Volumes (L)	Volume of sales	Price/ L
2006							
2007							
2008							
2009							

(a) How many litres are you currently getting per day?

(b) How much milk you sell?

(c) How many litres of milk are consumed/ day?

(d) How often do you consume milk?

- (1) 7 times a week (2) 3 times a week (3) two times a week (4) once in a week
(5) Once in two weeks (6) we do not consume it

(e) If you consume it, in which state do you consume it?

- (1) Raw (2) Boiled (3) As sour milk (4) Lihongo (5) Umlaza

(f) Do you have restriction in consumption of milk? Yes No

(g) If you have restriction, why.....?

(11) Indicate, how many times have you eaten the following food groups in the past seven days?

Broad food groups #	Sub-food groups	Examples of foods eaten in Swaziland	Frequency at which it has been eaten (A)	Food weight (B)	Food consumption score=(A*B)
1	CEREALS	Bread, biscuits, maize, rice, pap, oats, crispies, cookies from maize		2	
	WHITE TUBERS AND ROOTS	White potatoes, cassava or foods made from roots			
2	VITAMINA RICH VEGETABLES	Pumpkin, carrots or sweet potatoes that are orange inside		1	
	DARK GREEN LEAFY VEGETABLES	Spinach, cabbage, amaranthus		1	
	OTHER VEGETABLES	Other vegetables i.e tomato, onion, cauliflower		1	
3	VITAMIN A RICH FRUITS	Ripe mangoes, dried apricots, dried peaches		1	

		+other locally available vitamin A fruits			
	OTHER FRUITS	Other fruits, including wild fruits		1	
4	ORGAN MEAT (IRON- RICH)	Liver, kidney, heart or other organ meats or blood based foods		4	
	FLESH MEATS	Beef, pork, lamb, goat, rabbit, wild game, chicken, duck or other birds		4	
	EGGS	Eggs of chicken, eggs of duck or eggs of other fowl		3	
	FISH,FRESH,DRIED AND OTHER SEAFOODS	Fresh or dried fish and shellfish		4	
5	LEGUMES, NUTS AND SEEDS	Beans, peas, lentils,peanuts and pumpkin seed,sunflower seed		3	
6	MILK AND MILK PRODUCTS	Milk, cheese, yoghurt		4	

7	OILS AND FATS	Vegetable oils, ghee, butter		0.5	
8	SWEETS	Sugar, honey, sweetened soda and fruit drinks, chocolate candies and cookies		0.5	
9	MISCELLANEOUS (spices, condiments and beverages)	Coffee, tea, spices, salt, soysauce, chilli souce		0	

(12) How many workers are there in your dairy project?

Year	Hired labour	Family labour
2005		
2006		
2007		
2008		
2009		

(13) Has the project benefitted you in the following areas?

- (a) Education: yes No
- (b) Bought family food: yes No
- (c) Paid debts: yes No
- (d) Home electrification: yes No
- (e) Invested in other business: yes No
- (f) Stokvel: yes No
- (g) Living standard improvement: Yes No
- (h) Status in the society yes No
- (i) Other (specify)...

(14) Asset Accumulation attributed to the project

Year	Asset
2005	
2006	
2007	
2008	
2009	

(15) Dairy farmers' perspective on the following services.

(a) Were you happy about the conditions of the scheme? Yes No

State reasons for your

answers:.....
.....
.....

(b) Rank the following extension services according to the following Scale.

Poor=1 Fair=2 Good=3 Very good=4 Excellent=5

- (a) Extension service and farm visits
- (b) Night workshop
- (c) Sources of seeds
- (d) Organization of market through milk collection centre
- (e) Stabilising milk prices in the formal market
- (f) Milk processing
- (g) Preparation of dairy business plans and Business Management
- (h) Credit facility provision
- (i) Pasture & fodder production & Conservation
- (j) Winter pasture establishment
- (k) Artificial Insemination
- (l) Heat detection
- (m) Proper milking and clean milk handling
- (n) Calf rearing

(o) General farm Management

(p) Formation of farmer group

(q) Veterinary services

(16) Dairy cattle production systems adopted

(a) Zero grazing +dairy meal

(b) Zero grazing + dairy meal+ homney chop

(c) Semi-zero grazing+ dairy meal +homney chop

(d) Extensive grazing on cultivated pasture+dairy meal

(e)Extensive grazing on natural pasture +dairy meal +homney chops

(f) Extensive grazing on natural pasture + homney chop

(g) Extensive grazing on natural pasture

(h) Other

specify:.....

(17) Tick the relevant sources of your income and state the amount

(a)Piece jobs R/month

(b) Self employed R/month

(c)Elderly grant R/month

(d)Employed R/month

(e) Remittances R/month

(f) Farming other than dairy

R/month

(g) Dairy

R/month

Other sources of income

Specify.....
.....
.....

1.0