Evaluation of Smallholder Dairy Programmes in Zimbabwe.

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Executive Summary

Introduction

The Zimbabwean dairy subsector consists of a number of actors from input suppliers, milk producers, processors, transporters to service providers. The subsector was and remains dominated by production from the large-scale commercial farms and of late by imports. As a result of the land reform in 2000 and macroeconomic policies, milk production plunged from an all-time annual high of 262 million litres to the current 51 million litres, which falls far short of the demand estimated at 180 million litres. The Dairy Development Programme set up 24 smallholder dairy schemes, but the majority of these became dysfunctional during 2007/2008 as a result of hyperinflation at farmer and MCC level. The main purpose of this evaluation was to assess the status of all the MCCs in the country and to devise market based solutions in order to rebuild the capacities of these MCCs.

Methodology

The evaluation adopted both quantitative and qualitative methods of enquiry to facilitate both technical and socio-economic analysis. Specific data collection tools included Key Informant Interviews (KII), Focus Group Discussions (FGD), a Household Questionnaire and Case Studies documented during the field visit. The ten (10) selected MCCs comprised three (3) leading MCCs (Gokwe, Marirangwe and Rusitu Mayfield), three (3) medium performing MCCs, two (2) low performing MCCs and TWO (2) closed MCCs. All in all, 387 smallholder dairy farmers, 28.8% of whom were female, were interviewed for the household survey. Data entry, cleaning and analysis of household survey questionnaires was conducted using the Statistical Package for Social Sciences (SPSS) Version 16 and Microsoft Excel.

Dairy Sub-Sector Analysis

The 2012 SNV dairy subsector study established that the large-scale comemrcial dairy sector has two subcategories of registered commercial dairy farms and company dairy farms. Large-scale commercial dairy farms are characterized by large herds, commercial husbandry practices and linkages with formal markets. Company dairy farms, on the other hand, are characterized by vertical integration with both production and processing. National milk intake has fluctuated from 238 million litres rising to a peak of 262 million litres in 1990 and a low of 37 million litres in 2009 and has since picked to 51 million litres in 2011. Despite the efforts by the donor community and government, the contribution of milk coming from the smallholder dairy sector has remained fairly insignificant (3%). Milk production within the smallholder sector fluctuated from 2.7 million litres in 1990 to 1.5 million litres in 1998 and 1.13 million litres in 2011. The major constraining factors hindering growth within the smallholder dairy sector include import pressures, poor commercialisation, weak institutional support and governance, low herd sizes, low farm-level productivity, and viability constraints. The national dairy herd has equally fluctuated from 115,790 in 1987 to 32,837 in 2004 and 22,738 in 2011. The estimated demand for milk and milk products is 180 million litres, which presents a supply gap of 129 million litres, entailing that there is an opportunity for import substitution through improved competitiveness and increased production from local smallholder dairy farmers.

Status of Smallholder Dairy MCCs

Apart from the DDP, various stakeholders are active in providing development support to the MCCs including SCC, NADF, and Land ‘O Lakes. Consultations with the DDP and Land ‘O Lakes revealed that out of the 19 established MCCs, 16 are active, while three (3) having ceased operations by the time of the study. Another five are at different stages of establishment. Out of the total of 1,444 registered smallholder dairy producers only 436

(30.2%) are active and delivering milk to local MCCs. The survey statistic was 52%. Currently only 7.5 – 50.0 percent of the existing milk storage capacity is being utilized due to a myriad of challenges that include low productivity as a result of poor breeding, animal health management and poor feed management practices. The mean dairy herd is 5.76 animals (with a range of 1 – 75), while the average daily milk yield per cow stands at 6.77 litres (std. dev. of 7.55). Dairying acts as the major source of income and livelihoods of 55% of the respondents interviewed through the formal household survey. Average household income for the 2011/12 season was US$2,940. The average area under fodder production was 0.9ha, based on statistics from producers active in fodder production. A number of technologies have been successfully adopted by smallholder dairy farmers e.g. breeding (74%), supplementary feeding (76%) and use of homemade rations (55%). Resuscitation needs identified by the study include, but not limited to, improvements in productivity levels through breeding and feed management, improved producer pricing and viability levels, business development and the creation of sub-collection centres, the remobilization of farmers in some schemes, closer monitoring and evaluation, improving the provision of extension for capacity building and addressing governance constraints.

Best Practices

Key informant interviews with DDP, Milk Zim, Kefalos, Land 'O Lakes and the NADF, and focus group discussions with smallholder dairy farmers identified common characteristics of leading MCCs which serve as a basis of their success. Such factors include production related factors on one hand and governance and sustainability issues on the other. Successful MCCs have adopted comprehensive strategies for animal health and quality control, breeding, feed management, marketing, as well as access to resources and technical backstopping. Successful MCCs also boast of good governance, quality and committed membership, fair pricing which ensures viability, built-in sustainability mechanisms, and a shared vision. At individual farmer level, the best performing smallholder dairy producers have passion, commitment, good planning and management skills, and excellent record-keeping and financial management. Such farmers have also adopted technical recommendations, have comprehensive breeding programmes, have dairy herds that ensure economies of scale, organized group animal-drawn milk transportation and delivery systems, and consistently re-invested in the dairy enterprise.

Supplier – Processor Relationships

Partnerships between suppliers and processors are hinged on symbiotic synergy between the parties, based on forward contracts in which both parties are aware of their expected benefits. Forward contracts assure and improve processing volumes for processors. On the other hand, smallholder dairy farmers attain access to a guaranteed market, extension of loan facilities, loan guarantees, technical backstopping, as well as a reduction in marketing risks and costs, and a greater potential for growth. Obstacles and constraints to the supplier-processor relationships identified through the study include the contention on pricing, low productivity which manifests itself through the lack of economies of scale of poor producer prices, the high transaction costs associated with dealing with multitudes of small-scale producers, and the compound interfaces that result from inherent group dynamics.

Opportunities of Utilization of Renewable Energy in MCCs

The global village currently over relies on fossil fuels (coal, oil and natural gas) and nuclear power for their energy. The result is a system that lacks diversity and security, threatens health and the environment. In contrast, there are numerous types of renewable energy resources that are constantly replenished and, therefore, allows for sustainable use over time. Smallholder dairying offers great potential for the utilization of renewable energy viz: through biogas and solar options. Biogas can be used for heating, providing energy for milk cooling and processing, and more importantly, biogas can be used in combination with fossil

fuels in fuelling a stand-by diesel generator (10% biogas and 90% diesel). On the other hand, solar energy can be used for direct heating, lighting and cooling during milk processing. Solar energy units are more environmental friendly, have very little operational costs giving them potential to substantially reduce MCC running costs and improve both MCC and farmer margins, while solar energy unit sustenance is also less labour intensive thereby making it a more viable substitute.

Economics of Production

Despite the various identified challenges the majority of MCCs are operating as viable entities. Gross profits, based on the differences between gross milk sales revenue and direct MCC running costs, are positive for all the six (6) case study MCCs, with a range of US$4,595.70 (Dowa) to US$110,297.86 (Rusitu Mayfield). However, only one out of the six MCCs had a positive net operating income, while 4 MCCs had positive net incomes. At the individual farmer level, GMA results show that small dairy herds are uneconomic, with dairy herds with one and two milking cows producing GM/TVC (net returns per invested dollar) of -0.37 and -0.13 respectively. The other GM/TVC results were 1.23 for six milking cows, 1.21 for 7 milking cows, 0.73 for 22 milking cows and 0.74 for 30 milking cows. These results prove that smallholder dairying is most viable and most efficient with average herd sizes of 6 – 7 milking cows. On the other hand, while large dairy herds within the smallholder dairy subsector remain viable there is apparent evidence of gross inefficiencies and declining marginal returns. Basing further GMA analysis on the equi-marginal principle in economics shows that smallholder dairying at the moment is only yielding optimal returns at the 6 – 7 milking cow threshold levels, with anything outside this range failing to achieve optimal returns.

Recommendations

Capacity building is key in resuscitating smallholder dairying in Zimbabwe. There is need for capacity building of value chain players, notably for smallholder dairy producers. At the MCC level capacity development can be through the capacitation of local institutions and smallholder dairy subsector service providers such as the DDP, LPD, DVS, and AGRITEX who already have presence at the local level. There is also need to adopt inclusive business models that promote private sector led growth by creating a critical mass of dairy producers within selected hubs, increasing both dairy herd and milk production densities, improving the performance of the sector, and growing the smallholder dairy subsector to the level where private sector companies find it attractive to invest in the sector. Identified priority intervention areas and opportunities for unlocking value include efforts at restocking to ensure viability, breeding programmes, improved feed management, value addition through localized processing (using renewable energy), and engagement of the private sector.

1. Introduction

1.1 Background to the Evaluation

The dairy subsector is governed by the Dairy Act of Zimbabwe 1977. As an industry it consists of a number of actors from input suppliers, milk producers, processors, and transporters to service providers (Kagoro, *et. al.*, 2012). The subsector was and is dominated by production from the large commercial farms and of late by imports. Herd size, which generally determines scale of operations, is a key variable used to distinguish scale while channels used for marketing output is another. Smallholder producers have small herds averaging 3 cows per farmer and predominantly use informal market channels for their milk. As noted by Marecha (2009) the description of the dairy subsector in terms of size and operations often excludes informal players. The exclusion starts at data gathering.

Zimbabwe's dairy sector was driven by the commercial farming sector prior to 2000, producing enough milk for the local market as well as exporting surplus milk and other dairy products. (Dube *et. al.*, 2011; Kagoro, *et. al.,* 2012). The land reform saw commercial farmers losing their farms and destocking their dairy herds. Accompanied by macroeconomic policies (Zvomuya 2007) and drought-induced constraints the year 2000 marked the beginning of a downward trend in milk production in the country. Milk production plunged from an all-time annual high of 262 million litres to the current 51 million litres. The production falls far short of the demand estimated at 180 million litres.

Starting in 1983, the Government of Zimbabwe undertook the Dairy Development Programme (DDP) with the help of NORAD, DANIDA, Africa Now and Heifer International. This was meant to foster smallholder dairy development. The DDP was established as a branch of the then Dairy Marketing Board (DMB) to develop smallholder schemes and milk processing centres. From its inception to date, the DDP has set up 24 schemes (17 processing and marketing various milk products) with a membership of around 1750. Most of the dairy schemes became dysfunctional during 2007/2008 as a result of hyperinflation at farmer and Milk Collection Centre (MCC) level. Challenges faced by these schemes manifest in the form of low milk volumes and lack of viability. At farmer level, the most significant constraints include lack of proper dairy breeds, failure to access and afford stock feed, poor access to markets and related infrastructure and limited access to investment funds.

This study is one of three initiatives commissioned by the Netherlands Development Organisation (SNV). Pilot feed production and breeding initiatives are running concurrent to this study as informed by the subsector findings and recommendations of October 2012 done by Jonathan M Kagoro and Kudzai Chatiza.

1.2 Evaluation Purpose and Objectives

The main purpose of the evaluation was to assess the status of all the MCCs in the country and to devise market based solutions in order to rebuild the capacities of these MCCs. The evaluation was also used to generate baseline data for monitoring and evaluation purposes and impact assessment. The other objective of this exercise was to assess and develop suitable inclusive business models between smallholder milk producers and the private sector like the MilkZim dairy hub model, and Private Processors like Dairibord, Kefalos, Alpha and Omega Dairies as well as Nestle.

The consultants undertook the following tasks:-

(i) Assessed the status of each of the identified ten (10) MCCs and documented what needs to be done to make them functional

(ii) Carried out a more in-depth study of the three (3) leading MCCs to document best practice model for MCCs

(iii) Carried out an assessment of five (5) successful dairy farmers and developed best practice for smallholder dairy farming

(iv) Identified obstacles/constraints in the current processor relationships with supplying smallholder dairy farmers and recommended strategies for expanding the farmer network and increasing productivity per farmer

(v) Assessed the MilkZim model and made recommendations for expanding it .

(vi) Explored opportunities for utilisation of renewable energy in the MCCs through pilot programmes for biogas and solar energy at selected MCCs.

(vii) Developed a best practice model for MCCs.

2. Methodology

2.1 Approach

The evaluation adopted both quantitative and qualitative methods of enquiry to facilitate both technical and socio-economic analysis, and was carried out in different but integrated phases. The evaluation was based on information collected from the various Dairy Farmer Association members and executive and other stakeholders in Harare, as well as at project sites. Specific data collection tools included Key Informant Interviews (KII), Focus Group Discussions (FGD), a Household Questionnaire and Case Studies documented during the field visit. Data entry, cleaning and analysis of household survey questionnaires was conducted using the Statistical Package for Social Sciences (SPSS) Version 16 and Microsoft Excel.

Three (3) leading MCC and Five (5) leading farmers for detailed study and documentation were identified at this stage. The MCCs identified for detailed study were Rusitu Mayfield, Gokwe and Marirangwe. . The leading farmers were Mrs Madyangove of Nharira, Mr Gwanzura and Mr Hela of Marirangwe and Mrs Maguranye and Mr Chiweshe of Gokwe. In addition, seven MCCs were identified for study as follows;

- Three medium performing MCCs Rusitu United (Manicaland) Mushagashe (Masvingo) and Shurugwi (Midlands)
- Two low performing projects Dowa (Manicaland) and Guruve (Mashonaland Central)
- Two closed MCCs namely Umzingwane (Matebeleland South) and Mhondoro/Mubaira (Mashonaland West)

2.2 Phase 1: Literature Review and Development of Evaluation Tools

The consultants at this stage undertook a desk study and involved the review of project documents and consultations with experts in SNV, DDP, LPD, Land O Lakes, Kefalos and visits to Chikwaka and Marirangwe. Information collected at this stage was used to develop field data collection tools.

2.3 Phase 2: Field Data Collection

Data collection methods for the evaluation included key informant interviews, focus group discussions, administering a household questionnaire and gross margin and economic analysis. In addition Case Studies were documented during the field visit. The household questionnaire was pretested in Chikwaka.

1. ***Key Informant Interviews***
   Key informant Interviews (KIIs) was guided by a pre-prepared checklist attached. The KIIs targeted the Netherlands Development Organisation (SNV,) Dairy Association Executive, Dairy Development Programme (DDP), Department of Livestock Production and Development (LPD) personnel, AGRITEX, National Association of Dairy Farmers (NADF), Land O Lakes, Dairibord, Kefalos, Nestle, Swedish Cooperative Centre (SCC), MilkZim, Zengeya Farm, .
2. ***Focus Group Discussions***
   Focus Group Discussions (FGDs) were conducted with dairy farmers in the selected ten leading dairy projects. A FGD checklist was developed for this purpose (attached).

3. ***Household Interviews***
   The household survey was to collect baseline data for the ten MCCs. A minimum of 40 dairy farmers per scheme was sampled for the household survey. In cases where the number of farmers was lower, a census was conducted to cover all the dairy farmers. Field based enumerators were identified in each project site and were trained by the consulting team on Friday 7 December 2012 before administering the questionnaire.
4. ***Case Studies (MSC)***
   The consultants conducted an in depth study of three (3) leading dairy schemes and five (5) leading farmers to document best practice for the MCC and farmers as well as informing future programming. Most Significant Change (MSC) approach was used to document exceptional cases showcasing impact at MCC and farmer level.
5. ***Direct Observation***
   The enumerators administered the household tool *in situ* in order to enable the baseline survey team to see interventions on the ground. The direct observation acted as the basis of verifying data supplied.

2.4 Phase 3: Data Analysis and Draft Report Writing

Data entry, cleaning and analysis of household survey questionnaires was conducted using the Statistical Package for Social Sciences (SPSS) Version 16. The collected evaluation data was synthesized, analysed and presented in user-friendly tables and illustrational charts/graphs. In some cases data analysis was disaggregated by gender. Qualitative information was analyzed by establishing emerging common patterns and trends on the basis of discourse analysis. This phase also witnessed the compilation and submission of a draft evaluation report.

2.5 Phase 4: Dissemination of Findings

This phase was devoted to the presentation of preliminary findings and facilitating feedback from the client and stakeholders. Subsequently, a final report incorporating comments from the draft evaluation report and the presentations will be submitted to SNV Zimbabwe.

2.6 Methodological Challenges

The evaluation coincided with the festive season making it difficult for the consultants to arrange for interviews immediately post field work. Whilst farmer attendance in most project sites was commendable throughout the exercise, incessant rains in some cases and the fact that the evaluation exercise coincided with the peak of the planting/weeding period, meant that FGDs in some areas failed to achieve a 100% turnout. Record keeping remains poor in a number of contexts, both at MCC and farmer level, entailing challenges in conducting status and economic assessments. The poor road network, terrain and incessant rains made it difficult to access some smallholder dairy farmers for purposes of in-situ inspections in some areas e.g. Rusitu. However, the household survey managed to visit all 40 households affiliated to the Rusitu Mayfield smallholder dairy farmers association and another 40 households affiliated to the Rusitu United association.

3. Dairy Sub-Sector Analysis

3.1 Overview of the Dairy Industry in Zimbabwe

The large scale dairy sector started in a formally distinguisshable manner in 1910 on large farms with high producing pure exotic cows and their crosses. Until 1980, large commercial farms, the former European farming sector, occupied close to 80% of the specialised and diversified farming area in the intensive farming regions of Zimbabwe. Over 50% of all large-scale commercial land was located in natural regions 1 to 3, the high- to medium potential regions. Commercial dairy farms in Zimbabwe were well developed and compared very favourably with dairy farms in Europe and North America. The predominant dairy cattle breeds were the Holstein-Friesian breeds, followed by Jersey, Ayrshire, Guernsey, Redpoll, Simmental and Red Dane. Feeding in this subsector was based on maize and its by-products for energy and soya beans and cottonseed cake for protein. The major sources of roughage were natural grass, standing (range) hay and maize silage. Where irrigation was available oats, mid-mar rye and Lucerne were grown. Due to escalating costs of commercial feeds, there has been a recent trend towards feeds grown on the farm.

The dairy subsector study by Kagoro et al October 2012 indicate that the largescale comemrcial sector has two subcategories of registered commercial dairy farmers and company dairy farms. Subcategory one combines those whose land was not redistributed and a few new farmers. Herds are larger and husbandry practices more commercial with connections into formal markets. The second subcategory consists of company dairy farms involved in both production and processing. In this category milk is produced and processed into a diversity of products i.e. producer, bulking and processing functions are combined in one comprehensive enterprise. Large processors in this category include Dendairy, Kefalos Kershelmar and Gushungo Estates (with Alpha Omega as the processor), Dorkins (Milk powder), medium scale processors include Crofthead, Nondweni, Sedgemor, Gravity Investments, Africa University, Cladelshay, Dunluce, Morna Doone and Eskbank fall into this category.

According to the Dairy Services statistics, the national milk intake has fluctuated from 238 million litres rising to a peak of 262 million litres in 1990 and a low of 37 million litres in 2009 and has since picked to 51 million litres in 2011. Similarly the number of registered large scale commercial dairy farmers has dropped from 559 in 1987 to 165 in 2012 (Table 1). The national dairy herd has equally fluctuated from 115 790 in 1987 to 32 837 in 2004 22 738 in 2011. The estimated demand for milk and milk products is 180 milli0n litres and this presents a supply gap of 129 million litres. Thus there is an opportunity for import substitution whereby improved competitiveness and increased production from local smallholder dairy farmers can fill the gap between current demand and supply thereby substituting imports.

Table 1: *Trends in the large scale dairy subsector.*

Year, Variable,	2000	2001	2002	2003	2004	2005	2006	2010	2012
Registered producers,	***314***	***323***	***283***	***280***	***277***	***281***	***282***	***165***	***165***
Cows in milk,	29975	28321	28845	27667	23788	22687	23200	18000	20000
Dry cows,	8993	8496	8654	8301	6772	7392	6720	5000	5750
Heifers in calf,	7494	7080	7211	6917	5947	5020	5825	4500	5000
Heifers older than 1 yr,	12589	11895	12114	11620	9991	6584	6250	5250	6000
Heifers under 1 yr,	11091	10478	10672	10237	8802	5838	5525	5000	5750
Total female dairy animals,	70142	66270	67496	64742	55300	47521	47520	37750	42500
National milk intake (million litres)	***177***	***172***	***149***	***111***	***94***	***102***	***96***	***47.2***	***64.4***
Average production per cow per yr (litres),	4542	4671	4047	3086	3076	3391	3208	2052	2500

Source: NADF, 2012

3.2 Assessment of the State of Smallholder Dairying

Since independence in 1980, the Zimbabwe Government adopted a policy of encouraging farmers in the small-scale, communal and resettlement schemes to participate in the dairy sector. To spearhead this initiative, Government in 1983, set up the Peasant Sector Development Programme (now known as the Dairy Development Programme -DDP). The DDP was mandated with the responsibility of implementing dairy development projects in the communal, resettlement and small-scale farming areas. Government policy towards dairy development as stated in the National Dairy Development Strategy of 1987 gives the overall objective of "developing dairying so as to ensure there is a broad-based, viable production of sufficient wholesome milk and its derivatives to meet the national needs at an affordable cost." The specific aspirations are to:

- ✓ Improve and consolidate the viability of the established dairy sector;
- ✓ Continue the expansion of the national dairy production base to the small-scale, communal and resettlement farming sectors, so as to increase milk supply and develop the communities;
- ✓ Maintain and improve effective and strict statutory control over milk production, processing and marketing; and
- ✓ Promote an increase in the consumption of milk and dairy products amongst all sectors of the population and to develop export markets.

Donor funds and direct government support has helped meet both capital and recurrent costs of implementing dairy development in Zimbabwe. Support has channelled through the following areas:

- Bulk Milk Counterpart Fund - Norway/ Government of Zimbabwe
- Direct funding to the Dairy Development Programme by the governments of Zimbabwe - Norway (1990-1994).
- Funding of Guruve Small-Scale Dairy Project - Denmark (DANIDA).
- Training - Regional Dairy Development Training Team of the Food and Agriculture Organization of the United Nations (FAO RDDTT, Kenya).
- Dairy Association infrastructure development EEC – Sangano Dairy (micro-projects).
- Africa Now infrastructure and operational support
- Provision of heifers - Heifer Project International (USA).
- Provision of heifers and bulls by the Agriculture and Rural Development Authority (ARDA)

- Initiative for the Development and Equity in African Agriculture (IDEAA)-KELLOG Foundation institutional development, production, heifer/breeding and marketing support for Wedza MCC
- Rusitu Small-Scale Dairy Settlement Scheme capital funding - Britain (ODA).
- Construction of milking sheds and fodder establishment - EEC (food aid counterpart fund).
- Livestock and marketing support Swedish Cooperative Centre (SCC)
- Food and Agriculture Organisation (FAO) support to breeding and fodder production for Wedza MCC
- EU STABEX 95 support through NADF to selected dairy projects
- Land O Lakes support through NADF to selected dairy projects
- Plan International equipment support for Marange MCC

Through such support, the number of projects producing and marketing milk has increased over the years as depicted in figure 1 below.

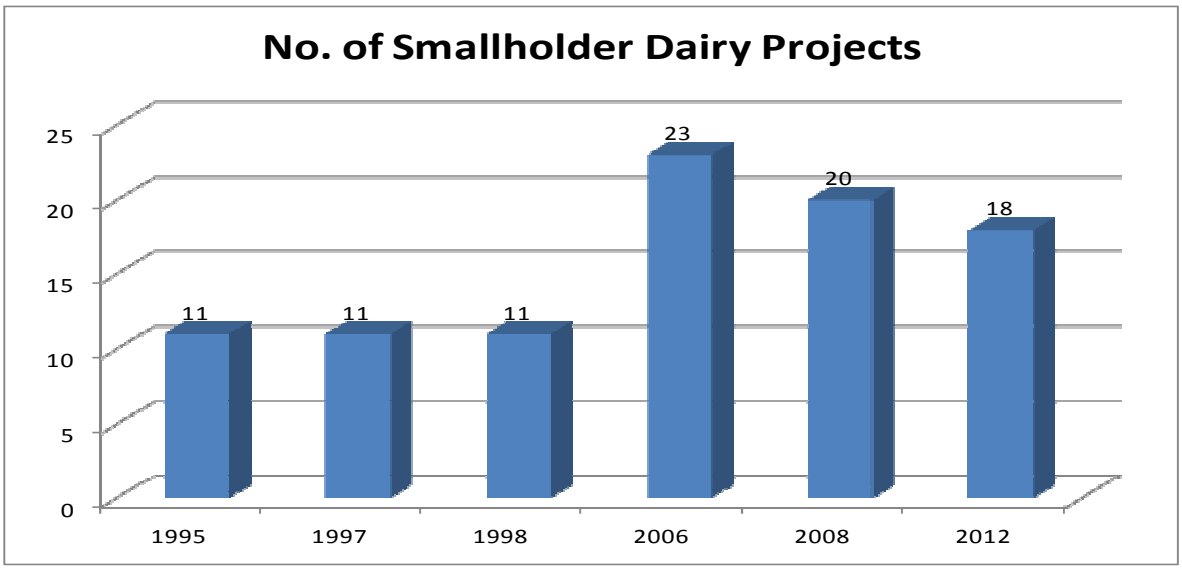

Figure 1: *Number of functioning smallholder dairy projects by year.*

Data available from the DDP indicate that milk production within the smallholder sector fluctuated from 2.7 million liters in 1990 to 1.5 million litres in 1998 and 1.13 million litres in 2011. Most projects suffered a slump during the period 2006 to 2008 with some closing as a result of the prevailing hyperinflationary environment (Fig 2). The smallholder dairy has infrastructure in place and vast knowledge disseminated since inception in 1983. However, its major weaknesses from the dialogue and reports indicate poor commercialisation and weak organisation/governance and low productivity as the major constraining factors hindering growth. Vast opportunities prevail in the current demand supply deficit and threats are in the non availability of dairy stock and reduced service provision from a cash strapped DDP and public institutions.

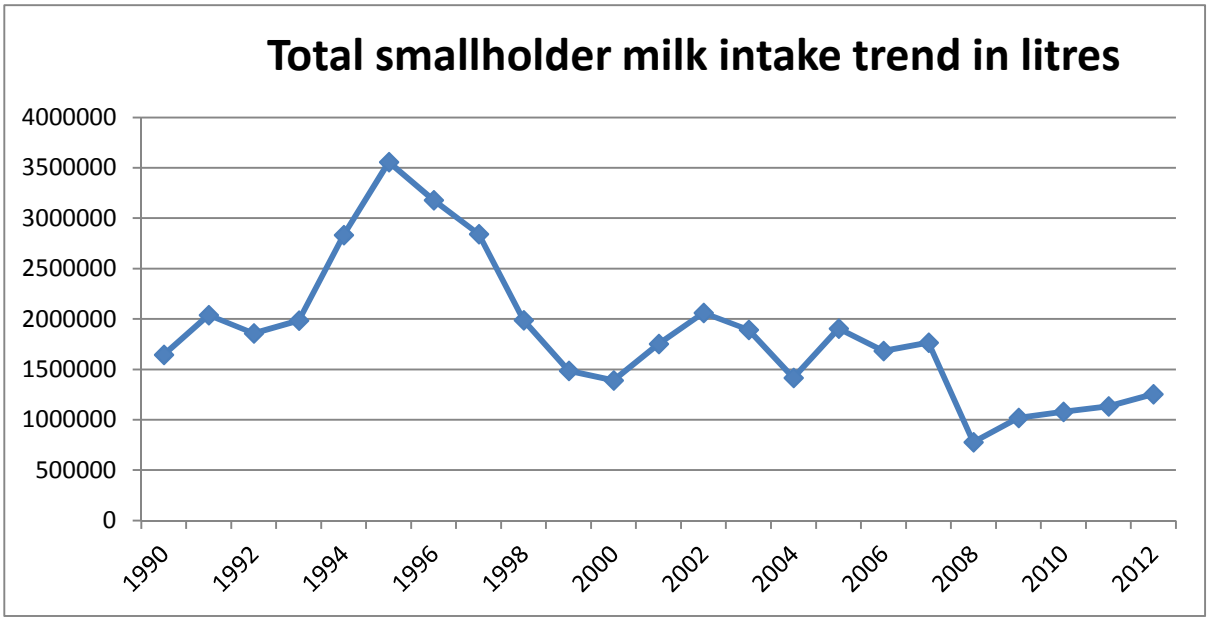

Figure 2: *Smallholder milk intake trends by year.*

The study revealed that a number of livestock support programmes have assisted project members in various forms. A total of three hundred and eighty seven dairy cattle were availed to the households interviewed in the ten selected projects from NGOs and credit institutions as indicated in Table 2 below.

Table 2: *Number of famers that received dairy cows and the cow providers by MCC.*

Source of the dairy cows	Name of MCC										
	Dowa	Mubaira	Mayfield	Umzingwane	Gokwe South	Hama Ruomba	Marirangwe	Guruve Dairy Co-operative	Risutu United	Tongogara	Total
N/A	28	19	16	39	39	13	24	16	15	6	**215**
H.I.	2	4	0	0	0	14	0	0	1	0	**21**
L.O.L	10	12	0	0	0	0	7	24	24	0	**77**
Africa Now	0	3	21	0	1	10	0	0	0	0	**35**
AFC	0	0	1	0	0	0	0	0	0	0	**1**
Stabex	0	0	2	0	0	2	0	0	0	0	**4**
Swedish Coop	0	0	0	0	0	0	0	0	0	34	**34**
Total	**40**	**38**	**40**	**39**	**40**	**39**	**31**	**40**	**40**	**40**	**387**

A study of the Zimbabwe dairy subsector by Jonathan Kagoro et al October 2012 reveals that there are some signs of subsector recovery since 2009. The study also indicates that the subsector remains strained by a serious shortage of skilled and experienced technical staff. Apart from a rather weak support environment the subsector is burdened by a number of constraints. The main ones are as follows;

- Reduced herd size, low farm-level productivity and sustainability,
- Reduced producer base, producer viability, weak succession planning and administrative capacity,
- Import pressure,
- Weak actor coordination,
- Poor animal breeds,
- Input availability, costs and quality
- Weak extension and farmer representation, and
- Lack of liquidity/capitalization.

The disturbing factor is that despite the efforts by the donor community and government the contribution of milk coming from the smallholder dairy sector has remained fairly insignificant to date (Fig 3). The contribution from the formal smallholder dairy farmers to national milk production has failed to surpass the three percent (3%) mark despite the fact that similar initiatives in Kenya and Rwanda have produced impressive results. The fact that the bulk of the prime land in Zimbabwe now lie in the hands of smallholder farmers point to the fact that any future milk promotion schemes should target this sector.

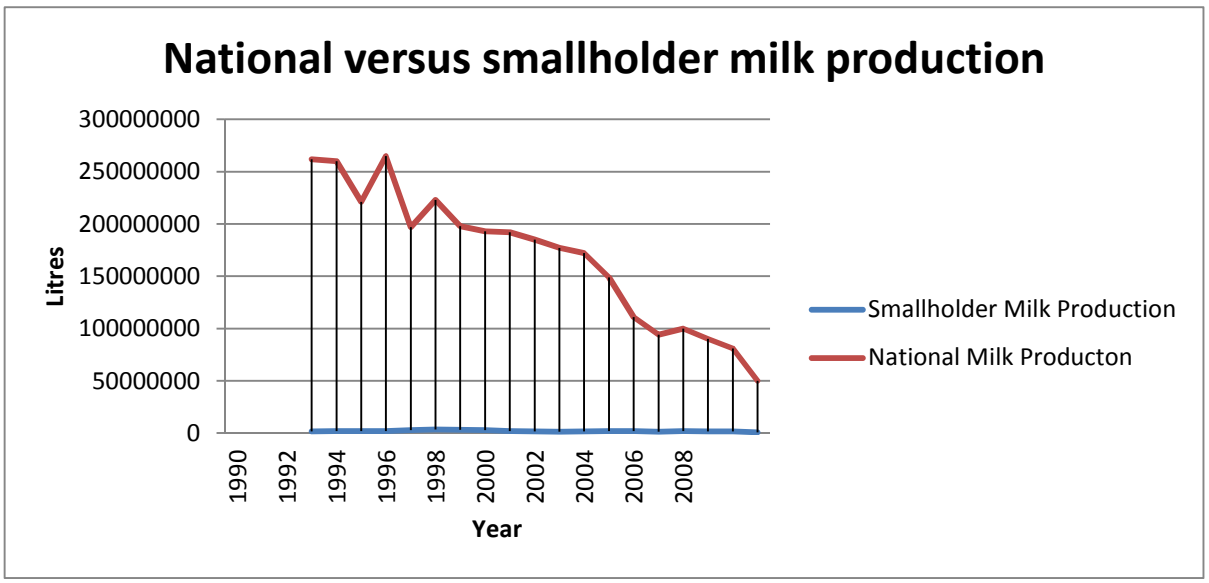

Figure 3: *National versus smallholder milk production trends.*

4. Status of Smallholder Dairy MCCs

4.1 Prelude

Consultations with the DDP and Land O Lakes revealed that out of the twenty four (24) established MCCs sixteen (16) are active and thirteen (13) of the active sites bulk and process locally while four (4) Mhondoro, Mount Darwin, Mubaira, and Zvimba had ceased operations by the time of the study. Apart from the DDP, various stakeholders were active in the provision of development support to the MCCs. The Swedish Cooperative Centre (SCC) was providing training and capacity development in the areas of production, marketing and value addition in three project sites viz Nharira, Sadza and Shurugwi. The National Association of Dairy Farmers (NADF) and Land O Lakes were active in the areas of livestock improvement, business development and production and marketing support in. The summarized Table xx below gives the established dairy schemes and their current status.

4.2 Top Performing MCCs

4.2.1 Overview for the Top Performing MCCs

Gokwe, Marirangwe and Rusitu Mayfield were chosen as the top producing MCCs. Gokwe draws its membership from the communal area. Marirangwe has eighty nine percent (89%) of its members from the small scale commercial farming area and eleven percent from the old resettlement areas. Mayfield has all its members settled on a dairy model small scale commercial farming scheme. The bulk of the members in all the projects are male ranging between seventy three percent for Mayfield to eighty one percent for Marirangwe (Table 3). The majority of the members are married ranging from seventy four percent in Gokwe to eighty one percent in Marirangwe the number of widowed members is high in Gokwe at twenty four percent. Literacy levels are high in all the three projects with Marirangwe as the most literate and Rusitu recording seven and a half percent of the members having no formal education. Training is made easier with such a high level of literacy. The majority of the members are not formally employed and thus are full time farmers. Gokwe (35.1%) and Marirangwe (80.6%) record the highest level of members who have not undergone agricultural training in the form of master famer training.

The average household size ranges from six (6) in Marirangwe to eight (8) in Rusitu Mayfield (Table 4). The use of family labour ranged from three (3) for both Rusitu Mayfield and Marirangwe to as high as seven (7) in Gokwe. Gokwe has an ageing membership. The average age of the household head ranges from fifty two (52) in Mayfield to fifty nine and a half years (59.5) in Gokwe. This has implications on succession and project sustainability. Mayfield has the highest dairy experience at twenty two years given the time the project was set up followed by Gokwe and Marirangwe with thirteen years (13) experience.

The dairy herd size is lowest in Gokwe at five (5), followed by Mayfield with ten (10) and Marirangwe (15). With such herd sizes the challenge is not on increasing the herd but on improving productivity per cow and on improving genetics. Average distance to the MCC shows that Marirangwe has the least challenge with an average delivery distance of four kilometres, Gokwe ten kilometres and Mayfield at 12.7 kilometres may experience some difficulty in delivery given the terrain.

Table 3: *Member characterization as a percentage for leading MCCs*

Member Characterisation		Milk Collection Centre		
		Gokwe	Marirangwe	Mayfield
Settlement type	Small scale commercial		88.89	100.00
	Old resettlement		11.11	
	communal	100.00		
Sex	Male	78.38	80.65	73.68
	Female	21.62	19.35	23.32
Marital status	Married	73.68	80.65	75.00
	Single	2.64	0.00	5.00
	Widowed	23.68	16.13	15.00
	Divorced		3.23	
	Separated			5.00
Education level	Primary	39.47	6.45	25.00
	ZJC/STD 6	18.42	29.03	32.5
	Secondary	28.95	38.71	25.00
	Tertiary	5.26	25.81	10.00
	None			7.50
Employment	No Formal employment	70.05	60.00	89.74
	Employed	5.26	10.00	7.69
	Pensioner	23.68	26.67	2.56
	Retrenched	0.00	3.33	0.00
Agricultural training	Master Farmer	56.77	12.90	87.50
	Advanced Master Farmer	8.11	6.45	2.50
	Diploma	0.00	0.00	2.50
	None	35.14	80.65	7.50

Table 4: *Comparing means on household size, family labour, ages, experience in dairy, dairy herd size and distance to for leading MCCs*

MCC Name		Household size	Family labour	Age of HH Head	Dairy experience	Dairy herd size	Distance to MCC
Mayfield	Mean	8.26	3.00	52.12	22.00	9.71	12.72
	N	38	38	39	40	35	40
	Std Dev	4.86	1.38	12.48	6.74	6.71	62.84
Marirangwe	Mean	6.16	2.65	56.68	13.33	14.84	4.16
	N	31	31	31	30	31	31
	Std Dev	2.89	0.98	18.14	9.84	17.07	3.99
Gokwe south	Mean	6.95	6.08	59.53	12.82	4.58	10.07
	N	38	38	38	39	38	39
	Std Dev	2.35	9.41	14.43	4.94	3.29	6.73

The members in all the three leading MCCs are fully paid up. Eighty percent (80%) of the members in Gokwe produce milk followed by Mayfield (82.5%) and Marirangwe (93.5%). However five percent of the farmers producing milk in Gokwe are not delivering whereas all the producing members in Marirangwe and Mayfield are delivering to the MCC. Mayfield (27.6%) and Gokwe (25.6%) record the highest number of registered members who are not active and Marirangwe (6.4%) has the lowest (Table 5).

Table 5: *Proportion of members registration and participation at the MCC*

MCC Name	Paid up Membership		Producing milk		Active Member		Registered but not active	
	Yes	No	Yes	No	Yes	No	Yes	No
Mayfield	100	0	82.50	17.50	82.50	17.50	27.59	72.41
Marirangwe	100	0	93.55	6.45	90.32	9.67	6.45	93.55
Gokwe south	100	0	80.00	20.00	75.00	25.00	25.64	74.36

The main source of income in all the three MCCs is dairying with Gokwe (60%), Mayfield (70%), and Marirangwe (82.8%). This is followed by vegetable and crop production with Gokwe (40%), Mayfield (25%) and Marirangwe (10%) –Table 6. This is understandable given the diversification into cotton and vegetable growing in Gokwe and tea in Rusitu. This has implications on farmer attitude towards commercialised dairying. Farmers who view dairying as the sole means of livelihoods are more likely to take a commercial outlook to the enterprise.

Table 6: *Proportion of members and their three main sources of income*

MCC Name	Main source income			Second income			Third income		
	Dairy	Veg &Crop production	All other	Dairy	Veg & Crop production	All other	Dairy	Veg & Crop production	All other
Mayfield	70.00	25.00	5.00	7.50	55.00	37.50	10.26	2051.28	38.46
Marirangwe	82.76	10.34	6.90	15.79	84.21	0.00	10.71	14.29	75.00
Gokwe south	60.00	40.00	0.00	21.05	78.95	0.00	30.55	36.11	33.33

The proportion of members owning different dairy infrastructure Is highest in Gokwe followed by Mayfield and Marirangwe (Table 7) but overall high across all the three MCCs. This shows that farmer commitment to the dairy enterprise is high in these projects.

Table 7: *Proportion of members owning different dairy infrastructures.*

Dairy infrastructure owned	MCC Name		
	Mayfield	Marirangwe	Gokwe South
Calf pen	72.50	81.58	97.50
Cattle handling facilities	75.00	52.63	87.50
Paddocks	77.50	44.74	97.50
Cattle kraal	85.00	78.95	97.50
Watering and feeding facilities	45.00	36.84	87.50
Other			

The majority of the farmers in all the three projects use recommended milking utensils with Mayfield being the highest at 94.9%, followed by Gokwe (80%) and Marirangwe (71%). There is however concern that the milk hygiene can be compromised by the balance of the famers who still use unsuitable utensils such as plastic buckets, tea pot and other unspecified utensils as cleaning of such utensils is difficult (Table 8). This ultimately leads to bacteria accumulation and subsequent contamination upon milk bulking.

Table 8: *Proportion of members owning different milking utensils*

	Mayfield	Marirangwe	Gokwe South
Stainless Steel bucket	94.87	71.05	80.00
Plastic Bucket			10.00
Tea Pot	2.56		10.00
Other	2.56		10.00

The majority of farmers (Table 9), use own capital to purchase maize seed, basal fertilisers, top dressing and chemicals. There is a high reliance on agro-dealers in Gokwe for the supply of such inputs and low reliance in Marirangwe and Mayfield possibly because of close proximity to Chipinge and Harare respectively.

Table 9: *Comparing sources of maize seed and inputs for grain among the top three MCCs*

Member Characterisation		Milk Collection Centre		
		Gokwe (N=40)	Marirangwe (N= 31)	Mayfield (N = 40)
Maize Grain seed source	Own capital	2.50	96.77	92.50
	NGOs	-	-	2.50
	Local Agro-dealers	77.50	-	-
Maize Grain Basal Fertilizer Source	Own capital	2.50	64.52	67.50
	DDP	-	6.45	-
	LPD	10.00	-	-
	AGRITEX	-	-	2.50
	Local Agro-dealers	77.50	-	2.50
Maize Grain Top Dressing Source	Own Capital	2.50	80.64	65.00
	DDP	-	6.45	-
	Local Agro-dealers	77.50	-	7.50
	Other Farmers	-	9.68	-
Maize Grain Chemicals Source	Own Capital	-	9.68	52.50
	Local Agro-dealers	50.00	-	-

There appears to be low purchases done directly by farmers targeted for silage making as depicted in Table 10 below. This can be so as most farmers make silage out of a portion of the maize meant for grain production. Framers should make a silage budget in line with the herd size to meet maintenance and production needs for the entire herd throughout the year. It is also prudent for the farmers to have a reserve silage pit capable of meeting the dairy herd roughage needs for a year in the event of a drought year.

Table 10: *Comparing sources of maize/sorghum inputs for silage among the top three MCCs*

Member Characterisation		Milk Collection Centre		
		Gokwe (N=40)	Marirangwe (N= 31)	*Mayfield (N = 40)*
Maize /Sorghum Silage Seed source	Own capital	10.00	12.90	2.50
	AGRITEX	-	6.45	-
	Local Agro-dealers	30.00	-	2.50
	Other Farmers	-	-	-
Maize Grain/Sorghum Silage Basal Fertilizer Source	Own capital	-	9.68	5.00
	DDP	-	6.45	-
	Local Agro-dealers	30.00	-	-
Maize Grain /Sorghum Silage Top Dressing Source	Own Capital	-	12.90	2.50
	DDP	-	6.45	-
	Local Agro-dealers	30.00	-	-
	Other Farmers	-	-	--
Maize Grain /Sorghum Silage Chemicals Source	Own Capital	-	-	-
	Processor	-	-	-
	Local Agro-dealers	-	-	-

Judging by the average quantities of maize seed used by the farmers in Table 11 below, farmers grow maize on 1.2 hectares in Gokwe to 2.5 hectares in Marirangwe. The use of both basal fertiliser and top dressing is equally high for Marirangwe and low in both Mayfield and Gokwe.

Table 11: *Comparing means on maize inputs used and their costs*

MCC Name		Maize Grain seed	Maize Grain input cost/ha	Maize Grain Fertilizer	Maize Grain fertilizer cost/ha	Maize Grain top dressing	Maize Grain fertilizer cost/ha
Mayfield	Mean	36.05	53.15	115.03	73.43	86.34	70.66
	N	40	38	30	30	29	29
	Std Dev	27.24	38.53	67.09	40.23	54.71	66.33
Marirangwe	Mean	63.17	100.10	461.90	289.47	331.67	242.43
	N	30	30	20	19	30	28
	Std Dev	33.42	57.51	330.87	206.17	310.58	234.22
Gokwe south	Mean	31.28	57.39	178.13	97.13	114.06	74.88
	N	36	36	32	32	32	32
	Std Dev	13.74	24.18	37.97	21.32	69.83	42.39

Gokwe (97.5%) and Mayfield (87%) are highly involved in breed improvement initiatives with Marirangwe recording nil returns with both Gokwe (100%) and Mayfield (95%) having been exposed to artificial insemination. All the three projects have benefited from the Land O Lakes cattle bank facility. However the repayment rate is very low across the board. This has implications on sustainability of the facility and points to the need to make follow ups on repayment schedules. The farmers have also benefited from other cow input schemes with Mayfield (62.5%) highest followed by Marirangwe (56.7%) the least being Gokwe (12.5%). The level of heifer pass on in the three projects is low with only Mayfield recording two and a half farmers benefitting from such schemes. This could be an indicator that pass on schemes were not carried out in these projects or that they are not a successful way of introducing dairy genetics in the projects.

Table 12: *Proportion of famers that participated in different support facilities by MCC*

Dairy production & institutional support		Milk Collection Centre		
Farmer involvement	Responses	Gokwe	Marirangwe	Mayfield
Involvement in breed improvement	Yes	97.50	0.00	87.18
	No	2.50	100.00	12.82
Artificial insemination exposure	Yes	100.00	0.00	95.00
	No	0.00	100.00	5.00
Beneficiary of L & O Lakes revolving fund	Yes	87.50	63.33	48.65
	No	12.50	36.67	51.35
Repaid the revolving fund	Yes		0.00	
	No		40.00	
	Still paying		6.67	35.00
Benefited from other cow input schemes	Yes	12.50	56.67	62.50
	No	87.50	46.67	37.50
Involvement in pass the heifer scheme	As beneficiary		0.00	2.50
	Pass on concept		0.00	0.00
	No		100.00	97.50

The use of supplementary feed is high in all the three projects (Table 13). However, the use of own silage is still very low with Gokwe (12) being highest followed by Mayfield (10), and the least being Marirangwe (6), most likely because of reliance on grazing. The use of grazing is high across all projects. This is cause for concern and could lead to low productivity because of the poor nutrient quality of the available grazing. This is an area where intervention could lead to noticeable impact. SNV could facilitate local agro-dealers to stock up dairy supplementary feed and scale up silage making initiatives as a means of improving access and utilisation of adequate quality feed by the dairy farmers leading to improved productivity.

Table 13: *Number of famers that provided supplementary feeds to dairy cows by MCC-nominal*

Supplementary feeds provision and allocations		Milk Collection Centre		
Activity	**Responses**	**Gokwe**	**Marirangwe**	**Mayfield**
Provision of supplementary feeds	**Yes**	31	27	38
	No	0	3	1
Source of dairy feeds	**Supplements**	35	27	39
	Grazing	39	30	39
	Combination	27	5	3
	Own silage	12	6	10
Type of feed used	**Concentrates**	39	27	37
	Rations	35	27	2
	Both	20	24	2
	Other	0	3	2
Daily feed allocation per milking cow	**Mean**	1.42	0.81	1.42
	Std Dev	1.47	0.50	0.70
Daily feed allocation per dry cow	**Mean**	1.77	3.95	1.39
	Std Dev	0.86	4.21	0.52

Training in the various aspects of dairy management is very high across all the three projects (Table 14). The area of emphasis is adoption and practice as well as refresher courses.

Table 14: *Proportion of famers that were trained on different production skill by MCC*

Area of the training	Milk Collection Centre		
	Gokwe	**Marirangwe**	**Mayfield**
Fodder Production	100.00	96.77	97.50
Silage Making	100.00	93.55	97.50
Feeding & Ration Feed Formulation	100.00	96.77	100.00
Artificial Insemination (AI)	100.00	96.77	100.00
Weaning	100.00	96.77	100.00
Tagging	100.00	96.77	100.00
Castration	90.00	96.77	97.50
Dehorning	100.00	96.77	100.00
Deworming	100.00	96.77	97.50
Disease Treatment	90.00	96.77	100.00
Record Keeping	100.00	96.77	97.50
Dosing	100.00	96.77	100.00

Marirangwe (93.6%) has the highest number of farmers delivering milk to the MCC, followed by Mayfield (87.5%) and Gokwe (70%). There appears to be a high rate of side marketing in Gokwe most likely due to low volumes and distance to the MCC. The majority of the farmers in Mayfield (97.5%) deliver milk on foot while the majority in Marirangwe use bicycles (41.9%) on foot (29%) and motor vehicles (25.8%). The bulk of the farmers in Gokwe deliver on foot (32.5%) followed by bicycles (27.5%), motor vehicle (20%) and motorcycle (10%). There is an interesting case of entrepreneurship in Gokwe where Mrs Maguranye uses a donkey cart to deliver milk and charges neighbouring farmers for delivering their milk on a daily basis except weekends. The majority of the farmers take less than one hour to deliver milk and this ensures that milk is delivered while still fresh.

Table 15: *Proportion of famers who marketed milk, transport & containers used by MCC*

Dairy production & institutional support		Milk Collection Centre		
	Responses	Gokwe	Marirangwe	Mayfield
Delivering milk to MCC	Yes	70.00	93.55	87.50
	No	30.00	3.23	12.50
Mode of transport used	On foot	32.50	29.03	97.50
	Bicycle	27.50	41.94	
	Motor cycle	10.00		
	Motor vehicle	20.00	25.81	
Time taken	0 – 30 min	32.50	67.74	67.50
	30- 1 hr	47.50	29.03	25.00
	1 -2 hrs	20.00		5.00
Containers used	Milk cans	100.00	100.00	77.50
	Plastic containers			
	Plastic pails			
Price received in October 2012	Mean			
	Std Dev			

4.2.2 Rusitu Mayfield

Illustrations: *Former ARDA guest house now serving as an MCC and milk collection at Upperlands collection centre.*

The Rusitu small-scale dairy resettlement scheme was established by the government as a special specific-built resettlement project in 1983 in Chimanimani District (Manicaland Province), with the objective of creating a nucleus of farmers who were to graduate into commercial dairy farmers. Each of the 345 smallholder dairy farmers was allocated an average of 4.0ha, with 0.4ha for the homestead and dairy infrastructure, 2.6ha for fodder production, and the remaining 1.0ha for subsistence crop production. Established fodder banks included Bana grass, Napier fodder, Star grass, Giant Rhodes, Lucaena, Caliandra, velvet beans, and maize for silage and crushes. Farmers brought indigenous cows which were crossed with dairy bulls, with the first milk deliveries to Chipinge Dairibord starting in 1987. The Agricultural and Rural Development Authority (ARDA) acted as the technical advisor and implementing agency, a number of breeding farms provided the nuclei herd, while AFC provided loans. Milk marketing is arranged on the basis of deliveries to DZL based on forward contracts, with premium payments and/or penalties based on quality of

supplied products. Milk production increased overtime, peaking at a daily output of > 15,000 litres and an annual production of 1,642,725 litres in 1995.

Notable challenges for the scheme included the 1992 drought, internal conflicts and the 2000 – 2008 macro-economic melt-down. The 1992 drought resulted in farmers loosing the majority of their dairy cows, whilst the 1992 – 1995 internal conflicts resulted in a split of the dairy association yielding 2 splinter associations *viz:* (i) Rusitu Mayfield, and (ii) Rusitu United. On the other hand, 2000 – 2008 macro-economic challenges resulted in critical feed shortages, the unavailability of drugs and vaccines on the market, disease outbreaks, increased mortalities, decimation of the dairy herd and a significant decline in milk output. However, it was the continuous power shortages and milk spoilage in September 2007 that forced stoppages in deliveries to DZL. EU STABEX/NADF and Land 'O Lakes interventions in 2009 - 12 initiated a revolving fund loan-scheme for in-calf-heifers, and assisted with centre renovations, farmers and centre staff training, AI facilities, and a 30KV generator. Additional advisory support has been provided by a multiplicity of agencies including LPD, DVS, AGRITEX and community livestock workers. Deliveries to DZL resumed in October 2010. However, only a few farmers have benefitted from the in-calf-heifer loan scheme with the majority of resettlement dairy farmers still having no dairy animals. The Land 'O Lakes facility facilitates farmers' access to only 1 cow/heifer. This is compounded by the fact that farmers have no access to alternative loan facilities. Thus milk output has remained low (averaging 600 litres per day), while viability has been poor. Despite the challenges, Rusitu Mayfield remains the flagship dairy scheme with the largest potential in increasing milk production and contributing to national dairy production due to its geo-physical attributes (including a cool climate and abundant water supplies), the scheme's design and the huge investment already sunk into the scheme. At full potential, the scheme has the potential to produce 69,000 litres daily; 2,070,000 litres monthly and 20,700,000 litres annually.

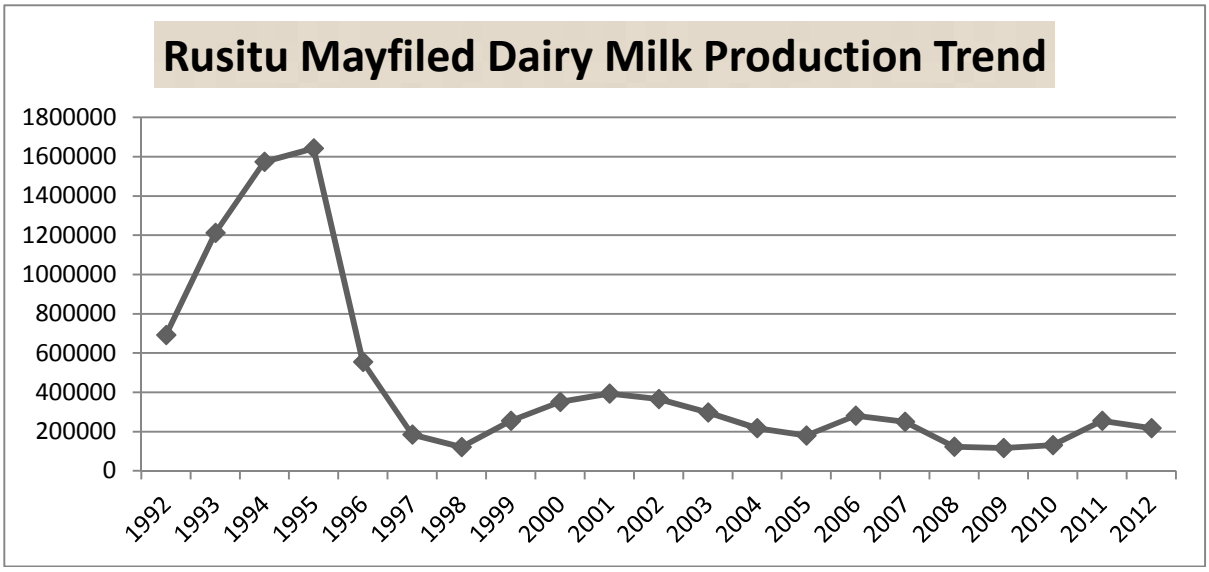

Figure 4: *Rusitu Mayfield milk production trends*

Milk production trends (Fig 4) show an initial increase from 1992 to 1995 1nd declines thereafter to a low of 121900 litres in 1998. This decline is a result of internal squabbles among the settlers and conflict with project implementation staff and lack of extension support. This is a strong indicator of how governance issues can adversely affect production within smallholder dairy schemes. The decline in 2008 and 2009 is a result of economic meltdown which affected all businesses in Zimbabwe. It is important to note that the

production trends prior 1995 represent the potential of the scheme and can be surpassed should the constraining factors be addressed.

4.2.3 Marirangwe

Marirangwe smallholder dairy scheme is set within a small-scale commercial farming area in Seke District (Mashonaland East Province), with an association membership of 31 although active membership is currently restricted to only 26[1]. The scheme was established in 1983 and built upon a donation of heifers from Red Dane Dairies, with milk production and deliveries to DZL commencing the following year. As the other smallholder dairy schemes, Marirangwe milk production enjoyed a positive growth trend since inception till it was negatively affected by the economic decline between 2000 and 2008. Apart from the macro-economic challenges, constraints to production have included the lack of commitment by some association members, the failure to conceptualize dairying as a business, and the lack of capital for the acquisition of heifers and supplementary feeds.

Since 2010 Marirangwe has benefitted from a new market linkage with Keffalos, an established dairy processing concern partly owned by Red Dane Dairies. The scheme has also benefitted from a heifer loan from the EU STABEX/NADF programme, breed and milk quality improvements from Keffalos, capacity building on fodder production from Land 'O Lakes, and disease surveillance from DVS. On the other hand, efforts in restocking, ensuring adequacy of feed stocks, and improved management have resulted in an increase in milk output and deliveries to the MCC. Marirangwe remains one of the best performing smallholder dairy schemes, and is currently the highest producing MCC, with a milk delivery rate of about 900 litres per day. However, two of the association members contribute more than 60% of this milk output. There is, thus great potential for improvement if the drive to revive smallholder dairying in the scheme materializes. Increasing the dairy herd, continued improvements in breed quality, an expansion of production volumes and diversification of enterprises (including goat milk production, marketing and processing) is likely to boast output and incomes.

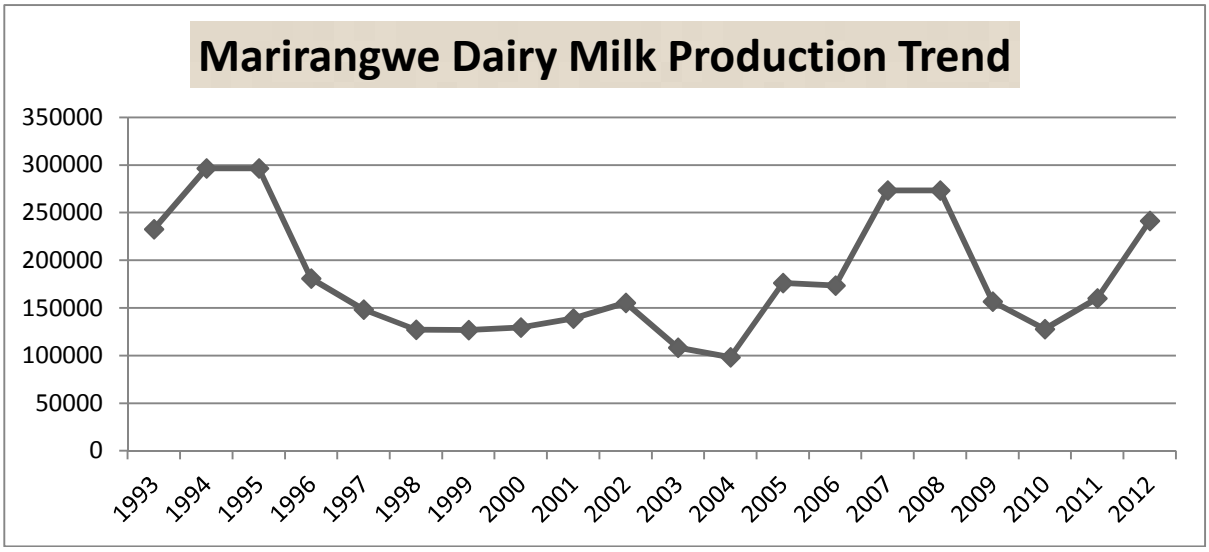

Figure 5: *Marirangwe milk production trends*

[1] Three (3) of the 31 members are recently resettled A2 farmers.

4.2.4 Gokwe

The project was established in 1994 and remains one of the best managed smallholder dairy schemes. The project has received assistance from ARDA DDP, STABEX 95, and Land O LAKES in the form of dairy cattle, business development support, marketing transport, fodder and feed. Focus group discussions and key informant interviews revealed that a total of seventy eight (78) dairy animals from ARDA, nineteen (19) dairy cows and 2 bulls and a revolving fund for dairy cattle and feed from STABEX 95 (2007/08), and thirty four (34) dairy animals in two phases from Land O Lakes. Land O lakes encouraged the project to form a cattle bank. However the genetics was depleted due to high mortality especially during the hyperinflationary era. The delivering members fluctuate between 30 and 35 members delivering 320 litres per day (Potential of 60). Farmer payout is dependent on centre running costs and varies between 50 to 80cents per litre net.

Key success factors as indicated through FGDs include transparency and consistent consultation with general membership; coordinated effort; milk volumes and productivity; record keeping and good financial management; good feed base and breeding; and adoption of extension advice. The project viability is good and have reserve fund created from contributing 0.04c per litre. The project also has diverse sources of revenue which include milk sales, drug and feed sales, and building investment income from rentals. The constraining factors pointed out during FGDs include feed and feeding, cow management, lack of specialisation, lack of knowledge, and incapacitated extension support. The FGDs also recommend that for success smallholder dairy projects should move away from seasonal peak production when markets are difficult to dry season production, increase feed base and incorporate youths for project sustainability.

The Gokwe project milk production trends show a peak of 215468 litres in 1996 to a low of 19791 litres in 2009 as a result of a difficult economic environment. The decline from 1996 coincides with reduction in direct funding support to the project.

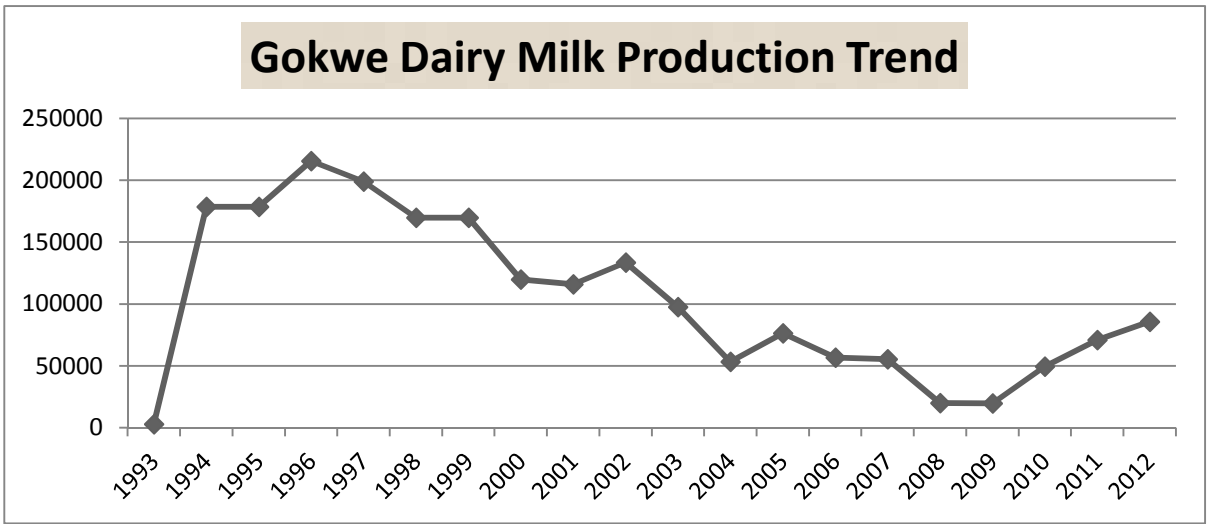

Figure 6: *Gokwe Milk Production Trends*

4.3 Average Performing MCCs

4.3.1 Overview for the Average Performing MCCs

Classification by settlement type reveals that Hama Ruomba (100%) and Rusitu United (100%) draw membership from the small scale commercial farming areas (Table 17). Tongogara (71%) draw members from the communal farming areas and the balance from the old resettlement farms(29%). The majority of the members are male Hama Ruomba (78.4%), Tongogara (77.5%), and Rusitu United (76.2%) The majority of the members are married. Literacy levels are high.. The majority of the farmers are not formally employed Hama Ruomba (5.2%) with some farmers who are employed. Tongogara (41%), and Hama Ruomba (35.1%) have the highest number of famers with no formal training in agriculture. This has a negative effect in farmer understanding of farming as a business and the comprehension of technical issues.

Table 17: *Member characterization as a percentage for intermediate producers*

Characteristic feature	Details	Milk Collection Centre				
		Dowa **	Hama Ruomba*	Guruve **	Rusitu United*	Tongogara*
Settlement type	Small scale commercial	75.00	100	7.69	100.00	
	Old resettlement	0.00	0.00	0.00	0.00	28.95
	communal	25.00	0.00	0.00	0.00	71.05
	A1			92.31	0.00	
Sex	Male	69.44	78.37	92.50	76.21	77.50
	Female	30.56	21.63	4.50	23.69	22.50
Marital status	Married	62.50	73.68	92.50	77.50	82.50
	Single	37.50	2.63	2.50	2.50	2.50
	Widowed	25.00	23.68	5.00	12.50	15.00
	Divorced	2.50	0.00	0.00	0.00	0.00
	Separated	2.50	0.00	0.00	7.50	0.00
Education level	Primary	22.50	36.84	25.64	41.03	30.00
	ZJC/STD 6	20.00	18.42	20.51	41.03	42.50
	Secondary	40.00	31.58	46.15	15.38	15.00
	Tertiary	17.50	13.16	7.69	2.56	12.50
	None	0.00	0.00	2.56	0.00	0.00
Employment	No Formal employment	80.00	71.05	79.49	100.00	84.61
	Employed	17.50	5.23	10.26	0.00	5.12
	Pensioner	2,50	23.68	10.26	0.00	10.27
	Retrenched	0.00	0.00	0.00	0.00	0.00
Agricultural training	Master Farmer	55.00	56.76	30.77	82.50	51.28
	Advanced Master Farmer	2.50	8.11	7.69	0.00	7.69
	Diploma	2.50	0.00	3.69	0.00	0
	None	40.00	35.14	48.65	7.50	41.03

*average performing **Low performing

The average household size (Table 18) ranges from six (6) for Tongogara to Hama Ruomba (7) and Rusitu United (9) of these family labour is highest at Hama Ruomba (6), followed by Tongogara (3) and Rusitu United (3). This is understandable as Hama Ruomba has larger land sizes. Tongogara (59.9) and Hama Ruomba (59.5) have a relatively ageing membership followed by Rusitu United (54.9). The dairy experience varies with Rusitu United (23.4) having the highest followed by Hama Ruomba (12.8) and Tongogara (11.3). The dairy herd size is similar Hama Ruomba (5), Rusitu United (5), and Tongogara (5). The distance to the MCC is longest for Tongogara at 22.8 km followed by Hama Ruomba

(10km) and Rusitu United (4.7km). Tongogara needs to put in place an efficient milk collection system if it is to avert side marketing.

Table 18: *Comparing means on household size, family labour, ages, experience in dairy, dairy herd size and distance to mcc for lead intermediate producers*

MCC Name		Household size	Family labour	Age of HH Head	Dairy experience	Dairy herd size	Distance to MCC
Dowa	Mean	5.31	3.05	56.18	11.33	4.03	6.56
	N	39	37	38	39	30	39
	Std Dev	2.27	1.22	16.19	6.30	2.91	5.00
Tongogara	Mean	5.92	3.30	59.93	9.78	5.08	22.75
	N	40	40	40	40	40	40
	Std Dev	2.04	1.09	12.51	1.05	4.11	22.83
Hama Ruomba	Mean	6.95	6.08	59.53	12.82	4.58	10.07
	N	38	38	38	39	38	39
	Std Dev	2.35	9.41	14.43	4.94	3.29	6.73
Rusitu United	Mean	8.49	3.11	54.87	23.43	4.85	4.71
	N	37	36	38	40	40	40
	Std Dev	6.25	1.55	13.57	6.12	3.45	7.97
Guruve Dairy Coop	Mean	7.11	2.00	53.40	10.83	4.80	10.83
	N	38	38	40	40	40	40
	Std Dev	3.00	0.87	15.85	7.41	3.55	13.47

The majority of the members (Table 19) are producing milk as follows Tongogara (95%), Hama Ruomba (94.9%) and Rusitu United (72.5%). The number of farmers who are registered but not active is high with Tongogara (51.4%), Hama Ruomba (50%) and Rusitu United (41.2%).

Table 19: *Proportion of members registration and participation at the MCC*

MCC Name	Membership		Currently Producing milk		Active Member		Registered but not active	
	Yes	No	Yes	No	Yes	No	Yes	No
Dowa	100.00	0	45.00	55.00	27.50	72.50	67.50	32.50
Tongogara	100.00	0	95.00	5.00	42.50	57.50	51.35	48.65
Hama Ruwomba	100.00	0	94.87	4.13	58.94	41.03	50.00	50.00
Rusitu United	100.00	0	72.5	27.5	66.67	33.33	41.18	58.82
Guruve Dairy Coop	100.00	0	27.50	72.50	15.38	84.62	85.00	15.00

Members in Hama Ruomba (74.4%) and Rusitu United (57.5%) cite dairying as the main source of income (Table 20). Only a small proportion of members at Tongogara (7.5%) regard dairying as the main source of income relying on vegetable and crop production (30%) and other sources (62.5%).

Table 20: *Proportion of members and their three main sources of income*

MCC Name	Main source income			Second income			Third income		
	Dairy	Veg & Crop production	All other	Dairy	Veg & Crop production	All other	Dairy	Veg & Crop production	All other
Dowa	7.50	77.50	15.00	35.00	45.00	20.00	7.89	39.47	52.63
Tongogara	7.50	30.00	62.50	12.50	50.00	37.50	20.51	1948.72	30.77
Hama Ruomba	74.36	15.38	10.26	17.24	69.23	17.95	10.00	57.50	32.50
Rusitu United	57.50	32.50	10.00	28.21	64.10	7.69	2.70	59.46	37.84
Guruve Dairy Coop	2.50	80.00	22.50	25.00	27.50	47.50	50.00	27.50	22.50

Generally the proportion of members owning dairy infrastructure for the three MCCs is high (Table 21) however, Tongogara (5%) and Rusitu United rank low for watering and feeding facilities.

Table 21: *Proportion of members owning different dairy infrastructures.*

Dairy infrastructure owned	MCC Name				
	Dowa	Hama Ruomba	Guruve Coop	Rusitu	Tongogara
Calf pen	66.67	82.50	80.00	72.50	95.00
Cattle handling facilities	82.05	87.50	60.00	80.00	72.50
Paddocks	79.49	85.00	40.00	90.00	37.50
Cattle kraal	43.58	95.00	100.00	92.50	95.00
Watering and feeding facilities	46.15	57.50	10.00	20.00	5.00
Other				10.00	

The proportion of members using recommended milking utensils is high for Hama Ruomba (92.5%) and Rusitu United (75%) but low for Tongogara (31.6%). There is thus need to focus on hygiene issue in both Tongogara and Rusitu United through accessing requisite utensils on the market.

Table 22: *Proportion of members owning different milking utensils*

	Dowa	Hama Ruomba	Guruve Coop	Rusitu	Tongogara
Stainless Steel bucket	80.00	92.50	40.00	75.00	31.58
Plastic Bucket	12.50		60.00	15.00	71.05
Tea Pot				5.00	
Other		2.50		5.00	

Judging by the average seed used, members in the medium producing MCCs grow maize on half a hectare for Tongogara to one and a half hectares in Rusitu United. The level of input use is high for Tongogara and Rusitu and low for Hama Ruomba possibly due to low rainfall for the latter MCC (Table 23).

Table 23: *Comparing means on maize inputs used and their costs per hectare.*

MCC Name		Maize Grain seed	Maize Grain input cost/ha	Maize Grain Fertilizer	Maize Grain fertilizer cost/ha	Maize Grain top dressing	Maize Grain fertilizer cost/ha
Dowa	**Mean**	19.83	37.17	270.83	166.00	208.33	157.50
	N	12	12	12	12	12	12
	Std Dev	15.69	10.62	183.97	77.95	106.24	77.43
Tongogara	**Mean**	13.80	23.00	50.00	30	50.00	30.00
	N	10	8	2	2	1	1
	Std Dev	12.73	0.00	0.00			
Hama Ruomba	**Mean**	23.69	19.31	84.62	38.31	62.50	32.63
	N	29	29	26	26	16	16
	Std Dev	3.51	12.57	44.20	16.51	22.36	9.97
Rusitu United	**Mean**	39.42	51.92	115.86	81.50	81,46	61.02
	N	36	36	30	30	24	23
	Std Dev	36.54	25.21	75.49	45.92	73.20	47.24
Guruve Dairy Coop	**Mean**						
	N						
	Std Dev						

There is high member involvement in breeding initiatives and exposure to artificial insemination for Hama Ruomba (89.7%), Rusitu United (91.9%) and Tongogara (100%). Hama Ruomba (78.4%) and Rusitu United (59.5%) have benefited from the Land O Lakes

cattle bank facility. There is low repayment of the cattle bank facility (Table 24). All the projects have benefited from other cow input schemes but there is low pass on activity.

Table 24: *Proportion of famers that participated in different support facilities by MCC*

Dairy production & institutional support		Milk Collection Centre				
Farmer involvement		**Dowa**	**Hama Ruomba**	**Guruve Dairy Coop**	**Rusitu United**	**Tongogara**
Involvement in breed improvement	Yes	17.50	94.44	70.00	83.78	100.00
	No	82.50	11.11	30.00	16.22	0.00
Artificial insemination exposure	Yes	5.00	89.74	80.00	91.89	100.00
	No	95.00	10.26	20.00	8.11	0.00
Beneficiary of L & O Lakes revolving fund	Yes	62.50	78.38	30.00	59.46	0.00
	No	37.50	21.62	70.00	40.54	100.00
Repaid the revolving fund	Yes	17.50	2.70	0.00	0.00	0.00
	No	12.50	*	17.50	37.84	0.00
	Still paying	20.00	21.62	7.50	2.70	0.00
Benefited from other cow input schemes	Yes	17.50	69.23	60.00	67.57	85.00
	No	80.00	30.77	40.00	32.43	15.00
Involvement in pass the heifer scheme	As beneficiary	15.00	33.33	20.00	0.00	0.00
	Pass on concept	5.00	24.24	20.00	0.00	0.00
	No	77.50	42.42	50.00	100.00	100.00

There is high use of supplementary feeds for the three MCCs as depicted by the number of members reporting supplementing the dairy cattle (Table 25). However the bulk of the farmers are reliant on grazing and the use of own silage is low. Daily feed allocation for milking cows for Hama Ruomba and Tongogara is low which may explain the low productivity in the projects.

Table 25: *Number of famers that provided supplementary feeds to dairy cows by MCC*

Supplementary feeds provision and allocations		Milk Collection Centre				
Activity	**Responses**	**Dowa**	**Hama Ruomba**	**Guruve Dairy Coop**	**Rusitu United**	**Tongogara**
Provision of supplementary feeds	Yes	27	30	24	35	34
	No	12	3	16	1	4
Source of dairy feeds	Supplements	23	30	0	32	34
	Grazing	38	16	8	36	39
	Combination	1	7	8	5	12
	Own silage	2	0	4	9	0
Type of feed used	Concentrates	26	18	4	34	32
	Rations	10	10	12	17	23
	Both	1	14	8	0	1
	Other	2	0	0	2	15
Daily feed allocation per milking cow	Mean	0.54	0.67	1.27	1.18	0.69
	Std Dev	0.41	0.43	0.38	0.77	0.83
Daily feed allocation per dry cow	Mean	3.07	2.25	1.25	1.56	2.54
	Std Dev	3.40	1.89	0.25	0.91	0.90

The level of training in various skills is high for all the three MCCs save for the recorded low level of training for Hama Ruomba in the areas of Artificial Insemination (35.98%),and tagging (41%). Rusitu United and Tongogara report very high levels of training.

Table 26: *Proportion of famers that were trained on different production skills by MCC*

Area of the training	Milk Collection Centre				
	Dowa	Hama Ruomba	Guruve Dairy Coop	Rusitu United	Tongogara
Fodder Production	75.00	87.18	100.00	97.50	97.50
Silage Making	75.00	74.36	70.00	100.00	100.00
Feeding & Ration Feed Formulation	25.00	79.49	70.00	97.50	100.00
Artificial Insemination (AI)	15.00	35.90	30.00	95.00	100.00
Weaning	72.50	76.92	10.00	100.00	97.50
Tagging	75.00	41.03	10.00	100.00	100.00
Castration	92.50	79.49	20.00	100.00	100.00
Dehorning	92.50	84.62	10.00	100.00	100.00
Vaccination	90.00	79.49	10.00	100.00	100.00
Deworming	90.00	79.49	20.00	100.00	100.00
Disease Treatment	85.00	76.92	10.00	100.00	100.00
Record Keeping	77.50	69.23	40.00	100.00	100.00
Dosing	95.00	79.49	30.00	100.00	100.00

The proportion of farmers delivering milk to the MCC is high for Hama Ruomba (84.6%) and Rusitu United (82.5%) but low for Tongogara (42.5%). The district approach for Tongogara makes it difficult and uneconomic for farmers to deliver due to long distance to the MCC. The mode of transport used to deliver milk to the MCC for the three projects is mainly on foot and bicycles with a few using motor cycles 10.2%) and motor vehicles (7.7%) in Hama Ruomba. All the producers deliver the milk in less than two hours for Hama Ruomba and Tongogara save for Rusitu United where two and a half percent (2.5%) deliver after two hours. There is need therefore to check on the quality of such milk as it may contaminate the other milk upon bulking. All the delivering farmers report using the recommended milk containers for Rusitu United (90%) and Tongogara (42.5%) and the majority in Hama Ruomba (87.2%). However, there is a segment of farmers in Hama Ruomba (5.1%) still using plastic containers and should be dissuaded from the practice.

Table 27: *Proportion of famers marketing milk, transport & containers used by MCC*

Dairy production & institutional support		Milk Collection Centre				
		Dowa	Hama Ruomba	Guruve Dairy Coop	Rusitu United	Tongogara
Delivering milk to MCC	Yes	55.00	84.62	90.00	82.50	42.50
	No	45.00	10.26	10.00	10.00	57.50
Mode of transport used	On foot	27.50	30.77	70.00	85.00	20.00
	Bicycle	72.50	41.03		5.00	20.00
	Motor cycle		10.26			
	Motor vehicle		7.69			2.50
Time taken	0 – 30 min	35.00	46.15	30.00	45.00	20.00
	30- 1 hr	30.00	33.33	60.00	20.00	17.50
	1 -2 hrs	35.00	12.82		22.50	5.00
	2 -3 hrs				2.50	
Containers used	Milk cans	80.00	87.18	70.00	90.00	42.50
	Plastic containers	20.00	5.13	20.00		
Price received in October 2012	Mean					
	Std Dev					

4.3.2 Rusitu United

Illustrations: *A reflection of the old (where renovations are necessary) and the new (indicating efforts at reviving smallholder dairying).*

Rusitu United was established in 1997 as a product of the internal conflict and eventual split in the Rusitu dairy resettlement scheme associations. Milk volumes have been averaging 2,900 litres per day prior to the 2000 – 2008 economic decline. Farmers within the association continued production and delivering milk to local MCCs during the economic decline even though production had became uneconomic owing to high production costs, low producer prices and hyper-inflation. Intermittent power supplies also led to significant losses due to spoilage given that the group had neither a stand-by generator nor other alternative power supplies. As a result deliveries to the MCCs and DZL were eventually halted in July 2007.

The group initiated the rehabilitation of local MCCs in 2010 using own funding but deliveries to MCCs and DZL only resumed in February 2011. This was after Land 'O Lakes provided 22 of the 120 dairy farmers in the group with in-calf-heifers and DZL provided the association with a US$12,000 loan to purchase a 20KV stand-by generator. The farmers are, however, struggling to repay the loans (valued at US$1,000), resulting in defaults given the lapse in the repayment period. The majority of association members (83%) are not producing any milk or producing insignificant volumes to warranty deliveries to the MCCs. Other members are also side-marketing due to the high administrative/processing costs. Current milk deliveries to the MCCs average 140 litres per day, representing a 95.2% decline from the peak established prior to the 2000 – 2008 economic decline. Returns per farmer are currently depressed due to the low production volumes, high inefficiencies, high administrative and processing costs (up to US$0.30 per litre[2])[3]. A re-merger with Rusitu Mayfield can boost overall production levels, reduce unit operating costs and increase margins for involved dairy farmers.

[2] This is largely because the MCC runs on a generator for most of the time.

[3] This compares with historical administration/processing cost averages of US$0.01 – 0.02. According to KIIs, these are also common administrative/processing costs figures in other smallholder dairy schemes.

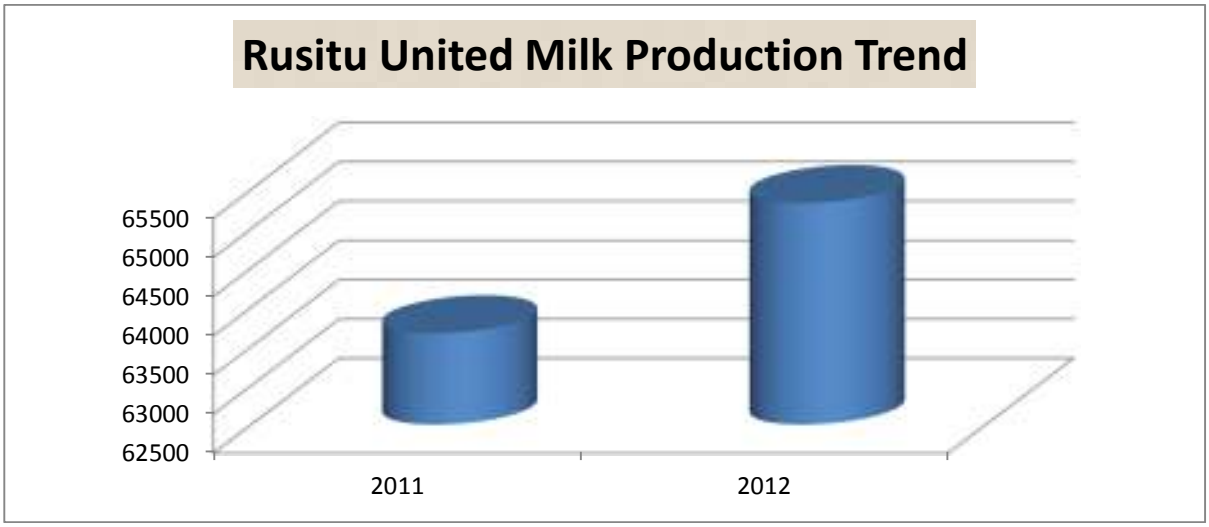

Figure 7: *Milk production trends in Rusitu United.*

4.3.3 Hama Ruwomba (Mushagashe)

The project draws its entire membership from the Small Scale Commercial Farming area and was established in September 2001 with support from Africa Now. The project later established sub-collection centres at Hama Mavhaire and Takawira. The project undertakes local processing into cultured milk and marketing its products to local institutions and retail outlets in Masvingo and was marketing products to Beitbridge at its peak. Hyperinflation led to reduced production during the period 2005-2008 resulting in market collapse and breakdown of marketing vehicle. At the time of the evaluation, current membership stood at forty two (42) with nineteen (19) delivering an average of one hundred and fifty (150) litres per day. The members are led by an executive committee and have subcommittees such as the fodder and women in dairy.

The project has received assistance from several organisations and institutions. The DDP facilitated institutional development and assisted in infrastructure development and equipment installation as well as capacity development at project initiation until the hyperinflationary era. Africa Now provided dairy cattle on a pass on scheme and in addition provided a marketing vehicle, tractor and accessories for fodder and feed production. Land O Lakes availed a loan facility and created a cattle bank in July 2012 leading to increased production. NADF provided extension support post the DDP era. By the time of the evaluation, the marketing vehicle and tractor were not in good working order forcing the association to hire out a marketing vehicle. This was an expensive option. Electricity outage was a big hindrance to processing and the project thus required a generator as back up. The electricity outages in turn forced the project to produce naturally soured milk leading to whey losses. The focus group discussion established that distance to the MCC affected milk delivery with thirteen (13) members over 25 km radius, ten (10) members within ten (10) to twenty five (25) km radius and nineteen (19) less than ten (10) km radius.

The focus group discussion established that access to stock-feeds and adequate fodder provision in addition to good dairy genetics were the major constraining factors for the project. The need for an extension officer attached to the dairy was highlighted. The poor rainfall pattern warranted the sinking of boreholes and most of the farms have borehole sites. Africa Now had assisted in the drilling of six (6) boreholes but only one had been equipped. The genetic pool injected through Africa Now and Heifer International pass on initiatives had been wiped out by the time of the evaluation through mortalities with the peak

period in 2008 as a result of drought and economic meltdown. Low productivity on farm affected farmer viability and in turn negatively affected business efficiency at MCC level.

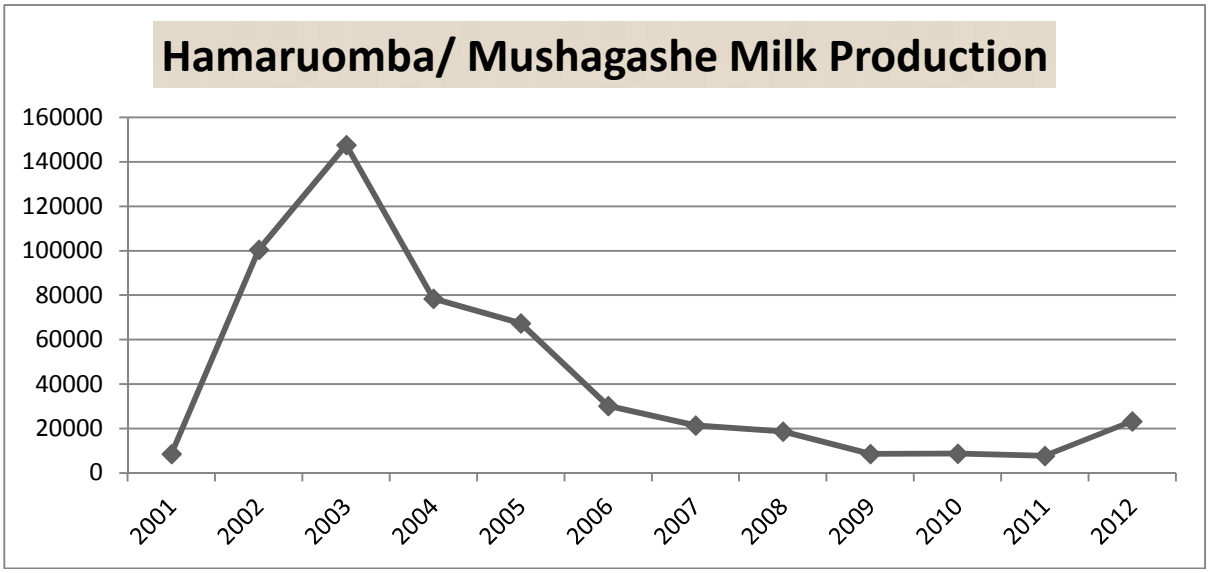

Figure 8: *Milk production trends in Mushagashe.*

4.3.4 Tongogara (Shurugwi)

The project is registered as a cooperative and has a unique approach which seeks to cover the whole district. The project started in 2001 with the training of farmers through ARDA-DDP and a dairy task force committee was established. Some members undertook education trips to Gokwe, Chikwaka, Nharira, Matopos, and ARDA Balu, Workshops were also held locally aimed at enhancing farmer knowledge on dairy production, marketing and business issues. In 2005 the ARDA-DDP provided building material for the project but budgetary constraints affected the construction of the MCC resulting in the utilisation of local expertise to complete the building. The project has the following branches viz. Tongogara, Chikato, Gwanza, Batanai, Chitora, Svika, Hanke, Musasa/Boterekwa still active but Mufiri and Dyemiti inactive.

The Swedish Cooperative Centre (SCC) provided a cold-room, fridge, generator, pasteuriser, sinks, and the borehole was installed with a hand pump instead of the intended solar powered pump due to low yield. A Loan facility for sixty (60) heifers and cows (Holstein/ Jersey; Friesland/Jersey) was provided. From 2001-2006 membership stood at 200 and was reduced in 2007-2008 period to 30. With the advent of SCC assistance, the membership increased to 300. By the time of the evaluation active members were reported to be around one hundred and sixty (160. Distribution of membership in relation to the MCC has thirty members within the 10km radius, Twenty two in the 10 to 15 km radius and the rest over the 15 km radius. A membership joining fee of $150 purchases 100 shares for infrastructure.

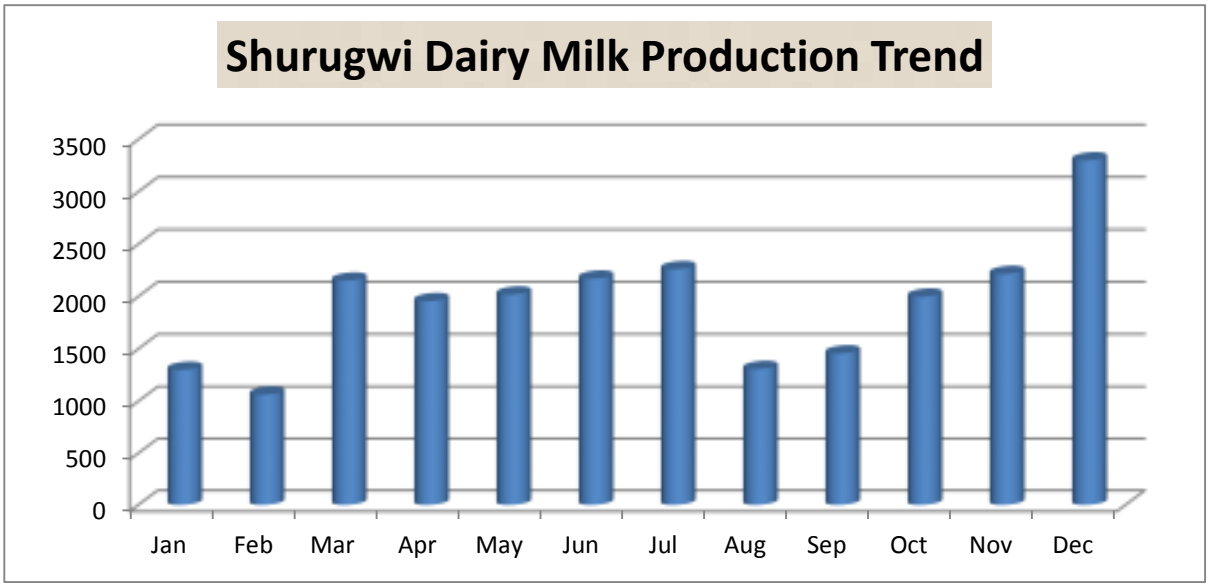

Figure 9: *Milk production trends in Shurugwi.*

4.4 Low Performing MCCs

4.4.1 Overview for Low Performing MCCs

Classification by settlement type reveals that Dowa (75%), and Guruve (7.7%), draw membership from the small scale commercial farming areas. Dowa (25%) draws the balance of its membership from the communal farming areas. Guruve (92.3%) has the bulk of its members from A1 resettlement area. This has negatively affected production as the some of the resettled farmers were the major producers in the project area and the relocation did not put into consideration the impact on production and factor in plans to harness milk production and collection strategies. The A1 farm is located 35 km from the MCC. The majority of the members are male Guruve (92.5%), and Dowa (69.4%). The majority of the members are married. Literacy levels are high with only Guruve (2.6%) reporting cases of members with no formal education. This has a bearing on training as members with no formal education are not able to read and write. The majority of the farmers are not formally employed with some formally employed Dowa (17.5%) and Guruve. Guruve (48.6%) and Dowa (40%), have the high numbers of famers with no formal training in agriculture. This has a negative effect in farmer understanding of farming as a business and the comprehension of technical issues.

The average household size is five (5) for Dowa and seven (7) for Guruve and of these Dowa (3) and Guruve (2) are used as family labour. The average age of the household is fifty three (53) years for Guruve and fifty six(56) for Dowa. The relative dairy experience stands at Dow (11 years) and Guruve (10.8 years). The dairy herd size is four (4) for Dowa and five (5) for Guruve. The Distance to the MCC averages six point six (6.6) kilometres for Dowa and eleven (11) for Guruve. The distance for Guruve however, does not take into consideration the fact that the sub-collection point at Karoe farm (The A1 resettlement) is thirty five kilometres to the main MCC.

In Dowa (45%) and Guruve (27.5%) of the members are producing milk. Of these, a very small number are active as follows, Dowa (27.5%) and Guruve (15.4%) and sixty seven and half percent (57.5%) are registered but not active while eighty five percent (85%) are registered but not active for Guruve. The reasons proffered during FGDs range from governance issues to production issues such as loss of dairy cattle during 2008, poor feeding and breeding as a result of poor animal condition, distance to the MCC and low milk prices.

Members in Dowa (77.5%) and Guruve (80%) regard vegetable and crop production as the main source of income with dairying coming in as the second for Dowa (35%) and third for Guruve (50%). The level of dependence on dairying as a source of livelihood is directly correlated to the level at which the farmer will be prepared to invest and commercialise the enterprise. Dowa and Guruve rank fairly for dairy infrastructure but Guruve ranks low for paddocks (40%) and watering and feeding facilities (10%).

Dowa (80%) has a high incidence of the use of recommended dairy utensils but Guruve (40%) has a low use of recommended utensils instead relying on plastic buckets (60%). This has an adverse effect on milk hygiene. There is need to emphasize good milking hygiene for Guruve.

Dowa has very high input use but Guruve has no returns probably indicating inconsistent use of inputs for maize grain production. Dowa (17.5%) has a low involvement in breed improvement while Guruve (70%) has a high involvement. On the same token Dowa (5%) has a low exposure to artificial insemination while Guruve (80%) has a high exposure to the technology. Both Dowa and Guruve have benefited from the Land O Lakes and other cow support schemes but there is low cattle bank revolving fund repayment and pass on activity.

There are a high number of farmers not providing supplements for Dowa and Guruve MCCs. The number of farmers providing own silage is equally low and the majority of the farmers use rations in Guruve and concentrates in Dowa. Dowa reports very high levels of training in the various production skills. However, Guruve reports low training in the following skills; artificial insemination (30%), weaning (10%), tagging (10%), castration (20%), deworming (20%), record keeping (40%), dosing (30%). This should reflect a low adoption of these skills on farm.

In Dowa (55%) and Guruve (90%) of the members deliver milk to the MCC but however the high figure for Guruve is misleading as the delivery is not consistent. The majority of the farmers in Dowa (72.5%) deliver using bicycles while the majority o the farmers in Guruve (70%) deliver on foot. All the farmers in Guruve deliver milk within one hour but a sizeable number in Dowa (35%) deliver between one to two hours. The majority of the farmers deliver using the recommended milk utensils but twenty percent report using plastic containers and this should be discouraged.

4.4.2 Dowa

Illustrations: *Dowa MCC, broken-down delivery truck and a dilapidated silage cutter.*

Dowa dairy scheme was established in 1987, although MCC operations and milk deliveries only commenced in October 1994. The scheme has 40 members – 25 from the small-scale commercial farming area and 15 from the surrounding communal areas. At the beginning, collected milk was sold as a raw product in schools and within the local community. The proceeds were used to purchase a truck in 1997, while farmer contributions were used to electrify the MCC in 1998. This enabled the processing of milk and expansion of the scheme's market. At its peak in 1997 the scheme sold a diversified product range to schools and supermarkets (including OK and TM). Geographical market areas included Rusape, Wedza, Murambinda, Headlands, Macheke, Marondera and Harare.

The 2001 – 2002 drought reduced the dairy herd. This subsequently reduced milk production volumes and MCC deliveries. The very low milk levels could not sustain the MCC's running costs but the association trudged on to avoid closure. In 2010 land 'O Lakes came in with assistance which again boosted milk output and MCC deliveries. However, 10 of the 30 in-calf-heifers extended on loan to farmers died within the first year, 2 of the remaining 20 heifers failed to conceive, with reports indicating that a further 50% of the animals that survived were affected by contagious abortion (CA). As a result, current production levels remain critically low. The MCC/association owes farmers money and is failing to pay NADF and ABS levies, while association members owe the Land 'O Lakes initiated cattle revolving fund. As is the case of Rusitu and Marirangwe, Dowa, because of its design retains a lot of potential if the right interventions are put in place.

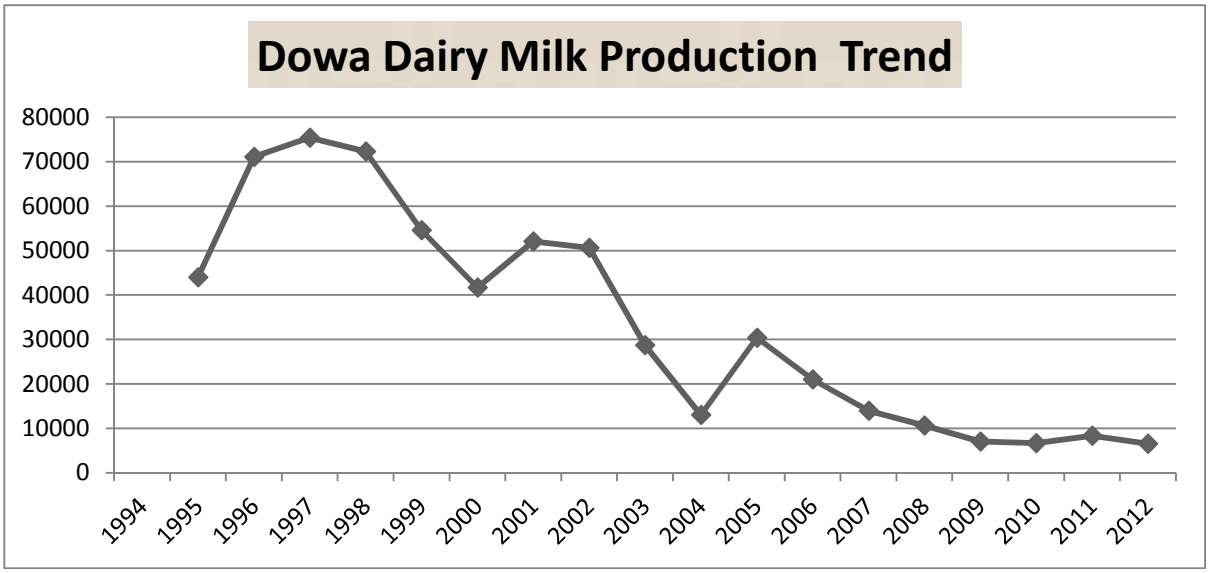

Figure 10: *Milk production trends in Dowa.*

4.4.3 Guruve

The project was established in 1987 had the first milk intake in 1992 and was flourishing using donkey carts and bicycles for delivery. In 2002, the EU micro projects through STABEX 95 provided funding for the construction of the processing room and a 300 litre pasteuriser, a 50 litre pasteuriser for yoghurt and a steel packaging table. Africa Now in 2002 provided assistance in the form of computers and a chopper grinder for silage making. The project registered a decline from 2002 until 2009 as a result of financial difficulties experienced during the hyperinflationary period.

A dairy settlement farm was established at Karoe farm leading to the resettlement of most of the productive farmers in the project area as this was deemed a dairy settlement scheme. Seventy five (75) plot holders were settled on the farm and the focus group discussion and key informant interviews revealed that only thirty (30) out of the seventy five are active in dairy . The 35 km distance from the MCC and the production levels make delivery of milk from Karoe difficult requiring the use of motorised transport. The level of production does not warrant the use of the motor vehicle thus the farmers end up selling milk locally. Efforts to establish a sub-collection centre were affected by unhygienic conditions prevailing at the proposed site. Production is seasonal with peak production during summer. The MCC was closed September/October 2012 due to low volumes.

Distance to the MCC poses delivery challenges for members. The areas with members affiliated to the project are Karoe 35km away with 30 active members, Gota 10 to 15 km away with ten (10) members, Guruve centre less than 1 km with three (3) members, Guruve communal less than five (5) km with two members, Tengenenge 43 km away with three (3) members, Taiseka 35 km away with three (3) members, Mvurachena thirty five (35) kilometres away with one (1) member. The ABS system indicates lack of viability due to low milk intake.

Governance issues need attention. The project has an APEX committee comprising seven (7) members (secretary died), and has a non-functional cattle bank committee, and another ineffective Heifer pass on committee for the Presidential and Salvation Army heifers

(Partially functioning infrequent feedback meetings). The number of paid up members is less than twenty. There is a high dependency syndrome and a culture of non payment of credit. No heifer pass on has been done and farmers are not paying back the revolving fund set up by STABEX 95.

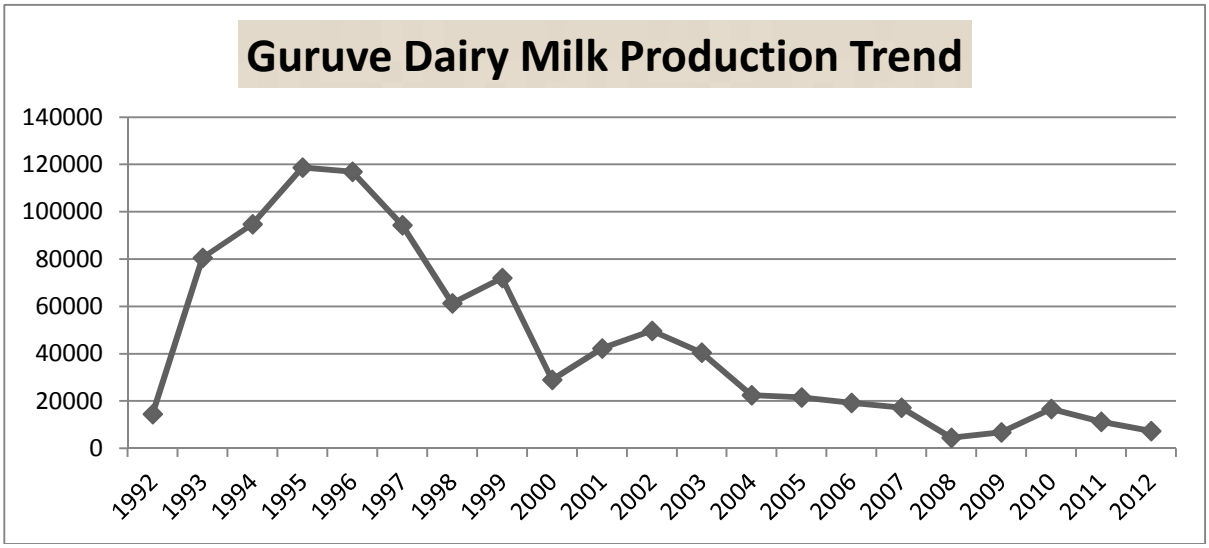

Figure 11: *Milk production trends in Guruve.*

4.5 Dysfunctional MCCs

4.5.1 Overview for Dysfunctional MCCs

Umzingwane (85.7%) and Mubaira 23.5%) have settlers in the old resettlement scheme and the balance Umzingwane (14,3%) and Mubaira (76.5%) in the communal area. The gender balance for Umzingwane is male (50%) and female (50%). The membership in Mubaira comprise male (55%) and female (45%). The majority of the farmers are married Umzingwane (81.6%) and Mubaira (60.5%) followed by widowed Umzingwane (25.8%) and Mubaira (31.6%). The level of education is high for both MCCs with the majority attaining ZJC/STD 6 education level. However, there is a significant number of farmers with no formal agriculture training for Mubaira (52.9%) and Umzingwane (31.6%).

Table 28: *Member characterization as a percentage for non producers*

Characteristic feature	Details	Milk Collection Centre	
		Umzingwane	Mubaira
Settlement type	Small scale commercial	0.00	0.00
	Old resettlement	85.71	23.53
	Communal	14.29	76.47
Sex	Male	50.00	55.26
	Female	50.00	44.74
Marital status	Married	81.58	60.53
	Single	0.00	2.63
	Widowed	25.81	31.58
	Divorced	0.00	2.63
	Separated	0.00	2.63
Education level	Primary	31.58	19.44
	ZJC/STD 6	36.84	50.00
	Secondary	23.32	27.77
	Tertiary	5.26	2.77
	None	0.00	0.00
Employment	No Formal employment	86.84	75.00
	Employed	0.00	5.55
	Pensioner	13.16	19.44
	Retrenched	0.00	0.00
Agricultural training	Master Farmer	47.37	47.06
	Advanced Master Farmer	21.05	0.00
	Diploma	0.00	0.00
	None	31.58	52.94

The average household size is eight (8) in Mubaira followed by six (6) in Umzingwane. The use of family labour is uniform at three (3) for both MCCs. The membership is aged with average ages of Umzingwane (60,5) and Mubaira (62.8%). Dairy experience averages eleven years for Mubaira and Umzingwane (8.7%). The dairy herd size averages three for Mubaira and four for Umzingwane. Distance to the MCC averages Mubaira (18.7%) and Umzingwane (9.7%).

Table 29: *Comparing means on household size, family labour, ages, experience in dairy, dairy herd size and distance to MCC for non producers*

MCC Name		Household size	Family labour	Age of HH Head	Dairy experience	Dairy herd size	Distance to MCC
Mubaira	Mean	8.26	3.08	62.84	11.05	3.23	18.72
	N	33	26	37	38	26	38
	Std Dev	2.59	1.94	15.78	1.80	3.25	18.84
Umzingwane	Mean	6.13	3.03	60.54	8.72	3.64	17.08
	N	39	39	39	39	39	39
	Std Dev	1.64	1.42	9.45	2.35	1.35	9.72

By the time of the study only thirty four percent of the members produced milk in Mubaira and a paltry twenty and a half percent in Umzingwane. Active membership was equally low at Mubaira (6.2%) and fairly high for Umzingwane (64.1%). The number of farmers registered but not active was high in both cases. The need for remobilisation and capacity development exists for the projects to take off.

Table 30: *Proportion of members registration and participation at the MCC*

MCC Name	Membership		Producing milk		Active Member		Registered but not active	
	Yes	No	Yes	No	Yes	No	Yes	No
Mubaira	88.24	11.76	34.38	66.62	6.25	93.75	0.00	100.00
Umzingwane	97.44	12.56	20.51	79.49	64.10	35.90	38.46	61.54

Dairying (Table 31) ranked high as the main source of income for Umzingwane (87.2%) and very low for Mubaira (5.3%) while other unspecified sources ranked high for Mubaira (63.2%).

Table 31: *Proportion of members and their three main sources of income*

MCC Name	Main Source of Income			Second Income Source			Third Income Source		
	Dairy	Veg & Crop production	All other	Dairy	Veg & Crop production	All other	Dairy	Veg & Crop production	All other
Mubaira	5.26	31.58	63.16	26.32	26.32	47.34	0.00	16.67	83.33
Umzingwane	87.18	0.00	12.82	5.13	28/39	23.08	8.33	5.55	86.11

The proportion of farmers owning dairy infrastructure was low for calf pens (29%), cattle handling facilities (23.7%) and watering and feeding facilities (21%) in Mubaira while calf pens (29%) was recorded for Umzingwane. There is need to to push for the listed infrastructure when the two dairies take off.

Table 32: *Proportion of members owning different dairy infrastructures.*

Dairy infrastructure owned	MCC Name	
	Mubaira	Umzingwane
Calf pen	28.95	28.95
Cattle handling facilities	23.68	73.68
Paddocks	63.16	44.73
Cattle kraal	60.52	92.11
Watering and feeding facilities	21.05	60.53
Other	7.89	

The proportion of famers owning the recommended milk utensils was very low in Mubaira (12.5%) but high in Umzingwane (85%). It would appear like there is need to revamp milking hygiene for Mubaira when the project takes off.

Table 33: *Proportion of members owning different milking utensils.*

	Mubaira	Umzingwane
Stainless Steel bucket	12.5	85.00
Plastic Bucket	20.00	2.50
Tea Pot		
Other		

The proportion of farmers using own resources for both Umzingwane and Mubaira for seed and fertiliser is very low (Table 34). This confirms the high dependency syndrome observed during FGDs. There is thus need to work towards self reliance in these projects.

Table 34: *Member characterization by absolute numbers for milk non producing centres*

Characteristic feature	Details	Milk Collection Centre	
		Umzingwane (N = 39)	Mubaira (N = 38)
Maize Grain seed source	Own capital	30.76	13.58
	AGRITEX	-	2.63
	NGOs	17.95	-
	Local Agro-dealers	2.56	-
Maize Grain Basal Fertilizer Source	Own capital	20.51	15.78
	NGOs	17.95	
Maize Grain Top Dressing Source	Own Capital	17.95	15.78
	DDP	2.56	-
	NGOs	15.38	-
	Local Agro-dealers	7.693	-
Maize Grain Chemicals Source	Own Capital	2.56	2.63

The level of maize inputs used is uniform for both projects. However Umzingwane should rely more on drought tolerant sorghum silage varieties because the area is more drought prone.

Table 35: *Comparing means on maize inputs used and their costs per hectare.*

MCC Name		Maize Grain seed	Maize Grain input cost/ha	Maize Grain Fertilizer	Maize Grain fertilizer cost/ha	Maize Grain top dressing	Maize Grain fertilizer cost/ha
Mubaira	Mean	2.50	29.67	100.33	78.17	75.33	52.67
	N	6	6	6	6	6	6
	Std Dev	3.67	14.99	94.45	50.70	68.49	27.02
Umzingwane	Mean	25.79	52.55	97.22	84.33	61.76	136.88
	N	19	11	18	9	17	8
	Std Dev	6.29	7.22	36.27	50.84	26.69	248.97

The farmers in Umzingwane (22.2%) have low involvement in breed improvement and artificial insemination while the Mubaira (100%) involvement is very high (Table 36). The bulk of the farmers in Umzingwane (95%) benefited from the Land O Lakes revolving fund while a very low number did so in Mubaira (2.8%). Famers in Mubaira (50%) benefited from other cow input schemes but in both cases repayment of revolving fond and pass on is very low.

Table 36: *Proportion of famers that participated in different support facilities by MCC*

Dairy production & institutional support		Milk Collection Centre	
Farmer involvement	Responses	Umzingwane	Mubaira
Involvement in breed improvement	Yes	22.22	100.00
	No	80.56	0.00
Artificial insemination exposure	Yes	18.92	100.00
	No	81.08	0.00
Beneficiary of L & O Lakes revolving fund	Yes	95.00	2.94
	No	5.00	97.06
Repaid the revolving fund	Yes	0.00	*
	No	0.00	24.32
	Still Paying	100.00	5.41
Benefited from other cow input schemes	Yes	0.00	50.00
	No	97.50	50.00
Involvement in pass the heifer scheme	As beneficiary	2.50	18.92
	Pass on concept	0.00	37.84
	No	100.00	*

Very few farmers in both Umzingwane and Mubaira provide supplements for their dairy animals (Table 37). Those who do so use either concentrates or home mixed rations.

Table 37: *Number of famers that provided supplementary feeds to dairy cows by MCC*

Supplementary feeds provision and allocations		Milk Collection Centre	
Activity	**Responses**	**Umzingwane**	**Mubaira**
Provision of supplementary feeds	**Yes**	37	13
	No	1	6
Source of dairy feeds	**Supplements**	38	22
	Grazing	38	24
	Combination	4	0
	Own silage	8	14
Type of feed used	**Concentrates**	17	6
	Rations	31	18
	Both	0	3
	Other	0	12
Daily feed allocation per milking cow	**Mean**	1.23	-
	Std Dev	1.12	-
Daily feed allocation per dry cow	**Mean**	5.33	1.33
	Std Dev	1.08	0.52

The farmers in both project areas are highly trained in all production skills as depicted in Table 38 below.

Table 38: *Proportion of famers that were trained on different production skills by MCCs*

Area of Training	Milk Collection Centre	
	Umzingwane	**Mubaira**
Fodder Production	75.00	94.74
Silage Making	97.50	92.11
Feeding & Ration Feed Formulation	95.00	97.37
Artificial Insemination (AI)	90.00	97.37
Weaning	97.50	97.37
Tagging	97.50	97.37
Castration	97.50	97.37
Dehorning	97.50	97.37
Vaccination	97.50	97.37
Deworming	97.50	97.37
Disease Treatment	97.50	97.37
Record Keeping	97.50	97.37
Dosing	97.50	97.37

4.5.2 Mhondoro (Mubaira)

Illustrations: *Highlights of key renovations and equipment repairs before business resumption.*

The Mhondoro Smallholder Dairy Scheme in Chegutu District (Mashonaland West Province) was established in 1996, when 3 associations came together culminating in the establishment of an MCC at Mubayira Growth Point in 2000, with the 3 points serving as milk collection points. Association members benefitted from credit facilities established by ARDA/DDP. Mhondoro dairy scheme developed and sold a diversity of products including unpackaged raw milk directly to the public, and processed and marketed finished products (packed sterilized fresh milk, naturally pasteurized milk, cultured milk, milk shakes, yoghurt, etc.). At their peak in 2004 – 2006, Mhondoro dairy milk products became the products of choice in schools, government/mission institutions, supermarkets and shops, with market demand exceeding market supply. The scheme's full-cream products stifled competition and grabbed the largest market share in Mhondoro, Chegutu and Kadoma districts despite competition from more established concerns such as DZL, Ameva and Dendairy.

During the height of macro-economic challenges (2006 – 2008) there were shortages of supplementary feeds and veterinary chemicals. Hyper-inflation eroded farmer payouts making it difficult for farmers to sustain feed, veterinary chemical and other dairy maintenance costs. All exotic dairy animals subsequently died. Farmers continued with local breeds and crossbreds, but because farmers had no dairy bulls, the quality of crossbreds had deteriorated to the point of producing milk yields equivalent to indigenous cows. Milk yields declined from 15 – 20 litres per cow per day to 2 – 5 litres per cow per day. Subsequently MCC milk deliveries declined from a maximum of about 180 – 200 litres per day to a low of 15 – 20 litres per day. Costs for transport, salaries, packaging materials, electricity and detergents remained relatively elevated (high fixed component), which entailed that with low milk volumes the scheme was enduring losses and hence the decision to close shop in 2007. A sizeable 20 of the smallholder dairy farmers who benefitted from the Fast Track Land Reform Programme (FTLRP) then moved their dairy animals to their new plots, 42km from the MCC, thereby making it uneconomic to deliver small volumes of milk, leading to a second collapse of the MCC in March 2011. The MCC remains dysfunctional up to date. Despite this closure, the potential for revival (in which restocking is key), remains because, the best basis for any economic venture is effective market demand which still exists in the district and beyond. In addition to a restocking exercise, renovations of infrastructure and equipment (cold room, refrigerator, and chilling tanks), as well as systems for ensuring reliable power supplies (e.g. a stand-by generator) are key for resuscitation of the Mhondoro smallholder dairy scheme.

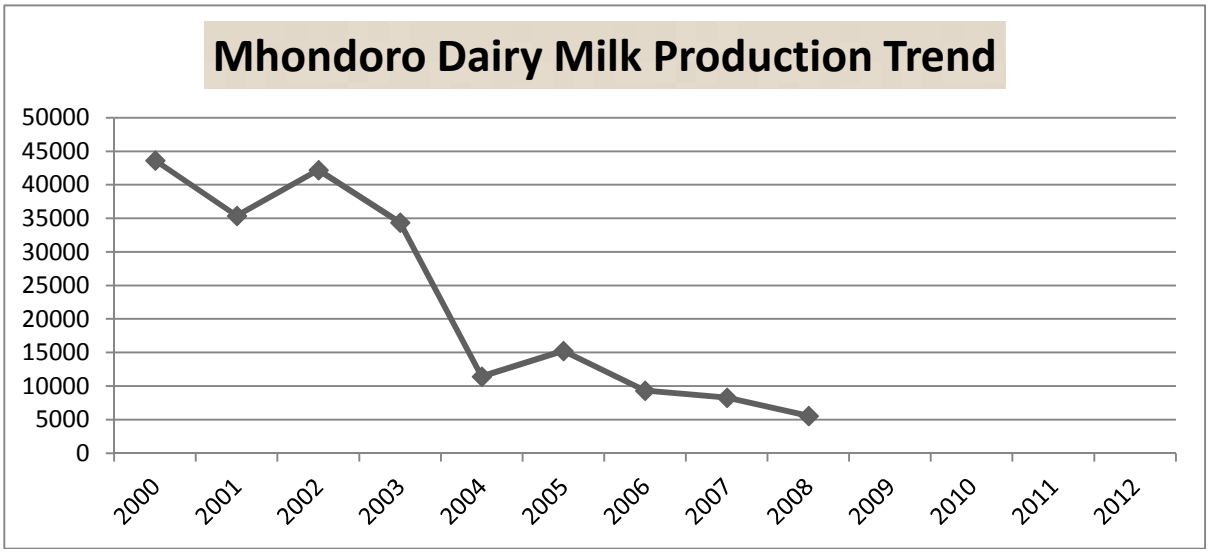

Figure 12: *Milk production trends in Mhondoro.*

4.5.3 Umzingwane

The project was started in 1999 but commenced operations in August 2001 with a membership of fifty three (53). The project was closed in September 2012 due to low volumes. The project owes ZESA $1300 and the association house rentals are being used to pay back. Africa Now provided heifers on a pass on scheme and a marketing vehicle which later broke down. There is no evidence of genetics in project area due to high mortality experienced during the hyperinflationary period and due to drought. NADF provided 22 heifers which the farmers claim were mastitis affected and had no record with some suspected to be old resulting in farmers deriving no benefit. Land O Lakes provided 24 heifers in March 2011. A farmer in Fig-tree exchanged dairy cows for oxen and ten dairy cows were obtained by farmers through this arrangement. A revolving fund was set up through NADF by Land O Lakes and dairy heifers were sourced from Zengeya farm in Beatrice. The arrangement was more transparent as it allowed for individual selection with assistance from vet.

The project lies in natural region IV and fodder remains a big constraining factor as there is competition between humans and cattle for grain and silage. During the evaluation, farmers were accessing drought mitigation feed for 2012 and this was being used for maintenance. STABEX 95 assisted the MCC with an artificial insemination kit and an Isuzu truck for marketing but the truck had a pump problem by the time of the field visit. Africa now assisted the project with a tractor (Plough, Disc, Silage cutter). A tractor account was set up. Sentiments were raised that the tractor was not being used for fodder production such as hay and silage making while concentrating on hiring out. The bulk of the farmers are located more than thirty kilometres (85.7%) from the MCC leading to milk delivery challenges.

A Focus Group Discussion (FGD) revealed that governance issues remain paramount and there is high donor syndrome in the project. The founder member syndrome has weakened the association and the need for transparency was apparent. The same FGD indicated low commitment by farmers as a constraining factor and some members suggested adopting the MilkZim model so as to improve on dairy cow management. There is need for capacity

development in dairy cow management as farmers treat dairy cattle in the same way they treat indigenous beef cattle resulting in reduced productivity. Some farmers were plunge dipping their dairy cattle while in bad condition and this was leading to deaths at the dip tanks. There is need for a strong commercialisation thrust and for farmers to invest in capacity development and training.

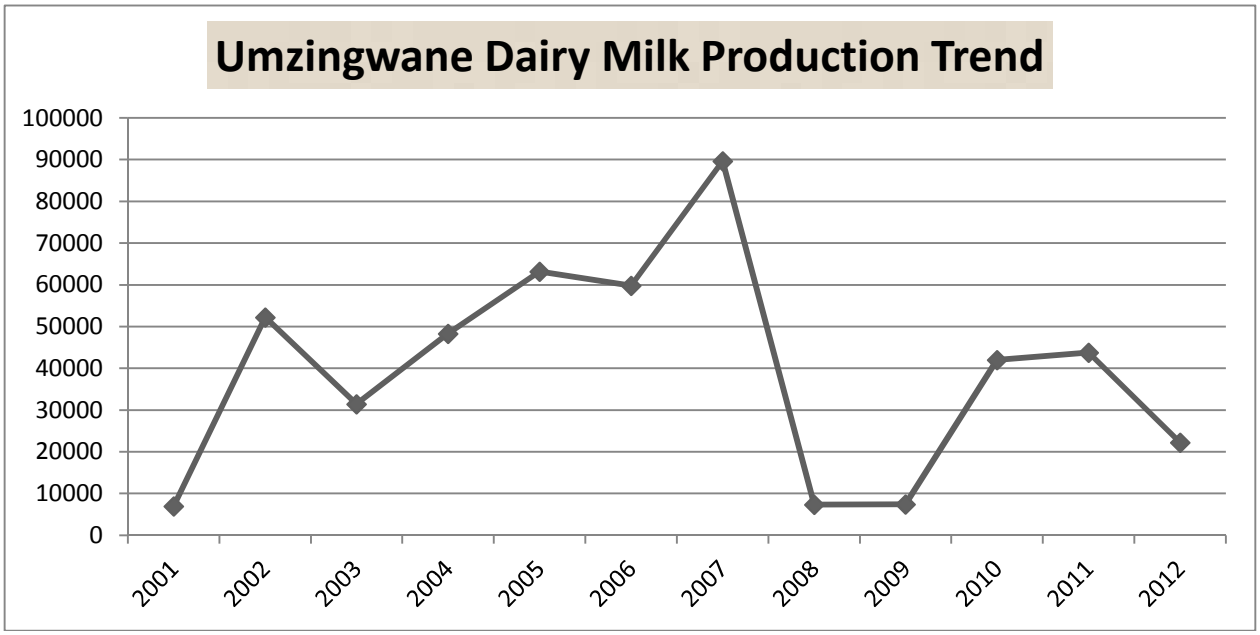

Figure 13: *Milk production trends in Umzingwane.*

4.5 Status Summary

Below are summarized details on association membership, equipment, milk intake levels and the current status of various MCCs. See Table 39.

Table 39: *Status of milk collection centres.*

Province	District	Dairy Project	Current Producers	Potential Producers	Equipment	Current Milk Intake L	Potential Milk Intake L	Status
Manicaland	Mutasa	Tsonzo	12	44	1200 L Bulk Tank 3500L Cold Room 500L Pasteuriser	60	800	Can process milk at centre Can deliver milk to DZL Breeding and governance are the major challenges Vast knowledge of dairy husbandry
	Chipinge	Rusitu	115	215	2500L Bulk tank 30Kv Generator Motor vehicle	600	1500	Deliver milk to DZL Feed and breeding are the major challenges (productivity) Vast potential for growth given large membership, climate and settlement set up
	Makoni	Sangano	29	63	500L, 300L, 50L-pasteurisers 3500L cold room	250	1000L	Milk quality, governance, feed and breeding are some of the challenges Process milk on centre
	Mutasa	Honde	25	40	3500L cold room 900L (need replacement of compressor) 300L pasteuriser	110	500	Breeding and feed and feeding are the major challenges Process milk on centre
	Rusape	Dowa	12	60	Cold room 900L Bulk tank 250L pasteuriser	65	500	Governance Productivity challenges (fodder & breeding) Membership is low
	Marange	Marange	New project Plan International procured equipment for MCC					
Mashonaland East	Harare South	Marirangwe	26	36	2500L bulk tank	900	2000	Productivity & milk price challenges Fodder equipment shortage
	Chikomba	Nharira/ Lancashire	59	180	500L bulk tank (needs repairs) Cold room 250L pasteuriser Tricycle	330	1200	Administrative challenges Marketing challenges Productivity challenges Has land for expansion Can benefit from economies of scale Needs development of Lancashire sub-collection centre and marketing vehicle
	Hwedza	Wedza	21	80	Cold room 250L & 50L pasteuriser Tractor & implements	80	500	Governance, productivity and marketing challenges Needs marketing vehicle

	Chikomba	Sadza	13	120	Cold room 250L & 50L pasteuriser	50	500	Productivity & governance challenges Has potential especially from the small-scale sector - Needs development of sub-collection centres
	Goromonzi	Chikwaka	33	180	Cold room 500L bulk tank 300L pasteuriser	215	800	Productivity & marketing challenges - Has access to land for demo plot
	Mutoko	Kanyongo	5	19	-Cold room - 250L Pasteuriser	10	200	Low membership, small dairy herd, feed and breeding challenges The few farmers are Committed o the project - Needs farmer mobilization and herd improvement
	Murewa	Murewa 44	Project at mobilization stage.; Old age, productivity and governance are some of the challenges; Has milk collection centre and electricity but no equipment Could be developed as a sub-collection centre for Chikwaka					
Mashonaland West	Zvimba	Murombedzi	14	36	- 300L pasteuriser - Milk cans - Cold room			- Closed due to lack of milk - Require motivation of farmers - Breeding, fodder & governance challenges
	Chegutu	Mhondoro	24	49	300L pasteuriser Milk cans			- Closed due to lack of milk - Requires remobilization of farmers - Breeding, fodder, governance issues
Mashonaland Central	Guruve	Guruve	12	189	Cold room 300l pasteuriser	30	400	- Needs farmer motivation - Productivity challenges - Has potential to improve & benefit from large possible membership
	Mt Darwin	Mt Darwin		67	3 Chillers 50L & 300L pasteuriser			- Centre closed due to low milk production - Transport, breeding & feed challenges - Requires development of Nyakasikana sub-collection centre - Farmer remobilisation
	Bindura	Chiweshe	Closed due lack of milk & old age; Has milk collection centre building					
Midlands	Gokwe South	Gokwe	36	66	- Cold room - Pasteuriser - Oil pressing machine	250	500	- Productivity challenges - Has hall for subletting - Very flexible in operation – offers high milk price

					- AI kit			- Farmer commitment is good
	Tongogara	Shurugwi	12	180	- Cold room - 300L pasteuriser - Marketing vehicle	200	2000	- New project that has just started milk collection - Requires extension for capacity building - Requires development of possible 10 sub-collection centres - The project covers the whole district
	Mvuma	Takawira	Project left at establishment stage. Requires re-mobilisation					
Masvingo		Mushagashe	20	80	- Cold room - 50L & 300L pasteuriser - Marketing vehicle - Tractor & equipment	120	400	- Productivity & business development 9record keeping) challenges - Needs development of Chirima sub-collection centre
Matebeleland South	Umzingwane	Umzingwane	22	87	- Chillers - Marketing vehicle - Tractor & implements - 50L & 300L pasteuriser		300	- Productivity, governance, business development - Has huge markets for milk products - Needs farmer motivation & close monitoring
Harare Metropolitan	Harare South	Nyarungu Training Centre		- DDP Farm	- 300L pasteuriser - Cold room - tractors	860	1500	- Expansion of the building & land for fodder production - Need capital development: training building expansion & hostels expansion to accommodate for farmers - Needs more extension staff - Needs capacity building to enhance fulfillment of mandate

5. Analysis of Supplier – Processor Relationships

5.1 Supplier – Processor Relationships

As already highlighted, out of the 24 established MCCs, 17 are active and 13 of the active sites bulk and process locally while four (4) MCCs supply to established processors e.g. Dairibord Zimbabwe Limited (DZL) and Kefalos. For milk collection centres that are bulking milk and supplying processors, the symbiotic synergy between the parties, based on forward contracts, cements the partnership. While processors have the advantage of assured and improved processing volumes, MCCs/smallholder dairy farmers garner various benefits that include:-

(i) A readily available (guaranteed) market. This eliminates losses due to milk spoilage, failure to sell, etc.
(ii) Reduced marketing risk and costs. An established and guaranteed market entails lower risk to entrepreneurs while some processors offer "free" transport thereby significantly reducing marketing costs. Viability assessments have also shown that this arrangement is also ultimately cheaper for the MCCs. See Section 9.2.
(iii) Lower overheads. Unlike MCCs processing on their own, MCCs supplying established processors need no specialized equipment (e.g. pasteurizers), specially trained personnel (e.g. processors), etc.
(iv) Freedom from marketing hassles and space for specialization. Frees farmers' time, allowing farmers to concentrate/focus on dairy production.
(v) Technical backstopping. As part of capacity building initiatives and efforts at ensuring that quality standards are met, processors offer extension support which is at zero cost to the supplier/farmer.
(vi) Extension of loan facilities. At one point Kefalos, through Red Dane Dairies, provided in-calf-heifers on loan to dairy farmers in Marirangwe that were paid back through 1,000 litres of milk while DZL provided Rusitu United MCC with a cash loan for the purchase of a 20KV stand-by generator.
(vii) Provision of loan guarantees with financial institutions. In some cases processors negotiate the terms and conditions of loans on behalf of the suppliers/farmers.
(viii) Potential for growth offered by processors. Linking smallholder dairy producers to established processors open a gateway to regional and international markets and opportunities for market-led and private sector driven growth.

On the other hand, according to key informant interviews and focus group discussions, MCCs bulking and processing their own milk do provide:-

(i) Higher producer prices. Locally sold raw/semi-processed milk retails for an average of US$1.00 per litre.
(ii) Smallholder dairy farmers with the opportunity for vertical integration entailing better margins and higher incomes. If and when produced and delivered milk volumes are high enough margins, returns and incomes are higher.
(iii) A platform for building farmers' capacity. Farmers get an opportunity to be involved in all the activities, *viz:* production, bulking, processing, storage and own marketing, thereby creating a local knowledge base and practical skills.
(iv) Better capacity for MCCs to respond to market and price changes.
(v) Employment creation opportunities within local communities, with ripple and multiplier effects that ultimately increase the effective demand for milk and other dairy products locally.
(vi) Improved cash equivalence based on improved liquidity and cash inflows.
(vii) Source and driver/propeller of community development.

5.2 Obstacles and Constraints to Supplier-Processor Relationships

A number of obstacles act as constraining factors in the relationship between processors and smallholder dairy farmers that supply the raw milk which is a key ingredient in their dairy processing enterprises. Producer prices are a key source of interfaces in processor-supplier relationships. According to smallholder dairy farmers, producer prices tend to be controlled i.e. a buyers' market where producer prices are determined by the processors. The perception is that the producer price determination system (which is hinged on a basic producer price with premiums and/or penalties based on quality assessments) remains flawed. This is because previously there was an independent assessor of milk product quality i.e. the government's Dairy Services, which used to test milk for quality and sent results to processors. In place today instead is a system where processors tests milk for quality, determine the producer prices/premium/penalty and pays the farmers. Milk producer prices also take long to change (less responsive to milk production cycles and cost of production trends) yet stock feeds and veterinary chemicals are affected by inflation more frequently, thereby squeezing farmer margins. Processors, on the other hand, are adamant that producer prices are determined by market forces of supply and demand, and are currently weighed down by low productivity and poor quality, and depressed by import pressure.

Smallholder dairy farmers' volumes also tend to be very low, making it difficult for them and the processors to benefit from economies of scale. Thus in cases where processors provide free transport for milk collections this becomes a costly exercise. According to processors, working with multitudes of smallholder farmers entails higher transaction costs and is more complex than working with a few large-scale commercial farmers with the volumes. This is because smallholder dairy farmers are also affected by thin markets for inputs and farm outputs. Demand for dairy inputs in smallholder farming contexts is very limited due to small quantities purchased by farmers per transaction. This on its own makes it difficult to attract business from well established companies who prefer to work with large-scale commercial farmers where the demand is very high. Poor producer prices and low incomes affects demand for input and other capital investments. Poverty also often results in a low level equilibrium trap such that smallholder farmers may never be able to engage in meaningful commercial enterprises without external assistance from the state or NGOs. Therefore, smallholder dairying may never be sustainable for as long as smallholder farmers remain in this low-level-equilibrium trap which often limit their ability to purchase own inputs and to source funds for crucial on farm investments.

Processors also decried the usual disadvantages of working with cooperatives. According to some processor representatives, some smallholder farmer association members, as is common in most cooperatives, lack focus instead choosing to fight over less important issues, creating numerous conflicts and interfaces e.g. association members fighting for positions for the sake of creating benefits for themselves, whereas more benefits could be derived from increased production volumes. On the other hand, smallholder farmers, while acknowledging support by processors, are of the perception that processor plough-back of profits is insignificant and too limited to warranty the anticipated growth in milk production volumes.

Other constraining factors include the lack of constant feedback and poor communication between producers/suppliers and processors, poor logistics, and a donor dependency syndrome in some smallholder dairy farmers. Some established processors, who are currently not linked to smallholder dairy producers but remain potential absorbers of

smallholder dairy output, are of the perception that smallholder farmers cannot produce quality milk and hence attach a high risk assessment to the potential linkage.

6. Assessment of Production Models

6.1 Commercial Dairying Model

This model remains prerogative of the remaining white large-scale commercial farmers. There is however recent entry by indigenous players. The model is built upon forward supply contracts with established processors and/or integration with individualized processing units within production zones e.g. Alpha & Omega, and Kefalos. The model has an advantage of economies of scale, and better opportunities for viability, growth and sustainability.

6.2 MCC Bulking and Supplying to Processors Model

The model ensures a guaranteed market; therefore, no marketing hassles for the farmer. There is reduced risk for MCC and association members. The model ensures guaranteed transport and has no marketing costs. However, MCCs become price takers under this model. It is a buyers' market with average producer prices of US$0.46 – 0.66/litre

6.3 MCC Bulking and Processing Model

The model presents better opportunities for higher prices and better margins provided the processing and marketing is done professionally and efficiently. The average producer price is dependent on overhead costs but usually higher than supplying to a processor but is highly prone to shocks. Where large markets exist e.g. Gokwe, presents better opportunities for adaptation of the inclusive business model.

6.4 Dairy Zone (MilkZim) Model

The model emphasizes on centralizing production and management resulting in uniform management style and uniform treatment. The model allows for intimate knowledge of each animal within the herd and a breeding strategy is easier to plan and implement leading to improved calving intervals. Disease control is easier and leading to reduced mortalities. The model releases the farmer after seeding the cow to do other chores. Twenty percent (20%) dividend is paid to the farmer monthly under the model. Various sub-committees are in place; Breeding, Fodder, Marketing, and Finance. The model allows for an exit strategy over 5 years with first two years for business building. There is security through shareholding and shocks and risk is spread across the entire membership. The downside is in convincing people to buy into the model and confidence building takes long. There is limited space for adequate fodder production and thus relies on feeding from the bag (need for alternative feeding e.g. outsourcing. The farmers seed substandard animals and group dynamics is always at play due to variation in vision and targets. Team and partnership development takes long. The model is allows for diversification of livelihoods and reduces risks of loss for individual scheme members. The model shows great potential but there is need for more time to operationalize the pilot programme, and determine its feasibility, opportunities for adaptation and scaling-up exist based on more in-depth analysis of the economic viability and the sustainability of the model.

Box 1: Milk-Zim Dairy Zone Model

Milk Zim (Pvt) Ltd was established in 2008 to contribute to milk production growth. The company established a pilot Dairy Zone in Domboshava, a smallholder farming community north of Harare. This project received grant funding from the United States African Development Foundation (USADF) to establish Zone facilities. Under the model dairy cattle, provided by local farmers are boarded in a central zone and professionally managed. To improve herd quality and increase milk production the local indigenous dairy cattle were sold and replaced by exotic breeds. These were purchased by Milk Zim using USADF funds provided. The company intents is to establish similar Dairy Zones in other smallholder farming areas in Zimbabwe.

The Dairy Zone business is still building up to a break-even point with 21 cows producing milk. The daily yield is 240litres per day, which is selling at US$ 0,63 per litre, giving a monthly income of approximately US$ 4 000. With the current herd, the maximum that can be attained is approximately 330 litres per day. Milk production will have to rise to 840 litres per day in order for the Dairy Zone to break even, including the costs of pay-outs to participating farmers and contributions to a Community Benefit Fund. To produce at this level the Zone requires 75 milking cows. Milk Zim established a processing facility for fermented milk (lacto) in July 2012 to increase the profit on milk produced at the Dairy Zone.

The company has upgraded its model through an "Inclusive Business Strategy" where it engages producers (**Farmers**), processes raw milk (**Processor**), and members of the community are engaged distributors of the product (**Retailers**). A Nutrition Network Group was established in July as the retailer wing to complement the Dairy Zone by offloading milk at a better price than that offered by other processors. The farmers benefit from sale of raw milk and from retailing of the processed product. The highest participant managed to sale 63 pockets at USD2 each to realize $126 for the month of July. Currently, there are 44 Nutrition Network Partners, 24% are members of the Domboshava Dairy Zone Association and the remainder are women from low income suburbs in Harare. Seven hundred and forty dollars (US740.00) was paid out as commission in July through this network. This is in addition to US720.00 paid as payout to 36 Domboshava Dairy Zone farmers.

MilkZim targets to have more dairy products under the Nutrition Network Partnership starting with yoghurt and dairy blend while the Nutrition Network Group is expanded to more than 100 partners in the low income suburbs of Harare and to have more than 30 in Domboshava. Plans are underway, to place a partner at every school in Domboshava where a "Nutrition Base" will be created. There, a School Milk Nutrition Partner will sell milk and milk products to school children. For schools the target is to sell calcium fortified milk to school children. MilkZim is planning to celebrate this year's World School Milk Day at the Domboshava Dairy Zone.

The Dairy Zone model developed by Milk Zim is unique in that it enables small-scale dairy farmers to take advantage of commercial dairy management methods. Other small-scale dairy farming programmes merely provide a collection point for milk produced by the farmers without offering them the benefit of commercial production techniques. There is a general shortage of dairy products in Zimbabwe, so this is not a specifically competitive field, but rather one where different business models can be developed and thrive alongside each other. Having been given a jump start through a private sector/community engagement program as a test case, MilkZim went on to build its business from the capacity building offered to it. The company created three SBUs (**DairyNet, FoodNet and FeedNet**) that drive objectives surrounding the Dairy Zone Concept. **FeedNet** provides a special formula dairy feed to the dairy operation **DairyNet** drives the Dairy Zone Concept offering technical expertise to emerging dairies on the Dairy Zone Concept. **FoodNet** pursues value addition

of the milk from Dairy Zones, beginning with the Domboshava pilot project. FoodNet is also running a small laboratory central to product development and quality control. This FoodNet Laboratory has been a major and consistent source of funding for MilkZim so far getting samples from some of the biggest dairy processors, abattoirs, food companies, dairy farmers, hotels and restaurants, as well as city council for water analysis.

Milk Zim annual turnover has grown to above $60,000 in just a year. With more Zones under its management, Milk Zim can treble its annual turnover through technical services; feed manufacturing, processing and allied laboratory services. As MilkZim expands its services, the communities it will be working with will be benefiting as well. In asking for increase in the piloting zones, MilkZim is aware of the fact that one Zone will be under immense financial pressure to meet administrative costs and technical service fees required. Having at least 5 Dairy Zones will allow a sharing of these costs amongst the Zones because the administration cost of MilkZim will not necessarily increase five times because of addition of the extra Zones.

Source: Milk Zim, October 2012,

7. Lessons Learnt

7.1 Best Practices from Three Leading MCCs

Key informant interviews with DDP, Milk Zim, Kefalos, Land 'O Lakes and the NADF identified (i) Rusitu Mayfield, (ii) Marirangwe, and (iii) Gokwe as the three leading MCCs, based on production volumes, consistency and the management systems in place. These MCCs share common characteristics which serve as a basis of their success. Such factors include:-

(i) Good governance based on principles of good and exemplary leadership, ideal management, transparency, accountability, and the manning of facilities with qualified personnel.
(ii) Management and decision-making organized through committees. Establish and maintain effective and efficient institutions rather than rely on a few strong individuals.
(iii) Good record keeping practices at both the farmer and MCC levels, thereby ensuring the existence of accurate and reliable records.
(iv) MCCs serve as innovation platforms. Farmer associations initiate and organize meetings and training programmes that are conducted by government institutions, facilitate field days and look & learn tours, and encourage farmer – to – farmer training and information dissemination.
(v) Command high milk delivery volumes.
(vi) Adherence to quality control measures, including maintaining excellent hygiene practices.
(vii) Ensuring access to a reliable, viable and sustainable market for their dairy products e.g. symbiotic relationships with established processors, own processing and/or linkages to a vibrant public market.
(viii) Exceptional financial management.
(ix) Maintaining a positive attitude.
(x) Unity of purpose/shared vision which ensures a better response to issues e.g. collection and better management of subscriptions which make their associations stronger and increases their capacity to deal with challenges.
(xi) Ensuring quality rather than quantity of membership (committed producers with the capacity to deliver a critical threshold in production volumes).
(xii) Comprehensive breeding programmes that benefit all association members through AI and/or bulling using exotic dairy bulls.
(xiii) Encourage members on fodder production, bulking, home-feed formulation and supplementary feeding as a mechanism for reducing costs and improving margins.
(xiv) Ascertaining enterprise viability based on producer prices and dividends received by association members e.g. competitive pricing to discourage side-marketing.
(xv) Enjoy economies of scale e.g. bulk purchase of concentrates, supplementary feeds, veterinary drugs and chemicals for onward distribution to farmers at more affordable prices and more relaxed repayment terms.
(xvi) Maintenance and upgrading of both infrastructure and equipment.
(xvii) Bought and maintain own vehicle for easier MCC management.
(xviii) Maintaining contact and good liaison with processors (who provide guidelines in terms of production techniques, quality requirements, etc.), support service providers, donors, and other MCCs.
(xix) Have built-in sustainability mechanisms e.g. complementary income generating initiatives tied to the MCCs. In Gokwe the smallholder dairy farmers association owns a hall in which all active members have shares redeemable through monthly dividends.

Specific details of best practices at MCC level are also conscripted in Section 4.1 (Status of Selected MCCs).

7.2 Best Practices of Successful Smallholder Dairy Farmers

7.2.1 Best Practices

Smallholder dairying, on the other hand, is driven by commitment and passion for dairying. Lessons learnt from successful smallholder dairy enterprises show evidence of the following attributes:-

(i) Passion and commitment, with most of their time devoted to dairying. This is because initiatives such as smallholder dairying generate a lot of interest but only a few farmers are committed enough to see the programme come to fruition.
(ii) Good management and planning as evidenced by milk production and income levels. Such farmers "look after their cows and are not looked after by their cows".
(iii) Establishment and maintenance of infrastructure and equipment.
(iv) Have better access to equipment e.g. mechanized silage choppers versus the use of hand slashers, possession of own sprayers versus reliance on DVBS for animal dipping.
(v) Excellent record keeping and financial management. Successful farmers maintain good records. These guide enterprise implementation and facilitate informed decision-making. Good records also provide insights on the enterprise's history (where they are coming from) and vision (where they are going).
(vi) Ensuring animal health, hygiene and good herd condition, including the possession of veterinary kits which enables a quick response to health challenges and the conducting of own animal heath assessments which reduce animal mortalities.
(vii) Adoption of dairy animal husbandry technical recommendations e.g. timely weaning, good calf management, identification, etc.
(viii) Excellent animal health management practices e.g. timely vaccination, dipping and disease treatment.
(ix) Commendable feeding management practices. This is ensured through timely fodder production, adequacy of feed resources (in tandem with the size of the dairy herd) through on-farm fodder production, quality of stock feeds, following supplementary feeding recommendations, on-farm feed formulations, and the adherence to stipulated feeding regimes.
(x) Practice zero grazing with irrigation facilities. With irrigation a dairy farmer can comfortably maintain 5 milking cows from 1ha of irrigated pastures.
(xi) Comprehensive breeding programmes that constantly and consistently improve the quality of the dairy herd through AI and/or bulling using exotic dairy bulls.
(xii) Striving for improved productivity, quality and viability e.g. on-farm fodder production and processing of home-grown feeds.
(xiii) Are innovative e.g. diversifying into aquaculture and other enterprises that are complementary to dairy production.
(xiv) Enjoy economies of scale i.e. farmers with a minimum threshold number of dairy animals (milking cows) that enable them to adequately cover their costs and make reasonable margins. Large dairy herds also ensure consistency in milk production and marketing, unlike single-cow dairies that are prone to production hiccups due to individual cow dry periods.
(xv) Have top-notch dairy breeds which guarantees them optimum milk production volumes.
(xvi) Own appropriate breeds i.e. animals that can adapt to local climatic and environmental conditions.

(xvii) Are passionate about learning and new innovations e.g. training and refresher courses provide farmers with cutting-edge information which capacitates farmers to cope with dynamic changes such as new production environments and the adoption of new technology.

(xviii) Dairy training attendance is not individualized but extended to spouses, managers, workers and other household members which ensures a shared version and continuity even during the absence of the entrepreneur.

(xix) Are resource endowed. Have access to more resources including capital resources, land, labour, larger dairy herds, etc. Most also have individually-owned vehicles which facilitates milk deliveries by farmers to MCCs and milk marketing by the MCCs. Being resource endowed also cushions successful dairy farmers against major risks e.g. can swiftly deal with disease outbreaks because they have resources to purchase veterinary drugs and can save their dairy herd from extinction during drought seasons because they have resources to purchase supplementary feeds.

(xx) Maintaining contact with support services and other technical backstopping institutions, including researchers (breeders), extension personnel (e.g. DDP, LPD, DVS, AGRITEX, etc.), providers of credit and other exemplary dairy producers. As a result, all successful smallholder dairy farmers have adopted various dairy innovations and recommendations.

(xxi) Organized group animal-drawn milk transportation and delivery systems.

7.2.2 Characterization of Successful Smallholder Dairy Farmers

These observations, views and perceptions were supported by findings of the 2012 MCC evaluation/baseline survey. See Tables 40, 41 and 42.

Table 40: *Characterization of smallholder dairy producers.*

Factor Variable	Characteristic Details	Classifications & Proportion (%)			
		Non Producers	Small Producers	Intermediate Producers	Large Producers
Settlement Type	Small scale commercial	47.22	36.78	55.88	51.28
	Old resettlement	5.56	17.24	14.71	12.82
	communal	44.44	39.08	11.76	23.08
	A1	2.78	6.90	17.65	12.82
Sex	Male	44.44	65.96	80.37	93.18
	Female	55.56	34.04	19.63	6.82
Marital Status	Married	55.26	73.06	78.18	95.45
	Single	10.53	1.55	1.82	0.00
	Widowed	31.58	21.76	18.18	4.55
	Divorced	0.00	1.04	0.91	0.00
	Separated	2.63	2.59	0.91	0.00
Education Level	Primary	27.78	26.94	23.85	15.91
	ZJC/STD 6	30.56	35.75	34.86	31.82
	Secondary	30.56	27.46	29.36	29.55
	Tertiary	8.33	9.33	11.01	18.18
	None	2.78	0.52	0.92	4.55
Employment	No Formal employment	83.33	80.63	83.02	73.81
	Employed	11.11	5.76	6.60	7.14
	Pensioner	5.56	13.61	10.38	16.67
	Retrenched	0.00	0.00	0.00	2.38
Agricultural Training	Master Farmer	36.84	52.69	54.63	65.12
	Advanced Master Farmer	5.26	6.45	8.33	4.65
	Diploma	0.00	0.54	3.70	4.65
	None	57.89	0.54	0.00	25.58

Table 41: *Household characteristics and size of dairy herd.*

Household characteristics	Statistical Parameter	Description of the producer			
		Non producers	Small Producers	Intermediate Producers	Large Producers
Household Size	Mean	4.89	6.11	6.52	8.60
	N	36	188	107	42
	Std Dev	2.15	3.45	2.64	5.06
Household Members Providing Labour for Dairy Enterprise	Mean	2.52	2.81	2.85	3.66
	N	29	186	107	41
	Std Dev	1.18	1.58	1.53	2.04
Age of Household Head	Mean	58.35	58.30	58.85	56.71
	N	37	191	108	41
	Std Dev	15.84	12.24	12.94	13.40
Experience in Smallholder Dairying	Mean	13.00	12.23	14.82	15.13
	N	37	194	109	45
	Std Dev	6.68	1.89	8.65	8.10
Size of Dairy Herd	Mean	4.27	3.44	6.75	13.53
	N	11	193	110	45
	Std Dev	3.74	5.51	4.01	10.99

Table 42: *Milk productivity and usage within producer categories.*

Milk productivity and usage	Statistical Parameter	Description of the Producer			
		Non Producers	Small Producers	Intermediate Producers	Large Producers
Milk Production in 2012	Mean	18.00	9.05	11.33	33.54
	N	5	155	105	45
	Std Dev	9.70	5.52	6.38	62.05
Milk Sold per Day	Mean	16.00	6.90	8.74	30.89
	N	5	145	94	43
	Std Dev	8.03	4.68	6.09	64.03.
Milk for Feeding Calves per Day	Mean	2.75	1.96	2.43	3.32
	N	4	112	58	25
	Std Dev	0.96	0.69	1.53	1.68
Milk for Home Consumption per Day	Mean	2.00	1.96	2.68	2.40
	N	4	139	99	40
	Std Dev	0.82	1.46	2.64	1.32
Calf Mortality in 2012	Mean	-	1.57	1.52	1.00
	N	-	30	27	15
	Std Dev	-	0.90	0.58	0.00
Adult Mortality in 2012	Mean	1.00	1.12	1.05	3.67
	N	1	25	20	6
	Std Dev	-	0.44	0.22	1.63

7.2.3 Case Studies

CASE STUDY 1: *Mr. Gwanzura (Marirangwe Small-Scale Dairy Scheme).*

Gwanzura Estates, comprising of a small-scale farm measuring about 250 hectares, has a history which dates back to1954. The current dairy producer is a second generation descendant, while the son who manages the enterprise is a third generation descendant of the original owners of the farm. The current dairy project was re-established in June 2011. The farm has a dairy herd of 75 animals, comprising of 30 milking cows, 23 calves, 20 heifers and 2 dairy bulls. Dairy infrastructure on the farm includes a milking parlour, calf pens, crush pens, water and feeding troughs, and several paddocks. As part of the equipment on the farm, there is a hammer mill, silage cutter, 2 tractors, maize planter, and tractor-drawn ploughs, harrow discs and cultivator.

The dairy enterprise is buoyed by ensuring adequate fodder for the dairy herd, with improved pastures (10ha), maize silage (10ha) and velvet beans (6ha). To ensure high productivity the farm maintains good management practices, feeding, animal health and record keeping practices. Milk yields vary from as little as 2 litres per cow per day to as high as 25 litres per cow per day. Average milk production is currently at 350 litres per day, with a 100% delivery to the MCC. Plans are afoot to expand the dairy herd and graduate the farm into a commercial dairy farm.

CASE STUDY 2: *Mr. Hela (Marirangwe Small-Scale Dairy Scheme).*

Mr. Hela's farm is 174 ha. As is common in the area, Mr. Hela inherited the farm from his late parents. He started dairy production in 2007 with two dairy cows. The dairy herd has since grown to 69 dairy animals comprising22 milking cows, 22 heifers, 17 calves, 6 steers and 2 dairy bulls. Infrastructure on the farm includes feeding troughs, water troughs, calf pens, and a milking parlour. Improved pastures take up 20ha of the farm with an additional 1ha of star grass. However, the farm has yet to establish a paddocking system and acquire dairy equipment.

The farm is owner-managed although a resident foreman is on the farm 24 hours to deal with any issues. The farm has good rapport with the local MCC, the nearby Red Dane Farm (which is a source of dairy animals and concentrate feeds, and Department of Veterinary Services which deals with any animal health issues. Current milk production is 280 litres of milk per day, with the least yielding cow producing 8 litres per day and the most yielding cow producing 25 litres per day.

CASE STUDY 3: *Mrs. Madyangove (Nharira-Lancashire Smallholder Dairy Scheme).*

Mrs. Madyangove is the chairperson of the Nharira-Lancashire Smallholder Dairy Association. Her dairy enterprise was initiated through a single heifer donation from Heifer Project International back in 1991. She bought another cow in 1995. She than received training on breeding which facilitated her efforts in cross-breeding between indigenous Tuli cows and Holstein bulls. This process produced several crosses, constantly changing bulls to avoid inbreeding. The first crosses averaged 8 – 10 litres per cow per day, while the second set of crosses averaged 15 litres per cow per day.

The current dairy herd has 15 dairy animals – 6 milking cows, 4 dry cows, 4 calves and 1 bull. These are supported by intensive fodder production. Fodder includes 2ha of yellow maize silage, 0.5ha of sugar graze, 0.4ha of velvet beans, and 0.1ha of cowpeas. She practices open grazing and supplementary feeding from January to April, switching to zero grazing from May till December. Current milk production is 55 litres per day. In addition to several other good management practices, Mrs. Madyangove has excellent records which won her the National Smallholder Dairy Farmer of the Year twice – in 2006 and in 2012.

CASE STUDY 4: *Mr. Elvis Chiweshe (Gokwe Smallholder Dairy Scheme).*

Mr E Chiweshe is a retired police officer who ventured into smallholder dairy farming seventeen (17) years ago and has never looked back. Mr Chiweshe derives his livelihood from income earned from his dairy enterprise in the communal farming area of Gokwe South District in the Midlands Province. He is married and at sixty (60) years of age is already grooming his son to run the enterprise. Mr Chiweshe farms on 3.8 hectares and owns eleven (14) dairy animals (4 milking cows, 2 dry cows, 3 heifers and 5 calves). In addition, Mr. Chiweshe is in charge of the upkeep of an association breeding bull. By the time of the evaluation Mr Chiweshe was milking four (4) dairy animals and delivering over thirty (30) litres daily to the milk centre located 10 km away at Gokwe Growth Point. Mr Chiweshe had over 16 tons silage (legume/maize/bana) and over 2 tons grass/legume hay. In addition Mr Chiweshe has legume reinforced paddocks at the homestead. Mr Chiweshe was crowned National Dairyperson of the Year in 2002, 2006 and in 2010. He attributes his success to good fodder production, good animal husbandry, good record keeping and above all a passion for the dairy enterprise.

CASE STUDY 5: *Mrs. S. Maguranye (Gokwe Smallholder Dairy Scheme).*

Mrs. S Maguranye is a widow aged sixty-one (61) years deriving her livelihood from smallholder dairying in Gokwe South District of the Midlands Province. Mrs. Maguranye has practiced smallholder dairying for the past seventeen (17) years with the help of her late husband, a retired extension worker. She is a retired teacher who feels that the income generated from her dairy enterprise is enough to sustain the daily needs of herself and seven other members of her household among them her grandchildren. Mrs. Maguranye farms on five (5) hectares of arable land in the Gokwe communal land located some nine (9) kilometres from the Gokwe Milk Collection Centre. Mrs. Maguranye has ten (10) dairy animals (3 milking cows, 1 dry cow, 3 heifers and 3 calves) and was delivering over 15 litres to the MCC by the time of the study. Mrs. Maguranye is also enterprising in that she provides donkey drawn transport for her neighbouring farmers daily to the MCC in the morning for a charge. Mrs. Maguranye had six (6) tons silage and over 1 ton hay. She was the National dairyperson of the year in 1998 and has come fifth on two consecutive years (2011, 2012). She attributes her success to hard work and implementing what she is advised by extensionists.

8. Opportunities for Utilization of Renewable Energy in the MCCs

8.1 Why Renewable Energy?

The global village, comprising of both developed and developing nations, currently over rely on fossil fuels (coal, oil and natural gas) and nuclear power for their energy. Fossil fuels are non-renewable entailing that they draw on finite resources that will eventually diminish, becoming too expensive or too environmentally damaging to retrieve. The result is a system that lacks diversity and security, threatens the health of its citizens, jeopardizes the stability of Earth's climate, and robs future generations of clean air, clean water, and energy independence.

In contrast, there are numerous types of renewable energy resources that are constantly replenished and, therefore, allows for sustainable use over time. According to Wikipedia, renewable energy is energy that emanates from natural resources such as solar energy, bio-energy, wind, rain, tides, waves and geothermal heat. Solar energy can be used directly for heating and lighting homes and other buildings, for generating electricity, and for hot water heating, solar cooling, and a variety of commercial and industrial uses. On the other hand, biomass can be used to produce electricity, for heating, transportation fuels, or chemicals.

Only 16% of global final energy consumption comes from renewable energy sources, entailing great potential for renewable energy use. While many renewable energy projects are large-scale, renewable energy technologies are also suited to rural and remote areas, where energy is often crucial in human development. The switch to renewable energy can also protect the environment and public health by avoiding or reducing emissions that contribute to smog, acid rain, and global warming; by reducing water consumption, thermal pollution, waste, noise, and adverse land use; increase economic development and create new family-wage jobs; and conserve natural resources for the benefit of current and future generations.

Smallholder dairying offers great potential for the utilization of renewable energy *viz:* through biogas and solar options. This is against the backdrop of very unreliable electricity supplies in the country and the need for consistency in power supply in milk production and processing.

8.2 Opportunities for Utilization of Biogas in MCCs

8.2.1 Biogas Pilot Programmes from a Bygone Era

There have been pilot programmes on biogas in selected smallholder dairy schemes. These include cases in Mhondoro in Mashonaland West Province and Hauna in Manicaland. In Mhondoro, one farmer (Mr. Tapera Makore) benefitted from the pilot programme, installed a biogas digester which supplied biogas for cooking purposes to 3 of his kitchens. For sometime his biogas project became a learning platform and exhibit to local, regional and international visitors.

Illustrations: *A biogas digester and gas stove at Mr. Makore's homestead in Mhondoro.*

In Rusitu and Marirangwe, despite the initiatives, groundwork and meetings, the pilot programmes never took-off from the ground. According to conducted FGDs, earlier attempts to use biogas in Rusitu failed to work due to suspected leakages. Only 2% of the 387 households interviewed through the formal household survey have used biogas before.

8.2.2 Opportunities for Utilization of Biogas in MCCs

Biogas can be used for heating, providing energy for milk cooling and processing, and more importantly, biogas can be used in combination with fossil fuels in fuelling a stand-by diesel generator (10% biogas and 90% diesel).

8.2.3 Challenges for Biogas Use

Biogas, as a renewable energy option, presents a number of challenges. According to the experiences of the biogas project pilot farmers, biogas is affected by cold weather and low temperatures. The lower the temperatures the less the biogas one can yield. Biogas also requires a minimum production threshold given that the biogas digester requires a minimum of 8 – 15 cows per household for sustenance. For the household, this presents challenges given current average herd sizes of 5.76 dairy animals per household, while the need for group effort for sustenance of an MCC-level biogas digester might suffer from the "cooperative fatigue". As an illustrational example, it might be difficult to coordinate farmers in bringing in cow dung to a centralized biogas digester. This is because biogas production at a centralized point involves a lot of labour in ferrying cow dung from homes to the MCC. Farmers could bring cow dung for a few days and then give up once the initial excitement is over. Biogas leakages, on the other hand, pose danger and the threat for explosions. For MCCs, biogas is also a potential source of contamination given that milk is a sensitive product e.g. biogas odour's likely impact on milk because of its susceptibility to foreign odours and taste.

8.3 Opportunities for Utilization of Solar Energy in MCCs

8.3.1 Potential for Utilization of Solar Energy in MCCs

Solar energy can be used as a substitute for all equipment and energy requirements currently met through national grid electricity supplies. Solar energy can also be used in conjunction with electricity and a stand-by-generator. Either way this will entail a significant reduction in energy costs for both the MCCs and individuals farmers who adopt solar energy use. Solar energy can be used to power water pumps in areas with rich networks of rivers and streams. In such contexts solar energy can be used to power water pumps e.g. for irrigation of fodder plots, which can be a launch pad zero grazing in smallholder dairying. Solar energy can also be used to chillers in rural outposts which can be used to increase milk output by collecting and bulking milk produced by farmers outside conventional milk production zones.

8.3.2 Potential Challenges with Solar Energy

The initial capital costs are high e.g. to run an MCC on solar energy smallholder dairy associations would require industrial 24-hour solar panels.

8.3.3 Solar Energy as the Preferred Option

The farmers' preferred option is solar energy. Compared to biogas, solar energy is more environmental friendly, with no pollution and hence its status as a "clean technology". Solar energy units have very little operational costs giving them potential to substantially reduce MCC running costs and improve both MCC and farmer margins, while solar energy unit sustenance is also less labour intensive thereby making it a viable substitute. This makes it more suitable for the dairy enterprise. According to the results of the December 2012 MCC evaluation and baseline survey, 65% of the interviewed households, have or are currently using solar energy, while 66% prefer solar energy over the use of biogas.

9. Economics of Production

9.1 Prelude

Subsector and enterprise viability is the basis of continued stakeholder interest, investments by the private sector, sectoral growth and sustainability. According to assessments by various stakeholders, smallholder dairying has regained its viability, although it might be sometime before the subsector fully recovers from the slump[4]. At the MCC level, viability is greatly influenced by milk production volumes, the level of deliveries, quality of produced milk, and the access to reliable, sustainable and viable markets. On the other hand, at the individual farmer level, viability is determined by production levels (e.g. possession of a minimum threshold of milking cows), ability to maintain quality standards and linkages to MCCs (which reduces unit operating costs, ensures access to markets and reduces individual farmer exposure to risk and market uncertainties). Other factors include the genetics at the farmers' disposal (with most dairy cows comprising non-descript dairy crosses), adherence to good animal husbandry practices and the quality of management.

9.2 Sampling Criteria for MCCs and GMA

As already highlighted, the ten MCCs that became the subjects for analysis for this evaluation and baseline study were objectively selected on the basis of a number of criteria including*, inter alia,* production volumes, consistency and the management systems in place at the different milk collection centres. On the other hand, farmer selection for Gross Margin Analysis (GMA) targeted 10 smallholder dairy farmers from 8 operational MCCs, entailing a target sample of one to two smallholder dairy farmers from each MCC. Of the sampled 10 smallholder dairy farmers, three (3) were top producers, three (3) were average producers, while the remaining four (4) were low producers. The proportion between male and female smallholder dairy farmers was designed to reflect the statistics on the ground. Presented results, however, are based on selected MCCs and individual farmer cases.

9.3 MCC Viability Assessments

Despite the challenges, as discussed in preceding sections, the majority of MCCs are operating as viable entities. See Table 43. Gross profits, based on the differences between gross milk sales revenue and direct MCC running costs, are positive for all the six (6) case study MCCs, with a range of US$4,595.70 (Dowa) to US$110,297.86 (Rusitu Mayfield). Operational expenses which include farmer payments, for the period under review (October 2011 – November 2012) have been very steep, hence all schemes, with the exception of Gokwe, had a negative net operating income. However, after taking cognisance of other income which includes office rentals, margins from feed and drug sales, farmer subscriptions, and AI service fees a number of MCCs managed to declare positive net incomes. Notable cases include Gokwe with a net income of US$65,312.03, Marirangwe (US$4,681.91) and Rusitu United (US$4,364.12). Meanwhile, the net income for Rusitu Mayfield has been insignificant while Guruve and Dowa recorded net losses.

In addition to challenges already cited, some dairy schemes are constrained by their design as suppliers of a primary product (raw milk) to established processors. In some cases, low

[4] Earlier studies showed that the lack of viability was the major factor behind negative growth within the Zimbabwean smallholder dairy subsector, while the fast track land reform programme combined with the 2000 – 2008 economic decline resulted in a plunge in milk production levels.

production volumes have also acted as an inhibiting factor to supplying established processors or setting up of own processing initiatives. On the other hand, low production volumes, high feed costs, low producer prices, meagre returns and subsequent low incomes have encouraged non-delivery to MCCs and side-marketing by MCC members, thereby negatively impacting on MCC viability. Capacity building tied to improvements in individual farmer and association dairy herd sizes, quality of dairy breeds and management can significantly improve gross profits, net operating incomes and net incomes.

9.4 GMA Analysis

The lack of viability in commercial dairying was the key reason behind en masse exits from the dairy sub-sector by large-scale commercial farmers in the late 1990s. Although smallholder dairying remained viable, with average GM/TVC (returns per invested dollar) of 0.06 for Gokwe, 0.12 for Rusitu and 0.42 for Marirangwe, smallholder dairying was heavily weighed down by a multiplicity of socio-economic constraints (Hanyani-Mlambo, *et. al.,* 1998; Hanyani-Mlambo, 2000). The 1997 evaluation also established a viability threshold of 6 – 10 dairy cows over which smallholder dairying was most efficient as evidenced by gross margin per cow, gross margin per hectare and the returns per invested dollar (GM/TVC).

The 2012 evaluation and baseline survey produced GMA analysis results that mirror to a large extent the 1997 assessment results, albeit with new twists to the established patterns. GMA results show that small dairy herds are uneconomic, with dairy herds with one and two milking cows producing negative gross margins of –US$239.20 and –US$290.20 respectively. An average dairy herd from the GMA sample with six milking cows had a positive gross margin of US$3,281.70, while a large dairy herd with 30 milking cows had a positive gross margin of US$21,200.35. As largely expected, other viability indicators such as the gross margin per cow, gross margin per total variable costs, gross margin per feed costs, gross margin per labour costs and the gross margin per litre largely mirrored the gross margin results. See Table 44 and Figure 14.

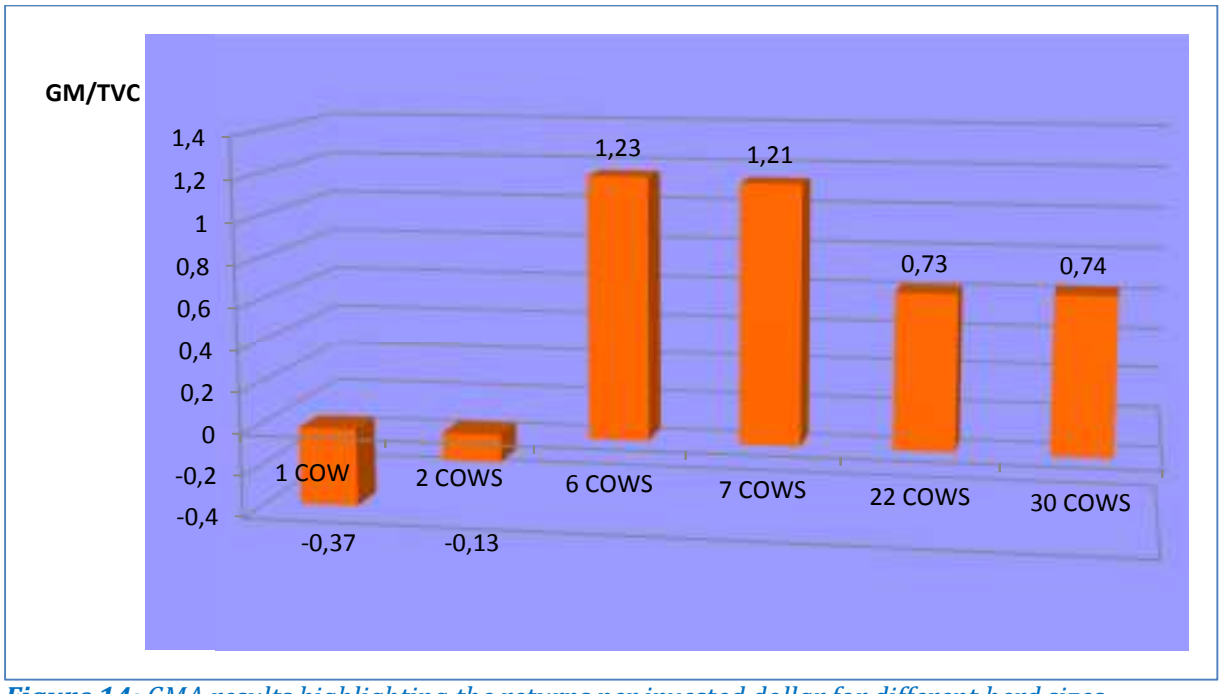

Figure 14: *GMA results highlighting the returns per invested dollar for different herd sizes.*

Viability and efficiency assessments, based on returns per invested dollar showed a GM/TVC index of -0.37 for the small dairy herd with a single milking cow. Other GM/TVC results were -0.13 for two milking cows, 1.23 for six milking cows, 1.21 for 7 milking cows, 0.73 for 22 milking cows and 0.74 for 30 milking cows. These results again prove that smallholder dairying is most viable and most efficient with average herd sizes of 6 – 7 milking cows. On the other hand, while large dairy herds within the smallholder dairy subsector remain viable there is apparent evidence of gross inefficiencies and declining marginal returns. Basing on further GMA analysis, the equi-marginal principle in economics (optimal profits are attained when a dollar invested returns an additional dollar) shows that smallholder dairying at the moment is only yielding optimal returns at the 6 – 7 milking cow threshold levels, with anything outside this range failing to achieve optimal returns (based on prevailing yield levels as limited by existing genetics at the time of the study).

The break-even yield for the loss making enterprises is 1,428 litres for the single milking cow herd compared to a current production level of 896 litres. Similarly, the break-even yield is 5,127 litres for the two milking cow herd compared to a current production level of 3,965 litres. The break-even prices for the same loss making enterprises are US$0.72 per and US$0.58 per litre respectively. Sensitivity analysis, on the other hand, produced largely expected results. Assuming a 20% increase in total variable costs yields a reduction in margins of between 24.5% and 107.7%. Similarly, assuming a 20% increase in producer prices yields an improvement in margins of 32.2% – 138.5%. See Figure 15.

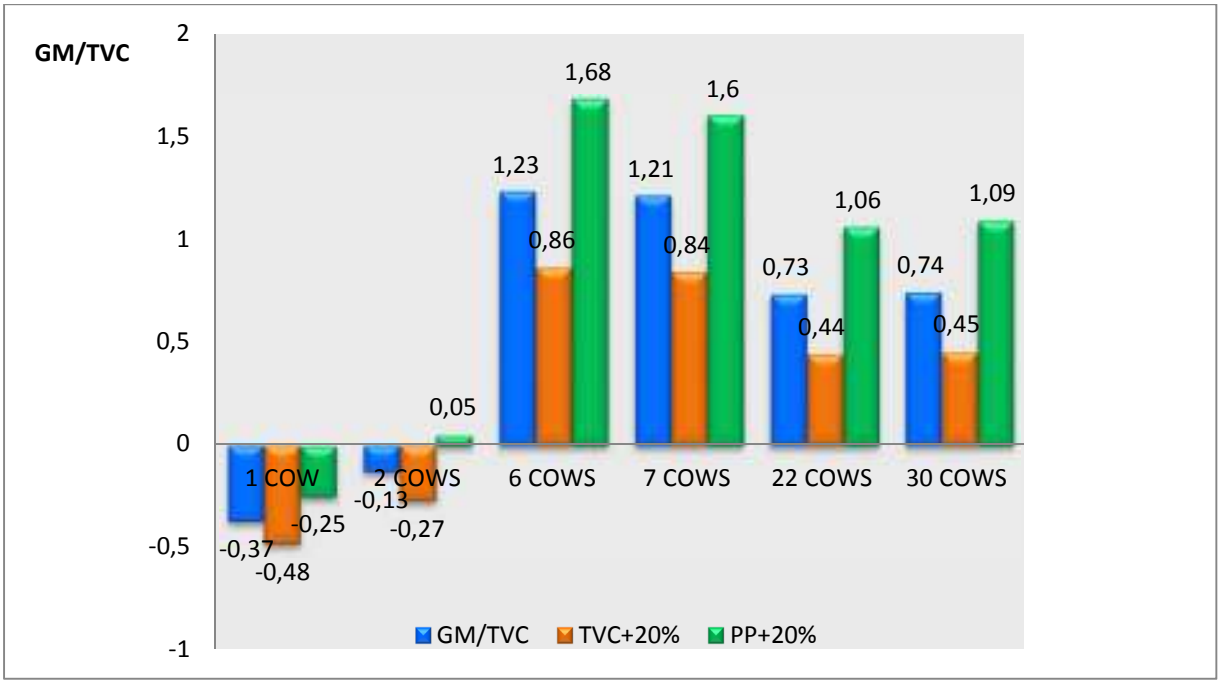

Figure 15: *GMA sensitivity analysis results for different herd sizes.*

Table 43: *MCC viability assessments based on comprehensive income and expenditure statements for selected schemes.*

Particulars	Income and Expenditure for Various Dairy Scheme [US$]					
	Rusitu Mayfield	Marirangwe	Gokwe	Rusitu United	Guruve	Dowa
Revenue						
Gross Milk Sales	117 500.23	92 069.72	89 907.13	32 074.45	15 760.80	7 848.50
Less – Sales Returns and Allowances	0.00	0.00	0.00	0.00	0.00	1 300.00
Net Sales	117 500.23	92 069.72	89 907.13	32 074.45	15 760.80	6 548.50
Cost of Goods Sold						
Direct Labour (centre staff)	6 961.37	3 116.89	8 420.00	2 400.00	3 468.00	1 290.00
Culture Ingredients	0.00	0.00	1 384.50	0.00	194.10	162.00
Detergents	241.00	75.68	586.00	565.00	85.90	70.80
Packaging Expenses	0.00	0.00	561.40	0.00	1 100.00	430.00
Total Cost of Goods Sold	7 202.37	3 192.57	10 951.90	2 965.00	4 848.00	1 952.80
Gross Profit (Loss)	**110 297.86**	**88 877.15**	**78 955.23**	**29 109.45**	**10 912.80**	**4 595.70**
Expenses						
Farmer Payout	95 561.19	67 430.28	61 143.51	13 209.26	6 231.00	3 531.83
Electricity Tariffs	2 306.00	4 373.65	862.00	285.00	1 777.00	419.91
Water Charges	0.00	0.00	623.00	350.00	715.00	252.00
Telephone and Cell phone Charges	213.00	251.90	191.00	60.00	335.00	120.00
Printing, Photocopying and Stationery	123.30	709.83	599.60	190.00	167.00	23.90
Charitable Contributions (donations/condolences)	0.00	4.00	10.00	10.00	0.00	0.00
Staff Welfare	240.00	265.50	907.04	0.00	675.00	182.50
Reimbursements to Committee Members	191.60	825.66	2 859.00	0.00	467.50	63.50
AI, Demo Plot and Workshops/Field days	939.00	5.00	457.50	300.00	99.00	0.00
Bank Charges	458.07	0.00	405.23	74.00	0.00	0.00
Land 'O Lakes ABS Levy	750.00	660.00	0.00	323.00	28.00	300.00
NADF Levy	7 237.00	4 603.48	294.05	312.24	0.00	35.00
DZL/Town Council Rates and Levies	145.00	1 478.00	0.00	145.00	265.00	290.00
Equipment/Building Purchases, Repairs & Maintenance	7 523.90	993.85	927.55	8 000.00	597.00	32.00
Vehicle Running Costs and Travelling Expenses	867.00	942.70	391.00	382.00	240.00	271.50
Office Consumables	0.00	296.89	81.05	30.00	0.00	0.00
Protective Clothing	0.00	0.00	102.50	65.00	0.00	0.00
Medical Examinations/Legal Costs	0.00	48.00	118.00	0.00	60.00	0.00
Drugs and Feed Expenses	10 561.88	4 194.00	0.00	5 399.33	0.00	0.00
Oil Press Expenses	0.00	0.00	0.00	0.00	0.00	0.00

Fuel wood and Casual Labour	0.00	0.00	290.00	0.00	229.00	180.00
Marketing Expenses	492.30	3 140.50	551.00	0.00	5 534.00	90.00
Miscellaneous Expenses	0.00	0.00	0.00	0.00	848.20	0.00
Total Expenses	127 609.20	90 223.24	70 813.03	29 134.83	18 267.70	5 792.14
Net Operating Income	**-17 311.34**	**-1 346.09**	**8 142.20**	**-25.38**	**-7 354.90**	**-1 196.44**
Other Income						
Office Rentals	1 547.00	780.00	12 499.00	0.00	0.00	0.00
Feed and Drug Sales	10 943.79	5 248.00	13 471.83	4 089.50	0.00	0.00
Cattle Bank (revolving fund)	0.00	0.00	28 323.00	0.00	0.00	0.00
Oil Press Project & Other Rentals	0.00	0.00	2 416.00	0.00	0.00	0.00
Telephone Services	0.00	0.00	0.00	0.00	0.00	0.00
Farmer Subscriptions	16.04	0.00	370.00	0.00	0.00	0.00
AI Service Fees	66.00	0.00	0.00	300.00	0.00	0.00
Vehicles and Equipment Sales	4 500.00	0.00	90.00	0.00	0.00	0.00
Unclassified/Lumped Other Income	695.38	0.00	0.00	0.00	6 865.80	0.00
Total Other Income	17 768.21	6 028.00	57 169.83	4 389.50	6 865.80	0.00
Net Income (Loss)	**456.87**	**4 681.91**	**65 312.03**	**4 364.12**	**-489.90**	**-1 196.44**

Table 44: *Gross Margin Analysis (GMA) results for 6 smallholder dairy case studies.*

Particulars	GMA Results for Different Producer Categories (based on the number of milking cows)					
	Low Producer 1 Cow	Low Producer 2 Cows	Average Producer 6 Cows	Average Producer 7 Cows	Top Producer 22 Cows	Top Producer 30 Cows
Dairy Income						
Income from milk sold to MCC	264.60	1 293.55	4 771.60	4 463.76	39 246.39	44 598.17
Income from milk sold locally	138.60	723.25	1 170.00	0.00	0.00	0.00
Income from dairy livestock sales	0.00	0.00	0.00	640.00	1 200.00	0.00
Total Dairy Income	403.20	2 016.80	5 941.60	5 103.76	40 446.39	44 598.17
Variable Costs						
Purchased Feeds Costs	200.40	303.00	927.90	694.65	12 750.60	18 823.00
Home-Grown Feeds Costs	180.00	830.00	682.00	550.00	4 500.00	2 625.00
Drugs & Vaccine Costs	22.00	34.00	60.00	254.50	720.00	1 824.00
Hired Labour Costs	240.00	300.00	660.00	184.00	4 800.00	4 800.00
Family Labour Costs	0.00	840.00	330.00	607.70	0.00	0.00
Transport Costs	0.00	0.00	0.00	16.00	669.60	669.60
Total Variable Costs	642.40	2 307.00	2 659.90	2 306.85	23 440.00	28 741.60
Gross Margins						
Gross Margin (US$)	-239.20	-290.20	3 281.70	2 796.91	17 006.39	21 200.35
Gross Margin per Cow (US$)	-239.20	-145.10	546.95	399.56	773.02	706.68
Gross Margin per Total Variable Costs	-0.37	-0.13	1.23	1.21	0.73	0.74
Gross Margin per Feed Costs	-0.63	-0.26	2.04	2.25	0.99	0.99
Gross Margin per Labour Costs	-1.00	-0.25	3.31	3.53	3.54	4.42
Gross Margin per Litre	-0.27	-0.07	0.31	0.29	0.19	0.19
Break-Even and Sensitivity Analysis						
Break-even Yield (litres)	1427.56	5126.67	5910.89	5126.33	52088.89	63870.22
Break-even price (US$)	0.72	0.58	0.25	0.24	0.27	0.26
GM/TVC given a 20% increase in TVC	-0.48	-0.27	0.86	0.84	0.44	0.45
GM/TVC given a 20% increase in producer prices	-0.25	0.05	1.68	1.60	1.06	1.09

The GMA results have serious implications for both new entrants and dairy farmers trying to revive their enterprises on the basis of small dairy herds. Thus, while the Land 'O Lakes intervention is commendable and quite noble, beneficiaries of the single in-calf-heifers are struggling economically. This is because, as shown by the GMA results, single milking cow dairy ventures are non-viable owing to low milk volumes, low income, and non-guaranteed low production costs given that farmers have to content with a certain level of fixed costs. In all cases, the expenditure for maintaining a single cow outweighs the income received by farmers. The Land 'O Lakes interventions were exacerbated by a high mortality rate in some schemes (as high as 33% in Dowa), false pregnancies in some supposedly in-calf-heifers, and the failure to cycle and conceive by some heifers due to poor capacity by farmers to maintain the heifers.

9.5 Comparative Analysis with Competing Enterprises

Comparative viability assessments show smallholder dairying as fairing much better than most competing enterprises, notably when smallholder dairying is operated at optimal threshold levels. See Figures 16 and 17.

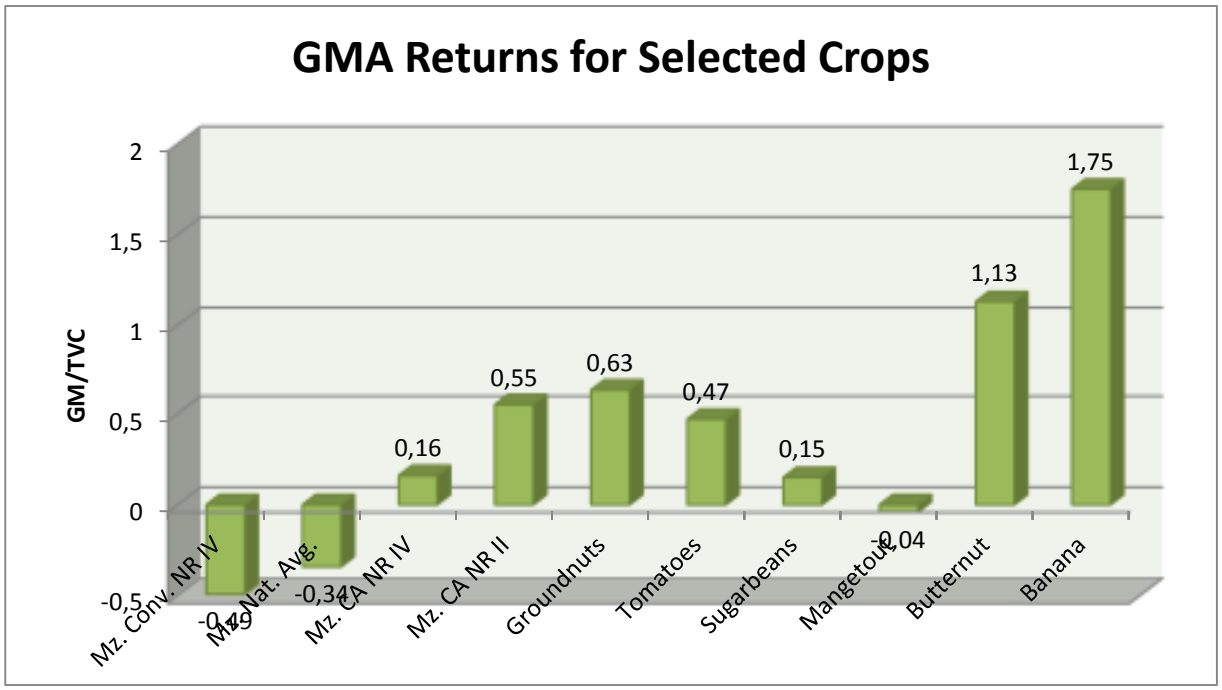

Figure 16: *Comparative GMA returns for selected crops.*
Source: Hanyani-Mlambo, *et. al.*, 2012.

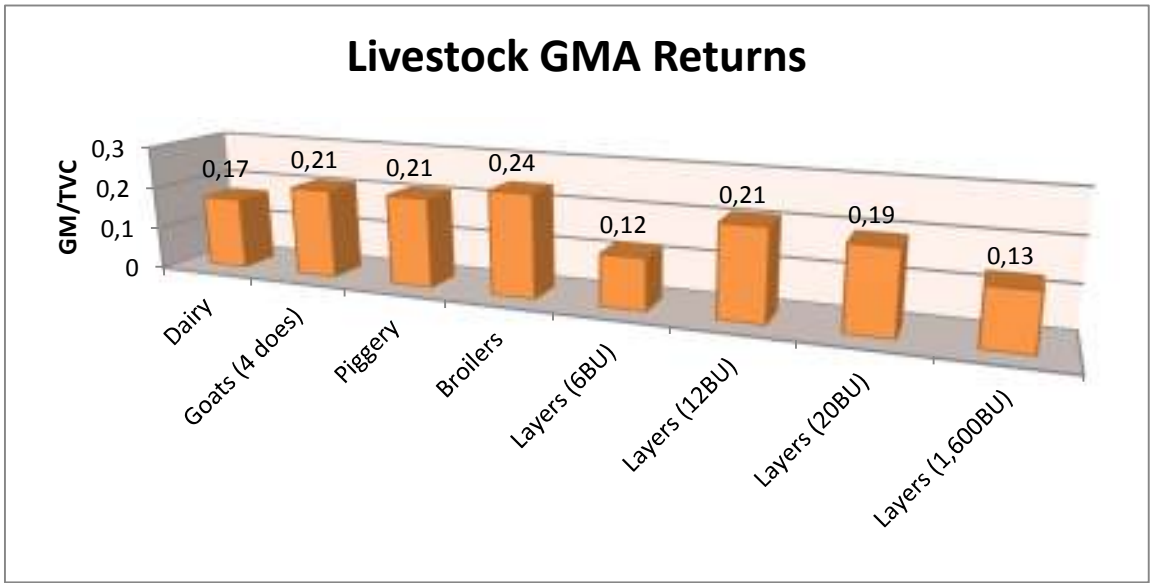

Figure 17: *Livestock returns per invested dollar.*
Source: Hanyani-Mlambo, *et. al.*, 2012.

Smallholder dairying, when compared to field crop production, also has the advantage of more frequent payouts entailing more cash inflows and better liquidity. The enterprise also benefits from complementarity linkages with crop-based enterprises on the farm e.g. maize; groundnut and bean stover can be fed to dairy animals. Non-arable portions of the farm can also be utilized for grazing, thereby facilitating a more efficient use of resources.

9.6 Viability Challenges in Smallholder Dairy Farming

Viability challenges within the smallholder dairy subsector include:-

(i) Limited land holding and the accentuated competition for land between conventional crop production and forage production/grazing for the dairy enterprise.
(ii) Lack of adequate fodder.
(iii) Poor breeds, inbreeding and challenges with AI technology/services.
(iv) Socio-economic status, with farmers keeping more dairy animals than what they can adequately feed.

However, key in viability challenges are small dairy herds, a problem accentuated by farmers' lack of access to finance. Most smallholder farmers interested in entering the dairy subsector or reviving their smallholder dairy enterprises lack adequate financial resources given the capital intensive nature of dairy farming. This scenario is exacerbated by poor access to loan facilities by smallholder farmers. Most financial institutions consider lending to smallholder farmers as very high risk business due to the problem of moral hazard and adverse selection. Lack of trust and information asymmetry increases transaction costs since banks may have inadequate information about smallholder farmers at their disposal and hence need to gather appropriate information thereby increasing the bank's lending costs. As a strategy to guard against the problem of moral hazard, banks use stringent measures to screen potential defaulters (adverse selection) and the problem with some smallholder farmers failing to honour their commitments once they benefit from loans advanced by financial institutions and rampant side-marketing (opportunism).

10. M&E Framework

10.1 Conceptualizing M&E

Monitoring can be conceptualized as a continuing function that aims primarily to provide the management and main stakeholders of an ongoing intervention with early indications of progress, or lack thereof, in the achievement of results[5]. It provides managers and stakeholders with continuous feedback on implementation, whilst identifying actual or potential successes and problems as early as possible to facilitate necessary and timely adjustments in project design. On the other hand, evaluation can be conceptualized as a periodic assessment of an activity's relevance, performance, efficiency, and often impact (both expected and unexpected) in relation to stated objectives[6]. It can also be seen as a selective exercise that attempts to systematically and objectively assess progress towards and the achievement of an outcome, including an assessment of the activity's effects and its potential sustainability.

10.2 M&E Framework for the SNV/DANIDA Smallholder Dairy Intervention

An appropriate Monitoring and Evaluation (M&E) system is critical for providing key benchmark information, noting project achievements, documenting lessons learnt, identifying areas requiring attention, determining appropriate design changes and identifying areas whose improvements are prerequisites for ensuring an effective and efficient intervention with tangible benefits and impact for the target beneficiaries and wider communities.

This subsector evaluation and baseline survey provide the benchmarks. These are provided in detail in the form of a baseline data template (Annex 7). Indicators and benchmark baseline data for the indicators are shown within the context of the following issues:-

(i) Socio-economic status of participating households.
(ii) MCC membership.
(iii) Dairy herd composition.
(iv) Livelihoods, income sources and household income.
(v) Dairy infrastructure and equipment.
(vi) Fodder production.
(vii) Dairy production practices and institutional support.
(viii) Dairy herd productivity.
(ix) Milk marketing.
(x) Production and marketing constraints.
(xi) Economics of smallholder dairying.
(xii) Utilization of renewable energy.
(xiii) Impact of smallholder dairying.

Note, however, that periodic monitoring, follow-up 2013 and 2014 annual reviews, and an end-of-project evaluation are all essential for effective M&E. As already highlighted, such annual reviews are critical for assessing progress achieved against the set targets, keeping track of issues such as improvements in performance, constraining factors and establishing the techno-socio-economic factors behind such phenomena.

[5] UNDP, 2002.
[6] USAID, 2002.

11. Recommendations

11.1 Capacity Building

Capacity building is key in resuscitating smallholder dairying in Zimbabwe. There is need for capacity building of value chain players, notably for smallholder dairy producers. The consultants recommend a comprehensive Training for Transformation (TFT) and Farming as a Business (FaaB)[7] training for all value chain players as a strategy for ensuring a change in the mindset, promote a business approach to agriculture, and the transition from semi-commercialized to fully-commercialized dairying.

On the other hand, productivity per farmer can be improved through restocking, recapitalization of the subsector, capacity building and improvements in management of existing enterprises. Farmers have been affected by droughts, vaccine and drug shortages, and mortalities while hyperinflation wiped farmers' savings. The capital intensive nature of dairying has also acted as a barrier to entry for a number of prospective dairy farmers. For restocking there is need to shift from short-term to long-term funding. Recommended are 5 – 10 year loans at an affordable cost e.g. provision of soft loans with flexible repayment terms for disadvantaged farmers or loans with concessionary interest rates of 5 – 10%.

At the MCC level capacity development can be through the capacitation of local institutions and smallholder dairy subsector service providers such as the DDP, LPD, DVS, AGRITEX who already have presence at the local level. Capacity building efforts at the MCC level could also include facilitated access to equipment (through renovations, refurbishments and the acquisition of new equipment e.g. new milk tanks owned by farmers or MCCs rather than the current arrangements of renting such tanks from the dairy coop), improved production and quality management, and improvements in transport, mobility and ensuring more reliable milk collection systems.

11.2 Adoption of Inclusive Business Models

By design, inclusive business models establish viable means for engaging low-income socio-economic segments into their business operations in a way that benefits the low-income communities and creates sustainable livelihoods. What this entails is that there is no one size fits all nor recommendation of a single prescriptive model. The idea is to promote private sector led growth by creating a critical mass of dairy producers within selected hubs, increasing both dairy herd and milk production densities, improving the performance of the sector, and growing the smallholder dairy subsector to the level where private sector companies find it attractive to invest in the sector. There is also need for an integrated/wholesome intervention (provision of a complete package), while pilot and best-bet models already in existence such as the MilkZim Model should be up-scaled and expanded.

[7] TFT and FaaB training incorporates capacity building on commercial orientation, entrepreneurship, marketing, contract farming, negotiating skills, business management, record-keeping, leadership, constitution, by-laws, conflict resolution, change management, teamwork, self-reliance, gender dynamics, public speaking, and facilitation skills.

11.3 Improving Smallholder Farmer Participation in Commercial Dairying

Strategies for improving smallholder farmer participation in commercial dairying include the adoption of inclusive business development models that ensure a shared vision and effective communication between processors and smallholder dairy farmers[8], credit facilities for increasing the dairy herd, increasing producer prices, and enhancing the viability of smallholder dairying. There is also need for ensuring the sustainability of supplies by supporting (financially or otherwise) e.g. better price support for smallholder dairy farmers. Another strategy could be facilitation of farmers' access to inputs e.g. buying inputs in bulk with bulk discounts passed on to the farmers. The better the support provided to existing smallholder dairy farmers the greater their productivity, viability and growth, and the interest it generates in private sector investors and other potential smallholder dairy farmers. Initiating viable projects/interventions that ensure sustainable growth, viability and improved incomes will have the same impact.

11.4 Promotion of Renewable Energy Use

While processing has no comparative advantage to MCCs with access to markets and those already supplying established processors, MCCs outside this range can immensely benefit from use of renewable energy in micro-processing e.g. for pre-heating water for boilers and the generation of heat for pasteurization. While the initial capital costs might be high and the payback period is extensive, long-term energy and cost savings make renewable energy a necessary investment. Renewable energy technology is also readily available locally. Renewable energy will not only act as a substitute power supply but can also be an ideal panacea to Zimbabwe's unreliable electrical power supply. Indications from stakeholder consultations show that there is, need for support from the Government, the donor community and the private sector to ensure capital injection, facilitated access to cheap and affordable credit, improved access to appropriate equipment and an enabling policy environment e.g. tax breaks and making renewable energy investments tax deductable.

In Rusitu, there are also opportunities for electricity generation through small hydro-power plants given the many springs and the mountainous terrain in the area. The potential for both such an initiative and benefits to the communities is massive. One such initiative was the ITDG-funded hydro-electric plant near Tonhorai Irrigation Scheme in Cashel Valley, Chimanimani District.

11.5 Opportunities for Unlocking Value

Identified priority intervention areas and opportunities for unlocking value include efforts at restocking to ensure viability, breeding programmes, improved feed management, value addition through localized processing (using renewable energy), and engagement of the private sector.

[8] It is critical that smallholder dairy farmers understand issues from a processor's point of view and those processors also understand issues from a smallholder dairy farmer's point of view.

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13. Appendices

Appendix 1: Terms of Reference (TORs).

Appendix 2: Key Informant Interview (KII) Guide.

Appendix 3: Focus Group Discussion (FGD) Checklist.

Appendix 4: Household Questionnaire.

Appendix 5: MCC Data Capture Instrument.

Appendix 6: Economic Analysis (GMA) Tool.

Appendix 7: M&E Framework & Baseline Data.

Appendix 8: List of Interviewed Persons.