Final Evaluation Report

Rebuilding Livelihoods and Resiliency in Zimbabwe (ZDL) Project implemented by Land O' Lakes and funded by USAID

By

Dr. Dammika Carr - Team Leader

Consultant- Livestock Production and Market Linkages Development

Mr. Benjamine Mlambo -Team Member

Consultant- Agriculture Economist and M&E Specialist

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The views expressed in this report, however, are those of the consultants, and do not necessarily represent the views of Land O' Lakes and/or USAID.

A list of all the consulted informants is provided at the end of this report as an annex.

Table of Contents

Contents

Abbreviations and Acronyms

ABS	Accounting Bureau System
AGRITEX	Department of Agricultural, Technical and Extension Services
ARDA	Agricultural and Rural Development Authority
BCR	Benefit Cost Ratio
CA	Contagious Abortion
CAHWs	Community Animal Health Workers
CBA	Cost Benefit Analysis
CLWs	Community Livestock Workers
DANIDA	Danish International Development Agency
DDP	Dairy Development Programme
DVS	Department of Veterinary Services
EPE	End of Project Evaluation
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
FTF	Feed the Future
GMA	Gross Margin Analysis
HEA	Household Economy Approach
HDDS	Household Dietary Diversity Score
HH	Household
IDEAA	Initiative for the Development and Equity in African Agriculture
IRR	Internal Rate of Return
KII	Key Informant Interview
LOL	Land O' Lakes
LPD	Department of Livestock Production and Development
M&E	Monitoring and Evaluation
MCC	Milk Collection Centre
MIHFP	Months of Inadequate Household Food Provisioning
MPA	Milk Production Association
MTE	Mid-Term Evaluation
NPV	Net Present Value
PMP	Performance Monitoring Plan
SLA	Sustainable Livelihoods Approach
SNV	Netherlands Development Organization
SPSS	Statistical Package for Social Sciences
TVC	Total Variable Costs
USAID	United States Agency for International Development
USD	United States Dollar
VCA	Value Chain Analysis
ZADF	Zimbabwe Association of Dairy Farmers
ZDL	Rebuilding Livelihoods and Resiliency in Zimbabwe

Highlights

- The ZDL project activities included the linking of dairy farmers to high-value milk markets, increasing access to animal health services, increasing capacity of fodder flow management, and promoting the use of donkeys for milk transportation.
- The project has been a major success, setting a foundation for smallholder dairying in Zimbabwe.
- The project distinguished itself through the promotion of a pro-business approach, facilitation of commercial dairy production, capacity building of local MCCs and the ZADF.
- The project achieved an overall physical progress rate of 97.2% against set targets, with the majority of the project's indicators surpassing expectations and the set targets.
- The volume of milk produced per household each month increased from 50 litres at the baseline to 562 litres in 2013 (1,124% increase). This was also a 187% achievement given a project target of 300 litres.
- The number of households with adequate food provision increased by 21.4%.
- The mean Household Dietary Diversity Score (HDDS) was 8.2 compared to averages of 7.2 during the baseline period and 7.6 during the mid-term evaluation period.
- The number of jobs achieved and attributable to the Feed the Future (FTF) initiative stands at 932, with 783 for males and 149 for females.
- Average annual dairy incomes increased by 743%, increasing from US$312 during the baseline to US$2,943 currently, and a paltry US$206 for the control group (non-beneficiaries).

Executive Summary

Project Overview

Smallholder dairying in Zimbabwe presents the greatest opportunities for unlocking value, generating quick returns to investment, increasing national dairy production, and taking advantage of opportunities for import substitution. However, Zimbabwe has faced a decline in dairy production, between the late 1990s and 2008 due to a complex combination of socio-economic, political and environmental factors. The smallholder dairy subsector remains strained by, inter alia, lack of capital, low herd sizes, poor animal breeds, low farm-level productivity, and a lack of access to markets. In response, Land O'Lakes has been implementing the *Rebuilding Livelihoods and Resiliency in Zimbabwe (ZDL) project* aimed at building livelihoods and promoting food security of farmers through interventions in the livestock and dairy value chains. It was expected that the significant gains from dairy in terms of income, improved food security and improved asset base that had been demonstrated regionally could be replicated in Zimbabwe.

Evaluation Purpose and Objectives

The purpose of this end-of-project evaluation was to carry out the final evaluation of the ZDL project in order to track program progress towards set targets; assess the appropriateness of project design; review constraints and how ZDL addressed them; and document the impacts, key lessons and best practices that will inform implementation of other USAID, Land O' Lakes or local stakeholder development programmes.

Evaluation Design and Methods

The Household Economy Approach (HEA), the Sustainable Livelihoods Approach (SLA) and Value Chain Analysis (VCA) were used as the guiding analytical frameworks for the evaluation. Data collection methods for the evaluation included a desk study and review of project documents, key informant interviews, focus group discussions, administering a household survey questionnaire, conducting gross margin and cost-benefit analysis, and the documentation of most significant case studies. Field data collection was based on a sample of 14 Milk Production Associations (MPAs) out of the 18 MPAs (78%) and 14 Milk Collection Centres (MCCs) out of the 21 MCCs (67%), the ZDL project was working in. The selected 14 MCCs were Murewa, Chikwaka, Marirangwe and Wedza (in Mashonaland East Province), Sangano, Dowa, Tsonzo, Hauna, Mayfield and Mafumise (Manicaland Province), Hama Ruomba (Masvingo Province), Gokwe (Midlands Province), and Umzingwane and Claremont (Matabeleland South Province). A total of 240 beneficiary households (representing 19.1% of the participating 1,258 households) were selected for the household survey and acted as the treatment, while an additional 55 non-beneficiaries were selected as the control group, thereby entailing a total sample of 295 households. Of the 240 beneficiary households, 81.7% were male-headed while 18.3% were female-headed. Household data analysis was conducted using the Statistical Package for Social Sciences (SPSS), while economic performance of the dairy/donkey enterprises and the financial performance of the MCCs were assessed through Gross Margin Analysis (GMA) and Cost Benefit Analysis (CBA). Identified evaluation limitations included reliance on recall, influence of the data collection period on results, and unobservable differences between comparator groups.

Findings, Conclusions and Recommendations

Relevance

Results of the household questionnaire survey showed that dairying remains the main source of household livelihood and incomes in the project areas, with dairying contributing 36.9% to total household income. The contribution of smallholder dairying to total household income is 35.1% in male-headed households and a more significant 55.7% in female-headed households. In comparison, the contribution of smallholder dairying to total household income within the control group (non-beneficiaries) is only 11.3%. The greatest strength of the ZDL project lay in its design. The project distinguished itself through the promotion of a pro-business approach; facilitation of commercial dairy production at smallholder farmer household level; the capacity building of local MPAs, MCCs and the ZADF; use of an integrated approach, and ensuring improved margins and returns at all nodes of the value chain. The project's integrated approach also ensured the achievement of set targets, greater impact, and better sustainability of benefits for project participants.

Effectiveness

The ZDL project has been a major success, and in the process managed to set a foundation for smallholder dairying in Zimbabwe. The project achieved an overall physical progress rate of 97.2% against set targets, with the majority of the project's indicators surpassing expectations and the set targets. A notable achievement under Component 1 (dairy production, collection and processing) has been the total volume of milk produced per household each month which increased by 1,124% from 50 litres at the baseline to 562 litres in 2013. This was also a 187% achievement given a project target of 300 litres. Notable achievements under Component 2 (preventive animal health and rangeland/fodder flow management) have been the number of community based volunteers receiving short-term agricultural sector productivity training as Community Livestock Auxiliaries (100%), the number of farmers and others who have applied new technologies or management practices (103.8%), and the number of hectares under improved technologies or management practices (97.8%). However, the achievement rates under Component 3 (donkey traction and transportation pilot programme) has been subdued due to lower uptake, with rates of 67.8% for the gross margin per donkey in traction business, and 77.5% for the number of households contracted with trained service providers for land clearing, ploughing and/or transportation.

Impact

The ZDL project recorded an increase of 21.4% in household food adequacy levels, with 87.4% of the informants interviewed during the end-of-project evaluation period having adequate household food provision, compared to levels of 66.0% at the baseline period. In comparison, household food adequacy levels were 88.1% for male-headed households and 83.9% for female-headed households. The mean Household Dietary Diversity Score (HDDS) was 8.2 compared to averages of 7.2 during the baseline period and 7.6 during the mid-term evaluation period, which indicates changes in diets and an improved household economic access to food. In comparison, the average HDDS for male-headed households is 8.2, while the mean HDDS for female-headed households is 7.9. This compares with an average HDDS of 7.3 for male-headed households and 6.8 for female-headed households at the baseline stage. The corresponding HDDS averages for the different MPAs range from 6.3 (Umzingwane) to 10.4 (Hauna). The number of jobs achieved and attributable to the Feed the Future (FTF) initiative stands at 932, with 783 for males against a target of 369, thereby entailing an achievement rate of 212%, and 149 for females against a target of 188 (79.3%). Average annual household dairy incomes increased by 743%, increasing from US$312 at the baseline to US$2,943 in 2013. Comparative

analysis across different farmer categories shows average annual dairy incomes of US$206 for the control group (non-beneficiaries). The proportion of more than 80% rural households having either iron or asbestos roofed houses is also evidence of the impact on household welfare as a result of the integration of smallholder farmers into the mainstream economy given averages from comparative data in ZimVAC reports.

Economic Analysis

GMA results for the average dairy enterprise increased from US$324 to US$1,199 per cow for a dairy herd with three lactating cows between the baseline and EPE periods. The average GM/TVC index is 0.63 which means that for every dollar invested by smallholder dairy farmers these farmers are getting a return of US$0.63. Results from comparative scenario GMA show that semi-zero grazing or use of the paddock system generates the highest returns per dollar invested, with GM/TVC figures of up to 3.53. Corresponding, GMA results for donkeys increased from US$328 to US$345 per animal between the MTE and EPE periods. However, due to their lower maintenance costs, the donkey milk transportation enterprise has a GM/TVC of 3.34 entailing a return of US$3.34 for each dollar invested. The shift from individual milk deliveries to the adoption of the group milk donkey transportation model has translated into up to US$50,000 in cost savings for farmer groups on an annual basis. The majority of MCCs are operating as viable entities. Gross profits, based on the differences between historical figures for gross milk sales revenue and direct MCC running costs, were 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). Data from other sources also show that 15 out of the 21 MCCs are breaking-even as a result of use of the Cost of Production (COP) model which ensures that MCCs can meet all their costs, with those not breaking-even not using the COP model and instead using fixed farmer payouts. CBA shows that smallholder dairying is a quick return investment. The NPV of $3,797,499 over a 5-year period is quite positive and worthwhile, the BCR of 1.85 entails that the ZDL project can yield US$1.85 in discounted money for each US$1.00 invested, while the IRR of 104% is very competitive given that financial interest rates range from 18 – 35%.

Efficiency

There was timeliness in service provision and the distributions of inputs. Farmers cost-sharing and a pro-business approach, which made farmers bankable, have proved to be more cost effective. The use of the revolving cattle loan facility is an efficient way of distributing livestock to beneficiaries. The introduction of the group milk donkey transportation model has also brought tangible benefits for the farmers in the form of increases in the milk volumes transported, great cost savings and greater milk delivery efficiency. The CBA analysis based on the option of acquiring in-calf heifers from South Africa at US$2,200 instead of purchasing locally at US$1,500 not only ensured cost savings for the local option but also better financial analysis results. Efficiency issues that need to be improved related to coordination issues with government, an issue related to USAID's policy.

Sustainability

Training and capacity building formed a significant component of the ZDL project. Such training has had the impact of reinforcing social and institutional capital by strengthening capacities at the farm, MCC and community levels and hence increased the resilience of not just individual dairy enterprises but for entire MPAs and communities. This entails that benefits can continue to accrue to target communities post-project funding and indeed beyond the lifespan of the ZDL project. By involving implementing partners, e.g. public stakeholder institutions, commodity associations (notably ZADF), financial institutions, and private agribusiness firms, processors, the ZDL project ensured the development of in-built sustainability mechanisms for all project initiatives. However, some MCCs may not remain sustainable because of inherent challenges within MPAs and the specific MCCs.

Best Practices and Lessons Learnt

There are a number of good practices that the ZDL project adopted that ensured success, enhanced efficiency, and stakeholder buy in which can be replicated by other projects. One of the best practices was the adoption of a pro-business approach which improved the bankability of resource-poor farmers through capacity building by business development specialists and ensuring that smallholder dairying remained viable, training of producers and MPAs in strategic planning, linking MPAs with milk processors and ensuring improved milk quality and volumes, and initiating sustainable linkages with the private sector since established linkages are likely to continue beyond the lifespan of the ZDL project. The other ZDL project best practices were the use of a Cost of Production model in determining farmer payments and thereby ensuring that smallholder dairying remains both viable and sustainable, the capacity building of ZADF as the local partner to ensure that their services are more appropriate to the need of smallholder dairy farmers, linking producers to insurance and other financial services, and the introduction of record keeping and the Accounting Bureau System (ABS). A number of lessons learnt also emerged. Managing expectations in an area where there is a long history of donor aid, and changing mindsets within a short-term project is problematic. While the introduction of the group donkey transport model was a noble idea, in some areas the long distances made alternative and traditional modes of transport, e.g. bicycles, more appropriate. Dairying is a volumes business, and it is essential that the break even volumes are reached for the centers to break even. As livestock and dairying is a medium term investment, farmers' time horizons need to be further than one season.

Constraints and Challenges

Given the history of smallholder dairying, from a humanitarian then a relief and now a pro-business approach, beneficiaries and target groups took longer to understand the motives, goal and objectives of the project. Consistent training and capacity building efforts established a common and shared vision. Due to USAID regulations and the short nature of the project MPAs where there had been existing structures were targeted. While appearing to be useful in terms of time and impact, often these sites for the MPAs/MCCs are no longer central to milk producers, and in addition often have poor access to formal processors current milk collection routes. Many MCCs and stakeholders view that "value addition" or the processing of milk for MPAs is a viable option when producing for a local market. However, analysis jointly conducted by the ZDL project and MPAs to help determine cost of inputs and viability showed most as non-viable. Private sector view of smallholder farmers in the past was one of corporate social responsibility rather than a reliable business partner. Due to the short duration of the initial 16 months for the dairy project, this led to challenges with targeting and approach in some areas in phase 1. With a longer time horizon, earlier implementation and approaches would have been different e.g. more time was necessary for strengthening the cattle bank facility/revolving fund, allowing farmers to be better prepared and targeting of MCCs with direct links to processors. The commercialization of the services offered by Community Animal Health Workers was not fully appreciated and supported by the communities. This could be linked to the donor-dependency syndrome and expectations by farmers to receive free services from one season to another. Despite emerging as an innovative and cost-effective milk transportation model, the use of donkeys in group milk collection was not adopted as well as originally anticipated. This is because donkeys are culturally viewed as the poor man's animal, with some target beneficiaries perceiving this as a drawback. In other areas this was because of the long distances between the production areas and the MCCs e.g. up to 50km in Wedza. The ZDL project redesigned the intervention by giving the MPAs bicycles.

Recommendations

Given the ZDL project's overall physical progress achievement rate of 97.2%, an increase of 21.4% in household food adequacy levels, and an increase of 221% in average annual dairy incomes, there is need to upscale and replicate this intervention in other Land O' Lakes and USAID sites, with slight tweaking in project design for adaptation purposes only but no major reviews are necessary. A major identified constraint has been the short-term nature of the ZDL project which has not allowed ample time for Cattle Bank Facility (CBF) loan repayments, viability and for individual dairy farmers to achieve full potential. We, thus recommend more time to allow farmers having started with one cow from the CBF to graduate to the Micro King loan products to access more than one animal thus reaching the optimum herd size of 3-5 cows faster, and thereby ensuring the viability of participating smallholder dairy farmers. There has been a significant increase in the area under improved pastures and fodder crops. Future programming should consider ways of ensuring an exponential increase in adoption and the expansion of the area under improved pastures and fodder crops e.g. as the case of conservation agriculture in Zimbabwe. Such phenomena would reduce the cost of feed and thereby increase the annual gross margin per dairy cow in lactation. While the introduction of Community Livestock Workers (CLWs) has promoted the idea of dispersed, active and locally accountable community workers who can work in a range of livestock activities, addressing services that are in demand and are best delivered locally, there is need to expand the CLWs concept e.g. through the training of more dairy farmers as CLWs. Despite the low uptake, the group donkey transportation system remains innovative and very cost effective. In addition, despite the fact that dairy cows have the potential to be milked thrice per day, a number of farmers are still making morning milk deliveries only due to the distances and low unit volumes thereby limiting overall milk supplies to the MCCs. There is thus need for further scoping studies on present and alternative transport systems especially for farmers who are located at a distance from the MCCs. Such a study could focus on the suitability of donkeys in all areas, factors affecting the adoption of such an innovation, long-term costs and benefits, comparative costs for tricycle milk collection systems, and other alternative models. Finally, there is need to extent the programme for another three-year phase to build capacities before weaning off the current target MPAs/MCCs.

1. Project Overview

1.1 Project Rationale

Livestock production systems are an important component in local economies at both the national and farm household level, where cattle constitute the main livestock species kept by farmers. Specifically, the dairy sub-component has proved to be practically vital, especially in the smallholder sector where milk is an important source of protein to young children and supplementary income to often cash-starved farm households. Despite the challenges prevalent within the smallholder dairy subsector, the large numbers of current and potential producers entail that the smallholder dairy production system has the greatest potential and thus provides the best basis for increasing national dairy production. Demand for dairy products in Zimbabwe surpasses supply from local dairy production, with the gap being currently filled-in through imports. The estimated demand for milk and milk products is 180 million litres, which presents a supply gap of 129 million litres. This, thus creates vast opportunities for import substitution within the local dairy sector. The local dairy industry can also take a leaf from how farmer cooperatives/associations transformed dairy production and processing in countries such as Denmark, Kenya and Rwanda. Smallholder dairying in Zimbabwe also presents the greatest opportunities for unlocking value, generating the highest and quickest returns to investment due to the diversity of dairy products and the higher margins that can be gained from niche markets e.g. through public-private sector partnerships, by providing platforms for private sector–led economic growth, and/or through responding to unsatisfied demand for feta cheese in Europe.

Zimbabwe had once been a major milk producer and exporter of milk throughout the SADC region, peaking at approximately 262 million liters in 1990. During the same period, several Zimbabwean companies exported milk and purchased other milk producing companies regionally. However, Zimbabwe has faced a decline in agricultural production, for nearly a decade between the late 1990s and 2008 due to a complex combination of socio-economic, political and environmental factors. This has negatively affected the ability of many dairy farmers to remain in viable milk business, with total annual milk volumes declining to less than 35 million liters in 2008. A number of milk processing plants in the country shut down, with the country running at less than 30% of installed capacity. See Figure 1.

The signing of the Global Political Agreement (GPA) in September 2008 which led to the formation of an "all inclusive government" and the subsequent dollarization of the economy in February 2009 saw a recovery in many sectors of the economy. However, the large-scale commercial agricultural productive base, which had been eroded by the Fast Track Land Reform Programme (FTLRP), saw large-scale commercial dairy farmers decreasing from 423 in 2000 to less than 120 in 2012 (ZADIT, 2012). Despite the recovery in national milk production to 56 million litres in 2012, Zimbabwe is still importing more than 60 million litres of milk annually.

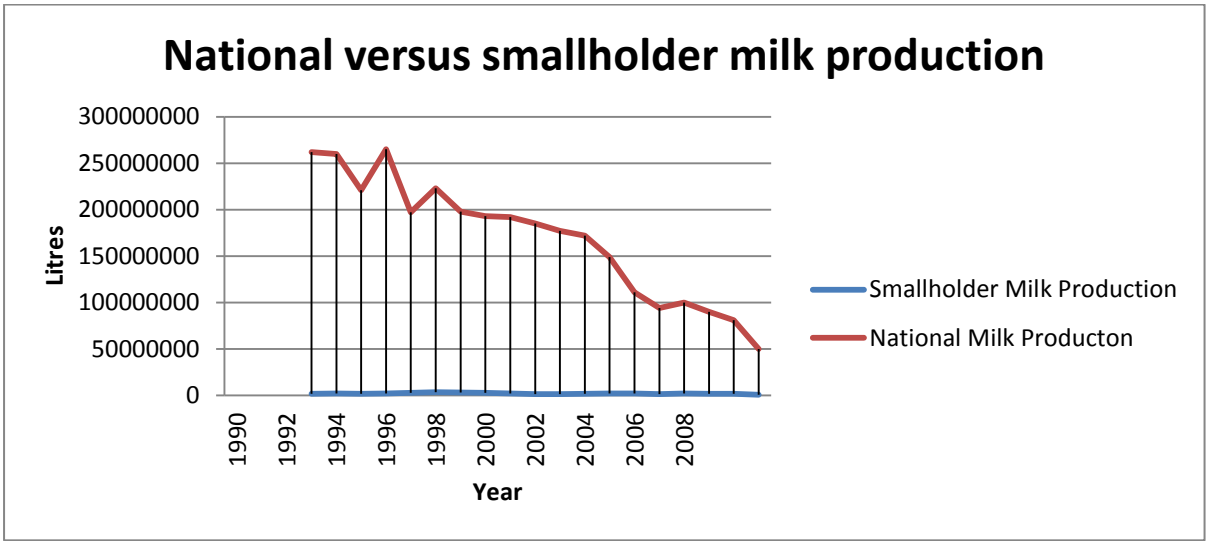


Figure 1: *National versus smallholder milk production trends.*

Milk production within the smallholder dairy sector fluctuated from 2.7 million litres in 1990 to 1.5 million litres in 1998 and 1.13 million litres in 2011. Most smallholder dairy projects, initiated by the Government and supported by development partners, and smallholder milk production suffered a slump during the period 2006 to 2008 with some closing as a result of the prevailing hyperinflationary environment (Figure 2). The smallholder dairy sector has infrastructure in place and vast knowledge disseminated since inception in 1983. Nevertheless, its major weaknesses are poor commercialisation, weak organisation, poor governance, and low productivity as the major constraining factors hindering growth. Vast opportunities prevail in the current demand supply deficit and threats have been in the non-availability of dairy stock and reduced service provision from a cash strapped public support system.

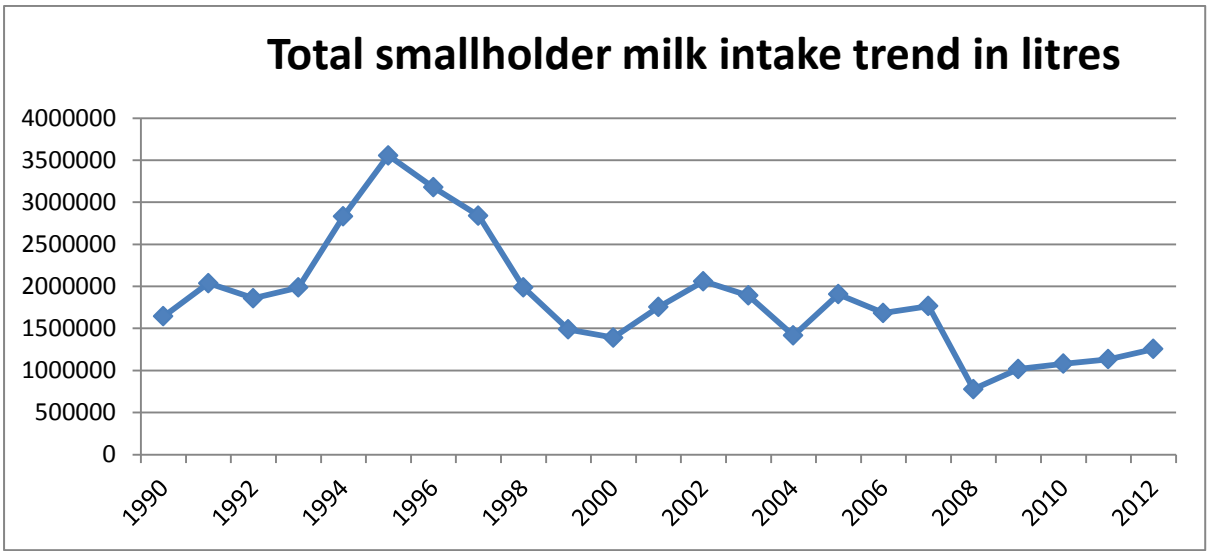


Figure 2: *Smallholder milk intake trends by year.*

Recent reviews of the Zimbabwean smallholder dairy subsector (Dube and Hanyani-Mlambo, 2012) reveal some signs of subsector recovery since 2009. The review also indicates that the subsector remains strained by a reduced producer base, lack of capital, low herd sizes, poor animal breeds, low farm-level productivity, lack of viability and sustainability, and weak institutional support. In a dairy value chain study, Kagoro and Chatiza (2012), established that dairy farmers had little or no access to dairy stock with very few farmers having dairy cows, dairy cattle loans, markets, improved breeding technology and animal health services. The majority of dairy cattle succumbed to diseases while macro-economic challenges eroded any opportunities for farmers to raise capital and rebuilt their dairy herds. Subsequently, there have been no adequate dairy animals to sustain milk production, deliveries to the MCCs, and MCC operations leading to the collapse of a number of smallholder dairy schemes.

1.2 ZDL Project Goal, Objectives and Components

In response to challenges bedeviling the smallholder dairy sector, Land O'Lakes has been implementing the *Rebuilding Livelihoods and Resiliency in Zimbabwe (ZDL) project* since January 2010. The project was being implemented in five provinces namely, Manicaland, Mashonaland East, Masvingo, Midlands and Matabeleland South. This USAID-funded project was designed to rebuild the livelihoods and promote food security of farmers through interventions in the livestock and dairy value chains. As already highlighted, livestock were once an important pillar of Zimbabwean households' food production capacity and livelihood asset base, but herds and productivity have been decimated as households sold off their livestock and other assets for lower prices mostly at farm gate levels in order to secure their staple foods. The livestock and dairy sectors, and the Zimbabweans that depended on them, were left in dire straits. ZDL focused on assisting vulnerable households, particularly women-led households, to increase milk production, rebuilding the cattle and dairy herds through a cattle bank facility/revolving fund, improving rangeland/fodder flow management, preventative animal health services, stimulating market linkages between value chain actors, building profitable livestock and dairy businesses, and promoting the use of donkey draught power in dairy production. The program has been implemented in two phases with more or less the same activities: January 2010-April 2011 (16 months); and May 2011 – November 2013 (30 months).

This programme had thus three components *viz:*

(i) Linking of 1,258 households receiving dairy cattle to high-value milk markets.
(ii) Increasing access to animal health services for 1,258 farmers through training of Community Animal Health Workers, as well as increasing capacity of rangeland/fodder flow management.
(iii) Promoting the use of donkeys for animal traction services and milk collection.

1.3 Project Support for USAID's Operational Plans

The ZDL project was initiated with the objective of supporting USAID - Zimbabwe's Assistance Objective 3 and 4:

Assistance Objective 3: Livelihoods Restored and Maintained/Economy Stabilized and Growing.

- IR 3.2: Basic Economic Activity and Livelihoods, Income Generation, and Employment.
  - Sub-IR 3.2.1: Improved Livelihoods, Income Generation, and Employment.

Assistance Objective 4: Increased Income and Employment Generated by the Agricultural Sector.

- IR 4.1: Increased Agricultural Production.
  - Sub-IR 4.1.1: Contract Farming and Out grower Schemes Strengthened.

It was expected that the significant gains from dairy in terms of income, improved food security and improved asset base that had been demonstrated regionally could be replicated in Zimbabwe.

2. Evaluation Purpose and Objectives

2.1 Evaluation Purpose

The purpose of this end-of-project evaluation was to carry out the final evaluation of the ZDL project in order to document the impacts (intended or unintended) of this project considering project design, project targets, budget and the outcomes. More importantly the final evaluation will provide an opportunity to reflect and to document key lessons and best practices that will inform implementation of other USAID projects, programs, new interventions, and innovation strategies. Finally, lessons learned will be made available to USAID/Zimbabwe, other development partners and local stakeholders who may continue to implement similar support strategies.

2.2 Evaluation Objectives

Specific objectives of this assignment included:-

(i) Carrying out a quantitative survey of a sample of 1,258 participating farmers, and smallholder milk producer associations working with the program to track program progress towards set targets.
(ii) Assessing program progress in addressing environmental, youth and gender concerns.
(iii) Identifying any weaknesses in the implementation approach, project design, activity implementation and what could have been done more effectively or efficiently.
(iv) Documenting cases (using case studies/testimonies) and quantify the extent to which the project made a positive impact at the household and community level.
(v) Documenting the impact using quantitative analysis and capital investment appraisal methods.
(vi) Identifying the most significant constraints and/or difficulties in implementing the project and, where appropriate, how ZDL addressed them.
(vii) Documenting lessons learned that have implications for similar interventions in the future, especially regarding the sustainability of similar projects.

2.3 Scope of Work

The team understood that the development of an appropriate survey design, including using statistical techniques to estimate the optimum sample size and random selection of survey participants, survey tools and methodology for conducting the evaluation was to be carried out with the collaboration with Land O'Lakes staff. The team then took the primary lead in

providing local expertise in the design phase, actual enumeration, and data collection during implementation in the field, data analysis and interpretation, support in drawing conclusions regarding the efficacy of the selected process and the results of the assessment, and drafting a final evaluation narrative report. A detailed SOW is provided as Appendix 1.

3. Evaluation Design and Methods

The end-of-project evaluation assignment was implemented through three main phases *viz*: (i) inception phase; (ii) field data collection phase; and (iii) data analysis and report writing phase. For a detailed discussion of the evaluation design and methods see Appendix 2.

3.1 Inception Phase

The inception phase was characterized by several induction meetings between the evaluation team and Land O' Lakes staff members. These included discussions with key Land O'Lakes staff to discuss the study and evaluation protocol, and the proposed methodology for undertaking the evaluation. Other discussions centered on full briefings with priority given to what the Land O'Lakes team felt to be the principal accomplishments made over the life of the project, as well as lessons they have learnt. The project staff outlined areas of program accomplishments, challenges, and where efforts may not have reached expectations (and why). In addition the team collated and compiled all the relevant project documents, reports and secondary information relating to the project during this phase. Following literature reviews and initial consultation meetings the team submitted an *Inception Report* to Land O'Lakes staff.

3.2 Field Data Collection Phase

A number of diverse but complementary analytical approaches were adopted for this final evaluation. The Household Economy Approach (HEA), the Sustainable Livelihoods Approach (SLA) and Value Chain Analysis (VCA) were used as the guiding analytical frameworks. In addition to improving the analytical rigor, these diverse but complementary analytical approaches were selected to allow for both quantitative and qualitative analysis, and to facilitate both technical and socio-economic analysis.

Below is an evaluation matrix which provides details of the specific methods that were used in addressing specific evaluation issues. See Table 1.

Table 1: *ZDL Project Final Evaluation Matrix.*

Scope of Work as informed by the TORs	Follow-up Evaluation Issues/Questions	Data Collection Methods and Sources of Information
a) Micro enterprise level program data **Farm level**	-**Farm budgets:** Yield, cost of production and gross margins from the dairy enterprise -Access and use of Business Development Services?: Level of adoption of productivity enhancing technologies, including: Adoption of Artificial Insemination; stainless steel cans and bucket, fodder establishment, feed conservation, among others -**Dairy husbandry practices**, including: Calving interval, culling interval, milking period, heifer breeding maturity, animal housing, feeding, milk handling practices, routine health practices – drenching, and de worming among others -**Access to financial services** as defined by farmers accessing loans by financial service providers Estimate number of short term jobs created at farm level in Full Time Equivalent (FTE)? -**Milk production at farm level**	Review of project proposal, baseline reports, and mid-term evaluation report. Data was collected for this scope of work from KII, Household survey, FGD
Micro enterprise level program data **Milk Collection Center level**	-Volume and value of milk purchased from smallholder dairy farmers (2010 to current) -Volume and value of other inputs and services besides milk cooling and processing offered by the MCC. This will include a breakdown by input e.g. feeds; semen, drugs etc. (2010 to current) from MCCs that offer these inputs as an embedded service -Financial performance of the MCCs based on ABS records	Review of project proposal/documents, baseline reports, mid-term evaluation report. Data was collected from KII and FGD with MCC
Micro enterprise level program data **Milk value chain**	-Volume and value (from 2010 to current) from selected milk processors working with the program - the key variable being the volume and value of milk sold by the small holder farmers to the processing plants.	Review of project proposal, baseline reports, mid-term evaluation report. Data was collected for this scope of work from KII, FGD with dairy value chain
Other stakeholders	-Views and perceptions about the program	KII using a semi-structure questionnaire with those who worked with the program.
b) Environmental concerns **Farm level**	-Have there been environmental threats on use of acaricides, AI, overgrazing, control of milk-borne diseases, and fuel wood among program beneficiaries?. -What are the program mitigation measures on farm-level?	Review of project proposal/documents, baseline reports, mid-term evaluation report. Household survey, and FGD with farmers (all four different groups as in TORs) KII with stakeholders
MCC level	Compliance with set environmental standards as evidenced by compliance certificates from Dairy services for all MCCs.	FGD with MCC and KII with related stakeholders -Dairy Services and others
Gender Concerns Gauge the effectiveness of USG efforts to promote gender equality	- Have the attitudes changed about whether men and women should have equal opportunities in social, political, and economic spheres? - Have the level of participation, including benefits accruing to women changed during the project period?	Review of project proposal/documents, baseline reports, mid-term evaluation reports. Data was collected from KII, Household survey, FGD

Throughout all analysis gender lenses was applied to see how the programme is mainstreaming and responding to gender issues, such as for example the participation of women in key decision making structures, whether the impacts of interventions as intended or are negatively affecting women or men and causing social disharmony.

3.3 Sampling

The Zimbabwe Dairy and Livestock (ZDL) Project had intervention activities working with 18 Milk Production Associations (MPAs) in 21 Milk Collection Centres (MCCs) in 17 wards spread across five different provinces. Sampling for the final evaluation was guided by sampling criteria that included geographical coverage, agro-ecological regions, the location of specific interventions and project components, and the performance of the different MPAs/MCCs. On this basis, the evaluation team selected 14 of the 21 MCCs (67%). The selected 14 MCCs were Murewa, Chikwaka, Marirangwe and Wedza (in Mashonaland East Province), Sangano, Dowa, Tsonzo, Hauna, Mayfield and Mafumise (Manicaland Province), Hama Ruomba (Masvingo Province), Gokwe (Midland Province), and Umzingwane and Claremont (Matabeleland South Province).

The primary target for the household questionnaire survey, FGDs and case studies were direct project beneficiaries. There was, however, a need to include a control group of non-beneficiary households for this ZDL Project final evaluation. To maintain consistency with sampling procedures during the baseline and MTR periods, a linear systematic sampling procedure was adopted for sampling for the household questionnaire survey. As such, 240 beneficiary households (representing 19.1% of the participating 1,258 households) and 55 non-beneficiaries were sampled for the final evaluation. The total sample size was, therefore, 295 households. Of the 240 beneficiary households, 81.7% were male-headed while 18.3% were female-headed. The mean age of the head of the male-headed households is 57.8 years and 60,1 years for female-headed households. The proportion of chronically ill members is 2.5% in male-headed households and 4.7% in female-headed households.

3.4 Data Analysis

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, analyzed and presented in user-friendly tables and illustrational charts/graphs. Data and data analysis was also disaggregated by gender and youth. Qualitative information was analyzed by establishing emerging common patterns and trends on the basis of discourse analysis. On the other hand, economics performance analysis hinged on Gross Margin Analysis (GMA) and Cost Benefit Analysis (CBA).

3.5 Study/Evaluation Limitations

Identified study/evaluation limitations included, *inter alia*:-

(i) Data collection during the final evaluation relied on recall, with the challenge that in some cases respondents could not be able to recall past events and details.
(ii) The period of data collection at baseline, mid-term review and the final evaluation were different which also influenced assessment results e.g. influence of period, especially for studies conducted closer to the harvest season.
(iii) In some instances and for some analysis there were unobservable differences between comparator groups, thus making comparative analysis difficult.
(iv) While a lot of effort was invested in ensuring a complete and quality data set, e.g. through training and in-field supervision, the resultant data set had missing information for some cases for selected variables.

4. Findings, Conclusions and Recommendations

4.1 Relevance

Relevance of the ZDL Project

Results of the household questionnaire survey showed that dairying remains the main source of household livelihood and incomes in the project areas, with dairying contributing 36.9% to total household income. The contribution of smallholder dairying to total household income is 35.1% in male-headed households and a more significant 55.7% in female-headed households. This entails that smallholder dairying plays an even more significant role in uplifting the livelihoods of rural female-headed households. In comparison, the contribution of smallholder dairying to total household income within the control group (non-beneficiaries) is only 11.3%. Analysis of household data from the group of ZDL project beneficiaries show the contribution of other sources of income as livestock sales (15.4%), formal employment and casual labour (12.3%), field crops (11.8%), gardening and citrus (10.1%), remittances (9.1%) and other sources (4.4%).

Targeting and Project Design

Targeting for the ZDL project tended to be component specific. Beneficiary MPAs and MCCs were selected on the basis of need and the scale of the challenges faced. Beneficiary selection for the dairy producers for dairy training and capacity building, preventive animal health training, rangeland and fodder flow management, as well as the donkey traction and transport was open for all farmers within the targeted MPAs/MCCs. On the other hand, selection of beneficiaries for in-calf heifers was based on whether or not the interested farmers had the required, appropriate and adequate infrastructure, fodder banks, stock feed resources, and a minimum deposit for the in-calf heifers.

The greatest strength of the ZDL project lay in its design. The project distinguished itself through the promotion of a pro-business approach; facilitation of commercial dairy production at smallholder farmer household level; the capacity building of local MPAs, MCCs and the ZADF; use of an integrated approach, and ensuring improved margins and returns at all nodes of the value chain. The project's integrated approach (encompassing the facilitated access to new dairy stock by smallholder dairy farmers, improvements in dairy cattle breeds, enhanced milk yields through improved fodder flow planning and management, better access to preventive disease veterinary services, and linkages with dairy processors) also ensured the achievement of set targets, greater impact, and better sustainability of benefits for project participants.

4.2 Effectiveness

Overall Project Effectiveness

The ZDL project has been a major success, and in the process managed to set a foundation for smallholder dairying in Zimbabwe. The project achieved an overall physical progress rate of 97.2% against set targets, with the majority of the project's indicators surpassing expectations and the set targets. Data from the household survey, key informant interviews and focus group discussions reveal a very positive assessment *vis à vis* project achievements as measured against the set targets and outputs.

Component 1: Dairy Production, Collection and Processing

Component 1 of the ZDL project focused on dairy production, milk collection and processing. Specific ZDL project component 1 interventions included:-

(i) Provision of in-calf heifers through a cattle loan facility designed as a revolving fund and later through linkages to a micro-finance institution (Micro King).
(ii) Training in farm business management including instruction on dairying as a business, business planning, farm budgeting, record keeping, financial management, economic analysis, etc.
(iii) Training in livestock management practices encompassing capacity building on dairy infrastructure development e.g. milk parlours, general dairy animal husbandry, dairy animal breeding, use of artificial insemination, heat detection, calf rearing, and calf management.
(iv) Training in MCC management practices e.g. training of MCC administrators and processors on MCC administration and management, milk hygiene and milk quality, record keeping, accountability at MCC level, transparency and governance, and the use of cost-of-production model in determining farmer payouts.
(v) Provision of grants and loans for MCC renovations.
(vi) Facilitation of exchange of information and experiences through exchange visits and dairy field days.

The ZDL project intervention, through its cattle loan facility and the provision of in-calf heifers, significantly increased the number of farmers with dairy/lactating cows thereby reviving dairying for a number of households who were out of business for a long time. Before the intervention by the ZDL project, only a few farmers were milking and delivering milk to the Milk Collection Centre (MCC) e.g. of the households surveyed in dairy sites during the baseline period, only 31% have been delivering milk to the MCC during the preceding 12 months, with the average quantity of milk delivered to the MCC being 50 litres per household per month.

The final evaluation shows that the majority of the ZDL project's indicators surpassed expectations and the set targets. Notable achievements under Component 1 (dairy production, collection and processing) include the total volume of milk produced per household each month which increased by 1,124% from 50 litres at the baseline to 562 litres in 2013. This was also a 187% achievement given a project target of 300 litres. Comparatively, the total volume of milk produced per household each month for male-headed households is 441 litres and 336 litres for female-headed households. The value of milk collected by MCCs each month achieved a progress rate of 152%, while the number of jobs attributed to the implementation of Feed the Future (FTF) initiative achieved a progress rate of 167% against set targets. Assessments to ascertain the increase in annual household incomes from milk sales showed an increase of 743% from US$312 at the baseline to US$2,943 in 2013. This also represents an achievement rate of 85.2% against the end-of-project target of US$3,455. Detailed, comparative and gender aggregated dairy/household income data is discussed under the impact section. See Table 2 for physical progress achievement rates for Component 1.

Table 2: *Component 1 Progress Report*

Indicator	Baseline	End of Project Evaluation		
		Project Target	Achieved	Achievement Rate %
Total volume of milk produced per household each month	50	300	562	187.00
Number of households producing milk for collection by MCCs	390	1200	681	56.75
Value of milk collected by MCCs each month	-	396750	603444	152.10
Number of MMCs collecting milk from producers	6	20	19	95.00
Number of jobs attributed to FTF implementation	0	557	932	167.32
Value of incremental sales attributed to Feed The Future (FTF) implementation	0	1473429	1527117	103.64
Number of producer organizations that applied new technologies or management practices	0	20	21	105.00
Number of firms (excluding farms) or Civil Society organizations (CSOs) engaged in agricultural and food security related manufacturing services	0	15	15	100.00
Increase in income of vulnerable households ($)%	312	3455	2943	85.18
Number of rural households reporting increased incomes from program intervention	0	1200	887	73.92
Gross margin per dairy cow in lactation	324	1151.7	1199.00	104.11
Number of food security private enterprises (for profit), producer organizations, water users associations, women's groups, trade and business associations, and community based organizations (CBOs) receiving USG assistance	0	20	21	105.00
Number of rural households benefitting directly from USG interventions	0	1200	1258	104.83
Value of agriculture and rural loans	0	675000	374824	55.53
Number of MSMEs receiving business development services from USG assisted sources	0	1220	1279	104.84
Numbers of individuals who have received USG supported short term agricultural sector productivity or food security training	0	1240	1298	104.68
Proportion of target population reporting increased agreement with the concept that males and females should have equal access to social, economic resources	-	65.00	66.1	101.69
Proportion of female participants in USG assisted programs designed to increase access to productive economic resources	0	30	41	136.67

Despite the existence of seasonal variations, the volume of milk delivered to the MCCs has consistently increased since the advent of the ZDL project, with the 2013 milk production season recording the highest volumes amid signs of recovery in the smallholder dairy sub-sector. See Figure 3. Pictures 1 and 2 shows evidence of improvements at both the farm and the MCC levels.

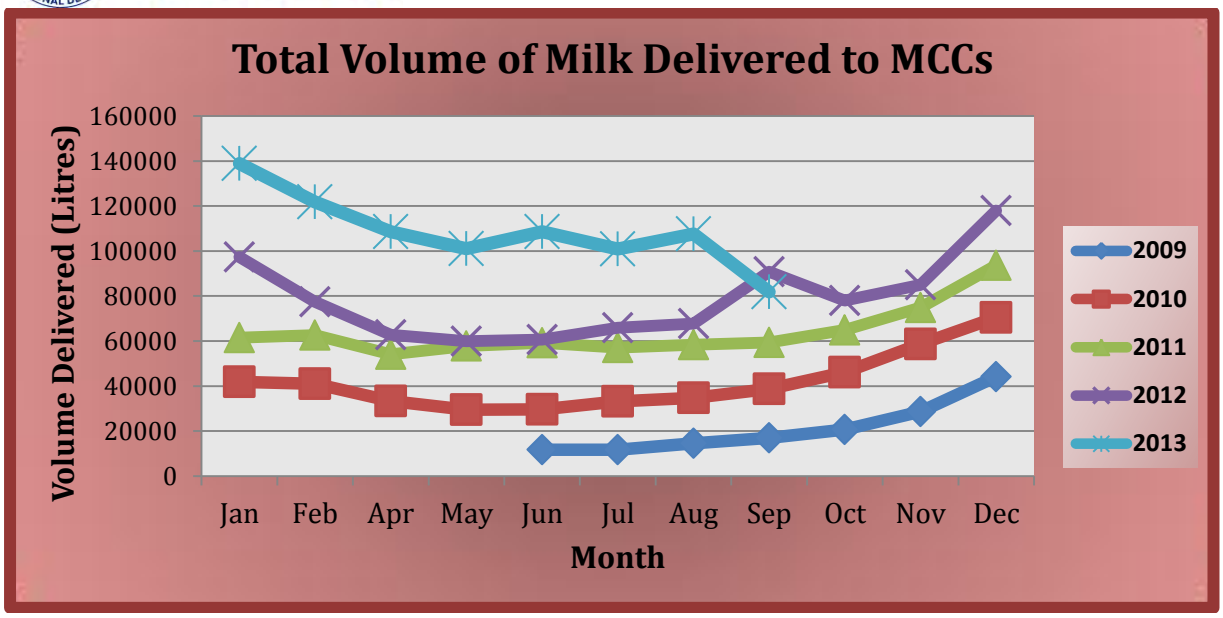


***Figure 3**: Total volume of milk delivered to MCCs from June 2009 – September 2013.*

***Picture 1:**Friesian cows awaiting milking.*

***Picture 2:**Processed milk ready for marketing.*

Component 2: Preventive Animal Health and Rangeland/Fodder Flow Management

Component 2 of the ZDL project focused on preventive animal health and rangeland/fodder flow management. Specific ZDL project component 2 interventions included:-

(i) Training of para-vets (Community Animal Health Workers) on disease identification and treatment.
(ii) Establishment of drug revolving funds and stocking of veterinary drugs.
(iii) Promoting farmer consultation of LPD, DVS and other service providers.
(iv) Establishment of demonstration plots for forage and fodder production.
(v) Training in forage establishment, fodder production (silage and hay), fodder conservation, fodder utilization, and animal nutrition.
(vi) Establishment of stock feed revolving funds.

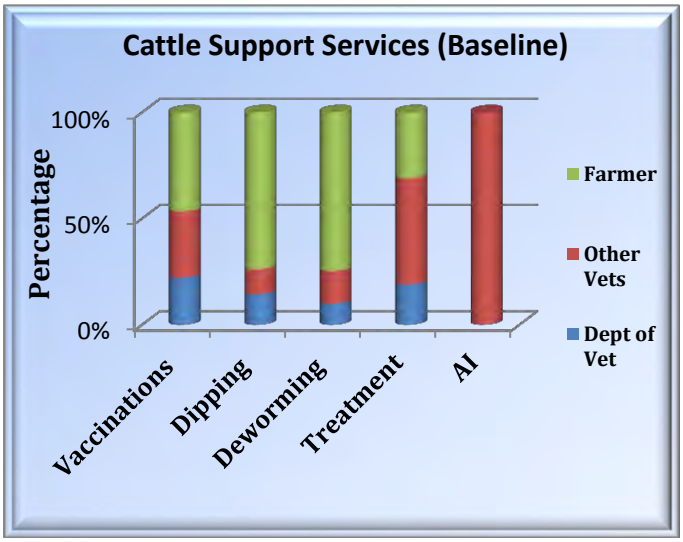
Notable achievements under Component 2 (preventive animal health and rangeland/fodder flow management) have been the number of community based volunteers receiving short-term agricultural sector productivity training as Community Livestock Auxiliaries (100%), the number of farmers and others who have applied new technologies or management practices

(103.8%) as dairy farmers outside the scope of the project also adopted new technologies or management practices, and the number of hectares under improved technologies or management practices (97.8%). See Table 3.

Table 3 :*Component 2 Progress Report*

	Basline	End of Project Evaluation		
Indicator		**Project Target**	**Achieved**	**Achievement Rate %**
Number of community based volunteers receiving short-term agricultural sector productivity training as Community Livestock Auxiliaries	0	60	60	100.00
Number of farmers and others who have applied new technologies or management practices	0	1200	1245	103.75
Number of hectares under improved technologies or management practices	0	1700	1663.00	97.82

The ZDL project's training and capacity building initiatives in preventive animal health has meant that more and more smallholder dairy farmers are now self-sufficient in identifying diseases and treating their own dairy animals. Trained Community Animal Health Workers have also provided assistance to smallholder dairy producers in other cases. This has translated into an improvement in farmers' access to preventive animal health services (both in terms of availability and affordability), the need for timely interventions, and the timely seeking of assistance. See Figures 4 and 5.



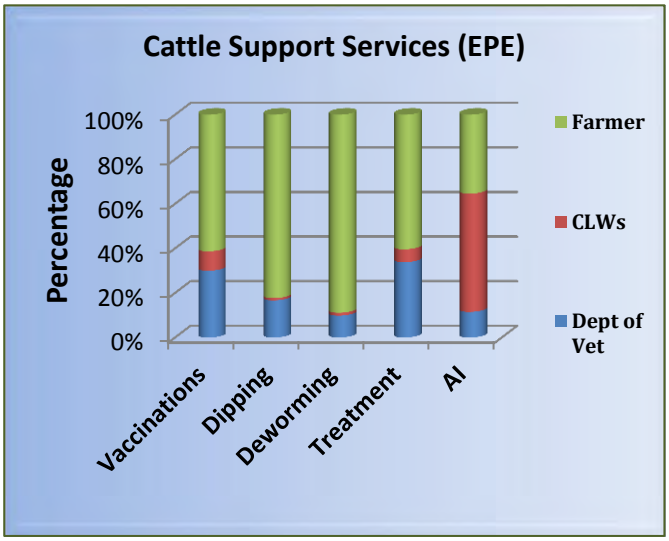


Figure 4 and 5: *Animal health and animal husbandry support at baseline and end-of-project.*

The ZDL project's integrated approach also ensured that revival and the resuscitation of smallholder dairying is supported not just through the provision of in-calf heifers designed to rebuilt the dairy herd but also by ensuring improved feed management. In this regard, the project supported the establishment of a stock feed revolving fund to facilitate smallholder farmers' access to dairy concentrates, and the promotion of fodder establishment, conservation and utilization. See pictures 3 and 4.


Picture 3 and 4: *Bana grass and good quality silage in Hauna*


Picture 5 and 6: *Hay bales for winter feeding in Umzingwane and Stock feed in Marirangwe.*

The result has been a significant increase in the area under improved pastures and fodder crops. The most significant increases were recorded in Hama Ruwomba in Masvingo Province where the average land under fodder production is now 1.33ha and in Rusitu Mayfield where the average land under fodder production is now 1.21ha. See Figure 6.

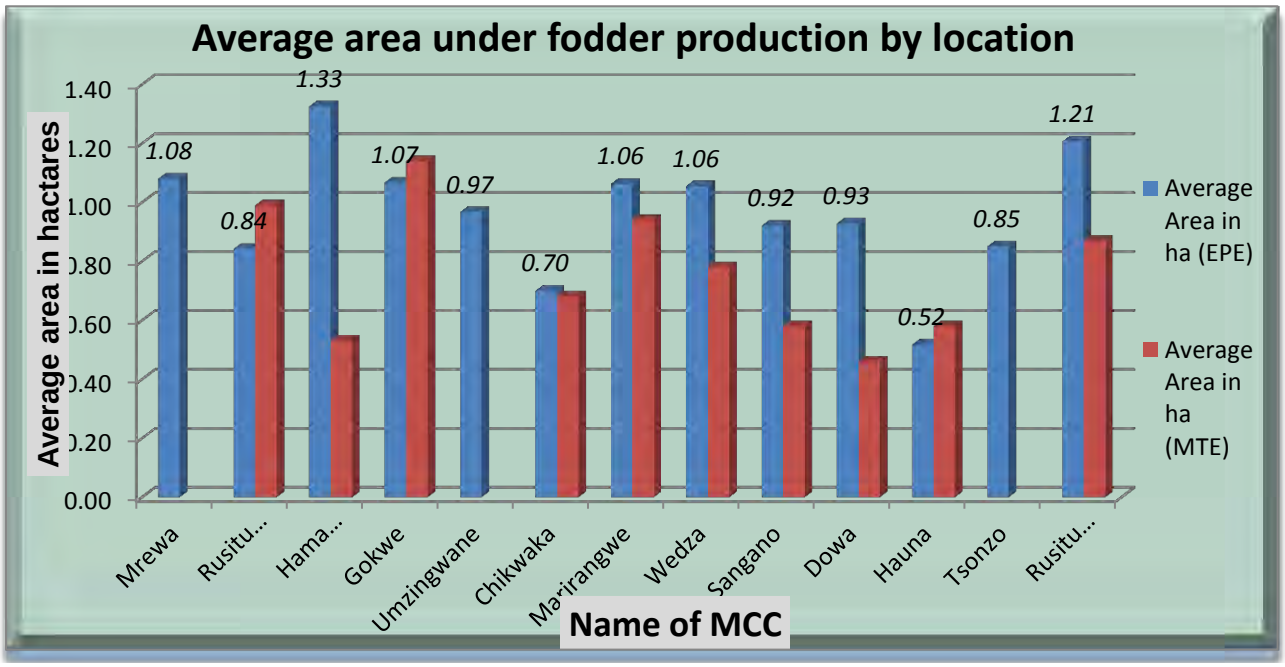


Figure 6: *Average area under fodder production*

The analysis of methods of grazing and the type of feed for dairy analysis also indicate an increase in the adoption of fodder utilization and feed management practices i.e. greater utilization of fodder and cultivated pastures. See Figures 7 – 10.

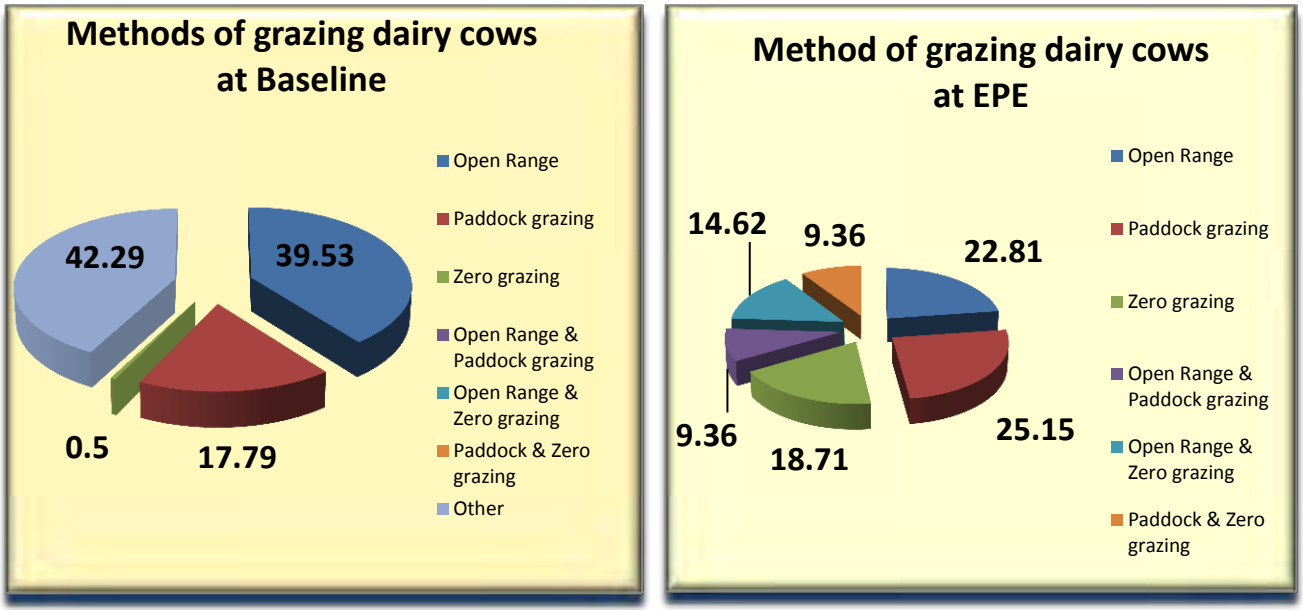


***Figure 7 and 8** : Method of grazing dairy cows*

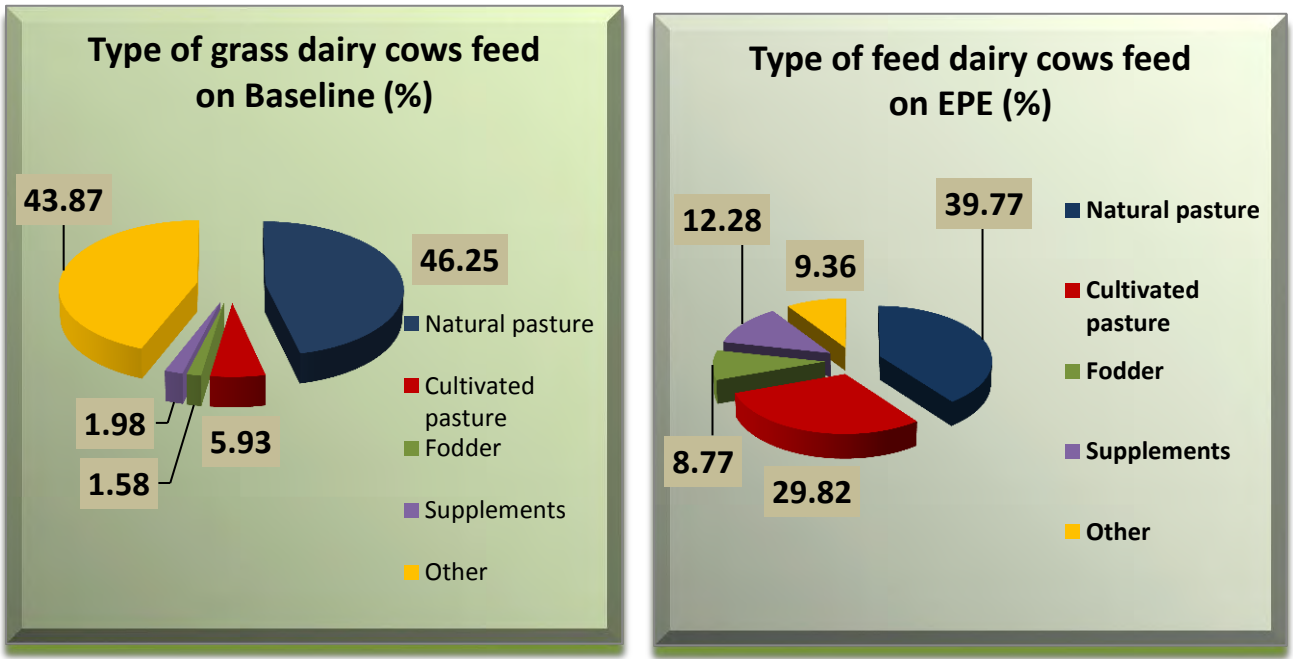


***Figure 9 and 10**: Type of feeds for dairy cattle.*

Component 3: Donkey Traction and Transport Pilot Programme

Component 3 of the ZDL project focused on a pilot programme that promoted donkey traction and transportation. Specific ZDL project component 3 interventions included:-

(i) Facilitated acquisition of donkeys by selected dairy producers.
(ii) Farmer training on donkey management encompassing feeding the donkeys and caring for the acquired donkeys.
(iii) Farmer training on donkey traction.
(iv) Farmer training on donkey harnessing and transportation system.
(v) Farmer training on the design and development of harnessing equipment.
(vi) Training of donkeys in traction, harnessing and commodity (milk) transportation.
(vii) Promotion of the use of the donkey transportation system.

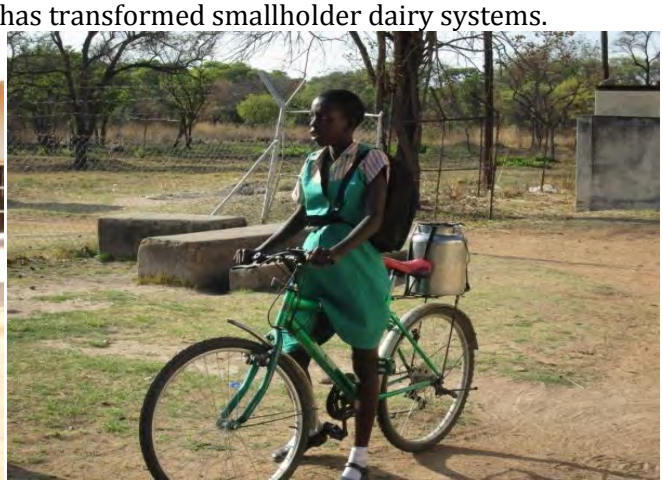
Insights from key informant interviews and focus group discussions revealed how the training and subsequent promotion of donkey traction and milk transportation transformed the smallholder dairy system. However, the achievement rates under Component 3 (donkey traction and transportation pilot programme) have been subdued due to lower uptake. This was largely due to incompatibility with local perceptions, with farmers perceiving donkeys as a poor man's animal and the innovation as retrogressive. Achievement rates with respect to set targets were 41.4% for the gross margin per donkey in traction business, and 77.5% for the number of households contracted with trained service providers for land clearing, ploughing and/or transportation. See Table 4.

Table 4 :*Component 3 Progress Report*

	Baseline	End of Project Evaluation		
Indicator		**Project Target**	**Achieved**	**Achievement Rate %**
Gross margin per donkey in traction business	-	833	345.00	41.42
The number of households contracted with trained service providers for land clearing, ploughing and/or transportation	0	200	155	77.50

Pictures 5 to 8 show how the donkey transportation system, through the use of individual donkeys or specifically designed donkey carts, has transformed smallholder dairy systems.

Picture 5:*Traditional milk deliveries on foot.*

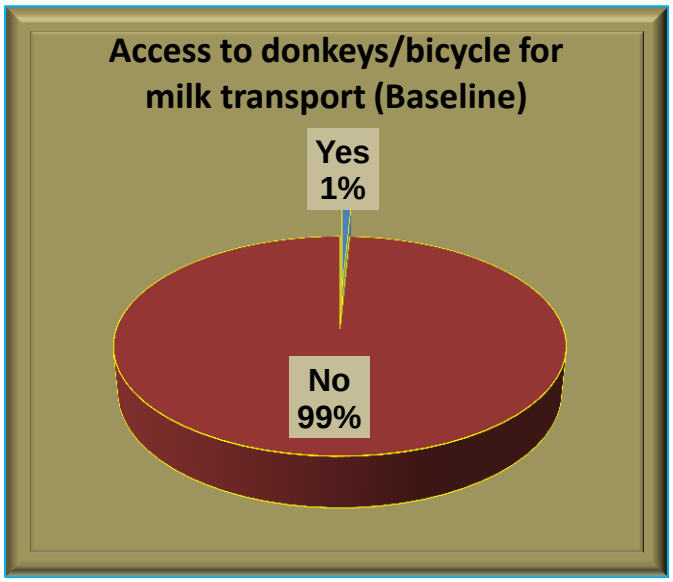


Picture 6:*Traditional milk deliveries by bicycle.*

Picture 7:*Group individual donkey transportation.*

Picture 8:*Group donkey cart transportation.*

In some areas the ZDL project distributed bicycles for both Community Animal Health Workers and to facilitate the transportation of milk to local MCCs. This subsequently improved smallholder dairy farmers' access to a diverse range of milk transportation models. See Figures 11 and 12.



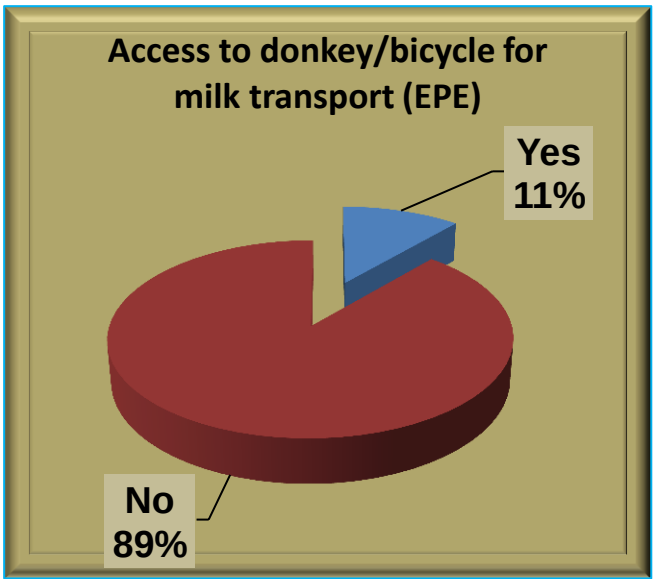


Figure 11 and 12*: Access to donkey/bicycle for milk transport.*

Project Progress in Addressing Environmental, Youth and Gender Concerns

The project addressed environmental concerns by ensuring the monitoring, proper use and safe disposal of syringes and drug containers, prevention of veld fires and the safeguarding of local grazing resources. Through the project's youth in dairy initiative there was promotion of youth incorporation in smallholder dairying, with the youth comprising the highest number of people who received and who stand to benefit from the Community Animal Health Workers training programme. The project also consciously promoted gender equity and the empowerment for both men and women in access to resources and opportunities.

4.3 Impact

Impact on Household Food Security

Comparative analysis of household data between the baseline period and the end-of-project evaluation periods show strong evidence of the impact of the ZDL project based on results of analysis of months of household inadequate food provisioning. While data from the baseline show strong seasonal variations with between 20 – 25% of the households reporting cases of inadequate food provisioning between October to February, the same period show a proportion of between 4 – 5% of the household reporting cases of inadequate household food provisioning during the final evaluation period. See Figure 13.

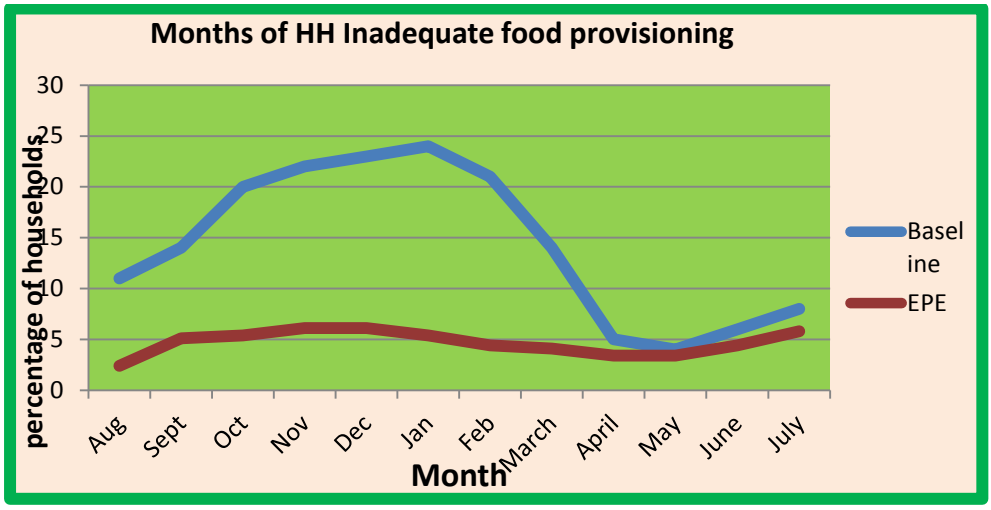
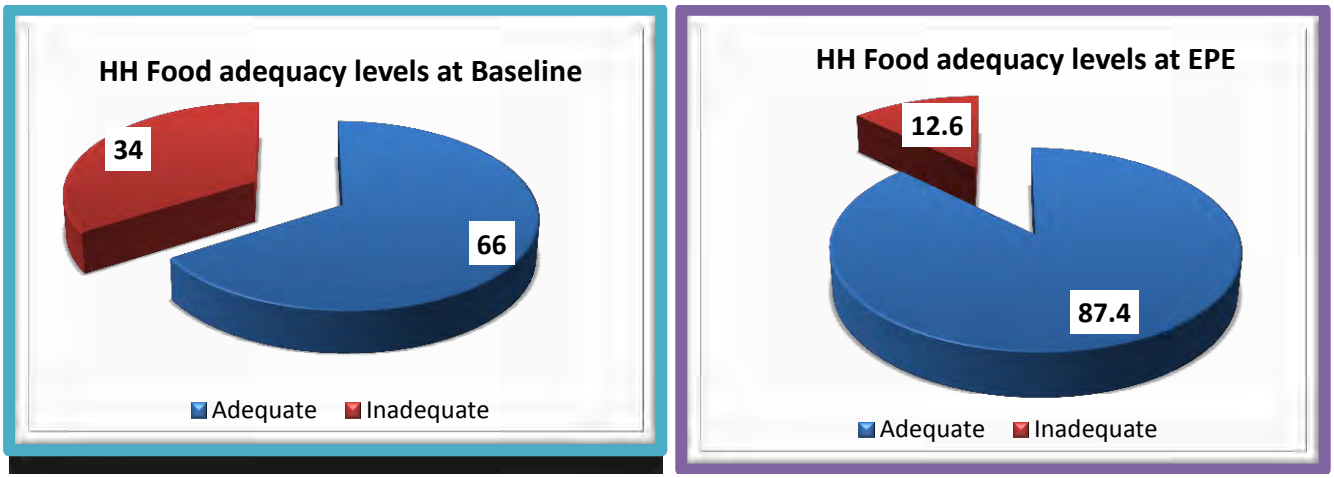


Figure 13 : *Months of Household inadequate food provisioning*

The project recorded an increase of 21.4% in household food adequacy levels, with 87.4% of the informants interviewed during the end-of-project evaluation period having adequate household food provision, compared to levels of 66.0% at the baseline period. See Figures 14 and 15. Gender disaggregated analysis showed that more male-headed households (88.1%) had adequate household food provisioning compared to female-headed households (83.9%). In a reversal of fortunes, gender disaggregated analysis at the baseline stage showed that less male-headed households (75.7%) had adequate household food provisioning compared to female-headed households (77.8%).



Figures 14 and 15: *Household food adequacy levels*

Household Dietary Diversity Score (HDDS)

The end-of-project evaluation also assessed the Household Dietary Diversity Score (HDDS) which is calculated by summing the number of food groups consumed in the household over the 24 hour recall period. The HDDS is the sum of the following 12 food groups (cereals, white roots and tubers, vegetables, fruits, meat, eggs, fish and other sea foods, pulses, milk and milk products, oils, sweets and spices). The HDDS is meant to provide an indication of household economic access to food, thus items that require household resources to obtain, such as condiments, sugar and sugary foods, and beverages are included in the score. The dietary diversity scores facilitate the assessment of changes in diet before and after an intervention (improvement expected). The mean HDDS was 8.2 compared to averages of 7.2 during the baseline period and 7.6 during the mid-term evaluation period, which indicates changes in diets and an improved household economic access to food. The corresponding HDDS averages for the different MPAs range from 6.3 (Umzingwane) to 10.4 (Hauna). See Figure 16.

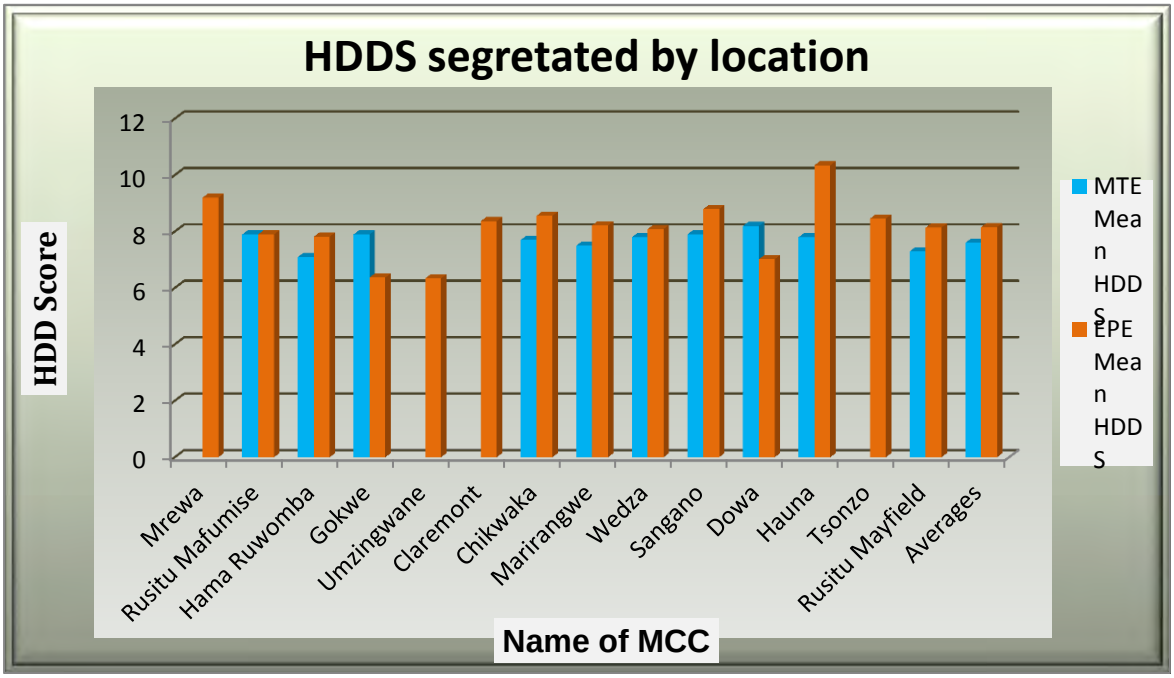


Figure 16: *Mean HDDS segregated by location*

In comparison, the average HDDS for male-headed households is 8.2, while the mean HDDS for female-headed households is 7.9. This compares with an average HDDS of 7.3 for male-headed households and 6.8 for female-headed households at the baseline stage. In both cases, differences are largely due to a differential access to socio-economic resources by male- and female headed households.

Impact on Employment Creation

The number of jobs achieved and attributable to the Feed the Future (FTF) initiative stands at 932, with 783 for males against a target of 369, thereby entailing an achievement rate of 212%, and 149 for females against a target of 188 (79.3%). In tandem with previous statistical results, a higher proportion of male-headed households employed at least one employee (58%) compared to female-headed households (51%). This is based on differential access to resources as discussed above.

Impact on Household Incomes

Average annual household dairy incomes increased by 743%, increasing from US$312 at the baseline to US$2,943 in 2013. Comparative analysis across different farmer categories shows average annual dairy incomes of US$206 for the control group (non-beneficiaries). The 743% increase in annual dairy incomes is testimony of the impact of the ZDL project. The differences in income levels across the gender divide can be explained by male-headed households' greater access to productive resources that include capital, land, labour, information and technical backstopping services.

Likewise, comparative analysis across different farmer categories also shows average annual household incomes of US$3,021 for the participating households, US$3,374 for participating male-headed households, US$1,420 for participating female-headed households, and US$1,826 for the control group (non-beneficiaries). In comparison, data from the 2011 ZimVAC report show average annual rural household incomes of US$1,560.

Impact on Household Welfare

The proportion of more than 80% rural households having either iron or asbestos roofed houses is also evidence of the impact on household welfare as a result of the integration of smallholder farmers into the mainstream economy given averages from comparative data in ZimVAC reports. See Figure 17.

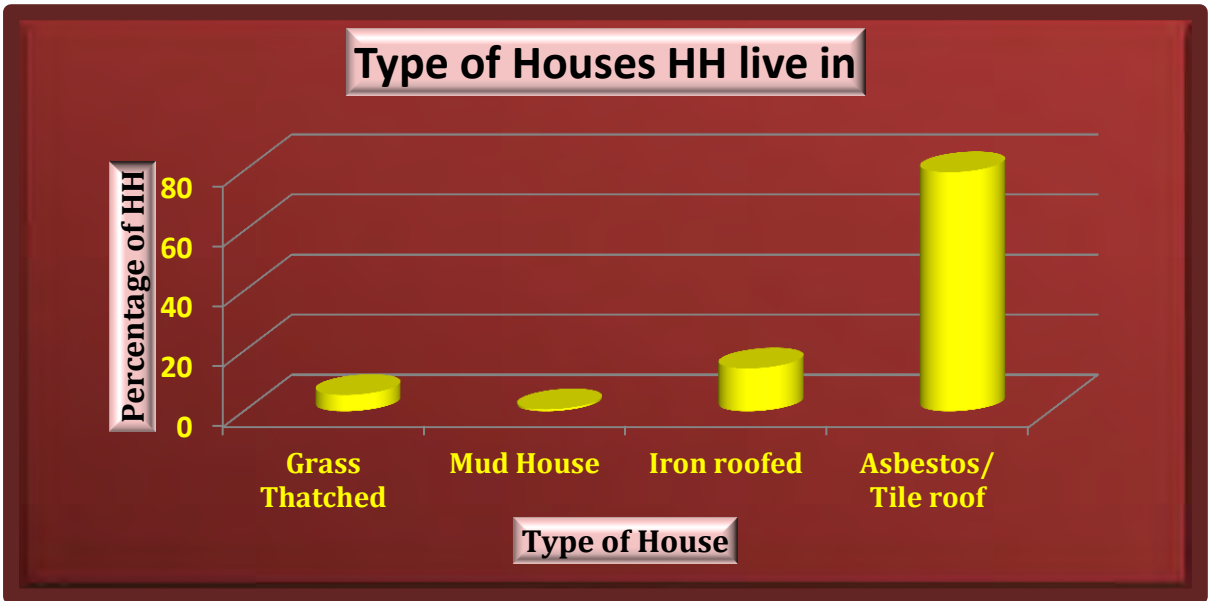


Figure 17: *Types of houses households live in.*

4.4 Economic Analysis

Dairy Gross Margin

Sampling for the Gross Margin Analysis

Farmer selection for Gross Margin Analysis (GMA) adopted a case study approach to allow for in-depth analysis. Thus, while the household survey targeted 240 beneficiaries, GMA was then based on case studies of a diversified but representative group of 30 smallholder dairy farmers from the selected 14 MCCs, entailing a target sample of at least 2 smallholder dairy farmers from each MCC. However, sampling of GMA case studies were also guided by the need to select and compare the economic performance of smallholder dairy producers across different farmer

categories and within the same categories e.g. farmers in the same agro-ecological regions, having benefitted from similar interventions, having the same dairy herd sizes, using the same breeds and management practices. GMA results presented in Table 5 are, however, based on an average case scenario, while results presented in Figure 19 and Table 6 are based on scenario analysis.

Average Scenario GMA

GMA was based on reviews of actual financial revenues and variable costs, while shadow pricing was used to determine the opportunity cost of variable such as family labour. The average scenario dairy GMA established an average gross margin of US$1,199 per cow for a dairy herd with three lactating cows. Viability assessments, based on returns per invested dollar showed a GM/TVC index of 0.63 which means that for every dollar invested by smallholder dairy farmers they are are getting a return of US$0.63. The training and capacity building component within the ZDL project also resulted in a transformation of business management practices e.g. training in "Dairying as a Business" (DaaB) resulted in the abandonment of the false economy where dairy producers limit dairy cow feeding in the hope of cutting on feed costs and increasing margins. However, further GMA analysis based on the equi-marginal principle in economics which is hinged on the realization that optimal profits can only be attained when a dollar invested returns an additional dollar, shows that smallholder dairying although viable is yet to achieve a point of optimal returns.

Table 5: *Dairy gross margin analysis based on a 3-cow unit.*

Details	Unit	Quantity	Price per unit	Cost
Dairy Income		3 Cows		
Value of milk sold to MCC	litres	15661.8	0.45	7047.80
Value of milk sold locally	litres	2264	1.00	2264.00
Dividends received				0.00
Total Gross Income				9311.80
				19925.8
Variable Costs				
Purchased feeds stock feeds	kg	8750	0.36	3150.00
Home grown feeds Hay	bale	28	2	56.50
Home grown feeds Silage	kg	966	0.05	48.30
Veterinary costs				240.00
Hired labour				600.00
Family labour				900.00
Transport costs				720.00
Total Variable Costs				5714.80
Gross Margins				
Gross Margin				3597.00
GM per Cow				1199.00
GM/TVC				0.63
GM per feed costs				1.11
GM per Litre				0.20

Scenario GMA

All scenario GMA were hinged on dairy herds with cross-bred animals and herd sizes based on the number of lactating cows. Scenario GMA was then based on analysis of gross margin case studies in three different scenarios *viz:-*

(i) Category A (Zero grazing, Benefitted from in-calf heifer from LOL, 1st lactation).
(ii) Category B (Zero grazing, Benefitted from in-calf heifer from LOL, 3rd lactation).
(iii) Category C (Paddock or Free/Open range grazing, Using own dairy cross-bred animals but benefitted from training from LOL, 3rd lactation).

Cross-category comparative GMA shows that Category C farmers (relying on semi-zero grazing through use of the paddock system, with their own animals but benefitting from the ZDL project training and capacity building initiatives, and with cows on their 3rd lactation) tended to be better performing economically, with better GMA results. The need for a minimum threshold of two or three lactating cows to ensure viability of smallholder dairying remains the same. See Figure 18.

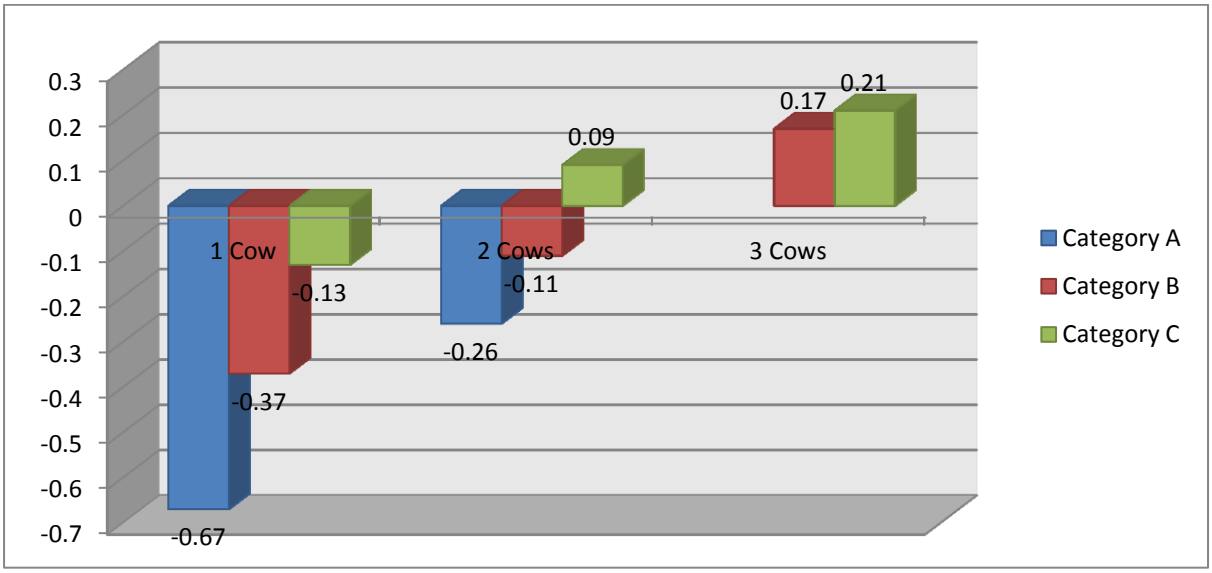


Figure 18: *Cross Category GMA comparative results.*

The results from comparative scenario GMA ran by Land O' Lakes supports the results above in which semi-zero grazing or use of the paddock system generates the highest returns per dollar invested, with GM/TVC figures ranging from 2.14 – 3.53. See Table 6.

Table 6: *LOL scenario GMA*

MCC	**Scenario 1** *Maize Cash Crop; Buying All Feed*	**Scenario 2** *High Value Cash Crop; Buy All Feed*	**Scenario 3** *Combination of Maize and Fodder for Feed*	**Scenario 4** *Grazing; Buy Feed as and when Necessary*	**Scenario 5** *Zero Grazing of all Dairy Cows; Buy all Feed*
Hauna	0.99	1.38	1.77	2.60	1.09
Rusitu	1.18	1.35	1.80	3.53	1.01
Marirangwe	0.74	0.27	0.83	3.45	0.88
Gokwe	0.84	-	1.57	2.14	0.45

Donkey Traction and Transport Economic Analysis

Donkey Gross Margin

As elaborated in the two case studies below, donkey transportation is now an alternative income generation activity for smallholder dairy farmers. A GMA of the donkey milk transportation enterprise based on a case study of 4 donkeys each with a capacity to transport 40 litres to the MCC twice per day. However, the donkey GMA was based on actual schedule, cost and returns on the ground. Due to their low maintenance costs, the donkey milk transportation enterprise has a gross margin of US$345 and a GM/TVC of 3.34 entailing a return of US$3.34 for each dollar invested. See Table 7.

Table 7: *Donkey gross margin analysis.*

Details	Unit	Quantity	Price per unit	Cost
Donkey Income		4 Donkeys		
Income from milk transportation	$	35866	0.05	1793.30
Total Gross Income	$			1793.30
Variable Costs				
Purchased feeds				0.00
Maize grain supplements	kg	195	0.12	23.40
Veterinary costs				30.00
Hired labour				0.00
Family labour	months	12 * 0.5	60	360.00
Total Variable Costs				413.40
GROSS MARGINS				
Gross Margin				**1379.90**
GM per Donkey				**345.00**
GM/TVC				**3.34**
GM per Feed costs				**58.97**

Cost Savings from Group Milk Transportation

The group transportation of milk using donkeys has transformed the milk delivery and transportation system within the smallholder dairy subsector. Below are two case studies.

Case Study 1: Rusitu United

The Before Situation:

Before the Land O' Lakes ZDL project intervention, milk marketing, just as in milk production, was a very individualized activity. Each farmer would ferry their own milk to the MCC using their own means. The majority of farmers used to carry milk cans on person and walked to the MCC. An insignificant few used bicycles. Distances from the production plots to the MCC ranged from 1 – 8km, with farmers in the 6 – 7km radius failing to deliver milk in the afternoons. This is because a usual trip would require an hour for the forward journey, half-an-hour at the MCC, and another hour for the return trip (total of 2½ hours for a single trip and 5 hours for 2 trips). As a result, double trips within a single day left farmers with very little time to do anything else n the farm. Milk volumes ranged from as little as 2 – 14 litres per farmer, which made deliveries to the MCC an unviable venture for a number of smallholder dairy farmers leading to increased cases of side-marketing and/or total abandonment of the enterprise. A number of producers were discouraged by the long distances and low milk volumes delivered resulting in non-deliveries and viability challenges for the MCCs and MPAs.

Group Transportation Model and Arrangements:

The ZDL project facilitated farmers' access to in-calf heifers through a revolving cattle loan facility, facilitated improvements in MCC administration and management, provided training on preventive animal health and rangeland/fodder flow management, and promoted the use of donkeys in traction and milk transportation. Milk production volumes have since improved to an average of 10 litres per farmer. A group of farmers in Rusitu United acquired eight donkeys through LOL's revolving fund. The group has a potential membership of 20 farmers which can make use of 5 donkeys at any given time. Each donkey cost US$150 including the transport fee. Beneficiaries are individual farmers who own these donkeys but with the potential for group ownership within the framework of a cooperative group arrangement. For the group transportation arrangement, individual farmers deliver milk to a sub-collection centre. The milk is then weighed, assessed for quality and recorded. The milk is then bulked and is ferried to the MCC by the donkeys. Each donkey has the capacity to carry 40 litres of milk for each trip, with farmers paying US$0.05 per litre. Group milk donkey transportation has meant great time savings for the involved farmers. This has in turn reduced the problem of side-marketing and improved milk deliveries to the MCC. The MPA and individual members also stand to benefit from an incremental premium bonus of up to 15% paid by the processor (DZL) as an incentive for increased milk deliveries. The other donkeys can also be utilized for traction, ploughing, fetching water.

Case Study 2: Sangano

The Before Situation:
Between 2010 and 2012, the Milk Producers Association (MPA) in Sangano had a vehicle which used to collect milk from distant milk producers and deliver processed dairy products to the markets. The association also had a tri-cycle which was used for collecting milk from farmers living up to 12km from the MCC. However, the two modes of transportation proved to be expensive for the association and for the individual farmers. Even when a milk collection charge of US$0.03 was levied on every litre collected, the money raised by the MPA was inadequate to cover mileage (fuel and maintenance) costs for the vehicle. Evidently, the association was failing to maintain or repair the vehicle every time the vehicle broke down. On the other hand, increasing the milk collection charges beyond US$0.03 rendered smallholder dairy production unviable due to the very low production volumes then. Individual deliveries of milk to the MCC was also too expensive for the farmers in terms of the unit cost to the individual farmers and the opportunity cost of their labour.

Group Transportation Model and Arrangements:
Land O' Lakes' ZDL project then took two farmers per MPA to Mozambique for training on donkey traction and transportation. Training focused on donkey management, donkey traction, donkey harnessing and transportation system, the design and development of harnessing equipment, as well as the use of donkeys in traction, harnessing and commodity (milk) transportation. LOL facilitated the acquisition of a group of donkeys by the farmer group in St. Faith Mission area. The ZDL project then fabricated a light donkey cart for use in ferrying the milk.

Impact to Date:
Compared to other modes of milk transportation, donkeys have proved to have an economic comparative advantage. As examples, donkeys provider a cheaper transportation option than use of an association vehicle or commuter omnibuses (see analysis below); donkeys are harder, faster and can go for longer distances than cattle; they are smaller in stature and are therefore easier to work with; donkeys can carry heavier loads than bicycles; donkeys are a lower maintenance animals surviving largely through veld grazing while the supplementary feeding of donkeys is usually not necessary; donkeys can run on nothing or very little medication; the light donkey cart comprises of only a few parts which drastically lowers maintenance costs. Tangible benefits for the farmers have included an increase in the milk volumes transported, reduced unit milk transportation costs, great cost savings and greater milk delivery efficiency.

Comparative economic analysis have since shown that the shift from individual milk deliveries to the adoption of the group milk donkey transportation model has translated into US$2,992.50 in cost savings for the group on an annual basis. See Table 8. Similarly, comparative economic analysis for the Sangano case study have shown that the shift from individual milk deliveries to the adoption of the group milk donkey transportation model has translated into US$50,966 in cost savings for the group on an annual basis. See Table 9.

Table 8: *Cost savings based on individual donkey milk transportation (Rusitu)*

Conventional Individual Milk Transportation		Group/Cooperative Donkey Milk Transportation	
Details	**Cost (USD)**	**Details**	**Cost (USD)**
Labour		**Capital Costs**	
Opportunity Cost of Labour 2.5 hrs x 2 trips x 365 days x 20 farmers x $0.125/hr*	4562.50	Purchase of 5 donkeys at US$150 each	750.00
		Feed	
		Natural grazing for the 5 donkeys	0.00
		Supplementary feeds	0.00
		Veterinary Costs	
		Basic veterinary costs e.g. treating donkey sores	100.00
		Labour	
		Hired labour for transportation and donkey care	720.00
		Cost Savings	**2992.50**
Total Cost	**4562.50**	**Total Cost**	**4562.50**

* Cost of casual labour = US$5/8-hr labour day

Table 9: *Cost savings based on donkey cart milk transportation (Sangano)*

Conventional Individual Milk Transportation		Group & Cooperative Donkey Milk Transportation	
Details	**Cost USD**	**Details**	**Cost USD**
Transport Cost		**Capital Costs**	
US$5 x 365 days x 25 farmers	45625.00	Purchase of 2 donkeys at US$150 each	300.00
		Light donkey milk cart	350.00
Labour		**Maintenance Costs**	
Opportunity Cost of Labour 7 hrs x 1 trip x 365 days x 25 farmers x $0.125/hr*	7984.38	Maintenance costs @ US$5/month	60.00
		Feed	
		Natural grazing for the 2 donkeys	0.00
		Grain supplements	93.60
		Veterinary Costs	
		Basic veterinary costs e.g. treating donkey sores	40.00
		Labour	
		Hired labour for managing group transportation	1800.00
		Cost Savings	**50965.78**
Total Cost	**53609.38**	**Total Cost**	**53609.38**

* Cost of casual labour = US$5/8-hr labour day

When compared with vehicle running costs (even when these are proportionally calculated), the donkey milk transportation model still amounted to US$71,171.40 in annual cost savings for the MPA and the farmers.

MCC Viability Assessments

MCC viability assessments were targeted at only six (6) of the 14 selected MCCs. The viability assessments showed that 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) selected 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 cognizance 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 Hama Ruwomba and Dowa shows struggling enterprises but still managing to break-even. Data from other sources also show that 15 out of the 21 MCCs are breaking-even as a result of use of the Cost of Production (COP) model which ensures that MCCs can meet all their costs, with those not breaking-even not using the COP model and instead using fixed farmer payouts.

In addition to generic challenges within the smallholder dairying sector, some dairy schemes are constrained by their design as suppliers of a primary product (raw milk) to established processors. In some cases, low 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, meager returns and subsequent low incomes have encouraged non-delivery to MCCs and side-marketing by MCC members, thereby negatively impacting on MCC viability. Sustained efforts in 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.

ZDL Project Cost-Benefit Analysis

Impact and economic analysis, based on capital investment appraisal methods focused on the use of the Cost Benefit Analysis (CBA) tool in assessing the returns to total project investment. While an economic CBA would have been more appropriate considering the intangible costs and benefits to the communities as well as the existence of both positive and negative externalities, limited resources and a limited timeframe made this impossible.

In conducting the financial CBA consideration during the four year ZDL project period focused on all ZDL project costs (the investment) as determined by:-

(i) In-calf heifer acquisition costs,
(ii) Annual support for MCC upgrades and capacity building,
(iii) Support for other initiatives e.g. training and capacity building for dairy farmers.
(iv) ZDL project personnel and administration costs.

Likewise, estimated value of benefit streams were largely drawn out of:-

(i) Incremental milk sales volumes and values.
(ii) Incremental sales and value of other dairy products.
(iii) Growth in dairy stock/asset values.

Project costs and benefits beyond the 4-year project period were estimated based on a multiplier factor determined by, *inter alia,* the expected herd growth rate. Specific assumptions for both the cost and benefit streams were:-

(i) There are no significant variations in weather.
(ii) There are no changes in policy and the macro-economic environment.

(iii) Annual dairy incomes increase by a factor of 1.7 or 70% based on an increase in average dairy incomes from US$312 in 2010 to US$2,943 in 2013.
(iv) The dairy herd and the dairy stock asset base grows by an annual factor of 1.3 or 30%.
(v) Beneficiary households also gain from cost savings e.g. by using organic manure in place of chemical fertilizers in their fodder and crop production, whose value is also factored in the determination of total benefits.
(vi) A discount rate in tandem with international lending rates of 10%.

Detailed results of the financial CBA are presented below in Table 10.

Table 10: *Financial cost benefit analysis of the ZDL project.*

Year		BENEFIT Revenue	COST Total Expenses	Net Income
1	2010	553,315.15	1,152,615.01	(599,299.86)
2	2011	1,182,825.76	1,072,475.47	110,350.29
3	2012	1,913,927.78	1,220,276.39	693,651.39
4	2013	3,127,738.43	2,351,633.13	776,105.30
5	2014	5,153,434.89	0.00	5,153,434.89

The financial CBA produced the following results:-
(i) NPV = $3,797,499.06
(ii) BCR= 1.85
(iii) IRR= 104%

CBA shows that smallholder dairying is a quick return investment. The NPV of $3,797,499 over a 5-year period is quite positive and worthwhile. The BCR of 1.85 entails that the ZDL project can yield US$1.85 in discounted money for each US$1.00 invested, while the IRR of 104% is very competitive given that financial interest rates range from 18 – 35%.

4.5 Efficiency

Efficiency Analysis

Efficiency measures the input-output relationships during project implementation, and answers the question on howcost-effective project implementation has been. Despite minor hiccups in some areas, reports from the ground provide the impression that there was timeliness in service provision (e.g. training and capacity building) and the distributions of inputs (seed/planting material for demo plots). Farmers cost-sharing and a pro-business approach, which made farmers bankable, have been more cost effective. Use of the revolving cattle loan facility was also an efficient way of distributing livestock to beneficiaries. The challenge of dead mileage, an inherent problem in a number of rural development projects, was non-existent given the strategic placement of Land O' Lakes project areas in places that allowed them easy access to all the 2 – 3 MPAs/MCCs they were working with. The introduction of the group milk donkey transportation model has also brought tangible benefits for the farmers in the form of increases in the milk volumes transported, great cost savings and greater milk delivery efficiency. Efficiency issues that need to be improved related to coordination issues with government, an issue related to USAID policy which prohibits the funding of government activities.

ZDL Project Quantitative Efficiency Analysis Results

Quantitative efficiency analysis were based on the CBA of the ZDL project by comparing the differences in returns when in-calf heifers are bought locally (as was the case) and when they are imported from South Africa (based on the alternative option that was available for the ZDL project). The CBA analysis based on the option of acquiring in-calf heifers from South Africa at US$2,200 instead of purchasing locally at US$1,500 not only ensured cost savings but also better financial analysis results. This is because the South African option has lower returns to investment given an NPV of US$2,814,840.78, a BCR of 1.52 and an IRR of 61%.

4.6 Sustainability

The ZDL project initiatives, activities and benefits accruing to smallholder dairy farmers and the target communities are likely to be sustainable beyond the lifespan of the project. This is based on various exit strategies put in place by Land O' Lakes as elaborated below.

Exit Strategies in Place

Revolving Dairy Cattle Loan Scheme

The introduction of a revolving dairy cattle scheme, through the facilitated access to in-calf heifers by farmers, coupled with training and capacity building (as elaborated below), transformed the thinking in smallholder farmers on how they approach dairying as a business. As already highlighted, the dairy cattle loan facility and the provision of in-calf heifers, significantly increased the number of farmers with dairy/lactating cows thereby reviving dairying for a number of households who were out of business for a long time. However, the cattle bank facility will only continue to be sustainable if farmers continue to repay their loans.

Collaboration with Strategic Partners

The ZDL Project, while being implemented by Land O' Lakes, had a number of implementing and collaboration partners on the ground. Public/government implementing partners included the Dairy Development Programme (DDP), the Department of Livestock Production and Development (LPD), the Department of Veterinary Services (DVS), and the Department of Agricultural, Technical and Extension Services (AGRITEX). Collaborating partners roped into the initiative by Land O' Lakes included private sector firms, notably processors such as Dairibord Zimbabwe Limited (DZL), Dendairy, Kefalos and Red Dane Farm. On the other hand, the main financial institution collaborating on the ZDL project was MicroKing, which is a subsidiary of Kingdom Bank. By involving implementing partners, such as public stakeholder institutions, commodity associations notably the Zimbabwe Association of Dairy Farmers (ZADF), financial institutions, and private agribusiness firms, the ZDL project ensured the development of in-built sustainability mechanisms for all project initiatives thereby warranting continued service provision and the accrual of benefits to target communities.

Training and Capacity Building

Training and capacity building formed a significant component of the ZDL project. Specific training was targeted at individual beneficiary dairy farmers, MPA and multiple committee members, as well as MCC staff. Technical training was fortified by training on business management, transparency and governance. Such training has had the impact of reinforcing social and institutional capital by strengthening capacities at the farm, MCC and community levels and hence increased the resilience of not just individual dairy enterprises but for entire MPAs and communities. This entails that benefits can continue to accrue to target communities post-project funding and indeed beyond the lifespan of the ZDL project.

Community Structures Managing the Project

A number of committees were developed and established to assist in managing the ZDL project. Examples include MCC management committees, MPA executive committees, cattle bank facility committees, livestock committees, fodder production committees, AI/cattle breeding committees, marketing committees, community livestock workers committee, women in dairy committees, and youth in dairy committees. Such committees are useful in assisting in programme and activity planning, facilitating the implementation of project activities, monitoring and reviewing progress, provision of feedback, and ensuring that corrective action has been taken. Sustained project management through established local community structures has also been enhanced due to, as highlighted above, training and capacity building of not just the individual beneficiary smallholder dairy farmers but also the various local structures.

Sustainability Risk and Potential Challenges

However, some MCCs may not remain sustainable because of inherent challenges within MPAs and the specific MCCs. Case examples include Dowa and Umzingwane where low milk yields and deliveries, poor governance, the long distances to the markets, and poor road network and complementary infrastructure could hamper sustainability. A killer assumption for the sustainability of smallholder dairying that all serves as a major risk factor is socio-politico-economic stability. The moment that this socio-politico-economic stability is lost this will entail another demise of smallholder dairying.

Potential for Up-Scaling

The Land O' Lakes ZDL project activities have great potential for replication and up-scaling given that the project addressed a real felt need, smallholder dairying significantly supports local livelihoods, dairy production is a traditional practice entailing widespread skills in the practice, and due to the potential benefits and rewards that can be reaped form participating in the smallholder dairy sub-sector. There is also scope for easy entry and exit in the enterprise given that local indigenous cows can easily be crossed through cutting-edge technologies such as artificial insemination for purposes of initiating and growing the smallholder dairy herd.

4.7 Best Practices and Lessons Learnt

Best Practices

There are a number of good practices that the ZDL project adopted that ensured success, enhanced efficiency, and stakeholder buy in which can be replicated by other projects. One of the best practices was the adoption of a pro-business approach which improved the bankability of resource-poor farmers through capacity building by business development specialists and ensuring that smallholder dairying remained viable, training of producers and MPAs in strategic planning, linking MPAs with milk processors and ensuring improved milk quality and volumes (e.g. the project's promotion of platform tests which improved smallholder dairy milk products' access to formal markets), and initiating sustainable linkages with the private sector since established linkages are likely to continue beyond the lifespan of the ZDL project (e.g. cost sharing, the cattle bank facility and the Micro King provision). The other ZDL project best practices were the use of a Cost of Production model in determining farmer payments and thereby ensuring that smallholder dairying remains both viable and sustainable, the capacity building of ZADF as the local partner to ensure that their services are more appropriate to the need of smallholder dairy farmers, linking producers to insurance and other financial services, and the introduction of record keeping and the Accounting Bureau System (ABS).

Lessons Learnt

This end-of-project (final) evaluation produced the following lessons that can be used as an input in future LOL and/or USAID programming:-

- Managing expectations in an area where there is a long history of donor aid, and changing mindsets within a short-term project is problematic.
- While the introduction of the group donkey transport model was a noble idea, in some areas the long distances made alternative and traditional modes of transport, e.g. bicycles, more appropriate.
- The ABS system is important to reveal the true financial position of the MCC, and it assists the farmers to plan their operations efficiently.
- To allow the current MCCs to operate effectively and efficiently and to build confidence with the stakeholders, it is important to address governance and financial transparency issues.
- Dairying is a volumes business, and it is essential that the break even volumes are reached for the centers to break even.
- The involvement of the private sector to help provide services, especially in regard to the agro inputs, is key to sustainability.
- As livestock and dairying is a medium term investment, farmers' time horizons need to be further than one season.

- Capacity development should be an integral component of any rural economic development initiative.
- Community structures, group work and coordination are key to project success.
- The idea of a revolving fund is a noble one but it requires consistent monitoring, which is an area where most MPAs are still lagging behind.
- The establishment of a good farmer association and having farmer contracts are not sufficient conditions for success in smallholder dairying when there is no enforcement or when the environment on the ground does not facilitate the enforcement of such legislation.

4.8. Constraints and Challenges

Constraints and Challenges at the Farm Level

The following constraints and challenges were identified at farm level:-

- The commercialization of the services offered by Community Animal Health Workers was not fully appreciated and supported by the communities. This could be linked to the donor-dependency syndrome and expectations by farmers to receive free services from one season to another.
- As already highlighted, there were issues of poor coordination with the government as a result of USAID policy which forbids funding of government activities. However, the ZDL project, responded by establishing the ZADF working group.
- Private sector view of smallholder farmers in the past was one of corporate social responsibility rather than a reliable business partner.
- Due to the short duration of the initial 16 months for the dairy project, this led to challenges with targeting and approach in some areas in phase 1. With a longer time horizon, earlier implementation and approaches would have been different e.g. more time was necessary for strengthening the cattle bank facility/revolving fund, allowing farmers to be better prepared and targeting of MCCs with direct links to processors.

Constraints and Challenges at the MCC Level

The following constraints and challenges were identified at MCC level:-

- Due to USAID regulations and the short nature of the project MPAs where there had been existing structures were targeted. While appearing to be useful in terms of time and impact, often these sites for the MPAs/MCCs are no longer central to milk producers, and in addition often have poor access to formal processors current milk collection routes e.g. Dowa which is ± 60km from both Marondera and Rusape lack access to viable, reliable and sustainable markets.
- Many MCCs and stakeholders view that "value addition" or the processing of milk for MPAs is a viable option when producing for a local market. However, analysis jointly conducted by the ZDL project and MPAs to help determine cost of inputs and viability showed most as non-viable.
- In some areas and for some MCCs, the lack of understanding by some stakeholders of the benefits they were supposed to derive from the project resulted in lack of or poor cooperation.
- Inherent profitability and viability challenges in some MCCs.
- Poor administration and governance in some MCCs which have resulted in closures.
- Founder member syndrome characterized by an unwillingness to attract new members. Many MCCs struggling to understand value drivers of volumes and membership to viability of centres due to historical dependency syndrome and operating for too long under a relief mode e.g. some MPAs perceive MCCs as donor sinks.

Constraints and Challenges at the Milk Value Chain Level

The following constraints and challenges were identified at milk value chain level:-

- Given the history of smallholder dairying, from a humanitarian then a relief and now a pro-business approach, beneficiaries and target groups took longer to understand the motives, goal and objectives of the project. Consistent training and capacity building efforts established a common and shared vision.
- Despite benefitting from training and capacity building, farmers still fail to optimize production due to lack of inputs (seed, fertilizer) and equipment for critical processes e.g. silage cutting. To this end the project trained artisans and made available manual silage cutters which farmers refused since they had already been exposed to and favoured motorized silage cutters. However, the facilitated link with Micro-King can assist dairy farmers to access resources for inputs and equipment.
- Despite emerging as an innovative and cost-effective milk transportation model, the use of donkeys in group milk collection was not adopted as well as originally anticipated. This is because donkeys are culturally viewed as the poor man's animal, with some target beneficiaries perceiving this as a drawback. In other areas this was because of the long distances between the production areas and the MCCs e.g. up to 50km in Wedza. The ZDL project redesigned the intervention by giving the MPAs bicycles.

4.9 Recommendations

The following are key recommendations, on the basis of which continued and future programming can be improved:-

(i) Given the ZDL project's overall physical progress achievement rate of 97.2%, an increase of 21.4% in household food adequacy levels, and an increase of 221% in average annual dairy incomes, there is need to upscale and replicate this intervention in other Land O' Lakes and USAID sites, with slight tweaking in project design for adaptation purposes only but no major reviews are necessary.

(ii) A major identified constraint has been the short-term nature of the ZDL project which has not allowed ample time for Cattle Bank Facility (CBF) loan repayments, viability and for individual dairy farmers to achieve full potential. We, thus recommend more time to allow farmers having started with one cow from the CBF to graduate to the Micro King loan products to access more than one animal thus reaching the optimum herd size of 3-5 cows faster, and thereby ensuring the viability of participating smallholder dairy farmers.

(iii) Small herd sizes and low dairy stock numbers have been making it difficult for both smallholder dairy producers and MCCs to breakeven. Subsequently, the introductions of the CBF and linkages to the Micro King facility have been reversing smallholder dairy producers' fortunes. However, there is need to sustain the facilitated access to in-calf heifers of an appropriate breed (preferably crosses) by vulnerable households.

(iv) Beneficiary smallholder dairy producers have been failing to optimize production due to lack of inputs and equipment for critical processes, notably for silage cutting. To this end the project trained artisans and made available manual silage cutters which farmers refused since they had already been exposed to and favoured motorized silage cutters. This makes it critical that there be facilitated linkages with alternative sources of input finance e.g. Micro-King can assist dairy farmers to access resources for inputs and equipment.

(v) There has been a significant increase in the area under improved pastures and fodder crops. Future programming should consider ways of ensuring an exponential increase in adoption and the expansion of the area under improved pastures and fodder crops e.g. as the case of conservation agriculture in Zimbabwe. Such a phenomena would reduce the cost of feed and thereby increase the annual gross margin per dairy cow in lactation.

(vi) While the introduction of Community Livestock Workers (CLWs) has promoted the idea of dispersed, active and locally accountable community workers who can work in a range of livestock activities, addressing services that are in demand and are best delivered locally, there is need to expand the CLWs concept e.g. through the training of more dairy farmers as CLWs.

(vii) Given coordination challenges on the ground, coordination with public players should be prioritized e.g. wider pre-implementation stakeholder consultation and the joint planning of interventions to ensure that interventions are more need-based and can generate greater impact on the ground.

(viii) Despite the low uptake, the group donkey transportation system remains innovative and very cost effective. In addition, despite the fact that dairy cows have the potential to be milked thrice per day, a number of farmers are still making morning milk deliveries only due to the distances and low unit volumes thereby limiting overall milk supplies to the MCCs. There is thus need for further scoping studies on present and alternative transport systems especially for farmers who are located at a distance

from the MCCs. Such a study could focus on the suitability of donkeys in all areas, factors affecting the adoption of such an innovation, long-term costs and benefits, comparative costs for tricycle milk collection systems, and other alternative models.

(ix) Three years of project cycle is insufficient particularly for a dairy project to see significant impact or the long term sustainability of the project. Hence there is need to extend the programme for another three-year phase to build capacities before weaning off the current target MPAs/MCCs.

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Appendixes