ZAMBIA
Title II Development Assistance Program

Final Evaluation of

Land O'Lakes Zambia Title II Development Assistance Program

(March 1, 2004 – September 30, 2009)

Dairy Development FFP DAP for Vulnerable Populations in Zambia

(TA No. FFP-A-00-04-00001-00)

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January 2009

Submitted to: FFP, Washington DC.

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Land O'Lakes, Zambia
Lusaka, Zambia

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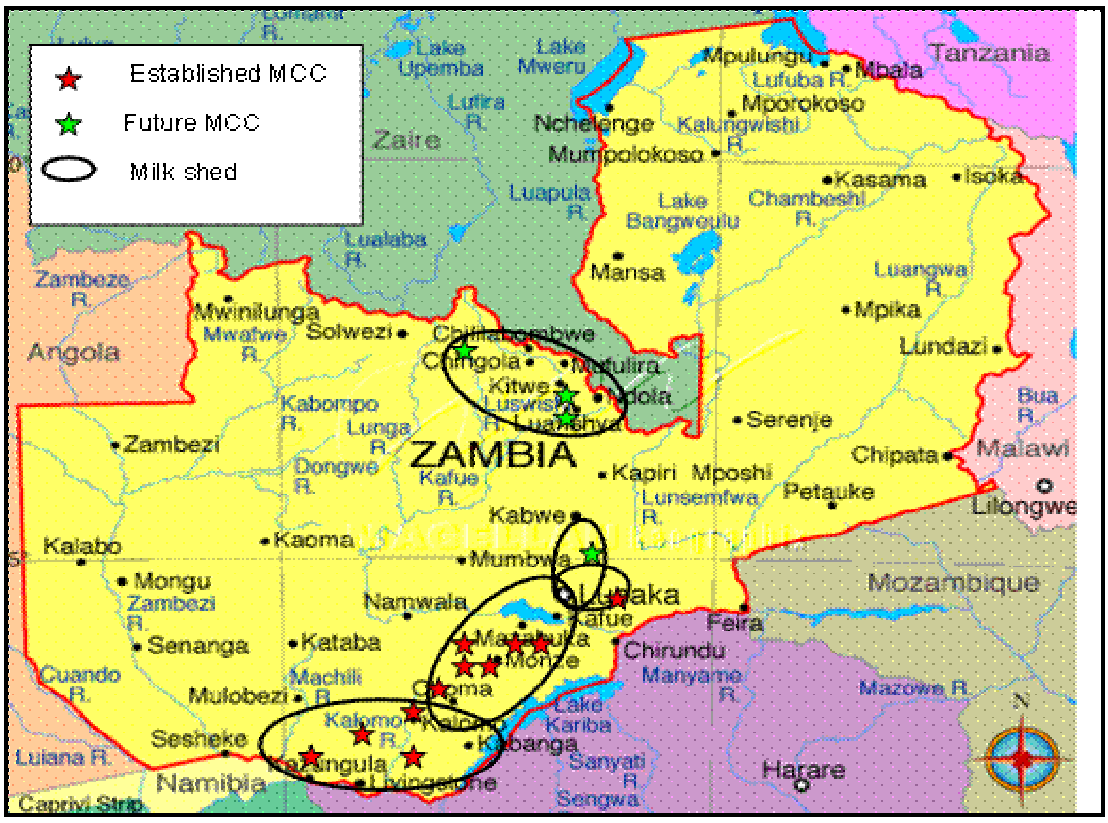
List of Acronyms

AI	Artificial Insemination
AIDS	Acquired Immune-Deficiency Syndrome
CFAARM	Consortium for Food security, Agriculture and nutrition, AIDS, Resiliency and Markets
C-SAFE	Consortium for the Southern Africa Food Emergency
DAP	Development Assistance Program
ESADA	Eastern and Southern Africa Dairy Association
FANTA	Food and Nutrition Technical Assistance
FFP	Food For Peace
FY	Fiscal Year
GART	Golden valley Agricultural Research Trust
HIV	Human Immune-Deficiency Virus
HIZ	Heifer International Zambia
HSZ	Herd Book Society of Zambia
HQ	Head Quarters
HRW	Hard Red Winter
IPTT	Indicator Performance Tracking Table
LOL	Land O'Lakes
LOL/Z	Land O'Lakes Zambia
M&E	Monitoring and Evaluation
MACO	Ministry of Agriculture and Cooperatives
NAIS	National Artificial Insemination Services (of GoZ)
MCC	Milk Collection Center
MTE	Mid-Term Evaluation
NDS	Northern Dark Spring
SOW	Scope of Work
TA	Technical Assistance
TORs	*Terms of Reference*
USAID	United States Agency for International Development
WWS	World Wide Sires
ZDEI	Zambia Dairy Enterprise Initiative
ZDPA	Zambia Dairy Processor's Association

Location of Land O'Lakes MCCs in Zambia[1]



Acknowledgements

It is a great privilege and daunting responsibility to be asked to evaluate in a few short weeks the efforts of a team of professionals working in often very challenging circumstances to accomplish major goals and objectives in the relatively short period of four years. This LOL dairy project is unusual in the scale of impact made upon vulnerable smallholder rural households of this FFP DAP. FFP can rightly be satisfied with the efforts made and resources well spent and look ahead to how these accomplishments and lessons learned might best be continued both within Zambia and expanded regionally to other countries. Many members of the LOL team contributed to this report and I appreciate the comments and suggestions for revisions made to earlier drafts. Any areas of apparent weakness or continuing challenges mentioned in this report are almost insignificant when compared to the results realized and impact made on the target beneficiaries – over 1,000 vulnerable households in many regions of the country. Most of these accomplishments and lessons learned were presented to the field team prior to the consultant's departure from Zambia September 29, through the attached PowerPoint presentation.

LOL Zambia currently possesses a very strong and hard working team of professionals of whom I wish to particularly recognize Andson Nsune, M&E specialist – both he and Frank Valdivia, LOL M&E manager in Minnesota undertook tremendous efforts in support to implementation of the final quantitative survey and tabulating results. The technical field team of dairy specialists – Johns Nyirongo, Evans Lwanga, and Makabaniso Ndhlouvu provided me with a wealth of information and are clearly respected and strong trainers and leaders in their own right. Project leaders Todd Thompson, country manager, and David Harvey, the LOL field technical manager took the time to assist me in every way possible – setting up a program of field visits that confronted me with both the strengths and continuing challenges of the program. Both themselves are also experienced and wise leaders to this DAP and responsible for much of the success realized. Meeting with the vulnerable dairy households – particularly those led by women – was certainly the highlight of the evaluation – seeing firsthand how well applied socio-economic development efforts, using a holistic business minded approach, can truly transform lives.

Note: Exchange rate used in this report was 3,500 Z = $1.00.

[1] Figure 4, p. 41, within this report presents an updated version of this map, showing some more recently developed MCCs, while excluding some MCCs that are no longer operational. This map dates to the first years of the project.

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0.0 Executive Summary

The final evaluation of the LOL Food for Peace Dairy DAP among vulnerable Zambian smallholder farmers extended over a period of several months, beginning in mid-June, and extending through December 2008. Beginning with a pre-planning period, preparation of the survey protocol, and quantitative survey instrument design and pre-testing, a final quantitative survey was undertaken by the LOL field team in August/September. This was subsequently followed by four weeks in September 2008, when the lead evaluation consultant worked with the program team in Zambia. More than half of this period was spent meeting individually and in groups with the direct beneficiaries of the program in four provinces, meeting with the managers of the milk collection centers and observing daily activities. The consultant also spent some time with private sector processors who are now purchasing increasing volumes of smallholder dairy producer milk. The LOL field team completed data entry and initial tabulation of the quantitative survey by late November. These data, considered along with information gathered in the field by the consultant were used to develop the current final evaluation report.

This project represents the first dairy project FFP has ever contracted with Land O'Lakes - an organization that is not an NGO. Here a different approach was tested to lifting vulnerable rural households out of the recurrent cycles of need for food assistance and socio-economic government support to economic self-sufficiency.

0.1 Overall Impact of Project

LOL has been successful in reaching its stated goal of reducing food insecurity among its targeted vulnerable populations in Zambia through increased incomes generated from the sale of milk and other dairy related products. The project will have significantly exceeded its life-of-project targets by September 2009, through the cost extension approved by received by USAID/FFP.

This is actually an unusual project, and FFP is to be highly commended for showing the flexibility needed to try a somewhat different approach to rural development – following relief programs in vulnerable areas. FFP is likely to take many of the lessons learned here to other countries in the region, where appropriate. There are many lessons to learn about what must be done to realize sustainable impact, and some of the key recommendations are summarized here – though a more complete list of these lessons and recommendations is given in this report's concluding remarks, and in the PowerPoint presentation given (Annex 16). Some of the key achievements which can be attributed to this DAP program include:

- Over 2,732 smallholder (once) vulnerable households have been the recipients of LOL program training efforts in their rural communities over the past four years, and at least 1,000 households will have received and benefited from an in-calf heifer or pass-on heifer by the end of the project, and become part of Zambia's formal dairy sector through their milk sales to their Milk Collection Centers.

- Unbelievable economic uplifting is taking place when smallholder rural householders have a milking cow – with many exceeding $1,000/year from 1 milking cow, representing about 70% of the total female headed household's income[2] – figures that can be doubled with a second milking cow.[3] The project has greatly exceeded its target for increased average household incomes by 125% - at an overall average of $872/household. True

[2] Annex 10, Table 8.3 clearly shows that female-headed households depend on milk income for close to 70% of their total incomes, while male-headed households' average is closer to 60%.

[3] Table 2 shows that the average household income, across nine MCCs, was $1,015/year for 2007, with a range from the lowest ($205 – Nteme – a start-up) to the highest ($3,560 - Palabana). This is gross income. Since in-calf heifers were given at no cost to the farmer, the largest start-up cost of the venture does not need to be deducted from operating expenses. Some of the expenses of raising the cow will come from barter/income from a portion of milk sales not at the MCC. To date, few farmers have actually paid directly for AI, though the accounts of some MCCs carry the costs against farmers. In some cases, the AI cost is included in the (lower) price given by MCCs to farmers per liter of milk.

potential exists for many of these households to become small commercial dairy entrepreneurs as the numbers of their animals increase.

- FFP food security targets will all have been met by the end of the project, September 2009. By the time of this final evaluation, the project had documented Number of Months of Adequate Household Food Provisioning (NMAHFP) of 8.73 months, or 87% of target set. Based on both quantitative and qualitative survey results on recipients of in-calf heifers and pass-ons, the project has probably already achieved NMAHFP above 10 months – with vulnerable female-led households scoring higher than male-headed households. The Household Dietary Diversity Score (HDDS) for all LOL project beneficiaries was 5.3 or 76% of set EOP target of 7 food groups. However, recipients of in-calf heifers and pass-ons had achieved a HDDS of 6.4 food groups, or 91% of the target. LOL supported dairy farmers now have the income to diversify diets, and evidence is strong that they are increasingly doing so.

- Infusion of cash incomes into rural economies from dairy sales is having an impressive rippling effect into numerous other economic activities for thousands of additional households within these dairy communities. It is also providing new jobs for many other economically depressed households – the employers being their once equally vulnerable neighboring households.

- Among the 10 most operational Milk Collection Centers supported by LOL, a total of **$2,759,010** has already ended up in the pockets of smallholder dairy farmers. These same 10 MCCs have earned a total of $3,015,175 from milk sold to processors, and the volume continues to increase as animal numbers increase – 56% in 2008 alone. [4] The handling and successful disbursement of this amount of money to smallholder dairy farmers by MCC management is a real achievement – particularly when we consider that these farmers had not previously been linked to the formal dairy sector. The daily recording of milk sales, by MCC and in farmer's own record books, is excellent. The total value of milk sold by the farmers above to their MCCs also probably represents only about 60% of total daily production - the balance is either coNsuned by the calf, by members of the household in fresh, sour, or yogurt forms, or used in barter or other sales for labor and other products.[5] LOL exceeded its target for MCC milk volume sales by 105% and milk value sales by 212%.

- Once not included within Zambia's formal dairy sector at all, today, because of this LOL DAP, smallholder dairy farmers are supplying an increasingly important percentage of the country's milk production. LOL has successfully linked Zambia's smallholder dairy farmers and established milk bulking centers with the formal sector through selected national private sector processors. LOL has also helped to expand national markets by supporting processors in developing additional milk-based products and through advertisements to the general public. Parmalat, Zambia's largest processor currently receives about 8% of its total volume of milk processed from smallholder dairy farmers, up from essentially zero only five years ago. Zambian processors now see smallholder dairy farmers as their fastest growing source for future milk. In-country and regional demand for this milk itself appears to be increasing rapidly each year, with prices increasing about 10%/year.[6]

- An estimated over-all cost-benefit analysis of this $10 million project gives an investment cost/household of $3,660/household (c.f. 5.4). Looking at the **net benefits** per household we get about a negative -$120/person or -$1,077/household. Given the continuing expansion of quality dairy cattle in the hands of existing smallholder farmers, expanding milk sales and the six additional MCCs now becoming operational (cf. 2.5), the entire cost of the project will have been 'recovered' in terms of a positive net gain within two years from now. This represents at

[4] The 10 MCCs produced a total of $ 1,175,169 during the past 12 months (4th Quarter 2007 through 3rd Quarter 2008); they produced $654,224 during the earlier 12 months (4th Quarter 2006 through 3rd Quarter 2007 – a 56% increase.

[5] The quantitative survey attempted to get an estimate of these sales, and information given suggested that over 80% was sold to the MCC; however, based on discussions with farmers, and looking at their workbooks, other household sales and use would appear to represent at least 40% of daily production. When production is low, farmers sometimes don't even take milk to the MCC. Farmers also can sometimes earn more than what their MCCs offer per liter upon occasion, and take advantage of this when possible. Yet, it is also true that farmers do want to earn the income, and do try to get as much to the MCC as possible.

[6] Price increase since 2006 has been 30%, according to LOL records.

least $1,300,000[7] each year received by smallholder farmers from milk sales to their MCCs, and does not count the increasing value of their expanding herds. This is a very good investment! These smallholder farmers, in the absence of a major calamity, **are no longer vulnerable**, and no longer seek or want future food relief assistance.

0.2 Challenges

In spite of impressive achievements, the project still faces significant challenges that must receive serious attention during the remaining year of this project, and also concerns future smallholder dairy development in the years to come. Included among these:

- The existing management structures of dairy cooperatives represent perhaps the greatest long-term threat to sustainability, principally because of old habits and orientations about cooperative management by boards of directors. Complete sets of interventions were perhaps not initiated quickly enough at the beginning of contacts with existing cooperatives assisted by LOL, and it is difficult to go back and change dysfunctional groups. Cooperative boards are not business minded, demanding and studying regular expense-profits statements. It is too early to know if new efforts to address this problem through Quick Books accounting will be successful. Cooperatives run more like social-welfare agencies, with management by committee at the 'lowest common denominator'. Financial accounting systems are inadequate, and open to potential for abuse.

- There is little or no ownership in the dairy cooperative or MCC by smallholder farmers themselves – their major preoccupation is making ends meet, and having a reliable place to sell their milk each day, and being paid for their milk. Smallholder dairy farmers depend heavily on the existence, and proper functioning of, the milk bulking centers (and the cooperative that manages them) in order to sell their milk. When they get paid regularly (as they usually are), they basically leave concerns of management to the board and MCC operators, and don't insist on seeing regular financial statement - nor do they receive them.

- Even if a dairy cooperative were to become well managed and focused, it will face a further challenge. The GOZ and other NGO's are always looking for 'well managed' rural organizations through which they can pass new opportunities or programs, and will always come knocking on the door of any well managed dairy program to 'expand' their opportunities. These are actually threats to the existence of the dairy cooperative, as managing its own business is already extremely difficult, and anything that removes focus threatens its sustainability.

- Smallholders themselves, though they have been given some program training in record keeping and animal management, remain far from where they need to be to become successful entrepreneurs, in their own right; this represents a direct threat to the future viability of these household level enterprises. The challenge is that smallholder dairy households come out of a context of having never kept written records or approaching dairy from a business perspective; many of the adults are illiterate and depend on their school age children to assist them in keeping the expected records. Yet unless they understand their own household dairy enterprise better, they will never be in a position to be the critical members needed by a dairy cooperative to assure that their MCC management is properly focused and meeting their needs.

- In retrospect, the use of artificial insemination (AI) within the program probably should have been one of the components initiated more quickly from the beginning – permitting more rapid growth of improved dairy animals particularly in those areas where households possessed local breeds. AI, as practiced, has also encountered numerous difficulties in successful implementation, as with any new technology. The issues are well understood by LOL and being addressed. Wider application of the use of mass AI during periods when the nutritional status of animals is good (at beginning of rains) would also help to improve success rates. Targeted use of synchronization

[7] Table 3 indicates households already earned $1,175,160 during the past 12 months for 10 MCCs, and the next 12 months for these same MCCs can actually be expected to exceed this, as five of the 10 MCCs are fairly new and in strong growth modes. Table 3 does not show any of the milk sales from the Copperbelt, yet milk sales are already quite active (though mostly private), and will certainly exceed the balance of 124,000 liters needed to bring an estimated $1,300,000 of sales for the final year of the project for all MCCs, everywhere.

also holds some promise. Efforts to use semen with higher rates of success for female calf births over bull-calves might also prove economical.[8]

- MCC's require electricity to permit the needed, and rapid, cooling of fresh milk – and maintaining the coolness for a day or two - until a processor can pick it up. Hundreds of smallholder dairy farmers in the Copperbelt Province have been seriously hindered in experiencing the benefits of dairy through 12+ months of inaction by the GOZ run electric company through delays in connecting and operationalizing three LOL supported MCCs to the national grid.[9] Power cuts in some regions also leads to MCC bulked milk going sour and financial loss to MCCs, threatening their viability, and diesel run generators are too expensive to fuel and maintain to represent a short-term alternative.

- Poor maintenance of dirt roads in some of the project targeted areas has made it impossible for processor trucks to gain access to a milk bulking center, particularly in the rainy season, requiring dairy farmers to cover long distances by bike to either an urban-based MCC, or paved road where an MCC can send a truck to gather the milk at various collection points. This challenge, and the transaction costs linked to it, clearly limits where MCCs can reasonably be placed, limiting many potential regions the benefits for dairy development.

0.3 Key Lessons Learned

- **Small-Dairy Business Approach & Dairy Value Chain:** The holistic business focused approach to smallholder dairy farmers, employed by LOL, has been a highly successful model for rural development in Zambia.

- **Targeting:** LOL's use of geographic, group, and household level targeting permits a realistic business orientated approach to dairy for smallholder households, including targeted vulnerable households. The question is not '*where are there cows'* to undertake a rural dairy initiative, but '*where and how will the milk be marketed'*?

- **Smallholder Dairy Farmers:** Smallholder dairy farmers represent an important and growing segment of Zambia's dairy industry. They are both economically and politically critical to Parmalat and other processor's businesses. To the smallholder diary farmer, the first and foremost role of the MCC is as a place to regularly sell milk produced, and to receive income from these sales on a regular basis. The MCC as a dairy activity hub, through which farmers can get AI and extension services, drugs and feed inputs for their animals,[10] is secondary.
- **Collaboration with Government of Zambia and Other Partners:** Achievements realized by LOL could not have happened without effective early – and continuing – mutual respect, trust, and collaboration with colleagues in various departments of the Ministry of Agriculture and Cooperatives and private sector partners contributing to the dairy value chain.

- **Recipients of In-Calf Cows or Pass-ons & Changing Behavior:** With the exception of the Southern Province, recipients have in most cases been households without cows of their own. In such cases, recipients are asked to practice a form of intensive management completely unknown to them. The learning curve for adoption of improved management of dairy cows appears to be faster with households that have NOT formerly possessed cows - as it is difficult to change old habits associated with extensive

[8] Though certainly more costly, higher success rates with female births, particularly during the early years of a program, would provide the initial encouragement to new dairy farmers, and those waiting for pass-ons, and MCCs dependent on a good volume of milk to become sustainable. This seems particularly true when vulnerable households are targeted.
[9] In spite of significant lobbying efforts by LOL to move the process forward, months have passed to over a year in these cases, suggesting the presence of corrupt officials waiting for a bribe to make a move. The shallow underground placement of one electrical connecting cord, at one MCC Copperbelt site, with subsequent rapid and easy theft of the valuable cable the following night, suggests further corruption.
[10] Some MCCs have struck their own deals with input suppliers.

traditional grazing systems. Adoption of intensive dairy management systems appears more rapid in the Copperbelt, for example.

- **Female Beneficiaries:** Households that were female-led, and received an in-calf heifer or pass-on led to very important and long-lasting impact in the dynamics of these households, the improved care of the animals, and in the way the household spent income. Project statistics also shows that these female-led households are among the most vulnerable, possess the greatest number of children, many of whom are orphans.

- **Female CLWs**: CLWs who are male do not appear to have been as effective as female CLWs in working with female-led households due to cultural reasons – one reason for the lower success rates for these households (especially in AI).[11] This suggests that either different expectations are required for female trained CLWs, with respect to AI, or greater attention and sensitivity by male AI CLWs is needed for the female-led households within their areas of intervention.

- **Food Insecurity:** LOL direct recipients of either an in-calf cow, or a later pass-on heifer (once they have calved and begun milking), very definitely have achieved household food security – often with twelve month food availability. These beneficiaries have not only increased incomes, but also a regular stream of income through the sale of milk. Peak incomes also coincide during the former peak 'hunger months', an extremely important fact.

- **Improved Nutrition:** All households with a milking cow noted the dramatic impact on the nutrition of their children and household members in general. Better nutrition for the milking cows remains a major challenge, but households have seen that the better their milking cows are, the better the household's nutritional status.

- **Barter and Local Employment:** Almost all smallholder dairy farmers, whether or not they deliver milk to a MCC, appear to practice some form of barter during the time their cow(s) are milking. Milk is exchanged for services (labor on household fields for example) or commodities (maize or other food), resulting in a multiplier effect within the vulnerable communities.

- **Behavioral Change & Time:** Major behavioral changes in societies take time. Intensive dairy management represents major change. Population level impact will take at least ten years.

- **Cooperatives:** Without professional managers and oversight, Zambian dairy cooperatives have an uncertain future. Some LOL assisted cooperatives have begun to realize this, exploring ways of being able to pay for qualified personnel. Alternative linkage relationships exist between dairy producers and processors, and should be also explored, where appropriate (e.g. processors managing MCC), for the benefit of the concerned vulnerable smallholder dairy farmers concerned. [12]

- **Repossessions:** LOL insistence on repossession and replacement of poorly managed in-calf heifers (or pass-ons) given out represents both a courageous and remarkably successful, though traumatic, policy. It was not often or consistently enough applied. The same principal could be applied with the cooperatives with respect to assets provided to them by LOL, in terms of better management practices required if they are to be successful.

[11] LOL has observed that women trained as AI technicians have not performed as well as men, with respect to the number of AIs done, success rates, and follow-ups. Given their own household obligations, these women technicians are not able to cover as wide an area as their male counterparts. From a cultural perspective, a woman beneficiary talking with a male technician about artificial insemination is taboo, which few women are willing to break – one reason that priority needs to be given by female AI-trained CLWs to female led households in their areas of responsibility.

[12] LOL, itself representing a successful dairy cooperative model, and understandably prioritizing the cooperative approach, should be open to other models for linking farmers to dairy processors, where this may represent a feasible approach. Clearly, building cooperative capacity among a group of MCC small dairy farmers provides them with potentially greater leverage with dairy processors, and greater flexibility for competition among processors for their milk production. Yet direct ties with a processor may better serve some groups.

- **Project M&E and Data Management:** The M&E system in place is too centralized, but data rich. It tracks valuable process and impact indicators that should have been included within the IPTT and USAID Zambia SO #5 Economic Growth program objective indicators.

0.4 Key Recommendations

- **Food for Peace:** Recognize smallholder dairy as a 'flagship activity', in appropriate areas, to permanently improve the lives of vulnerable-but-viable households into long-term food security. Formalize, across all project MCCs, the giving of in-calf heifers and pass-on heifers in the name of a household women in male-headed households, or female-headed households. Women and their children tend to be the major caregivers of these animals, they are always near them and most familiar with their needs. Such ownership greatly increases a woman's security and status within a household. For attacking the root causes of household vulnerability, household women best manage increased household incomes from dairy in a responsible manner for the nutritional and educational needs of household children.

- **Food for Peace**: De-couple LOL from other NGO FFP programs in Zambia MYAPs and consider similar strategies for other countries receiving FFP assistance, using LOL value chain business model and targeting approach. Other FFP NGOs, in areas of LOL intervention, could reinforce population base in development activities complementary to smallholder dairy development.

- **Food for Peace:** Modify FFP IPTT data approaches. Use of baseline – mid-term – and final socio-economic surveys for measuring long-term, goal level, impact is certainly appropriate, but should be limited or focused to these purposes. The cost of such surveys is greatly increased when seeking to measure a whole range of other socio-economic variables, whose usefulness to project objectives are not always evident. A number of additional key process and outcome/impact indicators routinely monitored over life of project, and reported in quarterly reports through the IPTT, could have been helpful to both USAID/Zambia and FFP. FFP Washington could learn from the experience of USAID field missions in the identification of key indicators for Program Objective, Program Area, and Program Element purposes of USAID operational plans for each country. Better integration of managing for results into USAID mission operating plans is necessary.

- **Model Smallholder Dairy Farmers:** Give priority to the identification of, and support to, 'model smallholder dairy farmers' within each zone of operation of all supported MCCs, and link all beneficiary farmers to these model farmers. Most project zones appear to have such households, whether they be a specific CLW, or other participating household – but their status as 'model dairy farmers' does not appear to be officially recognized and promoted. These farmers become the role models and could help with inputs needed by neighbors, and eventually become small commercial dairy farmers supplying MCCs.

- **Rural Milk Transportation**: Greatly expand diffusion of heavy-duty bicycles for transport of milk by smallholder farmers. Make this a private sector business opportunity, not managed through the MCC. Consider establishing opportunities for the development of transport entrepreneurs to collect (and test milk) and sell to MCCs (many smallholders, for example, don't want to go twice a day to MCC, but might be willing to sell their milk to someone else to transport it.

- **Artificial Insemination**: Southern Province: Given the cost and failure rates in some locations of individual, household-level AI, greater use of targeted synchronization[13] should be practiced or replaced with mass AIs implemented in each zone sometime between the rainy season months of November and January each year when animals are in their best nutritional status. Individual household level AI may only

[13] Use of synchronization brings with it its own set of issues, not least of which are the availability of required hormones, increased costs associated with this procedure, the special expertise required and generally unavailable among the communities targeted by LOL, and the potential for ceastic ovaries and reduced fertility among the cows treated. Yet where done correctly, the results can be quite dramatic in terms of successful live births.

be appropriate for small dairy farmers actually able to pay the full cost at time of application, and whether successful or not. When synchronization is possible, this too should be timed so that calving coincides with the start of the rainy season (Oct/Nov), thereby providing milk when most needed by subsistence households. Group AI services would be paid by the MCC through the price of milk given to farmers.

- **Artificial Insemination:** Elsewhere: AI in regions where smallholders do NOT own cows will not help increase dairy ownership among vulnerable households. Continued and priority giving of in-calf heifers to vulnerable-but-viable households should be encouraged in these areas, while certainly tracking pass-ons from previous deliveries. Again, mass AI or targeted synchronization probably would be the best strategy for MCC improved herds.

- **Repossession**: Continue the policy of repossession through the life of the project. The policy should be adopted for all similar programs of this kind with smallholder recipients of a dairy cow.

- **Cooperative Assets**: Formalize, ASAP, the disposition of assets provided by LOL to the dairy cooperatives it has been supporting – clarifying the value and share value for members of these assets. Use formal transfer of assets to a MCC as a point of leverage for cooperative level changes recommended here, with option of removal of assets, mirroring repossession at smallholder household levels for those MCCs resistant to these changes.

- **Containerized MCC**: Give priority use of the small 'containerized' MCCs as milk bulking centers – with priority to areas with the potential to become viable MCCs. A 'containerized MCC' can be a unique nucleus in some areas where a commercial dairy farmer or processor will provide technical and management support (e.g. Surprise Dairy), and where the vulnerable smallholder households may have difficulty forming into a viable cooperative.

- **Cooperative Management:** Revise the role of cooperative board members to one solely of oversight and setting of policy for the dairy initiatives of their members, centered on the Milk Collection Center and possible satellite bulking centers. BoD should NOT be involved in management.

- **Cooperative Management:** Recruit professional General Manager with full management authority for cooperative business with a competitive salary linked to clear production goals and incentives. At least six of the current LOL supported cooperatives should be able to do this; for the others, LOL might consider some salary support for the first year.

- **Cooperative Management:** Accelerate strengthening of MCC accounting using the QuickBooks accounting systems designed for this purpose. Accelerate links of each dairy cooperative with Herd Book Societies of Zambia for financial data input, accounting, and production of financial statements. This gives the greatest promise for financial sustainability and transparent accountability to MCC smallholder members who will want to see financial statements posted quarterly at each MCC. Farmers are most interested in their collective milk sales to their MCC – what they actually receive - and not being exploited by management when milk, or milk products produced by the MCC, are resold to either a processor or through over-counter or bulk sales. Financial statements should clearly show what was actually earned with sales (in all its forms) of milk by the MCC, and how the resulting funds were used in payment to the farmers themselves, but also for management purposes. Clear financial statements, for MCC members, help them to maximize what comes to them, and understand what may be used for secondary purposes – including possibly non-dairy ventures.

- **Milk Collection Centers: Purchasing of Milk:** Create member bank accounts and transfer funds directly into these accounts during payments. Consider payments twice each month. Support farmer bank loans for additional milking cows and dairy inputs only through the banks; coops should stay out of the complicated business of making and collecting on loans. Raise prices quickly to farmers as processors raise prices and

keep cost margins low between price received by processors/sales and farmer received prices – with transparent financial reporting on use of the difference margin. Consider dividends to members from profits of over-counter and bulk/sales (as % of milk provided), so that members feel ownership in these activities as well.

- **Smallholder Dairy Entrepreneur**: Reinforce, during the last year of this DAP, field-level hands-on support and training to the direct beneficiaries of dairy cows or pass-ons received. Close monitoring should be encouraged through farm visits and not mainly on group meetings as in the past. This training should focus on personal record keeping, improved management of animals, with attention to growing special feed for the dry season months. Provide direct linkages, where possible, to suppliers of needed inputs (medications, AI, dairy buckets and cans, plastic water vessels for calves, etc.) – and through the MCC, consider encouraging private entrepreneurs for this purpose. Building the capacity within the dairy cooperative, as LOL is doing, to focus on the priorities of their dairy business is essential. By encouraging the development, both internally within the MCC membership, as well as externally, with potential private sector actors for needed dairy inputs and services, the dairy cooperative can avoid some of the mistakes of the Small Dairy Development Program and similar programs of the past, where a private sector model was promoted, but internal cooperative capacity, priority setting with a clear business vision, was neglected.

- **Smallholder Dairy Entrepreneur:** Continue to monitor closely each succeeding generation of pass-ons, also keeping track of the increasing number of improved dairy cows possessed by all direct project beneficiaries.

- **Communications:** Give greater attention to developing a series of professionally written, high-quality, well-focused and documented success stories for wider distribution within program, and regionally. Take the best of these and professionally develop two or three short audio-video segments. Recount the 'life stories' of specific, once-vulnerable, households when illustrating key dairy lessons and impacts.

- **Lessons Learned:** As it approaches the end of this DAP, the LOL professional team itself needs to take the time to document what they consider to be the most important lessons they have learned over the past four years, with recommendations for future such programs. To date, the team has been reporting lessons learned in quarterly and results reports. A final, stand-alone document on lessons learned, as part of the final closeout report for submission to FFP and USAID, would be valuable.

Final Evaluation of

Land O'Lakes Zambia Title II Development Assistance Program

(March 1, 2004 – September 30, 2009)

Dairy Development FFP DAP for Vulnerable Populations in Zambia

(TA No. FFP-A-00-04-00001-00)

1.0 Introduction

This report presents the results of the final evaluation of Land O'Lakes first P.L. 480 Title II five-year Development Assistance Program (DAP) (March 1, 2004 – September 30, 2009) in 12 districts of four provinces[14] in Zambia. Life of project cost will be about $12.566 million,[15] largely monetized wheat grant money (62%) from USAID's Office of Food for Peace (FFP).[16] The first monetized funding did not become available until October 2004, which marks the operational beginning of the project (i.e. FY 2005). The project's goal was to reduce food insecurity among vulnerable populations in Zambia. Some 2,732-smallholder farm households, or about 24,588 people, have become the direct beneficiaries of this assistance. Indirect beneficiaries number at least another 5,464 rural households[17], without speaking about new jobs linked to the development of the various components of the dairy value chain, linking these small farmers with the private sector run dairy transporters and processors and creating the linkages required to open up alternative sources of income for Zambian smallholder farmers.

This LOL dairy project is imbedded in a Zambian context that is very complex – from the nuances of some 72 traditional ethnic groups and languages with and without experience with livestock, to local, regional and national level power politics, which use government promoted rural groups and cooperatives to organize the rural population base for political and tax purposes. The result is to both create dependency (e.g. promise of 70% subsidies on agricultural fertilizer inputs), while verbally also promoting private sector development and deriding the smallholder farmer's orientation towards dependency and expectations for free government hand-outs. "*The current dairy institutional framework is fragmented, weak, and uncoordinated. Its weaknesses are attributed by inadequate linkages between key stakeholders, inadequate legislation (Dairy Act), lack of a dairy regulatory body (Dairy Board), and the absence of a well defined dairy policy.*"[18] As an alternative agricultural business alternative for small farmers, successful dairy management is itself complex and very demanding, with many risks and pitfalls – though the rewards can be significant.

This report is divided into five major sections. Beginning with Section two, each section provides major findings or program observations, based on the consultant assisted qualitative and quantitative surveys in August and September 2008, followed by lessons learned and recommendations. **Section one** provides an overview to the background and objectives of the project, the methodology used for this evaluation, and a brief introduction to the project's results framework. **Section two** looks into the major thematic approaches of the project, specifically the business/marketing orientation, focus on small holders and vulnerable

[14] Southern Province, Lusaka Province, Central Province, Copperbelt Province

[15] LOL has received a no-cost extension for Year 5 (FY 2009). Recommendations of this evaluation will help the project to consolidate achievements and prepare for transitions towards potential continuing support through the MYAP program.

[16] The Title II DAP was signed in February 2004. Funding came from Title II 202e funding ($4,805,250) and Title II PL 480 Monetization program ($7,760,811). LOL is the organization delegated by FFP to monetize wheat within Zambia for all PL 480, Title II FFP programs. CRS, World Vision, CARE, and Land O'Lakes itself have funded most of their programs within Zambia with this money. For LOL, some 27,500 MT of wheat have been monetized between 2004 and 2008.

[17] Estimated by including a minimum of two neighboring households for each direct beneficiary, receiving both milk and additional income into households as a result of temporary employment and bartering arrangements with dairy farmers, particularly during 'hunger months'.

[18] David Daka, Deputy Director of Livestock Development Branch of the Ministry of Agriculture & Cooperatives, "The Zambian Dairy Industry, LOL report 2006, p. 6.

households, milk collection centers, and the contribution of program partners and dairy processors. Training and technical assistance are also reviewed here. **Section three** reviews program design, management, and the M&E program, with attention given to the FFP indicators, the indicator performance-tracking table (IPTT), and the final quantitative survey for this evaluation whose results are compared to the baseline and mid-term quantitative surveys of earlier years, where possible. A final **section four** reviews missed opportunities, cost effectiveness and impact, and provides key lessons learned and recommendations. It points out measures of unique impact and also looks at the issue of sustainability for future programs of this kind.

1.1 Background

Zambia has long been seen to have great potential for an expanded dairy industry both within the country, as well as regionally. It has also been seen as a "*strategic means of generating incomes and employment, reducing poverty, hunger and malnutrition – especially among vulnerable people*".[19] Government control of dairy development however between 1964 and 1983 through state dairy farms, dairy settlement schemes, rural milk production schemes, parastatal dairy farms and their related smallholder development programs ended in failure, "*largely due to poor selection of farmers who were not market orientated, unsuitable dairy animals, inadequate dairy extension services, high production costs, high subsidies on inputs by the government, regulated farm gate prices of milk by the government, and the overall involvement of government in milk production and marketing simply worsened the situation*".[20]

Following the financial collapse of the Dairy Produce Board in the early 1990s, Zambia began to move towards privatization. The assets of the Dairy Produce Board and State dairy farms were sold off, with one big buyer being what has become known today as Parmalat, an international dairy industry centered in Italy. Today there are more than twenty privately owned dairy processing plants with varying capacities, in different parts of the country. However, the GOZ's main focus within the agricultural sector since 1991 was focused, not towards livestock production but towards food security and particularly the production of maize, through a massive subsidy program – administered by the government through established cooperatives throughout the country. Every member of such cooperatives has the right to access a 'production package' of inputs for 1 hectare at 75% of the actual cost of those inputs.[21] This effectively destroyed private sector furnishers of agricultural inputs within the country. At the household level, it was in their interest for as many members as possible to register (and pay) for membership so as to gain these inputs. It is these same cooperatives that are being used by the LOL program, through the Milk Collection Centers (a cooperative asset), to reach farmers.

In September 2004, LOL completed a three-year USAID funded program: the Zambia Dairy Enterprise Initiative (ZDEI), where the focus was "*intended to stimulate the growth of the dairy industry by responding to the demand of the smallholder producer's participation in the value chain and to extend development assistance to more stakeholders in Zambia's Diary Industry. The program focused on improving the quality of raw milk, developing new dairy products and expanding markets for Zambian produced dairy products and assisting processors in improving their product quality and plant efficiencies. Program beneficiaries …were not necessarily food insecure*".[22]

The shift to this DAP in October 2004, funded by Food for Peace (FFP), required a change of focus towards working with food insecure households. Linkages **did not exist** between smallholder farmers, particularly vulnerable farmers of MCCs being established and a nascent Zambian dairy processing industry - acquiring

[19] David Daka, The Zambia Dairy Industry, Land O'Lakes report, 2006, p. 3.
[20] David Daka, Op. Cit. p. 3.
[21] The package included 4 bags (50 Kg) of basal dressing fertilizer – Compound D, 4 bags of top dressing fertilizer - Urea, and 20 Kg. of seed). Every cooperative member has the right to one package of inputs.
[22] Land O'Lakes, Evaluation Consultant Agreement; June 2008, p. 3.

milk from a few large and medium size commercial dairy farmers. Heifer International Zambia (HIZ) had already been working in Zambia, distributing improved in-calf heifers to small farmers, after initially working to train and preparing such farmers for these animals. HIZ however, did not have the capacity or technical expertise to look at the dairy industry holistically - as a value chain, or as a business enterprise. Indeed, to the extent that smallholder farmers in Zambia had cattle at all, they were kept largely as a means of wealth preservation/savings and not for milk, or for animal traction on fields. Without the aggregation or bulking of the 2-5 liters/cow of milk produced by a morning milking from one or two smallholder cows, into larger volumes at a local milk collection center, largely urban-based bulk private sector milk processors did not even consider the small farmer as a source of milk. Furthermore, because of quality issues of this highly perishable product – which must be cooled down to about 4 degrees C within a couple hours of milking, and then collected and processed within two days - milk from smallholders appeared unrealistic given low population densities and transportation issues.

Land O'Lakes DAP interventions were placed directly within the Government of Zambia's rural sector policy for development. Last year, recently deceased president of Zambia, Levi Mwanawasa, declared to the Eastern and Southern Dairy Association (ESADA) attendees *"It would not do for ESADA to concentrate on promoting commercial dairy farmers at the expense of small producers. Smallholder dairy farming has high potential for improving food security, nutrition, and income among the continent's rural poor*".[23] Land O'Lakes has been instrumental in helping to make market linkages possible between smallholder dairy farmers – through the MCC – and processors and the rapidly expanding market for milk products within both Zambia and in surrounding countries.

Funding of this project came through monetization of 27,500 Mt of wheat between 2004 and 2008.

1.2 Evaluation Methodology

The consultant used four principal sources of information to complete this final evaluation.

(1) Review of existing project documentation, including the earlier 2004 quantitative baseline survey results and 2006 mid-term survey results among program beneficiaries (c.f. Annex 2).

(2) Review and analysis of quantitative time series data from a sample of beneficiary households linked to specific milk collection centers (MCCs), as well as dairy milk purchases from partnering dairy processors, and found in LOL's Lusaka database.

(3) Quantitative Survey undertaken by in-country LOL staff in August 2008, prior to the consultant's arrival. LOL staff completed input and creation of data tables from resulting date September and October, and provided the consultant with the completed data tables November 8. The consultant provided input into the protocol for sampling and questions to be asked in the survey (cf. Annex 4), and format of the tables reporting on these data (c.f. Annex 5 & 10). The scientific methodology employed by the quantitative survey, describing the sampling frame used, approach to data collection, entry, cleaning and analysis are described in greater detail at the end of Annex 4 of the evaluation protocol.

(4) Qualitative Survey, led by the consultant, during four weeks in September 2008 (c.f. Annex 6 & 8 for sites visited and leading questions posed). The 1st week was spent being briefed by the LOL management team, meeting USAID, and Lusaka-based partners to the program. During weeks 2 and 3, the consultant met with program smallholder dairy households, MCC board members, managers, and others in the field, stakeholders, and project partners, including a number of dairy processors providing the market for smallholder milk production. During the first of these weeks, Andson Nsune, LOL M&E manager, accompanied me in the field, assisting in translation and providing background to each site. During the second, Makabansiso Ndhlovu,

[23] Mwanawasa, President of Zambia, quoted in Dairy Mail Africa, July 2007, p. 14.

Dr. Johns Nyirongo, and Evans Lwanga, LOL specialty technical leaders, accompanied me on different days. This permitted significant interaction both in and out of the field on their areas of expertise and the reality of what was being discussed and observed with the smallholder dairy farmers of the project. The final and 4th week was spent synthesizing and interpreting data and information from the four sources above, and preparing a PowerPoint presentation (Annex 16) of major conclusions and recommendations at the debriefing prior to departure. Work was also initiated on the first draft of this evaluation report.

1.2.1 Project Hypothesis

At its outset in 2004, this project put forth a development hypothesis on how it would achieve its stated objectives: The hypothesis states that (key concepts bolded):

*"Household **food insecurity** will be reduced among **vulnerable populations** in Zambia **through increased incomes** generated **from the sale of milk and other dairy related products**. This income would enable **better access to food** which would in term **reduce food insecurity** – particularly during the '**hunger months'** between December and March each year."*

The key concepts bolded above became a major focus for the evaluation. To implement the hypothesis among Zambian smallholder dairy households, the project focused on three interrelated areas, specifically targeting the food access element of food security through increased incomes:

(1) Improve the genetic quality of dairy cattle owned by smallholder farmers, thereby increasing their milk output. This was to be achieved through:
   - The distribution of improved in-calf dairy animals
   - A pass-on scheme whereby each recipient of an improved dairy animal passes on the first female animal to another beneficiary household;
   - Provide artificial insemination services to help improve and/or maintain the genetic quality of dairy animals owned by beneficiaries so that their animal productivity can be increased.

(2) Increase the quantity and quality of raw milk supplied by smallholder producers to milk processors, thereby increasing the incomes of these producers. This was done through the provision of technical assistance in:
   - Animal nutrition and health;
   - Pasture establishment and management, and
   - Milk quality assurance.

(3) Provision of market linkages through:
   - Formation of farmer associations and cooperatives;
   - Establishment of, and support to, milk collection centers (MCCs) where beneficiaries sell and bulk their milk;
   - Provision of market integration services through the facilitation of linkages to dairy processors.

Following the 2006 mid-term evaluation, the third component above was taken out of the DAP and moved to a related LOL program (PROFIT project) giving it greater flexibility in working with the private sector dairy industry. It continues to be an important overall part of reaching the initial objectives set, however, representing a major portion of the dairy value chain linking farmers with the market.

1.2.2 Focus of Evaluation

Title II final project evaluations, as recommended by Food and Nutrition Technical Assistance (FANTA), should focus towards project impact on the 'general population' within which program beneficiaries are located. One FANTA technical document states that a final evaluation for a Title II Development Assistance Program (DAP) "*is focused on population-level impacts, establishing plausible links between inputs and*

impacts, whereas the mid-term is oriented toward effects on participant households."[24] Yet, at the same time, one of the major purposes of a final evaluation is to determine the actual results (impacts) achieved by the project and lessons learned, so as to inform similar future program activities within the country or elsewhere. FANTA reference documents also note that: *"USAID's Food for Peace Office does not require that evaluations attribute effects to the project. Thus there are no compelling reasons preventing a project from selecting a Simple Pre-Post design and in many cases, this type of design is appropriate for a Title II project.*[25].

The final evaluation of this project seeks to both assess, as much as possible, the effect of the project on the 'general population', defined as specific, geographically defined, communities within which the project has been working over the past four years. However, to achieve true and lasting (sustainable) impact, four years (2-3 years in most cases for this Land O'Lakes project) is not a sufficient period of time to judge impact at the population level. Results would not be particularly meaningful. From this consultant's experience, this period should be closer to 10 years in length to permit diffusion of ideas, changed behavior, and adjustment to variable climatic factors over time, dairy industry maturity. Therefore, the quantitative survey, using a Simple Pre-Post sample methodology, does attempt to gain an initial understanding of what may be happening at a larger population level. Description of this survey, and its results, will be presented below, under section 4.0. Expectations for significant project impact at the population level, however, should not be expected.

Of much greater importance, after four years of project implementation should be the question: *Do program activities – at least among the targeted beneficiaries – REALLY have the impact suggested by the initial project hypothesis above*? *Do impacts appear sustainable for at least these people and the MCCs providing a market for the milk production of small dairy households*? These are the key questions this evaluation will address. To do so, we will stratify the project's beneficiary population', from the general population sample, into those groups that have directly benefited from the project in one way or another. The four survey groups defined were:

(1) Beneficiaries receiving in-calf heifers
(2) Beneficiaries receiving a pass-on heifers
(3) Beneficiaries of LOL technical Assistance (other than 1 & 2 above)
(4) Households not directly targeted by the LOL DAP, in areas of intervention.

Information from the qualitative survey, led by the consultant, and further analysis of the quantitative data sets currently regularly obtained each quarter by the project from a sample of beneficiary households and MCCs, as well as dairy processors purchasing MCC raw milk, will also fill in details about what is actually taking place within program areas of intervention.

Focus for this final evaluation was primarily on those aspects of the Zambia dairy value chain at the Milk Collection Center – cooperative level, and below. Efforts however were made to gain an understanding of the role and success of those dairy processors purchasing milk from the LOL assisted MCCs. Direct assistance to processors by LOL was removed from this DAP project in November 2007 and moved to the PROFIT project, where LOL continues its efforts. Nor does this evaluation look at the monetization of wheat commodities by LOL to support this program, or other PL 480 Title II activities of other NGOs within Zambia. Nor does it look at the Warehousing Receipts System that had been an initial component of the project, but was dropped by the project in 2006, following the mid-term evaluation.

This DAP combines results from both an analysis of quantitative and qualitative surveys undertaken in Zambia during August and September 2008. The major purpose of the evaluation was to assess the impact of the program on intended beneficiaries over the life of the project. The scope of work for the consultant is

[24] USAID FANTA Technical Notes #3, Patricia Barnard, "Title II Evaluation Scope of Work", April 2002.
[25] USAID FANTA Technical Notes #11, Bergeron, Swindale, et, al, "Evaluating Title II Development Orientated Multi-Year Assistance Projects (MYAPs)", March 2006, p.2.

provided in Annex 1. This evaluation has sought to include input from experience of all the principal stakeholders of this project, and Annex 3 provides a list of the major individual and/or groups interviewed by the consultant. This includes LOL Lusaka and field personnel, USAID, key leaders of dairy processors purchasing MCC raw milk from LOL's supported MCCs (Parmalat, Zambeef, Surprise Dairy), MCC leaders and the dairy farmers constituting the members of these MCC cooperatives. Efforts were made to meet both direct beneficiaries (e.g. recipients of dairy cows, pass-ons, AI, and specific training), as well as others benefiting from presence of the MCC in their communities. The consultant also met with individuals from the Government of Zambia Ministry of Agriculture and Cooperatives who are knowledgeable about the program and the country's dairy sector.

1.3 Data Limitations

Quantitative household level survey data, though extremely important, can also sometimes be misleading, in that they may appear to show the statistically valid 'real situation' on the ground. However, this is not necessarily the case, as the level of data aggregation, or the manner in which questions are asked, or how farmers anticipate the 'correct' answers to give, can skew reality. Qualitative surveys in the same areas, coupled with actual field observations, can often correct or complete understanding of what is actually complex reality. It is in the details of specific situations that we touch the complex reality smoothed out by numbers reporting. Together, the above four sources (c.f. 1.2) provided the information upon which this evaluation report is based, and determination of whether or not the project has reached its stated objectives of reducing food insecurity among vulnerable Zambian communities (and their households).

Despite all the efforts put in place through specified data quality assurance activities, there were some limitations in the data collected that were as follows:[26]

- Poor record keeping especially among dairy households not directly targeted by the program affected the quality of the milk production and sales data to some extent because the survey had up to a one year recall period for the last month of July, 2007 from August, 2008 when the survey was conducted. Despite the extensive training in good interviewing skills for enumerators, some beneficiary farmers were reluctant to disclose the volumes of milk sold in informal markets as they aimed to create a good impression of themselves. Most of the milk records present in households targeted by the DAP was also biased towards MCCs sales after production with noticeable gaps in household and calf consumption.
- The comparison of baseline and final evaluation results was only possible for five districts outs of the 11 districts surveyed. This resulted from the differences in the districts surveyed at baseline and the districts where the program was finally implemented.
- There were also challenges faced while trying to achieve the comparison between the baseline and the final evaluation. Data on yields of dairy cattle was collected as average household yields for all cattle of the same breed. Recent practices used by LOL in the farmer performance survey break down these data to each milking animal in the household. The decision to for gore this option was taken to ensure the tool did not overburden the respondents yet correcting data to allow for comparison of results of the final evaluation with the baseline.

Additional observations are made on data limitations in the final evaluation survey protocol, Annex 4, 1.3. This final evaluation report must be limited in the topics discussed – yet this DAP is extremely rich in data and lessons that could be learned and communicated.

[26] This section was written as part of the methodological section for the quantitative survey by Frank Valdivia, LOL M&E Manager, and was included as part of the data quality assurance plan. The specified data quality assurance plan can be reviewed at the end of Annex 5, under methodology.

1.4 Land O'Lakes Zambia DAP Strategic Framework and Life of Project (LOP) Results

Land O'Lakes Zambia DAP program managers have consciously and consistently sought to communicate program accomplishments within the USAID Food for Peace's strategic framework within Zambia (cf. Figure 1 below). The defined strategic objectives, with intermediate and sub-intermediate results, also contribute to USAID/Zambia's program objectives, most specifically to the SO #5 Economic Growth program objective area. The USAID/Zambia SO 5 team leader, Dann Griffiths, is also the LOL in-country project manager – though this is a Washington DC centrally funded FFP project. There is no FFP officer in Zambia.

1.4.1 Goal: Reduced Food Insecurity

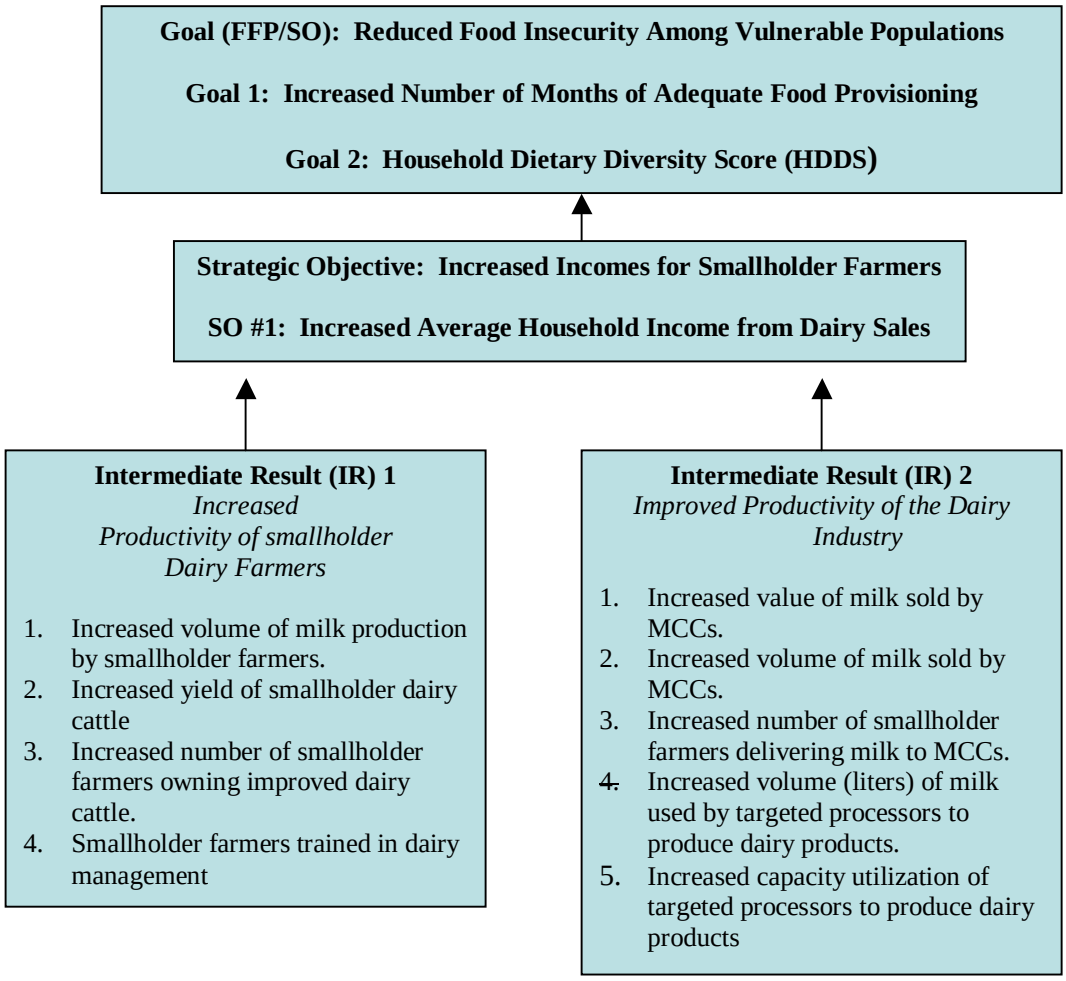
The overall goal of Food for Peace's activities in Zambia, through this Title II, PL-480 program Development Assistance Program (DAP) has been "*to reduce food insecurity among vulnerable populations"*. To achieve this goal, two intermediate results were defined: (1) "*to increase the productivity of smallholder dairy farmers*", and (2) "to *improve the productivity of the dairy industry*" in Zambia. A third intermediate result component focused towards support of smallholder storage and sales of other agricultural commodities; this was dropped in 2006, following the mid-term review.

1.4.2 Project Food for Peace Indicators

Twelve key indicators were developed to track progress in each of the above program areas and became part of the program's Indicator Performance Tracking Table (IPTT), and Performance Indicator Reference Sheets (PIRS) were created defining these indicators, with established baselines and targets (cf. Annex 5 for updated IPTT). Discussion of results is provided below in section 3.4. Five indicators were dropped from the original version of the IPTT, with regard to the Warehousing System. The current IPTT provides the results for the indicators maintained throughout the life of the project (1-12 below), but also includes results of dropped indicators until they were eliminated.

1. Number of months of adequate household food provisioning (Goal 1 level indicator)
2. Household Dietary Diversity Score (Goal 2 level indicator)
3. Increase in average household income from dairy sales (SO 1 level indicator)
4. Increase in average volume of milk produced by smallholder farmers (IR 1.1 level indicator)
5. Increase in average yield of dairy cattle (liters/cow/day) (IR 1.2 level indicator)
6. Number of smallholder farmers owning improved dairy cattle (IR 1.3 level indicator)
7. Number of smallholder farmers trained (IR 1.4 level indicator)
8. Gross average value of milk (US$) sold by MCC (IR 2.1 level indicator)
9. Average volume of milk (liters) sold by MCC (IR 2.2 level indicator)
10. Number of smallholder farmers delivering milk to MCC (IR 2.3 level indicator)
11. Volume of milk used by targeted processors to produce dairy products (IR 2.4 level indicator)
12. Capacity utilization of targeted processors to produce dairy processors (IR 2.5 level indicator)

Figure 1: Land O'Lakes DAP Results Framework



2.0 Program Thematic Orientations & Strategies Used

2.1 Vulnerable Households, and Development

Because this is a PL 480, Title II Food for Peace project, resources must be focused on addressing the food insecurity of "vulnerable households" within targeted areas of Zambia. The definition of what kind of households fall within the designation 'vulnerable household' has always been a debate, sometimes contentious, in FFP programs, usually implemented by such NGO's as CARE, World Vision, Save the Children, CRS, and others. LOL has developed what it calls a 'Food Security Continuum', trying to categorize rural households into those that are 'food insecure', 'relatively food insecure', 'vulnerable but viable', 'food insecure', and 'extremely food insecure – the latter falling below what they refer to as the 'food security threshold'.[27]

[27] Mara Russell, 'Food Security Continuum", Land O'Lakes, Washington DC, February 2006 (Cf. Annex 14). These categories appear fairy subjective, and any one household could slip in and out of a category at different times of the year. As pointed out by the project's Zambia M&E specialist, 'the food security continuum became just part of the whole selection process which is detailed in the approved Food Security Strategy paper. On its own, it was not sufficient to guarantee the selection of groups, as other aspects of the selection criteria have to be met as well' – described under the targeting section of 2.2.

This Zambia DAP is the first time LOL has implemented a DAP anywhere, and the approach is significantly different from what has become the 'traditional' approach adopted by most NGOs with DAPs. No free food assistance or food-for-work is given out, and dairy is approached as a small business – linked to its value chain - that the vulnerable smallholder farmer can manage, permanently leading them out of food insecurity.

In FFP DAPs, and now MYAPs, the 'traditional' approach has been to identify – through the local communities themselves - the 'hard-core vulnerable' within their midst – represented by (1) female-headed households, (2) the chronically ill (HIV/AIDS, TB, blind), and (3) households with one or more orphans being cared for, and particularly orphan led households. These are usually the special targets for the free distribution of food aid provided as well as other nutrition and health support (e.g. PEPFAR program). These 'hard-core vulnerable households' would be those most would classify as in need of continued welfare support, and often without the means of moving quickly, if at all, out of this state. They actually represent a very small percentage of the households of most rural communities in which FFP DAPs and MYAPs are working.

By far the largest recipients of support received from FFP 'development' programs (as opposed to food relief) in almost all countries are the 'rural poor' or smallholder households of the communities in which the 'hard-core vulnerable' people are found. The former are the people who actually make up the majority of most rural communities – households that every year experience lack of sufficient food during the last months of each dry season or early months of the rainy season before the first food can be found. Most just manage to get by through eating less, looking for temporary employment, or other strategies, but a poor rainy season or unexpected natural disaster (flooding, animal/crop disease, civil unrest) can within months place them all into a famine situation. These populations are the major DAP recipients of agricultural, health, nutrition, micro-finance, and small-scale irrigation support. **Anything** that can lead to improved production using available resources or the diversification of income sources - particularly during the 'hunger months - will lead to increased security for such households.

LOL has perhaps been more focused than most NGO DAP recipients in its efforts to reach the vulnerable or borderline vulnerable in the communities they are working in through their targeting approach – without compromising achieving real impact and increasing the odds of long-term sustainability. For households capable of keeping a dairy cow, and managing it appropriately, LOL dairy activities provides a new source of income throughout the year for smallholder households, and most significantly – the greatest incomes come during those 'hunger months'.

2.2 Targeting Beneficiaries [28]

The population groups that have benefited from this dairy focused DAP are similar to the rural poor or smallholder households usually targeted by FFP DAP programs both within Zambia and elsewhere. LOL describes their targeting at three levels:

2.2.1 **Geographic Targeting**. It is not realistic to support farmers with dairy if they cannot be linked to a market, and where the transaction costs involved in moving milk from farm to market or processing center cannot be sustainably maintained. Therefore, before becoming engaged with local communities and raising expectations, LOL considers the availability of markets and basic infrastructure required to support placing an MCC and moving milk to a processor (road network, electricity, and water for MCC). Consideration of agricultural systems and rainfall is also given. Twelve districts in four provinces were targeted within this DAP. LOL was to learn that the potential for success within a local dairy value chain is greatly increased if

[28] This consultant has evaluated many FFP funded DAPS in other countries of the region, and no NGO has ever gone as far as LOL in trying to truly target the 'vulnerable household' as recipients of the dairy cows given out. Most DAP or MYAP NGO's simply work with rural households in their target regions, the majority who can be classified as 'economically disadvantaged and vulnerable to some extent'. Field implementation always requires inclusion of some better off households as recipients, as they are the leaders of community groups.

there are small commercial dairy farmers (less than 50 milking cows) who would also benefit from a nearby bulking center, thereby reducing transportation costs of taking their milk to the market.[29] Such commercial farmers also represent potential technical assistance to their neighbor smallholder dairy farmers.

2.2.2 **Farmer Group Targeting**. LOL/Z has focused among communities that already possess established groups, or cooperatives, within LOL-selected geographical areas, who have developed working relationships with other partners or other organizations, depending on the location. Such partners may be able to carry forward technical support to new dairy activities and MCCs, once initiated, thereby increasing long-term sustainability. Other group criteria include having at least 30% female participation; at least 70% of the members must fall within the LOL food security target of **initially** having less than 6.4 months of adequate staple food provisions. Group members must prove active participation in development activities and prove high adoption rates for technical services, have access to land and water, be located within 2 hours from time of milking to delivery at a proposed site for the MCC, and show willingness to participate in the dairy development program and the conditions established.

2.2.3 **Household Targeting**. Once a farmer group has been targeted, LOL has developed a specific household level survey to determine the eligibility of specific households for special dairy support – particularly the receipt of in-calf dairy cows and the future pass-ons. Households must:

- Be food insecure (less than 6 Months of Adequate Household Staple Food Provisioning)
- Possess at last two members willing to attend training sessions and adopt dairy management techniques
- Willingness to put up livestock housing and other necessary facilities,
- Have access to water and land
- Homestead must be within 2 hours delivery time of milk to nearest or proposed milk bulking center
- Be an active member of a farmer group or association/cooperative
- Currently not owning dairy cattle and not owning more than 5 traditional cattle)
- Willingness to use proceeds from dairy sales to address household food security
- Willingness to pass on first female heifer to another program beneficiary after receiving an animal from LOL (or HIZ)
- Willingness to have animal given to them removed (and given to someone else) if they prove unable or unwilling to follow management instructions

2.3 Business Approach

Land O'Lakes is the organization within Zambia most directly responsible for initiating a viable means of assisting economically vulnerable smallholder rural farmers to become an increasingly important part of Zambia's dairy industry. This industry was once considered the sole purview of large commercial dairy farmers. Because of this dairy DAP, and the business approach taken, Zambian smallholder farmers have been given the option of becoming food secure through their own entrepreneurial efforts. What is this business approach, and what are the basic principles under-girding it?

Key LOL business principles include:

(1) One must undergo correct targeting. LOL Zambia developed its targeting at the three levels discussed above: geographic, farmer group, and household level.

(2) One must approach dairy development holistically; each link in the dairy chain must be targeted. This chain includes links between small commercial dairy farmers and their smallholder dairy farmer neighbors – milk bulking centers – processors – consumers and input suppliers. Failure at any point in this value chain will result in failure to the entire chain.

[29] Though this was not part of the selection process, this principal proved to be useful in cases where such commercial farmers are present to improve the viability of an MCC for the benefit of the targeted vulnerable farmers.

(3) All economically vulnerable smallholder households are equally deserving of assistance, whether in the Southern Province or the northern Copperbelt. Given limited resources and time, logic would suggest placing resources where they would have the greatest impact in terms of adoption and production.

(4) There is nothing noble in being poor, or remaining so. Is is OK for a vulnerable household to actually make money and cease to be vulnerable. Most vulnerable smallholder households would, given the choice, prefer to work their way out of poverty through their own efforts, to greater security for their families.

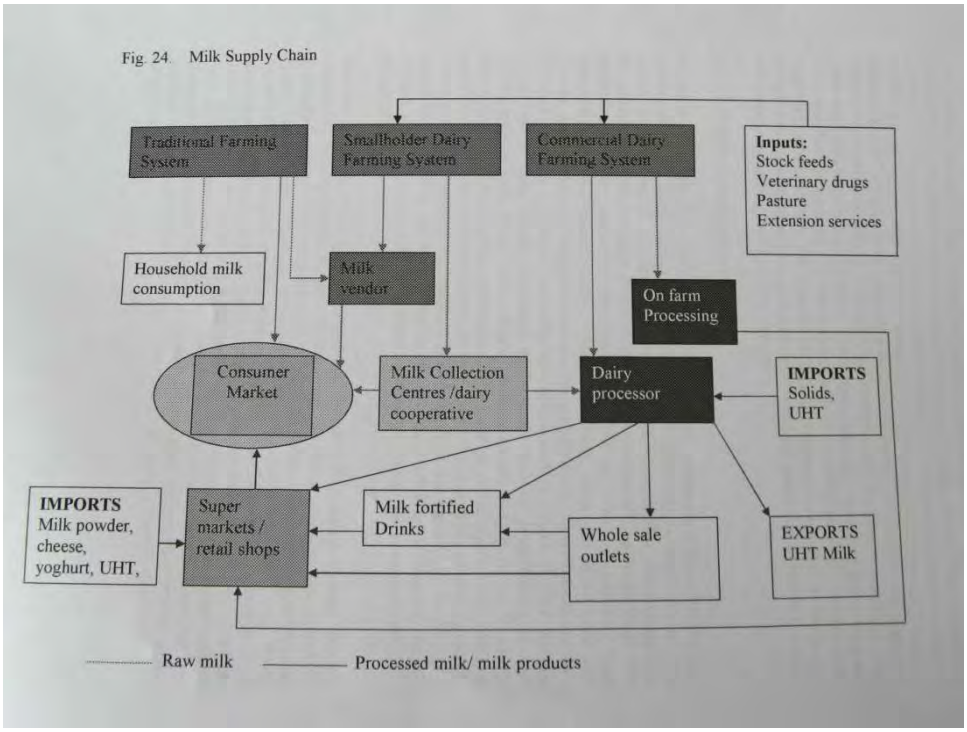
Food for Peace management leaders are dedicated to provide support for vulnerable households. FFP programs, through USAID funded DAPs and MYAPs, have been very successful in providing food relief through NGOs. When the immediate emergency or relief effort has passed, FFP encourages organizations receiving PL 480 Title II funding to move towards 'development efforts" for vulnerable smallholders households, many living in rural communities throughout the country. The goal is to help these households be less vulnerable to future socio-economic shocks. Yet FFP management leaders appear uncomfortable with the concept of moving the 'vulnerable' to 'not vulnerable' status. Doing so must implicate them into the national business economy. If vulnerable smallholder (new) dairy farmers are to be successful, the household must be linked to a functioning economic dairy chain linking them to the market and coNsuners. This means that attention must be given, where needed, to strengthening higher levels of the value chain – like the bulking centers for milk – the processors who would purchase the milk, the input suppliers that would provide these new dairy farmers with the tools needed for success (dairy buckets, medications for cows, AI, record books, etc.).

The project started off in October 2004 with a clear business direction – **looking at the entire value chain**, and excellent work was accomplished. By the third year, however, FFP leaders began to question whether LOL was properly targeting its beneficiaries. Some felt that LOL should be more clearly targeting only 'vulnerable smallholder households'. FFP representatives came to this conclusion because, in field visits to beneficiary households, they noted that recipients of in-calf heifers and other project support did not really look like vulnerable households. Many looked healthy, appeared to have assets, many even had cell phones. The conclusion: LOL had targeted wrongly.

The consultant looked into these allegations and concluded that the reality was that LOL only errored in introducing FFP visitors to project beneficiaries. Beneficiaries were no longer vulnerable households, they had actually moved up the economic ladder towards greater food and household security – something that the consultant also repeatedly observed during field visits. FFP visitors failed to distinguish the state in which these beneficiaries were in when they began receiving project support – and the state in which they found them two years into the project. LOL was, in fact, already experiencing significant success in their project objective of moving vulnerable households from a vulnerable state to one of greater economic security.

Nevertheless, FFP observations, at this time required, LOL to refocus towards that portion of the value chain at and below the cooperative/MCC level – and down to the smallholder farmer – with even greater focus on 'vulnerable farmers'. This resulted in a period in which probably more effort was given to the process of identifying the 'right farmers', and less time given to the business effectiveness of the cooperative/MCC itself, or its management. It has only been in the last year or so that there has been a swing back towards greater attention to the financial and business management issues of the cooperative/MCC; greater attention to linking GOZ cooperative inspectors and Registrar office for improved oversight of dairy cooperatives through cooperative by-laws and QuickBooks accounting being launched. Fortunately, earlier DAP LOL efforts with processors, and links to GOZ and other partners, were able to continue through a separate USAID project (PROFIT) which is funding LOL interventions targeted at processors; otherwise the entire LOL effort in Zambia could have been threatened with failure, with the smallholder farmers the greatest losers!

Figure 2: Milk Supply Chain



Approaching dairy as a business opportunity for smallholder farmers means looking at every opportunity possible to create opportunities for private initiative to support the local milk supply value chain (cf. Figure 2). Field visits with beneficiaries found that smallholder households have very clearly understood the potential they now have to become 'small dairy businesses' – beginning with one cow, but all anticipating expansion to two and more. These new dairy farmers are actively developing their own market links for the sale of their milk – not only to their MCC, but also to neighbors and other consumers. And with their increased incomes, they are themselves providing additional employment opportunities within their communities to support their new businesses.

LOL approach to providing sustainable, community based support to the growing dairy program through 'volunteer' community livestock workers (CLWs) is also founded on seeking entrepreneurs who will develop inputs for dairy farmers (AI in particular) as separate businesses. Transporting milk to bulking locations has given rise to individual entrepreneurs using their bicycles to collect and transport milk – and the project's introduction of, and support in access to, improved heavy duty bicycles continues this business approach.
Perhaps the greatest challenge of all for LOL over the life of this DAP has been in seeking to help existing cooperatives to change their focus from a recipient of GOZ assistance (and free or subsidized hand-outs), with multiple purposes, to running their dairy operation as a business enterprise. Cooperative boards are run by individuals with little or no understanding of business principles – but enjoying the prestige and power of handling funds and disbursing benefits to their local communities. Indeed, the existing cooperative structures and management norms of many, if not all, LOL cooperatives (and their MCCs) may represent the greatest threats to the long-term success of the smallholder dairy industry – placed as they are in the middle of the value chain between smallholder dairy farmer and the consumer.

Finally, LOL support to the end of the dairy value chain – the processors, selling to coNsuners – has also been based on business principles. Recognizing processor's skepticism and reluctance to put forth the capital to construct a milk bulking center for smallholder farmers, LOL has led in supporting these initial

investments through specific dairy cooperatives, and then linking them to specific processors. Initially transportation of small quantities of milk from rural locations to distant urban sites where a processor might have a facility to bulk milk was the major constraint. By establishing milk bulking centers, with capability of keeping milk cool, in more rural areas, with road access, processors have found it economically feasible to send their trucks in to gather milk – every two or three days. LOL even recommended the design to the manufacturer, and procured the development of smaller steel tanks for processors to use on the trucks they send into rural areas – permitting them to keep volumes of milk from different MCCs or small commercial farmers separate until delivered into a large bulking center, where proper grading and handling could be done.[30]

2.4 Small-Holder Households

Program direct beneficiaries – those receiving in-calf heifers or pass-ons, or direct training and technical input from the program - can be identified at several levels:

(1) Some of the hard-core vulnerable who are capable of caring for a dairy cow, yet have no means of obtaining one;
(2) Vulnerable but viable households who are willing and have the potential to participate in dairy development, yet have no means of obtaining one;
(3) Smallholder farmers, with or without one or more traditional cows, who wish to participate in dairy development; Most of these farmers care for multiple extended family orphans;
(4) Smallholder commercial dairy farmers (with at least one or more cows) who are seeking improved markets and technical assistance for their dairy activities;
(5) Dairy processors and their employees which are currently funded by the PROFIT program; and
(6) Consumers through educational and promotional campaigns on the benefits of consuming milk and other dairy products that have rapidly expanded Zambia's milk coNsuner base.

In addition to these direct beneficiaries, there are an even larger group of indirect beneficiaries:

(7) Rural community poor who find part or full time employment in both the small and larger scale dairy activities of their neighbors (milking, caring for cows, cutting forage and feeding of cows, construction of cow pens and Kraal, and all those employed through the MCCs, and for local milk transportation). Based on interviews with project direct beneficiaries, it became clear that each smallholder dairy farmer had developed relationships with at least two, and often many more, neighboring households for the exchange milk for food and services. During the peak hunger months, which coincide with the rainy season, when smallholder dairy cows are producing the most milk, milk is exchanged for multiple services. This access to food (milk) for labor was clearly important for many vulnerable households, many who themselves are on the waiting list to receive a pass-on cow in the future.

2.4.1 Farmer as Entrepreneur and Potential Small Scale Commercial Dairy Farmer

Fresh and Sour Milk Sales: By the end of 2008, LOL supported smallholder farmers were receiving about **$1,300,000 of income/year from the sale of their milk to the ten top milk collection centers**, a figure that continues to go up every year, and a figure that does not include home sales of milk or the sales at other newer MCCs.

[30] Both these steel tanks, as well as the MCC collecting tanks of many different sizes, were purchased by LOL FFP funding, and became part of the long-term investment into that part of the dairy industry focused towards smallholder dairy farmers in rural areas. This equipment, yet to be formally turned over to either the concerned dairy cooperative or processor represents valuable assets that will continue to serve Zambia's dairy industry well into the future.

In most sites visited, it appears clear that there will always be some local demand for both fresh and sour milk. The increased availability of milk during the rainy season (coming from the traditional cows) brings prices down; milk then becomes more difficult to sell, if a MCC is not available. Within the Copperbelt province in particular, demand still exceeds supply within some local communities. Dairy farmers there are still few in number, so milk/liter was observed to be selling for double the prices offered by the existing MCCs. This is posing a challenge for a new MCC like Fisenge, but, as the number of dairy farmers and milk volumes increase, this situation will change – the local market will become saturated; prices will drop, leaving MCCs as increasingly important means of bulking and selling milk to national level consumers. It is when supply exceeds local demand that MCCs become particularly important.

In practice, a farmer diversifies by practicing both options, bringing milk to the MCC in the morning (if there is one), and using evening milk for both home consumption and possible local market. When an MCC is available, an assured market, providing a regular income stream once or twice each month, provides increased security.[31] Milk that is rejected at the MCC (because it may be sour) can still be coNsuned by the household or sold to a neighbor. In local sales, sour milk appears to bring about the same price as fresh milk!

Households with milk to sell also are not forced to sell their own maize production, which they always used to do in the past to make ends meet, keeping it for household consumption, and thereby also increasing food security. Those 'hunger months between November and February' of the past are no longer so. On the FFP indicator for the number of months of adequate household food provisioning, the true answer (with rare exceptions) from direct beneficiaries must be considered to be close to 12 months of food security – having come from about 6.4 months of food security prior to dairy involvement.

Barter: The availability of milk for sale at the household level has also developed into a brisk bartering system. Barter thrives where there are impediments to delivery of milk to the MCC (i.e. households can only deliver morning milk because of long distance to MCC, or there is not a MCC at all, or for one reason or another, a family member is unable to deliver the day's milk to a MCC.) Since neighbors frequently do not have the cash to pay for the milk they purchase from a smallholder's dairy cow, and the seller prefers to avoid giving credit out, a system of exchange for goods and services has developed. Interviews with LOL beneficiaries everywhere showed this to be happening on a wide scale, with established amounts of milk for specific goods and services. The 2-½ liter jugs were a common denominator for most regions. If sold fresh to Surprise Dairy 20 miles away, this milk would have brought 3,500 K at 1,400 K/l). Such a jug of milk can be exchanged for 5 kilograms of maize (worth 6,000 K on the market). One Katapazi woman noted she had done such a transaction 5 times during the month of August alone. One man stated that he had purchased three 90 kgs. sacks of corn, at 5 liters of milk per 10 kilograms. Another household had twice exchanged the 2-½ liter jugs of milk for a large pile of cut hay to feed her cow with.

Interviews with both male and female-headed households in Masopo MCC illustrated similar responses. Most farmers practiced barter of milk, preferring this to giving milk to neighbors with a promise of future payment. Here too, a 2 ½ liter jug of milk would be exchanged for 5 kilograms of maize; sold for cash locally, this milk would sell for 2,500 k, fresh or sour. In preparing for the new rainy season, many households noted that they engaged neighbors wishing some milk to create – and later cultivate – 5 rows of maze per 2 ½ liters of milk. One female-headed household noted she had already done this four times this past month by engaging a neighboring woman. She also gave one large (standard) cup of milk (about ½ liter) of milk to neighbor's children if they would provide her with a large bundle of cut grass/hay. Female-headed households are engaging other women to do such work, while male-headed households engage both

[31] Local sales can be problematic, in that milk recipients often do not have cash on hand, and request credit, therefore delaying payments. Also, when such cash payments are made in small amounts, this money is easily used for multiple other needs, and is harder to save.

men and women. Women interviewed stated that '*women know if they don't have enough food in their house to feed their children, and so are more likely to go looking for work of this kind – bringing home milk for their children*'. One woman, now with a pass-on heifer, stated that before she received her cow she used to go to her neighbor (female headed household) and weeded this past January four times, for four 2 ½ jugs of milk for her children. She also went to another dairy farmer and did the same thing twice. This practice of working for milk by supplying labor, particularly during the rainy season, has been something practiced traditionally with farmers with traditional cows (who did have some milk during the rainy season). One male headed household interviewed noted that this year he had wanted 100 bales of hay for his dairy cows, and hired mostly women to obtain this for him, paying them at the 2 ½ liters jug rate for each 4 bales of hay. However, with the added income from dairy, dairy farmers are also using their money to purchase labor as well, one farmer noting that he hired school children to weed his fields during the rainy season.

Household Nutrition: Improved nutrition takes place in several manners. Instead of improving food security through increased incomes alone, LOL also improves food security of vulnerable smallholder farmers by making more food available – either from milk itself, or milk exchanged for needed additional food. In the first place, household members begin to drink either fresh or sour milk, many on a daily basis, some every two or three days, but especially Sundays. Interviewed household men and women repeatedly spoke of the better health of their children because of all the milk they were now drinking. Increased incomes from milk sales also permits purchase of other important food items like oil, fish, beans and maize if needed. Finally, this diversified income from milk protects the household from selling their own household produced food supplies, whether maize or other food products, permitting better household consumption as well as food security during what were once 'hunger months' between November and February each year. During the start-up phase of LOL efforts in a new area – with the construction and provisioning of a MCC - the very lack of an MCC also initially increases the home consumption of milk. Households interviewed noted that they regularly purchased both staple foods they might be low on from their own production, or other food items. Better nutrition also has a direct benefit to some household members who may be afflicted with HIV/AIDS, providing them with better health, and less susceptibility to opportunistic diseases.

Increased Incomes: When asked what were the two or three most important benefits received from their milking cow(s), farmers regularly stated increased availability to the household of **steady income** to purchase other household food needs, as well as improving their homes, and paying for school fees for their children, many of whom were orphans. On this basis, the true value for the Household Dietary Diversity Score would be at least 7, as targeted. Reported household incomes have clearly increased above the target set by the project of 6 food groups per farmer household per year (Indicator 3). Reported incomes in LOL surveys are almost certainly also (see discussion under 3.5) lower than the actual amounts received! [32]

2.4.2 In-Calf Heifers

With the exception of the Southern Province**,** recipients of in-calf heifers and pass-ons have in most cases been households without cows of their own, or prior knowledge on how to keep a cow. LOL, with assistance of its implementing partner Heifer International, brought in a new way to diversify household agricultural activities. In the Copperbelt Province in particular, most households had never been exposed to the raising of a cow in their lifetime. This was something completely new. In other areas, particularly in the Southern and Lusaka Provinces, many farmers had been exposed to the notion of keeping cows, some had once had cows that had died to disease, which they used for the cultivation of their fields through animal traction. In most traditional setups, cattle were largely kept as storage of household wealth, and sometimes sold for beef. For such largely Southern Province households, use of milk was higher in the rainy season months when forage was abundant, and even then production per cow was very low.

[32] LOL quarterly farmer performance surveys were developed to attempt to capture the more full incomes received by beneficiary households, because MCC incomes were underestimating the true incomes of these households. MCC income did not show sales within the community, or volumes coNsuned by the households, for volumes coNsuned by calves.

Initially, Zambian leaders, government officials, commercial dairy farmers, did not believe smallholder farmers could keep **dairy** cattle. Even in rural communities, people laughed at the idea of individuals actually going out and cutting grass for their cows, hauling water for them to drink; cows were supposed to graze freely. Zero-grazing, intensive management of dairy cows was largely unknown except on some commercial dairy farms. LOL efforts to target smallholders, as dairy farmers, were a radical departure from widely held popular belief concerning dairy operations.

The first 99 in-calf cows delivered by the DAP to smallholder farmers took place in March 2005 in the communities of Choma and Kalomo in the Southern Province. Those initially placed the first year came from the commercial Macleen farm in Kalomo, just a few kilometers from Kalomo MCC and only about 50 kilometers from Choma. These cows had experienced good feeding regimes and management on the commercial farm. All small farmer recipients of these cattle had received significant LOL preparation training and management care: feed and shelter had been prepared for their arrival. Nevertheless, these cows experienced stress, many died, and some would not come into heat. From such beginnings, and in subsequent months and years, **LOL placed 741 dairy cows** – both Jersey and Frisian (cf. Table 1 below). Of these, 231 or 31% died – largely from disease. Some Southern Province cooperatives experienced heavy loss (50% and 73% of the cattle distributed at Kayuni and Nteme in Monze. Government officials came in and slaughtered 100% of all placed cattle and their calves that tested positive to Contagious Bovine Pleural Pneumonia (CBPP) in Kazungula and Sikaunzwe. For other areas, particularly in the Copperbelt with less disease incidence, the loss was between 10-15% (e.g. Mutenda). Nevertheless, LOL has recorded remarkable herd growth of 55% on the total animals distributed in all project areas.[33]

Later, there was also a growing awareness within the program that the brown Jersey cows were adapting faster and better, matured more quickly, required less feed – though their milk production was lower than the expected average yields/day/cow from Friesian cows.[34] The larger black and white Friesian cows require higher maintenance and more feed. Under smallholder farmer management conditions, the Jersey cows became the preferred animals for distribution, ultimately resulting in lower mortality.

LOL undertook to see that at least 30% of the animals distributed went to female-headed households, and this generally did take place everywhere. In Katapazi, for example, of the first 37 in-calf heifers distributed, twelve (32%) went to female-headed households, and of these 37 households, 15 households (41 %) included orphans among the dependents supported. Across the regions and provinces of the project, we consistently encountered very high incidence of orphans among the vulnerable households selected to receive the in-calf heifers – as well as the pass-ons. Female-headed households also seemed to consistently have larger numbers of children (and orphans) supported – a strong argument that such households should always be given first priority as recipients of an improved dairy cow, if the household members are able and willing to manage it.

[33] Other similar dairy cattle restocking programs have experienced mortality rates of well over 80%, so LOL's efforts in this area should be seen as successful, in spite of these challenges. Details are provided in a LOL report prepared by Professor Pande and others in 2008.

[34] One smallholder farmer said that disease-bearing ticks attach themselves less frequently to the smooth skinned Jersey cows, while finding easier shelter in hairier Friesians. In a hot and sunny environment, the black and white spots of Friesians is believed to cause heat differentials within the body of the cow, leading to increased stress as well.

Insert **Table 1: Distribution of In-Calf Cows, Pass-ons, and Herd Growth**

2.4.3 Heifer Pass-ons

LOL, rather than using one prescribed approach in implementing pass-on policies in all regions adopted a more flexible and area specific approach. Thus, what ended up being done in one area sometimes ended up being different from what was practiced in some other areas. This was particularly the case in the disposition of bull-calves, where different approaches could be expected. This was further complicated by some differences in approaches between LOL and HIZ for pass-ons (who encouraged communal bulls in some locations, and use of some bull-calves for these purposes).[35] How does the pass-on work? The LOL approach is as follows, as described by implementing partner HIZ:[36]

"*If the first offspring of an in-calf heifer is **female**, the offspring is passed on after about one year of age to another vulnerable smallholder household within the community. [*This minimizes the expense and wait-time for the recipients in the care of a yet unproductive asset, at a time when the original owner will have some resources (from sale of milk) for the calf's care.*] If the first offspring is a **male**, this is supposed to be castrated, fattened, and sold. The cooperative group keeps these funds. If the **second offspring is a female**, the funds kept by the group are refunded to the family when this female offspring is passed on at one year. But if the **second offspring is again male**, it also has to be castrated and sold. The funds from the sale of these **two male** offspring are then used to purchase a reasonable heifer that is then passed on to a waiting family. This is how the family meets the pass-on obligation if there are two consecutive male offspring. The farmers also have the option of buying the bull calves. They want to sell them at a higher price because of the demand for such animals in the area. GOZ extension officers usually facilitate the selling of these bull calves to other farmers."*

LOL also worked with dairy cooperative groups to develop the wait lists for future recipients of these pass-ons – based on vulnerability and ability to care for them. Members of these 'waiting households' were expected to participate in LOL field training sessions, and preparing for their future receipt of these animals. Timing of distribution of pass-ons (of different ages) is also critical – with preference given towards the rainy season months when feed is more available. If there were 8 young heifers to pass-on, the top 8 households on a wait list would be notified. Slips of paper with each cow's tag number would be placed in a hat, and people would randomly select the heifer that was to be their own. If an initial in-calf heifer had died, prior to delivery of a calf – at no fault to the recipient household, then this household might also be an early recipient of a pass-on.

In some zones, there were less pass-ons than expected. In the first place, 8% (11 out of the 140) of the supposed in-calf heifers delivered to farmers in the Copperbelt turned out not to be 'in-calf'.[37] Some cows died in calving, losing the calf as well. Another problem was that the cows gave birth to much larger numbers of bull calves than heifer calves. Some farmers interviewed have received two generations of bull-calves. By the end of the 4th year of the project, only **175 farmers had received a pass-on heifer**.[38] The first generation of pass-ons has already produced a second generation of pass-ons (and bull-calves), and in a few cases, some of these animals have already born the 3rd generation. Many more are in-calf with the third generation. Currently, LOL has identified 133 female calves that will be passed on in the next phase of pass-ons. These were too young or had not yet been born during the period of last pass-ons. These are clearly

[35] Other organizations also had given out or were giving out in-calf heifers in some of the areas worked in by LOL. Besides HIZ, these included the GOZ, GART, and World Vision, though in much smaller numbers.

[36] Heifer International's approach in other areas is different, in that farmers are allowed to raise bull calves without castrating them, and use them for reproduction purposes, without necessarily promoting the use of specific bulls for genetic quality control.

[37] Use of AI during the first year was not widespread, and done by LOL technicians bringing in semen straws, and many early attempts were not successful (see discussion of AI below). Some of these cows have remained with beneficiaries for over two years without bearing a calf, and LOL is making arrangements to replace them.

[38] Up to 54% of the animals were distributed after 2006, with 88 households receiving their cows in 2007/2008. While most households received their in-calf heifers in 2006, many of them calved down late in 2006 or early 2007. This can also be linked to the high incidence of bull calf births and low AI conception rates; many of the households that had bull calves were not in a position to pass-on.

rolling figures that grow from month to month.[39] LOL has kept close records of the expansion of the herds for each MCC, including losses and pass-on beneficiaries (cf. Annex 13 for each MCC).

In our Katapazi interviews, near Livingston, we noted that pass-on heifers that should have been passed-on had not been – remaining with their original owner. Some of these had even grown up, and had born calves themselves. '*Why weren't they passed on*?' we asked. The GOZ has declared that, because of the outbreak of some cattle diseases in the region last year that no animals should be moved from one farm to the next – so no pass-ons.[40] Yet, abiding by the letter of this law proves to be completely meaningless in this region, as all household cattle **are mixing anyway,** as they are permitted (by local custom) to graze extensively and go to water.[41] In spite of LOL efforts through their district based facilitator and at least monthly visits by project dairy development specialists, changing long-held traditions with respect to raising cattle takes time. Even the LOL local community livestock workers of this area appeared resistant to putting into practice the management of their own improved cows following LOL recommendations. Cows and calves observed in stalls did not have feed available, nor water – expecting them to wander off and get it themselves.

Fortunately, these conditions are limited to a few specific areas and groups, and certainly do **not** occur in all areas or among all farmers visited. There are also examples of farmers and CLWs who are indeed excelling in the management of their animals, as observed with one CLW smallholder farmer in Mazeli Kitwe who was receiving an average of 20 liters/day from his cow, and selling for 4,000 K/liter. One female headed household interviewed in Kayuni, a member of a remarkable woman's group receiving LOL assistance, could have, herself, been considered a model farmer, having closely followed LOL management instructions with outstanding results. Beginning in July 2005 with her first in-calf heifer, she at the time of our interview in August 2008, had passed on her first female calf born to another group member, had purchased an additional heifer from the sales of milk, and now has three milking cows supporting her household of 8, of which three of four children are her daughters (and also member of household) who is ill with HIV/AIDS. Some of the success stories included in Annex 15 give testimony to this as well.

Currently, **801 smallholder households have either**:

(1) Received an improved cow surviving from the original in-calf heifers given out (510),

(2) Received a pass-on (175), some of whom have themselves already calved at least once. Many of these households – those benefiting in the first year of the project, already own two or three improved cows, two or more of which may currently be milking. The project does keep records on the total number of improved animals currently in possession by all direct beneficiary households at the district facilitator level to track herd growth. Some currently possess four or five cows, at least two of which can be milking.

(3) Received an improved animal through an AI cross with their traditional cows, resulting in improved crosses (116). These data are included in a table on surviving A.I. calves born (c.f. Annex 13). The number of calves born from households who received improved cows for the first time due to LOL supported AI activities is also included here.

To this 801 number will soon be added heifer calves – still in the hands of beneficiaries – waiting until they are old enough to pass on. Furthermore, there are many of the original cows and first generation heifers that are currently again in-calf, and will be calving in the coming months. Scores of cows, including traditional cows, await AI. Many will be inseminated during the coming rainy season (November/December) by project technicians. The quality of the dairy cows in the possession of all MCC members therefore continues to expand and additional vulnerable-but-viable households, yet without cows, wait impatiently to receive a

[39] The next pass-on period is scheduled during the rainy season beginning November 2008, following this final evaluation, and includes the following pass-one heifers: Mufulira -6, Kitwe -8, Chingola – 8, Choma – 33, Chibombo – 27, Kazungula – 28, Kalomo -15, Chongwe -4, and Kafue – 4.

[40] LOL is clearly obligated to respect government directives, even if farmers are not observing the rules for prevention of diseases; LOL continues in its efforts to educate farmers to respect these regulations.

[41] Two of the farmers interviewed here had their Jersey cows die from ingesting plastic, while free-grazing in this way.

pass-on. Excluding the area where all cows were destroyed, average actual herd growth has been about 84% for the past 2+ years, which is encouraging, given the losses and problems encountered. LOL intends to distribute an additional 120-150 in-calf heifers into the Copperbelt MCCs and Chibombo MCC during the coming months. A similar number will be passed to Southern Province MCCs through the CFARM MYAP of which LOL will be a continuing part beyond the life of this DAP.

Quantitative survey data indicate that, to date, only about 26% of 337 recipients of in-calf heifers have met their obligations to pass-on a female calf to another vulnerable household within their communities (Annex 10, Table 6.1).

Table 2: Proportion of Initial Land O'Lakes Beneficiaries that Have Passed on Cows to Other Farmers Q4.3.4.9

Survey Group	PROVNAME	Female		Male		Grand Total	
		n	%	n	%	n	%
1: LOL Cow Recipients	Southern	34	41.18%	150	22.67%	184	26.09%
	Lusaka	1	0.00%	30	20.00%	31	19.35%
	Central	8	12.50%	48	25.00%	56	23.21%
	Copperbelt	14	14.29%	52	32.69%	66	28.79%
	All Areas	57	29.82%	280	24.64%	337	25.52%

Note: Ns in the above table include households that directly received in-calf cows and passed on animals from LOL

Table 3: Proportion of Households Owning Traditional Cattle Q4 2 2

Survey Group	PROVNAME	Female		Male		Grand Total	
		n	%	n	%	n	%
1: In-calf heifers	Southern	24	66.7%	124	63.7%	148	64.2%
	Lusaka	1	0.0%	25	36.0%	26	34.6%
	Central	7	28.6%	44	25.0%	51	25.5%
	Copperbelt	12	8.3%	48	4.2%	60	5.0%
	All Areas	44	43.2%	241	41.9%	285	42.1%
2: Pass-on cattle	Southern	10	60.0%	26	50.0%	36	52.8%
	Lusaka			5	20.0%	5	20.0%
	Central	1	0.0%	4	25.0%	5	20.0%
	Copperbelt	2	0.0%	4	0.0%	6	0.0%
	All Areas	13	46.2%	39	38.5%	52	40.4%
3: Technical Assistance	Southern	17	41.18%	128	69.53%	145	66.2%
	Lusaka	3	0.00%	5	40.00%	8	25.0%
	Central	12	0.00%	43	13.95%	55	10.9%
	Copperbelt						
	All Areas	32	21.88%	176	55.11%	208	50.0%
4: Non LOL DAP	Southern	54	27.8%	247	51.0%	301	46.8%
	Lusaka	5	0.0%	19	15.8%	24	12.5%
	Central	27	7.4%	65	10.8%	92	9.8%
	Copperbelt	5	0.0%	41	0.0%	46	0.0%
	All Areas	91	18.7%	372	36.6%	463	33.0%

Notes: The Ns in the above table are for households that owned livestock

Though most recipients of LOL in-calf heifers did not possess **dairy cattle** previously, some did own traditional cattle. Quantitative survey data for the household surveys in both the table above and below give some indication of prior ownership of traditional animals by province and by sex of the household head

(Annex 10, Table 6.4). As would be expected, highest ownership is in the Southern Province, lowest in the Copperbelt.

Table 4: Proportion of Households Owning Traditional Breeds of Cattle Q4 2 4							
		Final Evaluation					
Survey Group	PROVNAME	Female		Male		Grand Total	
		n	%	n	%	n	%
1: All Households Interviewed	Southern	110	40.0%	551	55.7%	661	53.1%
	Lusaka	10	0.0%	62	24.2%	72	20.8%
	Central	59	6.8%	178	14.0%	237	12.2%
	Copperbelt	24	4.2%	108	1.9%	132	2.3%
	All Areas	203	24.1%	899	38.8%	1102	36.1%

2.4.4 Bull Calves

Though female calves are certainly more highly valued, and clearly provide a more rapid development of a household's business prospects from dairy, bull calves too are clearly also valued – though for quite different reasons (animal traction, future sale for cash, genetic qualities). However, within the context of the pass-on program, bull calves have posed major problems. Community households waiting to receive their own milking cow – through an eventual pass-on of a heifer – are forced to wait another year or two when bull calves are born. Indeed, the DAP has experienced an unusually high percentage of bull calves. Of the 355 calves born (and surviving) to households receiving an in-calf heifer, **63%** were bull-calves (cf. Table 2).

LOL, in response to different cooperative issues in different provinces, has been flexible in its responses to issues as they rise. In one area, a cooperative – on its own initiative - decided to accept a bull calf – given to the cooperative – as a pass-on, if the cooperative will either exchange thee bull calves for heifer cows from distant farmers or the cooperative will use the proceeds from sales of bull calves to buy heifer calves for pass-ons, thereby ending that specific farmer's obligation for future pass-ons. In such cases, if the second calf born is a female, the farmer has the right to keep it. This circumvents the pass-on rule initially established by LOL and HIZ with respect to initial farmer receipt of an in-calf heifer. The cooperative may sell this bull calf at 18 or so months of age, when taken from the farmer, for 2-3 million K - much less than the current 5-8 million cost of the heifer that should be passed on. Funds are used for needed cooperative expenses, such as purchase of liquid nitrogen and semen sticks, or other expenses. In principal, a number of bull-calves could be sold to eventually purchase a heifer which could then be passed on to a qualified member – though such a case does not seem to have actually happened.

LOL has experienced difficulties in the disposition of bull-calves born to the in-calf heifers distributed. The policy is that these bull-calves be castrated or removed completely from the community, as it jeopardizes the future genetic quality of the local herd. LOL does not encourage farmers, or their CLWs, to keep special bulls for the community – as an alternative to AI. While promoting AI, it also remains true that results in many locations have been mixed. The consultant observed many situations in which small farmers had received an in-calf heifer, but then having to wait for one, two, and in some cases longer to get their cows re-impregnated. Some have had as many as four AI treatments done without success – with multiple reasons cited for this failure – and all at a supposed cost of about 50,000 K per

AI.[42] But the bottom line is that the farmer's herd is not growing for these vulnerable households. Farmers that got a bull calf when their in-calf cow was received often do not want to castrate their bulls. Some want to keep them for breeding purposes. Some farmers interviewed indeed had seen them mount their own mothers, with positive results. The bull calves are from superior genetic stock and could potentially provide useful genetic material for local cows, if managed appropriately.

2.4.5 Livestock Management Systems

Within much of Zambia, traditional cattle are managed using extensive management systems, and are not enclosed and grazed or fed and watered as expected for dairy cattle. During the dry season months in particular, and under the care of young people, they are permitted to graze where they wish; cattle of a community may mix with those of others, increasing the possibility of transmission of disease. Changing such traditions for intensive management of dairy cattle, enclosing them in kraals and fenced pasture areas, growing forage crops, cutting and storing this for dry season months, and bringing water are new practices for smallholder farmers. Making the needed changes has proven to take time. Quantitative survey households that had received in-calf heifers or pass-ons were asked about how they were now keeping their cattle. The responses below show where special efforts need to continue to reinforce new management systems: Southern Province farmers lead in such need, followed closely by Lusaka and Central Province dairy households (Annex 10, Table 6.7). Copperbelt Province households have been the best in adopting new ways of management – having had the least former experience with traditional cattle.

Table 5: Proportion of Households Using Different Cattle Management System Question 4_2_7

		Southern Province						Lusaka Province						Central Province						Copperbelt Province					
		Male		Female		Total		Male		Female		Total		Male		Female		Total		Male		Female		Total	
Survey Group	**Types of Pastures Used for Soil Improvement**	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1: In-calf heifers	Free Range	124	20%	24	21%	148	20%	25	24%	1	0%	26	23%	44	2%	7	14%	51	4%	48	0%	12	0%	60	0%
	Zero Grazing	124	42%	24	54%	148	44%	25	56%	1	0%	26	54%	44	59%	7	71%	51	61%	48	100%	12	83%	60	97%
	A Combination of Both the Above	124	38%	24	25%	148	36%	25	20%	1	100%	26	23%	44	39%	7	14%	51	35%	48	0%	12	17%	60	3%
2: Pass-on cattle	Free Range	26	27%	10	30%	36	28%	5	0%	0	0%	5	0%	4	0%	1	0%	5	0%	4	0%	2	0%	6	0%
	Zero Grazing	26	42%	10	10%	36	33%	5	60%	0	0%	5	60%	4	100%	1	100%	5	100%	4	75%	2	100%	6	83%
	A Combination of Both the Above	26	31%	10	60%	36	39%	5	40%	0	0%	5	40%	4	0%	1	0%	5	0%	4	25%	2	0%	6	17%

Notes: The Ns in the above table are for households that received cattle from LOL

[42] According to LOL, these AI success rates are not out of line, or unexpected, even by US standards. The real issue here is that the costs involved are beyond the means of vulnerable smallholder farmers to pay, and LOL has supported the MCCs in dealing with this reality.

2.4.6 Repossession & Tough Love

Some recipients of in-calf heifers who were **not** following LOL best practices for management of these valuable animals had their animals repossessed and given to another household within community who promised better management and care. It took great courage on the part of LOL to insist that farmers, before receipt of such animals, agree to a management package for the animals – which included the pass-on provision and repossession if management recommendations were not followed. Following through on the implied threat was not an easy undertaking! Local cooperatives were not able or willing to follow through without the assistance of senior LOL management personnel direct involvement. It was traumatic for the concerned farmers to have their animals repossessed. It was also contentious. But LOL was able to convince the dairy cooperative leadership that NOT doing so was a punishment to the entire community for lost future pass-ons (if animal should die). Some farmers made formal complaint to local civil authorities – with the cases ending up at the highest ministry levels in the Zambian government. MACO sided with LOL however. The result was that program direct beneficiaries took much more seriously the recommendations given, and the care needed for their valuable animals. Many who have had their animals repossessed have subsequently returned to the dairy cooperative, admitting that their management was deficient, and have subsequently received later pass-ons. They have become some of the best dairy farmers in their communities. Tough love, well applied, led to success.

2.4.7 Book-Keeping

LOL has designed and provided a record-keeping book – with carbon sheets that LOL can take out for its own record keeping - which the farmer must purchase and eventually pay for through future sales of milk. However farmers do not use this book regularly. Rather, LOL supported dairy farmers have become accustomed to using a separate, pocket size, notebook (also introduced by LOL) where they daily record milk sales,[43] with the idea that someone with 'good handwriting' can transfer the information later on to the larger record-keeping book. And this does happen in many cases. The introduction, by LOL, of keeping written records of their dairy business activities to smallholder farmers who have never before kept such records, or seen the need to do so, is an achievement in itself. The use of the pocket size milk sale records appears to have become well established everywhere, and is a good base for future learning and expanded understanding for the use of the larger record-keeping book.

During our field visits, we asked to see the record books among the men and women who met with us. Actual records seen (i.e. the large record keeping books) were almost always incomplete – particularly when it came to something as important as the household's local production and sales of milk (volume and value) each day. On the next pages are given two examples which were frequently seen, when the consultant asked to see the individual household record books given to farmers to track quantities and utilization of milk. In the first case, our visit on **September 18** – showed 9 liters in morning, 9 in afternoon already recorded, with **future** results from the 19th to 24 also already entered! September 6, 7, and 8 had exactly the same number of liters obtained in morning and evening, and September 10,11,12,13,14 all had 12 liters in morning, 10 in the evening. In the second case, the cow remarkably gave exactly the same amount of milk every day for a month, morning and evening! Clearly though significant quantities of milk may have been coming from these cows, it is also certain that the amounts were not the same every time either.[44] These numbers were being put down for the project, and clearly

[43] The consultant frequently, at many different locations, observed the use of these smaller record books. After weighing the milk delivered by a farmer, a MCC worker would record, for the farmer, the liters delivered at that time, on that day - also recording the same information into the MCC's own record book of daily purchases. When a MCC had a truck to send out to take delivery of milk at different collection points along a paved highway, the same process was observed. It was possible to ask any smallholder dairy farmer to see his or her pocket record book, and be able to see the transactions over the past weeks and months.

[44] Farmers clearly lack understanding concerning precision measuring equipment to allow them to record differences of 100 ml. In most of the volumes indicated, any volume not making up a full liter may be subject to estimations – a half liter might actually be 0.2 or 0.6 liters.

not seen as important by the farmer himself to keep an accurate record of the true volumes and uses. For project data recording, this is why LOL reports on the actual milk delivered by the farmer at the MCC, where records are better kept and accurate. Also, dairy farmers noted that they usually took some milk, almost every day, for household consumption.[45] Yet their records rarely showed this. These households will not reach their potential in their new dairy enterprise until they begin to track, themselves, and as accurately as possible, amounts received and how it is used (sold or coNsuned).[46] Furthermore, these same households will never become fully responsible members of their dairy cooperative until they have kept such records for their own enterprise – knowledge that they can then transfer to their understanding of what their cooperative is doing with the milk furnished and sold to it – and how it keeps its own records! Much more time and effort should be given by LOL technicians to assisting direct beneficiaries of these dairy cows with their record keeping.

The MCC will, upon delivery of milk by a farmer – whether to the MCC itself or truck picking up the milk as shown above – register the volume of milk into the small dairy book carried by each farmer. In principal, the information from this book is supposed to be transferred into the larger books (shown in

[45] LOL's quarterly farmer performance surveys attempt to obtain these data on a three-month recall period. This survey focus on household milk production, household consumption, MCC sales, community sales, and calf consumption levels, as well as other variables.

[46] This challenge is, of course, not unique to small scale dairy farmers, but is an issue for all small farmer household level enterprise ventures. As rural households become more focused towards business principles, and as these households have more educated and literate members to support in record keeping, this situation will certainly improve. Nor does this issue detract from these same farmers's enthusiasm for improving their dairy management, or being part of a dairy cooperative – it is simply a limiting factor for full success.

photographs above, and in records below). If the records below were accurate and maintained by all LOL supported dairy farmers, they would certainly be extremely valuable in assessing the impact of dairy on these households.

Figure 3: Daily Milk Production Charts

Name of farmer

Male-headed / Female-Headed household (Just Tick)

Cow Name / Number

Month SEPTEMBER 2008

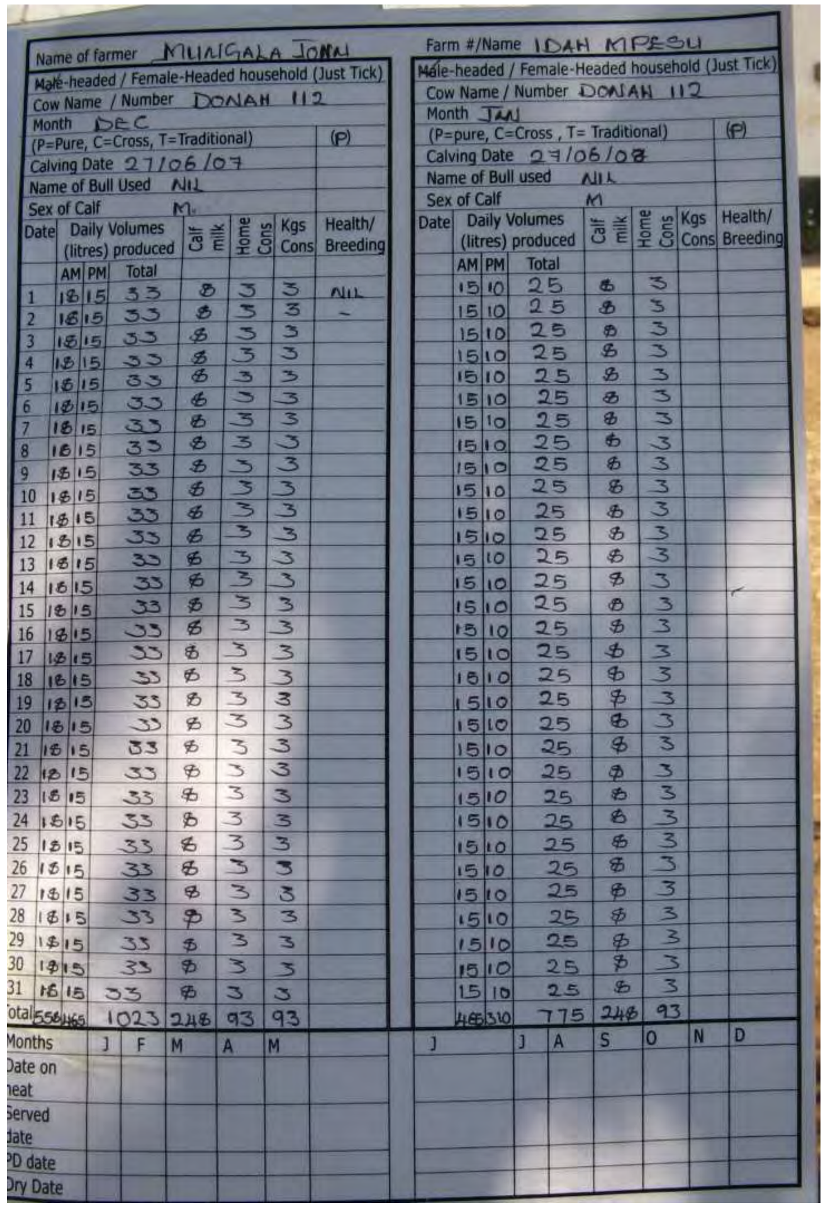
(P=Pure, C=Cross, T=Traditional) ( )

Calving Date 09-03-08

Name of Bull Used

Sex of Calf

Date	AM	PM	Total	Calf milk	Home Cons	Kgs Cons	Health/ Breeding
1	10	9	19 L	—	1 L		
2	10	9	19 L	—	1 L		
3	10	8	18 L	—	—		
4	9	8	17 L	—	—		
5	9	8	17 L	—	—		
6	10	10	20 L	—	—		
7	10	10	20 L	—	1 L		
8	10	10	20 L	—	1 L		
9	12	9	21 L	—	—		
10	12	10	22 L	—	—		
11	12	10	22 L	—	—		
12	12	10	22 L	—	—		
13	12	10	22 L	—	1 L		
14	12	10	22 L	—	—		
15	11	11	22 L	—	—		
16	11	10	21 L	—	—		
17	11	9	20 L	—	—		
18	9	9	18 L	—	—		
19	9	9			—		
20	8	8			—		
21	8	8			—		
22	8	8			—		
23	9	9			—		
24	9	9			—		



Name of farmer MUNGALA JOHN

Male-headed / Female-Headed household (Just Tick)

Cow Name / Number DONAH 112

Month DEC

(P=Pure, C=Cross, T=Traditional) (P)

Calving Date 27/06/07

Name of Bull Used NIL

Sex of Calf M.

Date	AM	PM	Total	Calf milk	Home Cons	Kgs Cons	Health/ Breeding
1	18	15	33	8	3	3	NIL
2	18	15	33	8	3	3	–
3	18	15	33	8	3	3	
4	18	15	33	8	3	3	
5	18	15	33	8	3	3	
6	18	15	33	8	3	3	
7	18	15	33	8	3	3	
8	18	15	33	8	3	3	
9	18	15	33	8	3	3	
10	18	15	33	8	3	3	
11	18	15	33	8	3	3	
12	18	15	33	8	3	3	
13	18	15	33	8	3	3	
14	18	15	33	8	3	3	
15	18	15	33	8	3	3	
16	18	15	33	8	3	3	
17	18	15	33	8	3	3	
18	18	15	33	8	3	3	
19	18	15	33	8	3	3	
20	18	15	33	8	3	3	
21	18	15	33	8	3	3	
22	18	15	33	8	3	3	
23	18	15	33	8	3	3	
24	18	15	33	8	3	3	
25	18	15	33	8	3	3	
26	18	15	33	8	3	3	
27	18	15	33	8	3	3	
28	18	15	33	8	3	3	
29	18	15	33	8	3	3	
30	18	15	33	8	3	3	
31	18	15	33	8	3	3	
Total	558	465	1023	248	93	93	

Months	J	F	M	A	M
Date on heat					
Served date					
PD date					
Dry Date					

Farm #/Name IDAH MPESU

Male-headed / Female-Headed household (Just Tick)

Cow Name / Number DONAH 112

Month JAN

(P=pure, C=Cross, T= Traditional) (P)

Calving Date 27/06/08

Name of Bull used NIL

Sex of Calf M

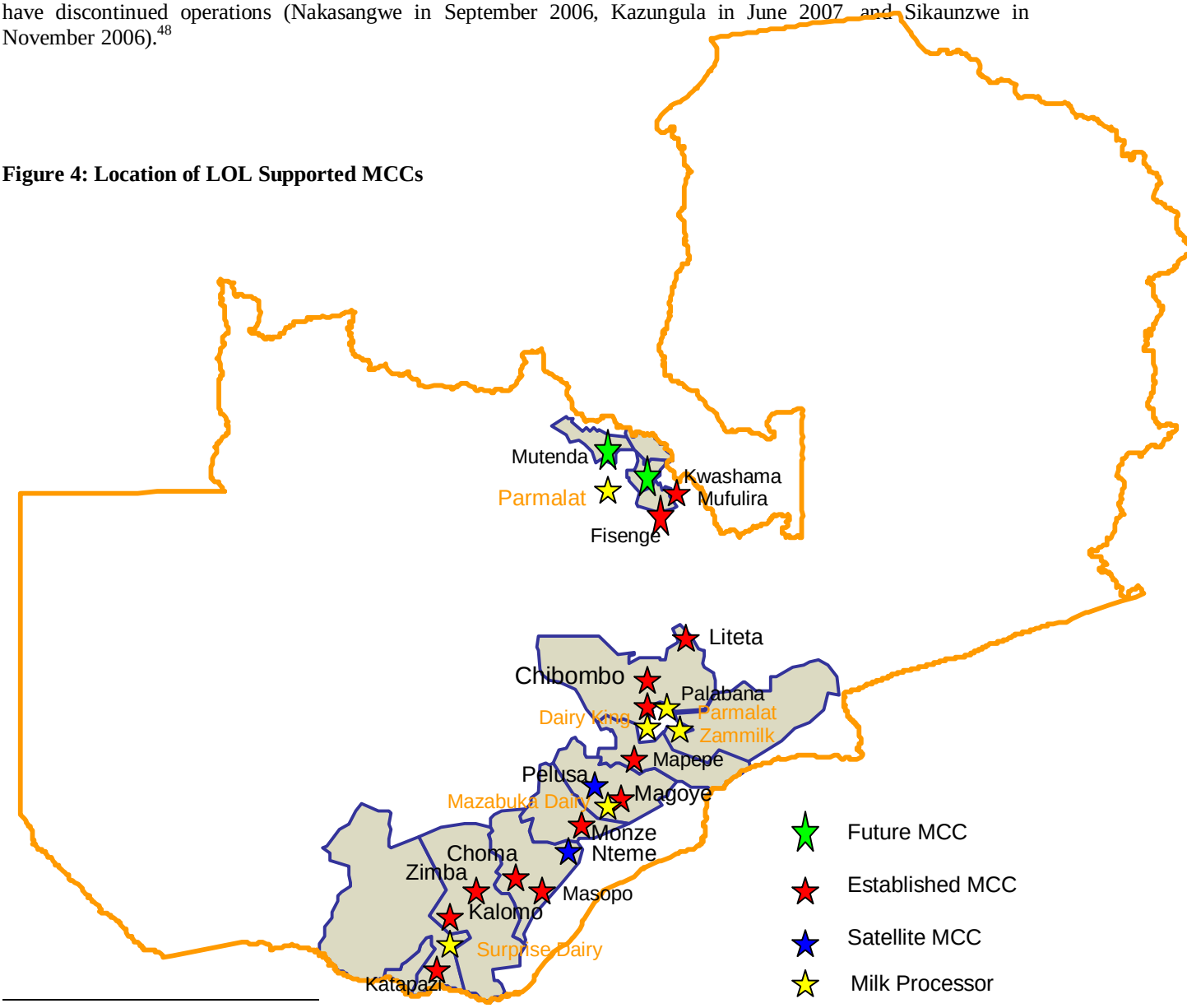
Date	AM	PM	Total	Calf milk	Home Cons	Kgs Cons	Health/ Breeding
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	18	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	15	10	25	8	3		
	465	310	775	248	93		

J		J	A	S	O	N	D

2.5 Milk Collection Centers

Land O'Lakes Zambia currently works in four provinces and 12 districts. Nineteen Milk Collection Centers (MCCs) have been supported over the life of the project, of which only 17 are today operational or about to become operational, as shown Figure 4 below.[47] Five MCCs, initiated in October 2004 (Magoye, Monze, Palabana, Kalomo, and Choma) have the potential to become successful cooperatives, if managed correctly (cf. Table 2 below). Seven additional MCCs (Zimba, Mapepe, Liteta, Chibombo, and Katapazi (and two satellite MCCs of Monze (Nteme & Pelusa), initiated later in the DAP, are still becoming established, but appear to have the potential to develop as well. Five new MCCs are about to become operational (Masopo, Fisenge, Kwashama, Mutenda, Mufulira). Three MCCs have discontinued operations (Nakasangwe in September 2006, Kazungula in June 2007 and Sikaunzwe in November 2006).[48]

Figure 4: Location of LOL Supported MCCs



[47] Two in the Copperbelt have been delayed, waiting over one year to be connected to electricity (Mutant & Kwashama) – though cows have been delivered to beneficiaries, and milk is being sold through local means. Fisenge has just been connected, after also waiting for over a year for connection to the Copperbelt electrical grid. Fisenge cooperative members have received in-calf-heifers and have been selling milk locally into the nearby town of Kitwe. Mufulira has just begun operations, allowing farmers to bulk their milk using a deep freezer LOL has purchased for the group.

[48] For Kazungula and Sikaunzwe, the reason for closure was mainly due to the slaughter of the animals by the GOZ after they were tested positive for CBPP. This also shows the lack of a clear and helpful compensation plan by GOZ to help vulnerable households rebound from such a catastrophe towards productive lives. For Nakasangwe, there was a problem of high costs of power generation due to the use of a diesel generator for the MCC, as well as cooperative management issues.

Copperbelt Province
(1) Mutenda MCC
(2) Fisenge MCC (opened August 2008)
(3) Kwashama MCC (3 groups of farmers)
(4) Mufulira bulking center (opened November 2008)

Central Province
(5) Liteta MCC (3 groups of farmers)(photo at right)
(6) Chibombo MCC

Lusaka Province
(7) Palabana MCC
(8) Mapepe MCC

Southern Province
(9) Monze MCC (two groups of farmers) 1 satellite MCC at **Nteme (16)**
(10) Magoye MCC (six groups of farmers 1 satellite MCC at **Pelusa (17)**
(11) Choma MCC (4 groups of farmers)
(12) Masopo MCC (opened August 2008)
(13) Kalomo MCC (4 groups of farmers)
(14) Katapazi MCC (direct sales to Surprise Dairy processor)
(15) Zimba MCC (2 groups of farmers)

2.5.1 MCC Management

MCCs currently operate under the management of a cooperative board of directors. Most cooperatives were multipurpose in nature before being taken on by LOL in Central and Copperbelt provinces, and LOL has worked to transform them into dairy cooperatives. Some of the cooperatives (Palabana, Monze, Choma, Magoye, and Kalomo) were dairy cooperatives when LOL adopted them. Yet many of the older cooperatives in Southern Province continue to have multi-purpose tendencies. The major intervention of this nature is currently to organize to receive GOZ subsidized inputs for maize production.

Most cooperatives/groups in the Southern Province were already registered as dairy cooperatives when this LOL DAP adopted them after the ZDEI program, and capacity building for them has focused on improving their by-laws as well as refining their various sub-committees. By the time of this evaluation, Fisenge and Kanfinsa had already been assisted to register as dairy cooperatives and the process had started for all other MCCs such as Musahashi in Mufulira, Mutenda in Chingola, and Liteta in Chibombo. Yet, in spite of this effort, the older cooperatives (their boards of directors, principally) remain multi-purpose in focus, while the newer ones – because of the precedents established in the past – seem to be moving in this direction as well.

The numbers of farmers delivering milk to their MCC rises and falls each year, depending on the season, and if their cows are milking or not. Yet, the numbers of farmers delivering milk over time has consistently increased from project inception. This peaks during the rainy season months of December and January, and is greatly supplemented in the Southern Province from the traditional cattle able to produce at this time. Though the liters/milk/cow is low for traditional animals, the numbers of traditional

Insert **Table 6: LOL DAP Supported MCCs**

cows that can be milked at this time can be quite high in some areas. Furthermore, with the exception of one or two MCCs, there has been a continuous **decrease** in the number of farmers **not** delivering milk to their MCCs in successive project years. This has been due to improved management at the farm level resulting in longer lactation cycles.

Figure 5 and 6 for Magoye and Palabana MCC monthly milk production in liters, respectively, shows variability in milk production by month. The pattern of other MCCs is fairy similar, with greatest dips in August through October (c.f. Figure 7a and Table 7 below). In 2007 Magoye MCC averaged 180 smallholder farmers delivering milk each month, receiving an average price of 1,255 K/liter. Farmers delivered annually between a high of 22,660 liters/year (small commercial farmer) to a low of 3.4 liters/year (one farmer, one delivery), with the median being 1,469 liters/year. Total smallholder receipts from the sale of this milk – largely to Parmalat - for Magoye in 2007 were $179,685 (cf. Annex 12). Prices received by farmers this year are about 1,800 K/liter, and volumes/farmer appears to have increased as well.

Figure 5: Southern Province: Magoye Monthly Milk Production in Liters

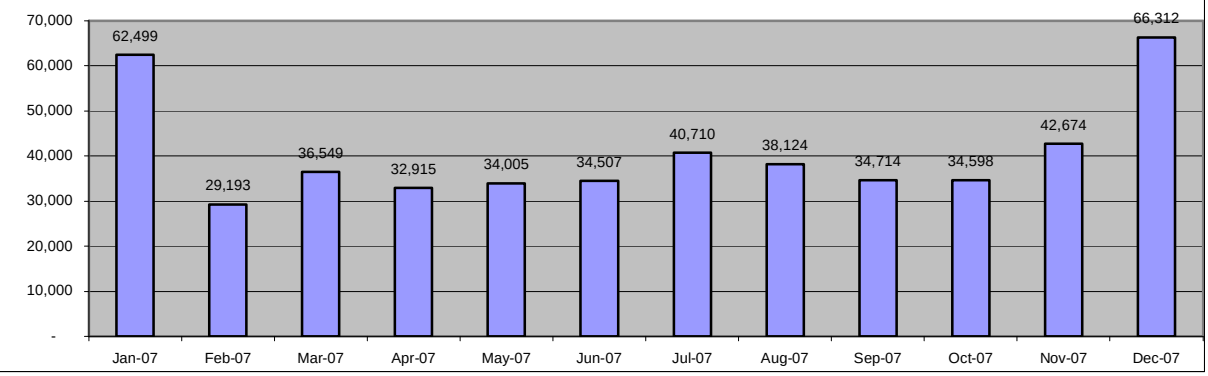
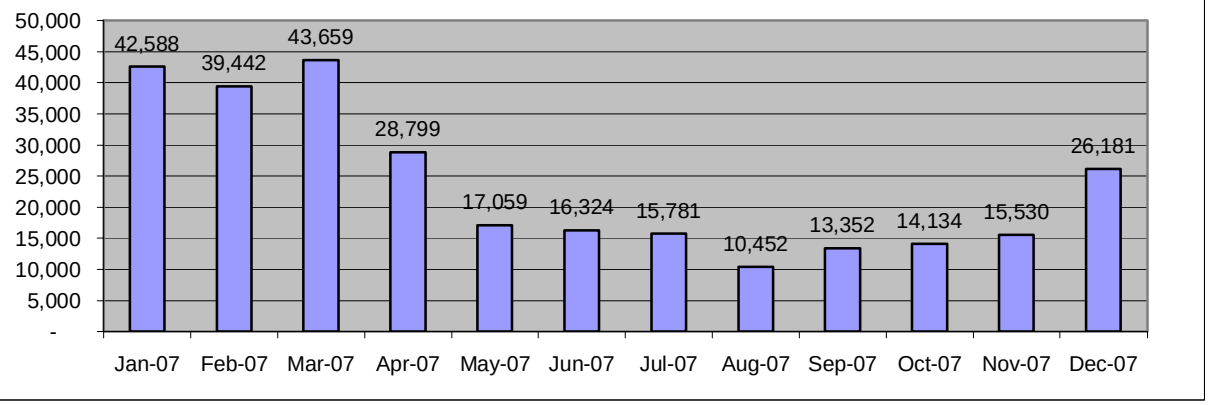


Figure 6: Lusaka Province: Palabana MCC Monthly Milk Production in Liters



Boards of Directors of all cooperatives supported by LOL are also dairy farmers themselves, some of whom also received in-calf heifers given out by LOL. Though most of these animals were reserved for those classified as truly vulnerable, around 10% of animals were given to better off members wishing to be involved in initiating a MCC in their areas. For sustainability reasons, the involvement of such

Insert (7a and 7b)

Figure 7a: Value (US $) Milk Production Purchased by MCCs from Smallholder Dairy Farmers by Quarter

Insert

Table 7: Top Ten LOL Supported MCCs: Volume and Value of Milk Purchased from Farmers by Quarter

individuals is essential for rural community success. Some of the individuals included in this 10% spent their own resources to make the program successful. These were also the literate members of their communities. Examples of their efforts include using their personal buildings (and land) for the MCCs, or using their vehicles to deliver milk to MCCs during the start-up phase. Board members, appointed to three-year (once renewable) terms, rarely have much idea about running dairy as a business and may have their positions because of their social standing or perceived influence by the membership. Presidents and treasurers tend to hold the most power on the boards.

Financial management of funds that used to be one of the greatest challenges is slowly being dealt with LOL's creative effort in the past year through the establishment of Quick Book accounts for the principal MCCs being supported.[49] This has required each MCC to furnish LOL with book keeping records (milk purchases from farmers, expenses, and milk and other dairy product sales) that can be used to produce financial statements for MCCs. Annex 12 provides an example of information currently available for Magoye MCC.

The strategy is that these Quick Book accounts will be transferred to an independent, private-public partner agency, Herd Book Society of Zambia (HSZ), who will continue to manage these accounts, for a small fee, on behalf of the cooperatives in the future. This provides an outside audit source to the program, as well as hardcopy reports, charts, and figures which can help the MCC manager, board, as well as members, understand the business of their cooperative. The challenge, already experienced by LOL, is to actually receive from the cooperative/MCC all the financial records, and on a timely basis. HSZ with whom LOL has partnered in this endeavor already provides other services to Zambian cooperatives, and success in this area could be extended to other cooperatives in the country. MACO/Zambia leaders who have responsibility for oversight of all cooperatives within Zambia strongly support this initiative, as it would provide them with accurate information about the profitability of dairy cooperatives. Engagement of professional cooperative/MCC managers at all MCCs would facilitate this process, and remove the board from financial accounting and fiscal management.

2.5.2 Capacity

With the rapidly growing demand for fresh milk and milk products within Zambia and the region, Zambia's private sector has not been idle in increasing capacity to exploit market opportunities. Farm gate prices for milk has increased significantly during the life of this DAP – about 10%/year or 30% since FY 2006, and the milk from smallholder Zambian dairy farmers, as a percent of total national production, has gone up dramatically – from essentially ZERO to about 15% currently. This has been of enormous benefit to Zambian rural economies, and smallholder vulnerable households in particular.

2.5.3 Milk Purchases & Prices to Farmer Members

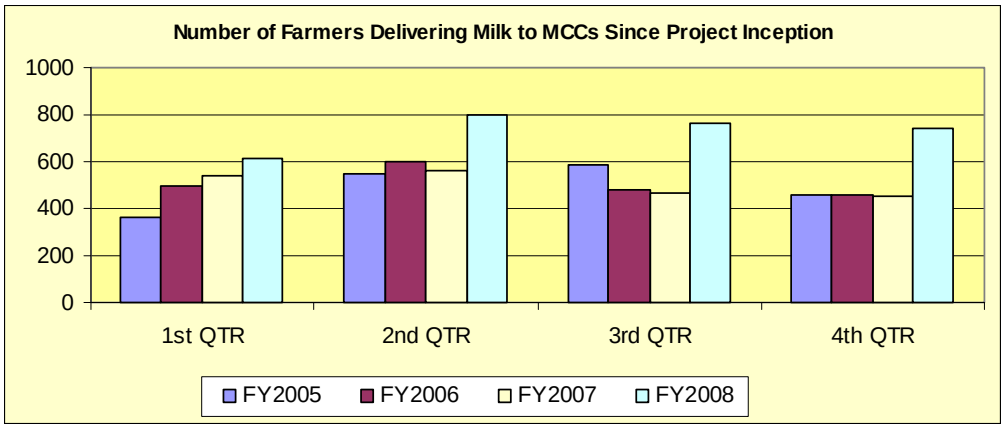
Over the life of this DAP, for the operational 10 MCCs, a total of $2,759,010 has ended up in the pockets of the smallholder dairy farmers supporting these MCCs, most linked to the five older MCCs above (cf. Table 6). These funds went directly to 879 separate – once vulnerable – households, representing at least 5,441 individuals. The same 10 MCCs have sold their milk to processors for a total of $3,015,175, with volumes and values increasing dramatically as LOL provided improved dairy cows continue to increase and become established within these concerned communities. This value represents only part of the total

[49] Magoye, Monze, Palabana, Kalomo, Choma, Zimba, Liteta, Mapepe and Chibombo have been initiated; the balance of LOL supported MCCs will be initiated during the coming year, and also managed by HSZ.

MCC dairy sales, as they have also sold both fresh, sour, and yogurt products in over-counter sales. The latter funds, combined with the difference between prices received from processors and payment to farmers, represents assets used to manage the MCCs and cooperative.

There has also been continuing growth in the numbers of farmers delivering milk to their MCCs, from year to year, as evidenced in Figure 8 below. Starting at about 600 farmers prior to the DAP's installation and support to the MCCs in 2004, the project has seen an increase to 879 smallholder farmer households delivering milk between 2005 and 2008, 70% of the project's target of 1,250 households (c.f. IPTT, Annex 7, p. 64). With an additional 300 vulnerable farm households that have been reached with dairy in the Copperbelt during the past year and not counted in the numbers above, this target has almost been reached, and will be by the close of the DAP by September 2009 (c.f. 2.5.2 below, under HIZ).

Figure 8: Trends in Number of Farmers Delivering Milk to MCCs since Program Inception[50]



Well-established MCCs have been able to diversify the final use of the milk purchased and bulked from their farmer members. While processors like Parmalat still purchase the bulk of most milk, some MCCs have also found significant bulk sales to other markets. Many also, with urban market locations for their bulking center, also manage to sell significant quantities of their own processed milk products – like strawberry or pineapple flavored yoghurt – sold at $0.59 or 2,000 K per 250 mls. plastic bottle (Choma cooler shown here). A ½ liter plastic sachet of fresh or sour milk will sell for 1,500 k. ($0.44).

The Choma MCC site visited was different from all the other LOL supported MCCs in that this is actually a union of smaller MCCs, with three rural bulking centers (Masopo, Mbabala, Kanchomba with cooling tanks of 1,600, 1,000, and 500 liters, respectively. Currently, Choma sells its fresh milk to Parmalat, even though other processors have tried to

[50] Note that FY 2008 data does not include MCCs in CFAARM operational areas (Kalomo, Zimba, Masopo, Kanchomba and Katapazi bulking centers, and new centers in FY2008 in DAP areas including Liteta, Chibombo, and Fisenge, so actual numbers are somewhat higher.

negotiate purchases from them (Surprise Dairy, Finta). Choma had sold milk to Finta before, but because they could close at any time for maintenance, or would be closed on holidays – they could not be counted upon to take their milk consistently enough. Yet it was also clear that this dairy cooperative union was very poorly managed, they don't look at profit/loss statements, there was no financial transparency, and financial records were not published and communicated to members. Without significant changes, it is not likely to remain viable long, and could break up into a number of more independent units – which probably would not be a bad thing.

Masopo, a member of the Choma dairy union, is well on the way to becoming independent. With over 130 active members, they are in the process of registering themselves as a dairy cooperative with the government. This is an area that has received considerable food relief support in recent years through World Vision, which continues with a number of their own development activities in the area, including many of the MCC members. Vegetable gardening activities, using manure from cattle, appears a successful complementary activity. All 54 households who received the initial delivery of in-calf heifers were also once recipients of World Vision food relief assistance – today none of them continue with such assistance. As practiced elsewhere, Masopo dairy farmers, as a group, pay Choma 45,000 K ($14) for transporting their bulked milk every three days to Choma. Since becoming operational with their own bulking center, Masopo dairy has received one payment from Choma for their milk, August 31, 2008 for 8,389,300 k ($2,467), with expenses for transport, livestock medications and feed already deducted. Over and above this, Masopo has had counter sales (fresh and sour milk) for an additional $2,566, some of this reportedly going to teachers in the area. The center is purchasing milk from its members at 1,700 k/liter, of which 100 k is deducted/liter to cover their costs of MCC workers, guards, and eventually electricity as well. One of the CLWs here has been very successful with using synchronization for AI, and farmers are very supportive of getting rid of un-controlled bulls. In fact, farmers themselves stated that they now prefer AI with their traditional cows, because calves are better adapted than the animals brought in from the 'outside' – something that LOL technicians have also observed and remarked upon.

Masopo beneficiaries interviewed, as elsewhere, were very appreciative about the benefits they have already received from the income of milk sales. Most frequently cited benefits: ability to purchase additional food maize, payment of school fees for children, cooking oil, sugar, and vegetables, feed for animals, school uniforms for children and better family clothing, and payment for barter labor services on their household farms (milk in exchange for labor). Some had purchased a TV, operated by battery for their homes! A large number had also purchased cell phones.

Estimating the actual average net household income being received through dairy can be accomplished in several ways. In the discussion below under cost effectiveness of the program (c.f. 5.4) the cost/household of this DAP project would be $10 million/2,732 (total direct household beneficiaries) or $3,660/household. Net benefits per household would be total investment minus total benefits ($7,217,668) generated by the program, which is about $1,077/household or $120/person.

In the DAP final quantitative survey (c.f. Annex 10, Table 4.6.9), responses from the target beneficiaries (recipients of in-half heifers, pass-on cattle, and technical assistance) reported $959.46 in annual income – very close to our $1,077 estimate above. The difference between the grouping of project recipient sub-groups and the sub-sample of 'non-LOL households' in the same areas was also statistically different - with the latter group reporting annual household income of $710.

Table 8: Dairy Incomes (Average for Different Provinces and Survey Sub-Groups)(Annex 10, Table 4.6.4)

		PROVNAME				
SurveyGroup	Data	Central	Copperbelt	Lusaka	Southern	Grand Total
1: In-calf heifers	Average of SumOfEarnings	ZMK 1,426,616.67	ZMK 2,449,503.03	ZMK 4,343,021.74	ZMK 2,738,484.27	ZMK 2,613,572.30
	StdDev of SumOfEarnings	ZMK 1,490,544.33	ZMK 1,928,177.65	ZMK 9,568,001.06	ZMK 4,136,928.15	ZMK 4,492,286.16
	Count of HH	42	33	23	124	222
2: Pass-on cattle	Average of SumOfEarnings	ZMK 472,800.00		ZMK 612,750.00	ZMK 3,527,291.30	ZMK 3,185,615.38
	StdDev of SumOfEarnings	#DIV/0!		ZMK 423,203.41	ZMK 5,402,570.63	ZMK 5,159,820.71
	Count of HH	1		2	23	26
3: Technical Assistance	Average of SumOfEarnings	ZMK 439,000.00		ZMK 26,793,283.33	ZMK 3,448,947.89	ZMK 5,086,900.00
	StdDev of SumOfEarnings	ZMK 169,608.37		ZMK 29,707,551.92	ZMK 4,463,421.43	ZMK 10,607,852.52
	Count of HH	3		6	71	80
4: Non LOL DAP	Average of SumOfEarnings			ZMK 801,666.67	ZMK 2,503,926.42	ZMK 2,412,733.93
	StdDev of SumOfEarnings			ZMK 666,827.06	ZMK 5,819,123.79	ZMK 5,672,823.84
	Count of HH			3	53	56
Total Average of SumOfEarnings		ZMK 1,341,471.74	ZMK 2,449,503.03	ZMK 7,772,932.35	ZMK 2,945,694.28	ZMK 3,138,292.06
Total StdDev of SumOfEarnings		ZMK 1,450,291.88	ZMK 1,928,177.65	ZMK 16,621,764.63	ZMK 4,691,989.69	ZMK 6,499,545.95
Total Count of HH		46	33	34	271	384

Summary					
	ZMK	ZMK/$	US$/year	days	US$/day
All Survey Groups	ZMK 3,138,292.00	3,400.00	$923.03	365.00	$2.70
First Three Survey Groups	ZMK 3,262,167.84	3,400.00	$959.46	365.00	$3.83

2.5.4 Bookkeeping and Financial Transparency

Until now, few of LOL supported **members** of the MCCs appear to receive regular reporting on the business of the dairy cooperative from their Cooperative/MCC boards. Though it may be mandatory for cooperatives to provide an audited financial report at every annual general meeting, what members actually appear to be receiving at such meetings are verbal reports; but transparent, financial reporting has not taken place.[51] Most cooperatives are creating some form of financial reporting at the board level, as evidenced by comprehensive tables viewed for the Mutenda Farmers Cooperative Society in the Copperbelt. This included a balance sheet, value of assets, and income and expense statements for the past quarter, including a commentary about the dairy business of cooperative over the past months. To the extent that most cooperatives consistently produce such documentation, this represents a good base for further improvement of financial reporting.

Quick Books accounting established by LOL for the five initial MCCs, to be expanded to others, should eventually provide the greater transparency and ease of reporting financial management to cooperative boards and members. However, for members to be able to even understand such information, even if posted at the MCC or elsewhere, they need themselves to be tracking the profit-loss of their own small-scale enterprise at the household level. Though LOL has provided dairy record books at the direct beneficiary farmer household level, actual use of these records has not been very successful. LOL has been successful in introducing the regular use of small pocketsize milk sale books for all beneficiaries, who recognize the importance of knowing what they have sold to the MCC – to verify what they should receive in later payments. They have yet to regularly track household and calf milk consumption regularly, or sales (cash or barter) of milk to neighbors. Final evaluation survey data

[51] Because the consultant was not able to confirm this statement, this remains more of an impression than a proven fact. What I mean by 'transparent reporting' is the posting of such statements in a place (e.g. MCC), where members can read or study them at their own leisure.

suggests that most LOL smallholder dairy farmers have the ability to fill out such books, so not doing so consistently has probably more to do with lack of conviction of its importance, or inability to coordinate this with a household member able to keep such records. Given the state of these dairy enterprise record books at household levels, there almost certainly has not been enough effort given to helping individual dairy farmers at this level. Frequent household level visits to assist and verify that records are being kept properly and consistently are necessary until the time that these households begin to see for themselves why such records are important. MCC dairy farmers will not begin to take their responsibility as cooperative members seriously, and use their power as the actual owners of the MCC, until they are themselves first applying business principles with their own household level dairy activities.

2.6 Program Partners

2.6.1 Golden Valley Agricultural Research Trust (GART)

As a private sector research institute in Zambia, GART has been a partner in providing specialized assistance in several specific areas of the LOL dairy program. GART undertakes crossbreeding of improved breeds with local Zambian cattle, and has been one of the sources of in-calf heifers for distribution to farmers, particularly at the beginning of the distribution program in 2006. It was also an early supporter of LOL's entry into the AI program initiated two years ago in early 2007. GART has also been one of the project's sources for pasture grass seed for sale through the cooperatives. Finally, GART has been a center of excellence in the control of milk quality and grading with LOL MCCs. GART, however, sometimes offers services to dairy cooperatives which may hinder their long-term development and sustainability – for example providing 100% free trucks to some cooperatives for pick-up of rural milk, or providing their own managers to prop up failing cooperatives – when it would probably be better to let them fail and reorganize for efficiency. GART does not seem to see dairy cooperatives as businesses that must learn to operate without continuing government or donor intervention.

2.6.2 Heifer International Zambia (HIZ)

Heifer Project International is a faith-based international NGO with decades of experience in Zambia. HIZ is perhaps best known internationally for its distribution of all forms of livestock to vulnerable farmer households – with its own source of funding from individuals and churches in the USA and elsewhere providing the seed capital. Prior to distribution, training in care and management is given, always expecting recipients to eventually pass-on the same to a neighbor.[52] Because of its more holistic value chain and business approach to dairy, LOL has proved to be an important partner to HIZ in linking those benefiting from HIZ in-calf heifers to processors and markets. HIZ has had a strong presence in the Copperbelt and was therefore a natural partner to expand LOL's program within that area. One of the criteria for selecting a target area was that local dairy farmer groups should have existing relationships with other organizations capable of supporting dairy efforts after the end of the project and departure of LOL. HIZ is such a partner, with long-term commitments to areas in which they work.

In the Copperbelt therefore, LOL had a sub-agreement with HIZ using its DAP resources to purchase in-calf heifers for distribution and HIZ's initial technical with LOL's funding for field support and training to farmers in management and care of the animals. LOL was called upon to assist with the creation of the MCC in Luanshya (Fisenge) to integrate the farmers into the formal milk market. Here, LOL has also provided technical support on milk handling and hygiene and has trained four AI technicians and carried out AI synchronization activities benefiting a total of about 300 farmers. This additional number has helped the program to exceed its targeted numbers of farmers trained and supported by the program. The animals and technical support provided by HIZ in Kitwe, Chingola, and Mufulira was done with LOL's DAP funding. In Luanshya and Ndola, HIZ used its own funds to organize the groups and provide technical support. HIZ, using its own funds, has distributed, during the life of this DAP, some 273 in-calf heifers in the Luanshya and 65 in-calf heifers in the Ndola areas of the Copperbelt. These initial animals have subsequently resulted in an additional 200 pass-on heifers, with another

[52] Animals distributed include in-calf heifers, bulls, goats, sheep, pigs, bees.

62 waiting to be passed-on. LOL focused on helping these new dairy farmers with milk equipment, with AI (and CLWs), and in development of and support of MCCs and the distribution links to processors. LOL's successful partnership with HIZ in Luanshya has allowed the program to extend its support to an additional 300 farmers mainly through market linkages, cooperative management and artificial insemination.

HIZ director, Barnabas Chitalu, noted "*Heifer provides heifers and communal bulls where AI services are not well developed. In Fisenge (in the Copperbelt), farmers were given communal bulls. LOL then (subsequently) introduced AI services here (through World Wide Sires), but is was not effective, so farmers abandoned it and went back to the bulls. In LOL groups, AI was only introduced after two years, because at the time of the (initial) animal placements (within Zambia), LOL did not have the capacity to do AI.*" [53]

2.6.3 Ministry of Agriculture & Cooperatives (MACO)

LOL's most important partner in Zambia is certainly the Ministry of Agriculture and Cooperatives through which this DAP is linked to various groups and cooperatives in the target zones. The project has established strong and collegial working relationships with individuals in several divisions of MACO. All those interviewed during this evaluation appeared to hold LOL and its team in highest regard. The Ministry's National Artificial Insemination Services (NAIS) division in Mazabuka trains all AI technicians in Zambia through a two-week course. LOL, through its farmer-to-farmer program, was able to provide a professional volunteer who, while working with NAIS, was able to completely revise this training course, bringing in many hands-on practical skills to the training. NAIS has trained 48 CLWs from LOL MCCs over the past two years, with 21 having just completing the course in September 2008 (c.f. Table 11 below).

Some 21 MACO personnel have also been trained, in the field, as community livestock workers, dairy community and AI extensionists (c.f. Table 12 below). The Ministry's Cooperatives and Marketing division has provided guidance in placement of LOL cooperatives and supported the establishment of the dairy activities within these groups and cooperatives. This division will become increasingly important as LOL supported cooperatives become dairy associations linked to their MCCs, and become disengaged and independent from their 'mother cooperative'. The long-term sustainability of these new dairy cooperatives may depend on the Ministry's support for such a direction. The livestock development branch of MACO has also been particularly supportive of LOL DAP activities because its objectives fit so closely and well within the ministry's overall objectives for smallholder dairy initiatives within Zambia. This is also the division that authorizes the importation of semen from the USA, through World Wide Sires, that are the basis for the future quality of the dairy herd within Zambia – a herd that has become increasingly inbred over recent years. Finally, the division caring for the spread and control of cattle diseases within the country is also important.

2.6.4 World Wide Sires (WWS)

WWS's role within this project was greatly diminished from the role initially anticipated at the beginning of the project. Soon after the project mid-term evaluation in October 2006,[54] LOL discontinued its sub-contractor arrangement with WWS, while maintaining a relationship with them as a major source for AI straws. According to program management, WWS did not appear to have the capacity or inclination to build up the local capacity of the CLWs and MCCs to develop sustainable marketing links for needed AI supplies – dealing with such issues as liquid nitrogen, storage tanks, management and timing of AI use, etc. As a international genetics company, WWS

[53] Personal communication with HIZ Zambia director, September 9, 2008. About this communication, LOL notes that though the bulls were promoted, management of such bulls was difficult due to moving them from one farm to another, and fears of spreading diseases. This reality was what encouraged area farmers to call on LOL to help them with AI services and led to the training of four AI technicians for Fisenge farm groups, including supporting AI synchronization and insemination there. Kampelembe farmers in particular have castrated all their bull calves and registered with the Herd Book Society of Zambia to ensure continuous access to quality AI services.

[54] LOL Mid-Term Evaluation, John Keyser, October 2006, pp.60-61; The mid-term provided a good description of expected deliverables, achievements to date, and relevant observations on progress to date of WWS efforts, which will not be repeated here.

was perhaps more interested in simply selling US AI supplies to the Zambia program and in increasing market share. WWS continues to be one of the major sources for AI semen straws for the DAP.

2.6.5 Herd Book Society of Zambia (HSZ)

HSZ, though only becoming a significant partner within this LOL DAP in 2008, has been a private sector supporter of Zambian commercial dairy farmers for many years. Seeking a sympathetic and reliable partner who might support Zambian dairy cooperatives in one of their most serious constraints – financial management and transparent bookkeeping – LOL approached HSZ with a creative new approach. LOL has during the past year begun to focus on the serious issues of the financial management of the dairy related finances generated through the Milk Collection Centers. Cooperatives, including dairy cooperatives, continue to be engaged in all kinds of other financial transactions, including loans to its members, and sale of GOZ subsidized inputs. The Mutenda cooperative referred to above was also looking into a program with dairy goats with HIZ. Without a transparent financial management system, these dairy cooperatives are likely to misuse their funds and, through mismanagement of resources, lead themselves into bankruptcy.

LOL, in early 2008, began to work with the most successful of the dairy cooperatives it has been supporting over the life of the DAP, and to obtain current fiscal data and place this into Quick Books accounting formats. It probably is NOT realistic to expect any of the existing dairy cooperatives to actually be able to maintain these Quick Book accounts themselves – at least not until far better managed and organized than they currently are. None yet have an executive manager with the professional qualifications to run these dairy cooperatives as business entities – though they do employ accountants to keep fiscal records.

Therefore LOL approached HSZ, which does have the professional staff able to do the accounting needs of a dairy cooperative, using Quick Books, as the in-country agency to provide this service, for a reasonable fee, to dairy cooperatives. HSZ has accepted to undertake this role, and has been working with LOL over the past several months to develop the reporting formats that would provide each dairy cooperative with regular statements on profit and losses, and figures to show trends. Annex 12 provides an example of such statements and figures for the Magoye MCC. The GOZ and MACO have been extremely receptive to this new approach, hoping that this will indeed provide a way forward to professionalism accounting and use of fiscal data for dairy cooperative planning and management purposes. It is far to soon to know whether or not this initiative will be successful – as so much depends on the openness and transparency of each dairy cooperatives itself in actually providing the complete financial data on operations. Given past and existing management practices, there may be many reasons that existing boards may not want this much transparency.

2.6.6 Dairy Processors and Marketing

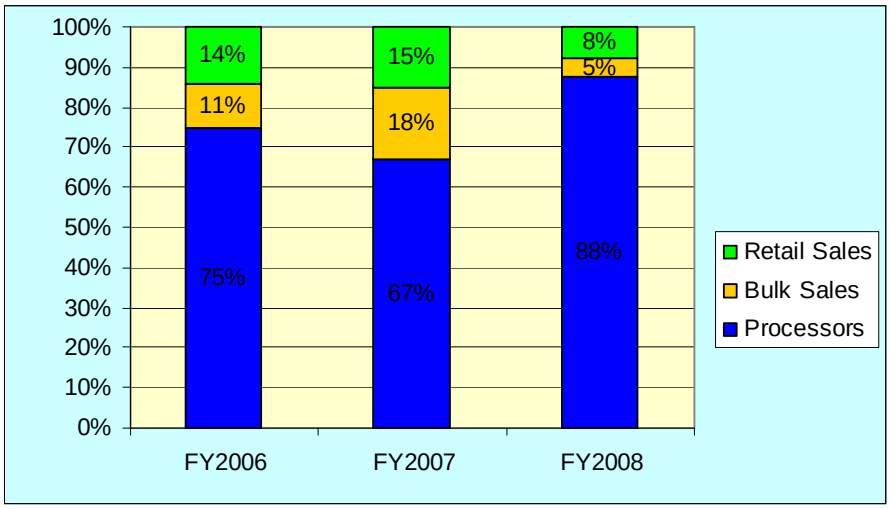
According to MACO, following the privatization of the Dairy Board between 1991-1996, the number of processors increased from one (the GOZ Dairy Board) to more than twenty currently. Parmalat and Finta are currently the largest processors in the country, with an installed capacity of 120,000 liters/milk/day, of which only about 42% of capacity was being used only several years ago.[55] But capacity has not only increased, but many of these processors are operating at almost full capacity during some periods of the year. With the increasing need for additional milk, processors, in spite of their reservations, are being 'pushed' into strategies of acquiring more milk, offering more services for rural milk bulking centers - the most important of which is picking up the milk at the rural site, and also giving MCC opportunity of receiving higher prices for higher grades of milk. These trends help smallholder farmers.

It was observed in field visits, as well as noted in LOL's own reports, that processors do continue to be the most dominant – and growing - buyers of milk from the MCC – providing the stability and sustainability needed by the small farmers to move forward in growing their small businesses. As MCCs become better managed, they are finding other options for the sale of their milk – either to bulk buyers who may provide higher prices/liter than

[55] MACO Report, p. 69.

what a processor might (e.g. Kwashama in the Copperbelt purchase at twice the MCC expected rate, once operational, at 4,000 K/liter). Also, as Zambians come to drink more milk, over counter sales also increases as small plastic sachets of milk and other dairy products are sold to individual clients. In FY 2007, LOL noted that 1,078,623 liters were purchased by processor clients of 6 MCCs, representing 67% of total milk sales of these MCCs, representing a reduction from 75% in 2006. Yet, by the end of 2008 this had increased to 1,831,710 liters. As seen from Figure 9 below, market shares for processors sales increased between FY 06 and FY 08 from 75% to 88%, with both retail and bulk sales decreasing. This trend was expected with increasing volumes of milk and local availability of milk.

Figure 9: Comparison of Market Shares for Milk Buyers in FY2006, FY2007, and FY2008 [56]



Market Shares in FY2006, FY2007 and FY2008

Liters:	Processors	Bulk Sales	Retail Sales	Total
FY2006	1,166,366	171,571	223,269	1,561,206
FY2007	1,078,623	290,006	241,256	1,609,885
FY2008	1,831,710	94,218	167,433	2,093,361

Parmalat

Land O'Lakes has been working with fourteen of the 20 processors who currently make up the membership of the Zambia Dairy Processors Association (ZDPA). Some of these are large firms; others are small, sometimes family businesses. All have experienced significant growth in recent years. Of these firms, four are given particular importance for this review in that they purchase the bulk of the milk coming from the LOL initiated Milk Collection Centers (MCCs). Without these MCCs, small farmers who might wish to diversity their income sources through dairy and the sale of milk would have had no sustainable marketable outlet. Certainly, some milk can always be sold locally, but such local markets are extremely limited and selling a couple liters of this perishable product each day takes time and includes high risk. MCCs provide the small farmer with a more reliable market as well as additional benefits through shared group efforts to improve veterinary and feed accessibility for their animals.

Parmalat, one of the two largest milk processors in Zambia, is an international firm, based in Italy, with branches throughout southern Africa. Their quality manager, Mr. Martin Njovu, in Lusaka, noted that the firm has

[56] FY2008 data does not include sales by CFAARM supported MCCs (Kalomo, Zimba, Masopo, Kanchomba, and Kataspazi).

experienced strong growth over the past few years, with monthly purchases over the past year (2008) at about 2 million liters of milk each month (cf. Annex 9 for production volumes since 2004). Total production purchases are at about 45-50 million liters/year, representing about 150,000-160,000 liters/day currently. He noted that if another 60,000 liters/day were available, Parmalat could easily take this in. Such growth is expected to continue to trend upward, with prices offered to farmers increasing annually at about 6-10% (related to inflation rate of 9-10 % in 2008). Historically, they have purchased from commercial dairy farmers, but in recent years, due largely to LOL interventions in the creation and support of regional milk collection centers (MCCs), they have begun to purchase from small farmers. The growth of this latter group has had a very significant impact in spreading the benefits of dairy into many new areas of the country, benefiting thousands of small farmers and certainly reducing their vulnerability to seasonal lack of rain for crop-based agriculture. He also observed that while commercial farmers produced most of their milk in the dryer months (zero-grazing)(when they would let their cows 'go dry', the small-scale producers did so during the rainy season months – grazing on grass in their field. Milk production currently increases for them during the dry season months – from the large commercial farms - with peak in October, and with lows in January-February-March during the rainy season. Therefore, free grazing small farmer dairy cattle during the rainy season months and the milk they produce, is a very welcome complement to the industry.

Initially, when Parmalat began to purchase milk from small-scale farmers, through MCCs, they have expected these groups to bring the milk to them, even though Parmalat has large volume trucks that they go to commercial farmers to pick up. LOL introduced into Zambia the use of smaller size containers, and partnered with Parmalat to pick up milk from the MCC. LOL provided the steel container, and Parmalat provided the truck on which these were mounted. Since December 2007, Parmalat has been using these smaller milk-hauling trucks to collect from MCCs – currently three in South, for example (Magoye, Choma, Monze). This action has resulted in further increased growth in the volume of milk local farmers are bringing in to the MCCs.

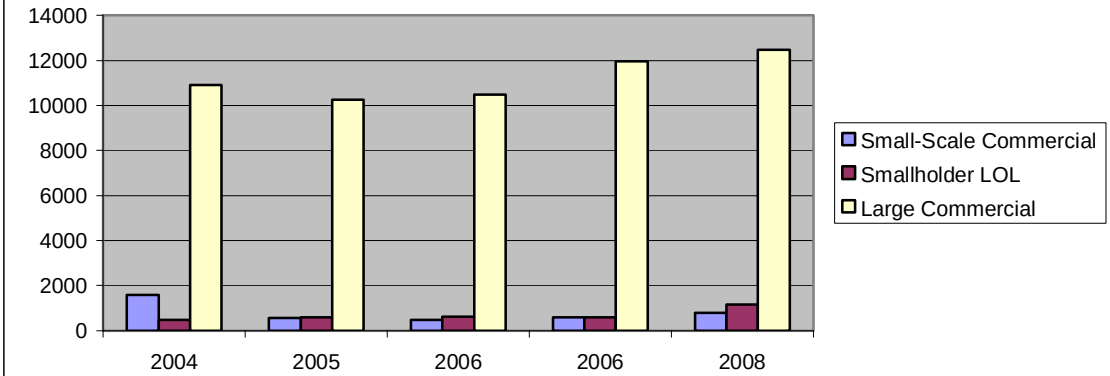
In its business focus, LOL has encouraged the processors with whom they have worked in linking to MCCs to begin to provide quality controls and business management/record keeping training at the MCC level. Parmalat has provided such training, at no cost to trainees, who have also been exposed to working conditions at 'model' dairy farms to see how well-run operations work. Increasing these links will be important for the sustainability of the MCCs in the future. Indeed, many small-scale processors have actually begun to compete for the rights to access to milk from MCCs, and the links between some private sector run processors with specific satellite MCCs and other private dairy farms has grown. One important service has been in the informing of dairy farmers of the actual prices being offered for their milk – something which will certainly have a controlling influence on the possible miss-use or prioritization of funds coming in to MCCs from sales to processors. This gives farmer producers a greater transparency on where their milk is going, what it is being sold for, and how much they should be receiving. MCCs often don't inform farmers of price increases they are receiving, and keep it for their own 'extra expenses'. This also permits MCC management to compete for the best prices through annual contracts with such firms.

Parmalat is currently (2008) purchasing Grade B milk (50-000-200,000 bacterial count/unit of milk), from MCCs, at 2,100 Kwacha/liter. A 10% extra payment is given to producers capable of Grade A milk (50,000 bacterial count/unit of milk). Some MCCs are capable of obtaining Grade A type milk, but since volume is not large, it is mixed with Grade B. Many commercial farmers are able to produce Grade A milk.

Demand: Because the growing demand for milk and milk products[57] continues to exceed supply, Parmalat continues to reconstitute milk from dry powder (imported) - at about 200,000 liters/month. Cheese, which did not use to be a big factor in the Zambia market, has seen a three-fold increase in demand, and this continues to `also increase. Parmalat's shortfall in milk is about 200,000 liters/month – made up for by this reconstituted milk – all of which in the future could potentially be supplied by the growing smallholder dairy sector.

Parmalat had historically been hesitant to purchase milk from small farmers, because of lack of controls, bulking of milk, quality of milk issues, etc. It was with the activities of LOL that this has completely changed. Now there are 14 LOL assisted milk collection centers in various parts of the country, most of who supply to Parmalat (see Table 2). Parmalat purchased most of its milk from some 21 commercial dairy farmers in 2004, and this number increased to 24 commercial farmers by 2008. Using available data from January through August for a five-year period, volumes from these large scale commercial dairy farmers grew from 10,896 million liters to 12,474 million liters. However, while it purchased from only about 234 smallholder dairy farmers in MCCs in 2004, this has grown to over 998 smallholder farmers by 2008! Volumes for LOL supported smallholder dairy farmers grew from 449 million liters to 1,145 million liters during this same period, while volumes received from Parmalat from small-scale commercial (non MCC) farmers actually dropped from 1,576 million liters in 2004 to 802

Figure 10: Parmalat, January - August Liters of Milk Purchased



Millions of Liters Purchased

	Small-Scale Commercial	Smallholder LOL	Large Commercial
2004	1,576	469	10,896
2005	559	593	10,253
2006	469	605	10,471
2006	602	580	11,959
2008	802	1,145	12,473

[57] Products include pasteurized milk, UTH milk, cultured sour milk, yogurt, Ghee, cheese, butter, cream, flavored milk, and other milk based products.

million liters by the end of August 2008 (Cf. Annex 9, Table 1 for the complete year-by-year data on milk purchases by Parmalat). Figure 10 above illustrates the volumes of milk purchased from Parmalat's three main sources (large commercial dairy farmers, small scale dairy farmers, and LOL smallholder farmers) between January and August over life of this DAP.

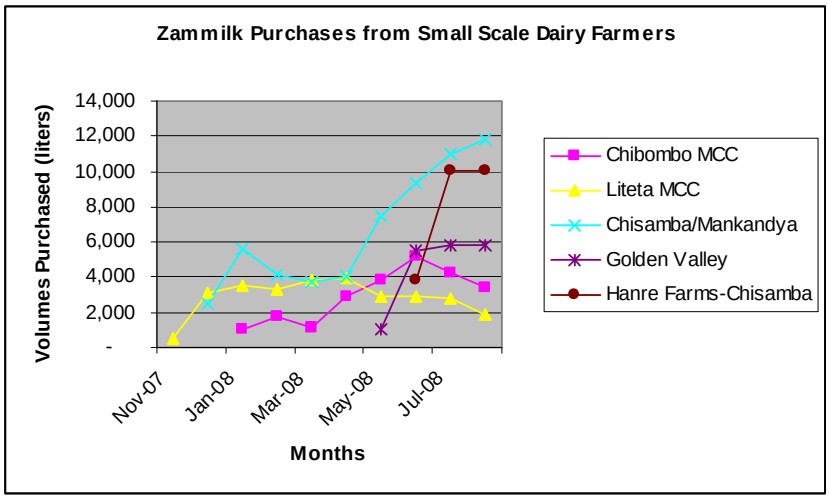
Parmalat sees the greatest challenge for smallholder dairy farmers to be in the 'dependency syndrome" – where farmers have become used to the government doing thing for them, and their not taking the initiative to improve themselves. Changing rural farmer's mindset on this is considered a major potential issue to sustainability. Farmers will ask for assistance, when in many cases they are perfectly capable of doing this on their own. It is also important that the GOZ keep policies in place that protect the dairy industry from outside competition (e.g. Kenya), where prices may be lower and constitute 'dumping'. Kenya pays its farmers 1/3 what Zambian farmers are receiving, and so their milk would be cheaper and would undercut Zambian farmers if permitted to enter. Until the dairy sector becomes better established, with an ability to also better manage livestock disease problems, etc., these policies are important.

ZAMMILK

Zammilk, a sub-unit of the Zambeef operation, is a much smaller milk processing operation than Parmalat, with a capacity of about 20,000 liter/milk/day, of which about 18,000 liters/day comes from their own milking cows (cf. Annex 9, Table 2 for milk purchases between 2004 and 2008). The dairy side of this business started in 1999, beginning with 568,900 liters in October 2004 – and most recently 622,712 liters during the month of August, 2008. Zammilk currently possesses over 600 milking cows; 28 employees are working in the dairy processing side of the business, with an additional 130 working with the management of the dairy herd. It is based not too far from Lusaka. Zammilk takes the milk it is able to acquire, and uses 70% for pasteurized fresh milk sales, 14% for cultured milk (sour, buttermilk), 14% for yogurt, and about 2% for cream, butter, and cheese.

Seeking to expand its operations beyond its own private dairy commercial production operation, Zammilk began purchasing, in November 2007, increasing volumes of milk from small-scale dairy operators, including a couple of LOL supported MCCs (Chibombo and Liteta) located nearby. By helping to provide appropriate training and some initial infrastructure, LOL here and elsewhere was successful in taking some of the risks processors were not willing to initially take in purchasing milk from small farmers – particularly in quality control and costs for establishing bulking centers, and helping to organize farmers to bring their milk by established times to these processors. Once requiring these MCCs to deliver their milk directly to their processing center, Zammilk now sends in a truck to take delivery every two days from MCC cooling tanks set up by LOL. Doing so has also helped them to also collect milk from a number of other small commercial farmers on the same routes (Golden Valley, Hanre Farms, and Chisamba). These commercial farmers have seized upon this opportunity much more quickly than the cooperative based MCC dairy farmers, expanding their operations rapidly (Figure 11).

Figure 11: Zammilk Purchases from Small Scale Dairy Farmers



MCC/Commercial Farmers	Monthly Volumes (liters) Nov-07	Dec-07	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	# of Milking Cows per farmer (est.)	Milk Grades Purchased
Chibombo MCC			1,022	1,781	1,110	2,885	3,870	5,200	4,241	3,375	1-2	B,C
Liteta MCC	476	3,071	3,486	3,297	3,802	3,979	2,910	2,933	2,797	1,852	1-2	B,C
Chisamba/Mankandya		2,440	5,628	4,114	3,751	4,043	7,500	9,345	10,990	11,827	10+	A.B
Golden Valley							1,073	5,458	5,762	5,835	20+	A.B
Hanre Farms-Chisamba								3,870	10,040	10,040	10+	A
TOTAL	476	5,511	10,136	9,192	8,663	10,907	15,353	26,806	33,830	32,929		

Zammilk, like Parmalat, in an effort to increase quality of milk purchased from both commercial and smallholder farmers, has begun to give premium prices for grade A milk, currently at 2,300 k/liter. One challenge rural MCCs face has been in the maintenance of the cooling tanks – partly due to the irregularity of electricity at some sites. LOL, wisely, has strongly resisted being solicited by MCCs in help for such maintenance.[58] The response has been to link them to private services able to help in this way, and Zammilk has linked them to their own sub-contractors. Zammilk's milk plant manager noted that it might be possible for them to use up to 20% of the time of their herd managers to provide some professional extension services to smallholder farmers in an effort to improve both milk quality, AI, and veterinary services and animal forage/feed preparation for zero grazing. As processors seek larger market shares in milk produced, efforts to find different kinds of supporting roles to smallholders dairy farmers will almost certainly also take place. This would be excellent, and help promote sustainability within this growing sector of Zambia's economy.

Surprise Dairy

This is a small family-operated dairy processing operation based outside of Livingston that, through the encouragement of LOL, has been purchasing milk from smallholder households in Katapazi[59] some 20 miles away, and picking up milk cans from the Kalomo MCC in its small truck (pictured below). The owner's father had once been a commercial dairy farmer, but was put out of business when the government nationalized the dairy industry some years ago, and controlled prices. Recent changes in government policies towards the private sector have made it possible to once again initiate operations. Not wishing to hostage his own dairy processing capacity to locally available milk, Surprise Dairy has its own growing dairy herd of 250+ milking cows.

Surprise Dairy is unusual in its willingness to purchase directly from smallholder farmers – already operating much like a MCC itself so as to increase availability of milk. In discussions with the owner/operator, Mr. David Combrink, it was clear that he would prefer that Katapazi farmers organize **themselves** into a cooperative, and manage the bulking of their own milk; he would purchase their bulked milk from them. He would be willing to give the cooperative a spot on his own land to place the MCC, would even connect it to electricity and water. He

[58] During the first couple years of operations, MCCs were constantly calling LOL in Lusaka for assistance with breakdown of equipment and other issues.

[59] Katapazi farmers bring their milk by bicycle to Surprise Dairy, where it is tested, weighed, and recorded for future payment.

would be willing to keep some of cooperative semen straw in his nitrogen flask. Daily purchasing of small quantities of milk from individuals is very labor intensive, even though the costs are covered in the price given to farmers for their milk. Though currently unwilling to sell any of his Jersey in-calf cows, to Katapazi farmers (wishing to grow his own herd), he has done so in the past, and would be willing to do so again sometime in the future. Yet his own careful management of his own calves would be an excellent example for Katapazi farmers to observe, given the poor management observed by this consultant of their existing animals.

Surprise Dairy, however, would be an excellent case study for an alternative model for linking smallholder dairy farmers with a processor – where it is the processor who owns and operates the MCC, staff's it with his own personnel, and provides some technical support and supplies (medications, AI, etc.), for a fee, to farmers. The processor would place his own representative as the 'manager' of the bulking center and manage the books and financial records about specific farmers delivering milk. Mr. Combrink was willing to consider doing this, and LOL's containerized MCC would be an excellent unit to begin this with, admitting that his employing and placing the manager would probably be the system that would actually work best, under the circumstances. Given the special circumstances of this area, this model would seem appropriate. In time, Katapazi farmers may be in a position to form their own cooperative, and take greater charge of their own affairs.

LOL supported Kalomo MCC has been selling part of its fresh milk to Surprise Dairy over the past year, receiving a price of 1,850 K/liter, which includes Surprise Dairy's cost to transport the Kalomo milk to its processing site. This MCC has a 1,500-liter cooling tank, provided by LOL, for which they are paying a rent each month. Review of this MCC's records showed that payment by Surprise Dairy is made immediately upon pickup, which, during the month of August, took place six times. For example, August 4 there was a pickup of 1,480 liters, for which the MCC received 2,738,000 K (or US$ 805). On August 13, 1,840 liters were taken, for a price of 3,404,000 k (or US$ 1,001). Kalomo MCC faces a serious problem of power outages, which causes their bulked milk to turn sour, and forcing them to sell what they can as sour milk to other vendors in Livingstone and out of their own shop. Their own counter sales of milk (fresh and sour) go for 2,500 K/liter. During the month of August, this MCC received from its member farmers between 350 and 440 liters milk/day, about half of which comes from one commercial farmer; the balance comes from about 14 farmers currently (LOL supported intensive dairy farmer households) – or up to 50 during the rainy season. These individual farmers, on the 18 of August 2008, were bringing in 5.7, 5.7, 5.4, 4.7, 7, 5… liters each morning. During the rainy season, Kalomo MCC received about 500 liters/day, and Surprise Dairy then comes every 3rd day for the pickup.

Kalomo MCC has an excellent female manager, employed by the cooperative board; she was the only one encountered at any of the LOL supported MCCs who actually kept fairy good records, and even herself tracked pass-ons. Kalomo also received a GART truck as a grant, which they use to pick up milk (along the highway) from distant members. This MCC rents its space for $118 month. Farmers at this MCC were among those in the

program that received **two in-calf heifers** when they started out in 2005– not one; 83 mostly Friesian-cross in-calf cows were initially delivered, of which 22 were to die within a few months. These animals were to bear 36 female calves that have been passed on. Experience does not show that these farmers performed any better than those receiving one cow initially, though they clearly earned higher incomes from the start. The observation was that it probably would have been better to give more vulnerable households the opportunity to become engaged in dairy.

2.7 Technical Assistance and Training Provided

2.7.1 Community Livestock Workers (CLWs)

In order to reinforce local capacity to learn and transmit technical messages provided by LOL project extension workers, technical leaders, and others, LOL encouraged each cooperative or MCC group to identify local volunteers willing to be the point persons within their communities for dairy development. These individuals, both men and women, were referred to as community livestock workers. These individuals have been a very important link to the farmers and in data collection at the field level. In order to reinforce their roles within communities, LOL provided the opportunity for CLWs to become trained and certified by the GOZ, in AI. The cooperative was responsible, with LOL assistance, to obtain semen straws. These were placed into a tank supplied by LOL to the cooperative; liquid nitrogen, purchased by the cooperative, would preserve them until a CLW would take them for application. Each trained CLW AI technician was also provided a small kit for AI, which included a flask that could hold a few semen straws, with enough liquid nitrogen lasting several days. Some CLW technicians were also provided a bicycle to reach more distant areas. The hope was that AI could become a small business opportunity for the CLWs, who would be paid by the farmer (through the cooperative's fee for AI.[60] To date, only a few have been successful in this regard.

LOL provided regular training through its subject specialist technicians to both the CLWs and government extension service staff (cf. Tables 9, 10, 11, and 12 below). Ten topics covering critical areas for management of dairy cows, health issues, artificial insemination, and animal nutrition were given at established periods of the year through a trainer of trainers approach. The CLWs and GOZ extension workers were then expected to transmit these messages through regular weekly meetings given at all the MCCs and various farmer group locations – targeted on recipients of in-calf heifers, pass-ons, and those anticipating future pass-ons. While the training given by the LOL senior specialist personnel was almost certainly of high quality, and most households noted that it was useful (see table below), field observations at the household beneficiary level suggests that a great deal has not yet been internalized into changed or appropriate animal management behavior.

[60] The 45,000 K fee included 10,000 for the CLW, about 22,500 K for the semen straw used, and the balance to the cooperative for costs of liquid nitrogen.

Table 9: Technical Assistance Received

Count of HH		Received TA Total	Used TA		TA Useful	
Survey Group	Type of TA Provided by LOL		No	Yes	No	Yes
1: In-calf heifers	AN MAL HEALTH	276	2	274	5	271
	AN MAL NUTRITION	276		276	5	271
	ARTIFICIAL INSEMINATION	269	12	257	17	252
	CALF REARING	278	2	276	5	273
	DA RY NG AS A BUS NESS	280	5	275	6	273
	FEED CONSERVATION	278	1	277	2	276
	FODDER/PASTURE ESTABLISHMENT	282	3	279	5	277
	MILK HANDLING & HYGEINE	279	5	274	6	273
	RECORD KEEPING	270	108	162	10	260
	SUPPLEMENTARY FEED NG	277	2	275	4	273
2: Pass-on cattle	AN MAL HEALTH	48		48		48
	AN MAL NUTRITION	46		46		46
	ARTIFICIAL INSEMINATION	46	2	44	3	43
	CALF REARING	49	1	48	1	48
	DA RY NG AS A BUS NESS	50	1	49	1	49
	FEED CONSERVATION	49	1	48	1	48
	FODDER/PASTURE ESTABLISHMENT	49	1	48	1	48
	MILK HANDLING & HYGEINE	49	1	48	1	48
	RECORD KEEPING	47	18	29	2	45
	SUPPLEMENTARY FEED NG	49		49	1	48
3: Technical Assistance	AN MAL HEALTH	186	11	175	13	173
	AN MAL NUTRITION	182	11	171	14	168
	ARTIFICIAL INSEMINATION	169	15	154	18	151
	CALF REARING	179	13	166	16	163
	DA RY NG AS A BUS NESS	178	16	162	18	160
	FEED CONSERVATION	182	9	173	12	170
	FODDER/PASTURE ESTABLISHMENT	189	14	175	16	173
	MILK HANDLING & HYGEINE	181	15	166	16	165
	RECORD KEEPING	180	119	61	28	152
	SUPPLEMENTARY FEED NG	179	15	164	18	161

The almost total reliance on group meetings for this training is perhaps not the most effective manner to pass on new information and ways of behavior towards intensive keeping of dairy cows. Greater efforts need to be given to spending more time with beneficiary farmers themselves – helping them to become future model dairy farmers and examples within their communities. When asked what training received turned out to be most useful to them, farmers placed training in maintaining animal health an improving animal nutrition in first order, followed by training at looking at dairy as a business (including book keeping), feed conservation, milk handling and hygiene, and pasture establishment (Annex 10, Table 10.4).

When asked how technical assistance could be improved to better meet their needs, the following responses were provided by DAP dairy farmer beneficiaries:

(1) Provide more improved cows: 41% of responses
(2) Provide bicycles: 12%
(3) Need an MCC not so far away: 9%
(4) Closer access to a veterinarian: 7%
(5) AI needs improvement: 6%

Other responses included AI inputs needed, need for a hammer mill, need for more pastures training, and the need for loans to purchase additional animals (Annex 10, Table 10.8).

Insert Table 10: Details of Major Trainer of Trainer Workshops

Insert Table 11: Farmers Trained as Community Livestock Workers

Insert Table 12: Government and Partner Organization Staff Trained

In the training received, CLWs are supposed to keep careful records of the animals receiving AI, with planned follow-ups for evaluating results. Field visits indicated that AI results, though lower than desired, are not unexpectedly low – and approach success rates in developed countries – with 3 or 4 re-inseminations's sometimes needed – still without success at times. Some CLWs do not appear to be keeping adequate records themselves of what they have undertaken in AI – success and failure rates. Issues of detecting heat, adequate nutrition, age of animal are given to explain failure rates – but more seems to be taking place. There may be a problem with the semen itself, or its care between time of removal from the cooperative container with liquid nitrogen, and administering to the animal. CLWs have noted that sometimes the cow appears to have passed the optimal time for the AI, but the farmers will insist that it be done anyway – therefore wasting a precious resource for the community at large (through the pass-ons), as well as the cost of the procedure itself.

Efforts were made that CLWs come from the different zones served by a MCC, but this was frequently not the case in practice. Cases were observed when 2 or 3 CLWs resided in the same zone, but had responsibilities for AI services to cooperative members in distant zones. The result is that some farmers must travel a great distance to notify the CLW for the need for an AI service, only to find the person not home, or away on other business. An unexpected impact of smallholder dairy farming, and milk sales, is that almost everyone has a cell phone in areas where coverage permits – therefore such farmers can directly call CLWs (who all carry cell phones) when AI is required.

Field observations of CLWs, all of whom were also recipients of LOL in-calf heifers, showed that some of these individuals were not always good examples of the management techniques they were supposed to be passing on within their communities. Some CLW however proved to be excellent examples within their communities. Besides AI support, they take leadership in dairy management within their communities, pasture establishment and animal feeding, disease control and all the other skills needed by a small dairy farmer to become successful. All members of each MCC local dairy group are expected to attend training sessions provided by LOL within their communities, while CLWs are expected to provide the follow-up and support needed. They are, in principal, the resource that will sustain the program in the years beyond the life of the project. As with any program, success with such field-based personnel varies. Ideally, CLWs should become the 'model dairy farmer' in their respective communities, and are, in some cases. Fortunately, most areas possess some smallholder dairy farmers, male and female – whether or not they are CLW, who are already becoming 'model farmers within their communities, and will be resources for neighbors for years to come, after the departure of LOL. During the final DAP year, LOL may consider being more proactive in clearly identifying who they consider to be the real models within each community worked in, and communicating this clearly within the neighborhoods.

Though LOL has been successful, through the MCC dairy groups, to identify women who are interested in being trained as CLWs, it has had difficulty in building up the number of women who are prepared to undertake the AI program. Table 11 above shows that only 5 women have been trained as CLW (out of total of 19, and of these only one went on for training in AI. In field visits, we met this CLW AI technician, and it was clear that LOL women beneficiaries appreciated her presence – though she apparently did not cover a very wide area. Discussions with the Ministry NAIS trainers revealed that there have been very successful women trained in AI. Initially, some groups are sensitive to discussing AI, particularly between men and women, or young men and older women, a fact that argues strongly for the presence of trained AI women technicians for particularly reaching and supporting women led households. The challenge is that CLWs who are women are more closely tied to their own households and are not as free to move around a zone of intervention, as are their male counterparts. Therefore if a woman is the only CLW in a zone, dairy households not geographically very close to the female CLW are disadvantaged not only for AI, but for general technical support in dairy. This is the principal reason that most LOL CLWs are male. This however does not change the fact for the need for female CLWs. Field interviews with such women clearly showed their reluctance to go and call (or even call by cell phone if possible) a male technician for AI and discuss the heat conditions of their cow. It is seen as a taboo subject. LOL's AI technical advisor recalled the first time he introduced this subject with a group of rural women – they all, in embarrassment, hid their faces from him and could no longer look at him. It took many months for

them to begin to interact more normally with him again. Some of the female led groups (widows) interviewed had also some of the worst records for successful AI with their cows. One group of women (of 15 households in one zone) had **never** succeeded with AI with their cows received by the project – over a period of two years!

In spite of these challenges, LOL has become recognized as a model for the application of AI with smallholder households and is currently visited by many organizations within Zambia to observe and learn how they have been implementing this component of the project. The benefits will impact small farmers in many other regions of the country in years to come.

2.7.2 Artificial Insemination (AI)

AI has been practiced in Zambia for many years, but those benefiting from this procedure where the large and medium size commercial farmers – and during the years with the GOZ tried to manage their own state-run dairy and beef operations, they too used AI. Efforts by the GOZ to extend the benefits of AI through their extension agents to rural farmers met with failure. GOZ extension workers may have been trained in AI, but there was only one to serve an entire district, without supplies or a means of getting to farmers. Even small commercial farmers – those with less than 40-50 cows – had difficulty to avail themselves of this service. Upon its arrival in Zambia, LOL studied this problem and developed an approach that they would use in this DAP. **LOL is responsible, within Zambia, for introducing for the first time a viable means of extending AI to smallholder dairy farmers**, through dairy cooperatives, and through the training of the CLW discussed earlier (c.f. Table 11). These CLW farmers were members of the dairy groups established, and among the first recipients of an in-calf heifer.

Clearly the CLW technicians need to be more decisive on whether or not treatment is done, put perhaps have a conflict of interest in that they are paid whether or not successful. Absence of liquid nitrogen and or semen straws was frequently mentioned as a limiting factor as well. Synchronization, though technically more challenging and costing somewhat more than standard AI techniques, because of the use of hormone shots, appears to have had some good results where applied, and will represent a possible option in some cases. Yet, as repeatedly pointed out by LOL, the best AI option will probably be through organizing mass AI campaigns during the early months of the rainy season to take advantage of when smallholder cattle have the best nutrition, and are in the best state for successful AI treatments.

The quantitative survey conducted in September 2008 asked 337 recipients of LOL in-calf heifers and pass-ons about their experience with AI; the response was fairly equally divided between male and female-headed households.

Table 13: Proportion of Households with animals received from LOL (including pass-ons) that used AI Question 4_2_8

SurveyGroup	PROVNAME	Female		Male		Grand Total	
		n	%	n	%	n	%
1: Benefiaries of LOL Animals (including pass-ons)	Southern	34	38.2%	150	46.0%	184	44.6%
	Lusaka	30	50.0%	1	100.0%	31	51.6%
	Central	48	64.6%	8	75.0%	56	66.1%
	Copperbelt	52	80.8%	14	78.6%	66	80.3%
	All Areas	280	56.1%	57	54.4%	337	55.8%

The survey also asked of these same 337 LOL target beneficiaries about the outcomes of AI treatment. Certain problems seem more important in some provinces. For example, a higher percentage of farmers (13%) noted that it took many AIs for their cows to finally conceive in the Southern Province. Many experienced the problem that their cows did not conceive after AI treatment, or that they received a bull calf (and not female as hoped for). It is not clear why more did not note that a 'more improved calf was born' as a result of successful AI – perhaps they saw them as equal to the already improved mother that gave birth to the calf. AI was available for other community farmers as well (those receiving only technical assistance as well as others delivering to the local MCC, with traditional cows being inseminated. Their responses are fairly similar to those given by the target beneficiaries, though here the birth of a better calf is noted. Other issues cited with AI are detailed in Annex 10, Table 9.4.2).

Table 14: Proportion of Outcomes After use of AI by Households that received cattle from LOL Question 4.2.9

		Southern Province						Lusaka Province						Central Province						Copperbelt Province					
		Male		Female		Total		Male		Female		Total		Male		Female		Total		Male		Female		Total	
Survey Group	**Types of Pastures Used for Soil Improvement**	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1: Beneficiaries of LOL Animals including pass-ons)	Still Awaiting Pregnancy Diagnosis	69	7.2%	13	0.0%	82	6.1%	15	13.3%	1	0.0%	16	12.5%	31	29.0%	6	50.0%	37	32.4%	42	23.8%	11	27.3%	53	24.5%
	Cow is in Calf	69	23.2%	13	23.1%	82	23.2%	15	6.7%	1	0.0%	16	6.3%	31	25.8%	6	16.7%	37	24 3%	42	26.2%	11	9.1%	53	22.6%
	More Improved Calf was Born	69	40.0%	13	23.1%	82	37.8%	15	40.0%	1	100.0%	16	43.8%	31	16.1%	6	16.7%	37	16 2%	42	14.3%	11	9.1%	53	13.2%
	Most Calves Born are Bulls	69	5.8%	13	**15.4%**	82	7.3%	15	**13.3%**	1	0.0%	16	12.5%	31	6.5%	6	0.0%	37	5.4%	42	0.0%	11	0.0%	53	0.0%
	Cow Conceived After Many Ais	69	13.0%	13	15.4%	82	13.4%	15	6.7%	1	0.0%	16	6.3%	31	3.2%	6	0.0%	37	2.7%	42	4.8%	11	9.1%	53	5.7%
	Cow did not conceive	69	13.0%	13	**30.8%**	82	15.9%	15	6.7%	1	0.0%	16	6.3%	31	**19.4%**	**6**	**16.7%**	**37**	18 9%	42	**28.6%**	**11**	**45.5%**	**53**	32.1%
	Cow Aborted	69	1.4%	13	0.0%	82	1.2%	15	0.0%	1	0.0%	16	0.0%	31	0.0%	6	0.0%	37	0.0%	42	0.0%	11	0.0%	53	0.0%
	Cow and Calf Down	69	0.0%	13	0.0%	82	0.0%	15	6.7%	1	0.0%	16	6.3%	31	0.0%	6	0.0%	37	0.0%	42	0.0%	11	0.0%	53	0.0%
	Calf was Born Dead	69	4.3%	13	0.0%	82	3.7%	15	6.7%	1	0.0%	16	6.3%	31	0.0%	6	0.0%	37	0.0%	42	0.0%	11	0.0%	53	0.0%

Table 15: Proportion of Outcomes After use of AI by Households that not received cattle from LOL Question 4.2.9 Analysed as Pooled Data

		Southern Province		Lusaka Province		Central Province		Copperbelt Province		Total All Areas	
Survey Group	**Types of Pastures Used for Soil Improvement**	n	%	n	%	n	%	n	%	n	%
1: Households that Used AI on Animals Not Received from Land O Lakes	More Improved Calf Born	61	41.0%	10	60.0%	1	0.0%	1	0.0%	73	42.5%
	Most Calves Born are Bulls	61	16.4%	10	30.0%	1	0.0%	1	0.0%	73	17.8%
	Cow did not conceive	61	23.0%	10	0.0%	1	100.0%	1	0.0%	73	20.5%
	Cow Conceived after Many Ais	61	9.8%	10	10.0%	1	0.0%	1	100.0%	73	11.0%
	Cow was Sick after AI	61	1.6%	10	0.0%	1	0.0%	1	0.0%	73	1.4%
	Cow is In - Calf	61	14.8%	10	10.0%	1	0.0%	1	0.0%	73	13.7%
	Cow Conceived But Died	61	1.6%	10	0.0%	1	0.0%	1	0.0%	73	1.4%
	Cow Aborted	61	1.6%	10	0.0%	1	0.0%	1	0.0%	73	1.4%
	Calves Died	61	1.6%	10	0.0%	1	0.0%	1	0.0%	73	0.0%

The impact of improved milking cows is quite evident when survey farmers were asked about the numbers of traditional and improved animals (Frisian, Jersey) they currently possessed, and how much milk each type would normally give in the rainy season and in the dry season. Milk production per cow is shown to have dramatically increased from the 2004 baseline and final evaluation survey in 2008 (Table 16). Kalomo farmers, for example, cite going from 4.3 liters/cow in 2004 to 10.32 liters/cow in 2008 – largely because of improved management of their improved cows. Production per cow for their traditional cows barely changed. These same farmers were asked to identify their most important problem encountered when raising cattle (Annex 10, Table 6.10). Farmers noted an average of between 6 and 10 liters/day during the dry season compared to an average of between 10 and 17 liters during the rainy season with the kind of cattle provided by LOL through the in-calf heifers and their pass-ons. This rate drops for the crosses between pure and traditional cows. Traditional cattle milk production is low in the dry season (3-5 liters) and rainy season (5-7 liters) – less than half of that of the pure or exotic cows introduced. More detailed data on milk production for different cattle breeds during rainy and dry seasons is provided in Annex 10, Tables 7.1-7.2). Cattle diseases were almost unanimously cited as the most serious problems faced, followed by poor nutrition and pasture management (Annex 10, Table 9.3 for other problems in raising dairy cattle).

Table 16: Dairy Production by Site, and Breed (Baseline Vs Final Evaluation)

Site/ Breed of Cattle	Baseline/Final Evaluation	Average Number of Cattle Raised	Quantity of Milk Produced in Dry Season	Liters Per Cow Per Day in Dry Season	Quantity of Milk Produced in Rainy Season	Liters Per Cow Per Day in Rain Season	Most Important Problem in Raising Animals
Pure/Exotic Breed Cattle							
Chongwe	Baseline	-	-	-	-	-	-
	Final Evaluation	6.5	Lower	10 8	Higher	16.8	Disease (3)
Kalomo/Monze	Baseline	1.6	Lower	1.7	Higher	**4.3**	Disease (60)
	Final Evaluation	1.7	Lower	5.7	Higher	**10.32**	Disease(6)
Kazungula	Baseline	1.5	Lower	1 5	Higher	4 38	Disease(50)
	Final Evaluation	1 33	Lower	10 2	Higher	17.5	-
Cross Breed Cattle							
Chongwe	Baseline	-	-	-	-	-	-
	Final Evaluation	5.1	Lower	6.815	Higher	11.7	Disease(4)
Kalomo/Kazungula	Baseline	1 25	Lower	2.06	Higher	4.13	Disease (65)
	Final Evaluation	3 56	Lower	4.28	Higher	8.74	Disease (22)
Kazungula	Baseline	-	-	-	-	-	-
	Final Evaluation	2.8	Lower	6.158	Higher	10.14	Poor Nutrition and Pasture Management (6)
Traditional Cattle							
Chongwe	Baseline	1 83	Same	5.46	Higher/Same	7.08	Disease (74)
	Final Evaluation	3	Lower/Sale	5.25	Higher	7	None(5)
Kalomo/Monze	Baseline	4 86	Lower	1.66	Higher	**3.84**	Disease (80)
	Final Evaluation	7.45	Lower/Same	2.27	Higher	**4.8**	Disease (23)
Kazungula	Baseline	4 81	Lower	1.86	Higher	4 21	Disease (80)
	Final Evaluation	5.43	Lower/Same	2.38	Higher	4.69	Disease (9)

Finally, the analysis of how many cows – traditional, beef, or dairy – the final quantitative survey households in the Southern Province areas of Chongwe, Kalomo/Monze and Kazungula possessed clearly illustrates that, in this region, even recipients of pure/exotic breed in-calf heifers and their pass-ons had significant numbers of traditional cows (Annex 10, Table 6.10). Households that received in-calf cows, for example, possessed a mean of 11.52 traditional cows and 3.26 dairy cows (Table 17 below). It is interesting to note that the numbers of dairy cows possessed by both male and female headed households is fairly similar (3.74 to 3.26, respectively for the in-calf cow sample group) among most survey sub-groups – while the differences in possession of both traditional and beef cattle by male headed households greatly exceeds that of female-headed households. The sale of cattle – particularly traditional and beef cattle – was important for all sub-groups, with food shortages and payment of school fees for household children cited as the most important reason for these sales.

TABLE 17: Analysis of Final Evaluation Data on Livestock Details By Beneficiary Category

Beneficiary Category	Breed of Cattle	Mean Number of Livestock Raised	Mean Number of Livestock Raised by Males	Mean Number of Livestock Raised by Females	Mean Number of Livestock Jointly Owned	Average Number of Deaths	Average Number of Sales	Most Important Reason for Sale
All Survey Sites								
1: In- Calf Cows	Traditional	11 52	10.31	7 87	11.6	2.09	1.95	School Fees
	Beef	18.08	21.1	4	15.58	1.67	2.7	School Fees
	Dairy	3 26	3.74	2 27	3.26	1.53	1.77	School Fees/Food Shortage
2: Pass On	Traditional	9.47	15.67	9.6	12.7	4.33	3.67	Food Shortage/School Fees
	Beef	12 82	17.17	1.5	7	1.5	4.25	-
	Dairy	2 33	2.59	1 96	2.13	1	1	School Fees
3. Technical Assistance	Traditional	11 53	9.29	5 81	12.86	2.15	2.32	School Fees
	Beef	20	15.17	20.75	25	3.4	2.6	Food Shortage/School Fees/Better House
	Dairy	19.03	9.93	44 86	8.7	1.5	3.13	School Fees
4. LOL Non DAP	Traditional	9.19	10.37	4 32	7.62	3	2.18	Food Shortage/School Fees
	Beef	8.19	6 8	5	8 9	2.2	2	Food Shortage
	Dairy	9.47	7.13	25.5	4.25	1.25	1	-

Table 18 below shows that LOL technicians have performed a total of 1,111 AI treatments with smallholder dairy farmer cattle, of which 520 conceived (47%). Of these, 386 calved down (35%), and of these, 355 calves have survived, of which 63% were bull calves! Besides the farmers who received in-calf heifers or a latter pass-on, an additional 116 smallholder farmers were able to improve their own traditional cows, only 22% of whom were female headed households. Discussions with CLW showed that some technicians have gained a much better track record of successful AI than others, and, as a result, also are in greater demand for future AI from area farmers. This is part of LOL strategy in developing a group of trained local technicians will hopefully begin to be able to support themselves through their AI and other technical services provided to their communities.

Insert **Table 18: Artificial Insemination Summary Chart**

Field visits with farmers suggest that the AI component of the program has been very difficult to implement successfully. Many in-calf cows received by farmers, once calf was born, have never been able to get the cow pregnant again in next one and two years! This strongly and negatively impacts the pass-on program. With the exception of the first try, successive efforts are rarely paid for, though the debt may show on the MCC books for that dairy farmer as a negative balance. This subsequently leads to problems of the availability of liquid nitrogen and AI semen 'sticks' to use when animals come into heat. Yet, smallholder dairy farmers remain very positive about AI, and continue to desire AI for their animals as a way to improve their dairy operations. LOL continuing efforts through the end of this program will focus on the coming rainy season, with well-organized mass AI campaigns in zones of effort.

2.8 LOL Creativity in Project Implementation

The LOL technical team has proven itself to be creative but resolute in responding to complex and difficult issues faced in implementation. Though there are doubtless other examples that escaped the consultant, the following are noteworthy.

2.8.1 Transportation of Milk Between MCC & Processors

Among the greatest challenges faced by LOL at the on-set of the program was how to get the milk bulked from smallholder rural MCC dairy farmers to a processor willing to purchase all that could be delivered. MCC's would beg processors to purchase their milk. Initially, a processor like Parmalat would send their milk tanker trucks to a regional urban collection point. At this urban collection point, local commercial dairy farmers would bring in their milk in their own smaller trucks or 4X4 vehicles, carrying their milk cans. But smallholder farmers did not possess such transport vehicles – bikes were their modes of transport.

By developing strategically targeted MCCs – along fairly well maintained gravel roads in rural locations, with electricity, the 500 or 1,000, or 1,500 liter or larger tanks that LOL placed into a rural MCC could cool down milk quickly and keep it cool long enough (day or two if need be) until a processor would be willing to send out a truck to collect the milk. Yet, moving 500 + liters of cooled milk from a rural MCC tank into 40 liter steel tanks (see photo above) to transport to an urban bulking center involved a lot of milk handling, spillage, and increased opportunities for other loss. LOL was creative in designing **new 1,000-liter steel tanks** that could be loaded onto a flatbed truck and which could maneuver the roads to collect the entire volume of several MCC, or even private commercial dairy farmers. This permits keeping the milk separate from different sources until it can be graded at the larger bulking center at Mazabuka for butterfat content, bacterial count, and sourness. From there milk is pumped into large milk tankers for Lusaka, where Parmalat's processing plant is located.

Parmalat collects milk from Choma MCC every other day (milk going into one of the 1,000-liter tanks on truck. This truck holds 8 such tanks. On this day, they picked up 960 liters of milk. Insulated tanks keep milk at about 5 degrees C, for up to 6 hours. From here, truck was heading to pick up milk from two commercial farmers near Choma.) Parmalat has two trucks like this – the other used outside of Lusaka (for Palabana MCC for example); one for Copperbelt planned.

The manufacture of these innovative tanks, under LOL design specifications and oversight – in India – and their ultimate availability for large processors in Zambia has probably resolved the problem of moving milk from rural based MCCs to the processors.

2.8.2 Containerized MCC

As an alternative to costly programs in which a cement building is constructed upon someone's land, near a power line, LOL creatively looked at taking a 16 foot steel container and building its interior into a small Milk Collection Center with a 500 liter cooling tank. These can be entirely equipped by an urban based entrepreneur, and then loaded on to a truck and dropped off at a site near a power line, central to a community of rural smallholder dairy farmers. One of the advantages to this is that should the local cooperative be unable or unwilling to manage the facility properly and efficiently (with enough milk), it can be loaded up and taken elsewhere. Costly investments into building much larger MCCs for a cooperative do not guarantee that the local group will remain focused on dairy, or that this building will not end up being used for multiple other purposes, unrelated to the business of dairy. Using such a containerized bulking center is also ideal for use as a satellite centers to a larger milk staging area. Costs for these MCCs vary between $2-4,000, depending on how it is equipped (usually including milk cooling tank, a water tank, a small office with minimal furniture + cost of connection to water source and electricity).

Kwashama MCC

Our field observations at Mtandalike, near Choma, suggest that this is clearly a site that could benefit by a containerized MCC bulking point. Once bulked, Choma MCC could collect more efficiently. These dairy farmers have already located a site with power! This has been a satellite farmer's group of the Choma MCC, and initially smallholder dairy farmers from this area delivered their milk to the paved road, where the Choma truck would pass by, weigh and pick up their milk, paying 1,600 K/liter. But farmers stopped delivering their milk in this way because of the 48,000 k/trip ($14) **surcharge** made by the MCC to collect their milk in this manner. They are currently delivering their milk, by bike, all the way to Choma itself, more than 30 kilometers away - where they receive 2000 k/liter. However, most of the milk from this group is being sold locally, fresh or sour, for about 1200 k/liter. Clearly dairy farmers are not delivering evening milk to Choma, which limits their income options.

Choma MCC

2.8.3 Bikes for Milk

Milking one's dairy cow early in the morning is one thing. Getting it to the distant local MCC before mid-morning (9-10 am) is another thing altogether. Many smallholder dairy farmers live more than 20 kilometers from the MCC. Without a bicycle, timely delivery is virtually impossible. Bikes have become the most important means of transporting the 10, 20, or 40-liter milk cans to either the MCC or a pick-up point. Men, women, or household children use the bikes for transport of their milk. In some locations, farmers are able to bring their milk to collection points along a highway where a MCC owned truck will arrive mid-morning to test, weigh, and record the individual deliveries of various farmers, recording the results in both the farmer's milk book, as well as MCC's delivery ledger. Most locally available bikes are poorly constructed, heavily worn, with little capacity to transport these milk cans. LOL has recently begun to address this problem by partnering with World Bicycle Relief, who is marketing a heavy-duty transport bicycle capable of large cargos on the reinforced carrier over the back wheel. Initially, 61 such bikes have been provided by LOL in July 2008 through several MCC cooperatives (Magoye, Katapazi, Fisenge) for sale to local dairy farmers for their transportation needs.[61] The response from farmers has been extremely positive, and there is certainly a huge demand for additional bikes. The program is considering greater expansion.

2.9 Environmental Issues

There does not appear to be any negative environmental impacts taking place as a result of the more intensive dairy systems being undertaken by smallholder households. Indeed, these dairy farmers tend to be more careful about the quality of the water their animals are drinking, and in many cases transport the water to the dairy cows, though this is not yet widespread enough done. Farmers are also trained in the proper disposal of diseased dead animals, drug bottles, and other equipment. MCCs themselves appear also careful in the washing and cleaning of milk pails and tanks that the farmers bring in with the milk – thereby saving the farmer the cost and effort of doing the cleaning at their home sites where running water is not available. Manures from animals are collected and used for productive purposes in gardening or in household maize fields. At the end of the rainy season, grasses are cut and stored for future forage needs of the dairy cows, and greater efforts seem to be made by farmers to avoid widespread burning which will reduce their ability to have access to additional grass later in the season.

2.10 Gender Issues

LOL has taken every realistic opportunity to target women as recipients of the dairy cattle received by targeted households – with a goal of at least 30% going to female-headed households. Interviews in the different regions showed that in some areas the percentages were higher for female-led households, in some areas – particularly the Southern Province – the project seems to have found it more difficult to reach these targets (because of local traditions about livestock ownership). Though efforts have also been made to increase the number of female CLWs, this is perhaps one area in which more effort may need to take place in the future. Women CLWs are more restricted in their zones of operation, but are also more appreciated by female-headed households (and women in male headed households) for training on care of household cattle and procedures with AI. Perhaps some modification of the expectations for female CLW would lead to greater numbers of women volunteering and being trained. One area in particular would seem to be particularly appropriate – household record and financial record keeping. Household women are probably the best placed to do the best job in this, and being trained for this purpose would also give them higher status and provide better accountability for dairy incomes within households. Young girls and boys becoming literate can help their mothers in this task. Men generally dominate MCC boards of directors, and it is difficult for LOL to have much influence over this. Yet employment of women in managing MCCs or their records was a role well filled by women in some MCCs, and should be expanded.

[61] A micro-finance partner institution is usually also involved to work out regular payments, through the cooperative and milk sales from the farmer.

2.11 Lessons Learned

(1) **Targeting**: It makes no sense to begin activities in an area that cannot have access to a market. In a value-chain approach, farmers must be linked to markets if there is to be sustainability. This is a lesson applicable to any MYAP development activity in any agricultural development sector. The simple presence of (traditional) cows and economically disadvantaged households is not a criterion for establishing a dairy operation. Such cows and households must be geographically located in areas with access to a market. The widespread incidence of cattle diseases also is a limiting factor – such as Foot and Mouth Disease endemic to wildlife areas with Cape buffalo. This automatically excludes some regions of Zambia from consideration.

(2) **Targeting**: LOL's use of geographic, group, and household level targeting permits a realistic business oriented approach to dairy for smallholder households. However, efforts to target 'vulnerable' households exceeds standards set by other DAP NGOs who generally address the 'rural poor' making up the majority of most rural communities, and unnecessarily inhibited program flexibility to aggregate dairy farmers near MCCs.

(3) FFP DAP Beneficiaries: Within a holistic and business approach to rural dairy development, all potential stakeholders for the existence of a MCC must be included: the 'rural poor' who with project assistance gain a dairy cow, as well as small commercial dairy farmers. Increasing milk volumes to MCCs increases everyone's ability to gain a better market and draw processors with unique ability to provide some of the technical and managerial support needed for MCC sustainability (veterinarian, crop and fodder).

(4) **Vulnerable Households**: *Very few of the 'hard-core vulnerable' within the communities targeted by LOL, as defined above, are in a position to care for a dairy cow, and so have not been recipients of one.* LOL's stringent and necessary criteria for selecting households to receive and care for a valuable in-calf cow essentially excludes these hard-core vulnerable. However, whenever it **is** possible for such households to receive a cow, they have been included, particularly in the case of female-led (widow) households, often caring for not only their own children but also extended family orphans. And **almost all** smallholder households receiving benefits from LOL have a number of orphans – some as many as seven.

(5) **Heifer Pass-ons:** *Though pass-ons have occurred, the numbers of pass-ons have clearly not reached the extent that had been hoped for initially within the program by the farmers themselves. Fortunately, continued herd growth among improved dairy cows in most regions continues to encourage other vulnerable MCC households that they will indeed receive their pass-on eventually.*

(6) Bull Calves: *The LOL approach to what should be done with bull calves has been flexible enough to permit MCCs to address the issues raised. While clearly preferring the birth hof female calves, smallholder farmers nevertheless consider them an important asset.*

(7) MCC Trucks: It is not evident that the current manner of use of these trucks – given as a grant by GART – is actually a good thing for the MCCs managing them. They are expensive to run and maintain, and the cost of their operations are being passed on to rural farmers through the price they receive for milk collected. With the development of satellite bulking centers (e.g. a containerized MCC), perhaps a smaller truck could be designed to carry one or two of the LOL designed transportation tanks currently being used by Parmalat.

(8) **AI:** AI crosses with local cattle produce offspring with a higher survival rate than both animals brought in from the outside, as well as the first generation offspring of the in-calf heifers delivered by the project. Many cows and/or their calves were lost during the initial stages of the program, probably from stress in the management received by smallholder farmers. Mass AI during the rainy season period of better nutrition with targeted synchronization, where appropriate, appears to be the more effective methods for AI than one-on-one methods, at different times, practiced in most areas by LOL technicians.

2.12 Recommendations

- Continue to encourage all cooperative groups working with LOL assistance in completing the revision of their by-laws to reflect that the dairy business is their **principal focus**, and, if not already completed, to become registered as a 'Dairy Cooperative'. Attention should be given to what 'principal focus' actually means. Strongly discourage tendencies to expand the cooperative's agenda to one that is essentially multi-purpose in nature. Reduce or even terminate LOL support during the last year of the project to cooperatives not willing to do this and focus resources on those that do.

- Cease giving two in-calf heifers to single vulnerable households. The learning curve for keeping one intensively managed cow is high enough without risking two cows with one family. This also spreads out the benefits to more households, who will all be transformed by possessing even one milking cow.

- Consider replacement of large trucks currently being used by some MCCs for smaller trucks capable of transporting one or two of the steel tanks designed by LOL for moving chilled milk from a MCC to a larger bulking center – like Choma.

3.0 Program Design & Effectiveness of the M&E System

3.1 Program Management

This LOL DAP project has been well-led and currently possesses a very strong team of both experienced and professional managers in the persons of the Country Manager and Field Technical Manager. It currently has excellent mid-level specialists and field trainers in the persons of the M&E in-country manager and technical specialists, all based in Lusaka.[62] Some weaknesses have been noted elsewhere in this report with respect to field level and field based dairy development facilitators, extension personnel, and the CLWs. Strong technical support is also received from specific specialists in USA LOL home offices.

Over the four-year life of this DAP, there has been fairly high personnel turnover which most likely has impacted the program in terms of programmatic development and prioritization of ordering of technical assistance to be delivered in different areas of the country. Yet delivery of intended project results has occurred, in spite of this. Two different country managers have provided overall guidance. The current in-country M&E leader has been in place since early 2008, preceded by two others (Antoine in 2004 and Mtonga in 2007). Within the accounts department, there have been four different leaders since 2004 (Maila, Kunda, Douglas, and currently Donald and Kenneth). For cooperative business development, Evans Lwanga, who joined the program this year, was preceded by Kelvin (2004) and Ernest (2006); this situation probably accounts for the relatively slow start-up of efforts in improving LOL support for cooperative business plans and financial accounting. Two individuals, initially Antoine (2004), and currently Nigel Wilkenson since 2006, have provided excellent support of and linkages to in-country milk processors. Finally, two key technical specialists have been with the DAP since its beginning: the dairy production, livestock management and AI specialist, John Nyirongo, and dairy production and animal husbandry specialists Makabaniso Ndhlouvu – providing very important continuity within the program.

[62] The consultant did not work with or meet all LOL in-country DAP staff; these observations only concern those with whom some significant contact was made.

3.2 Project Reporting and Documentation

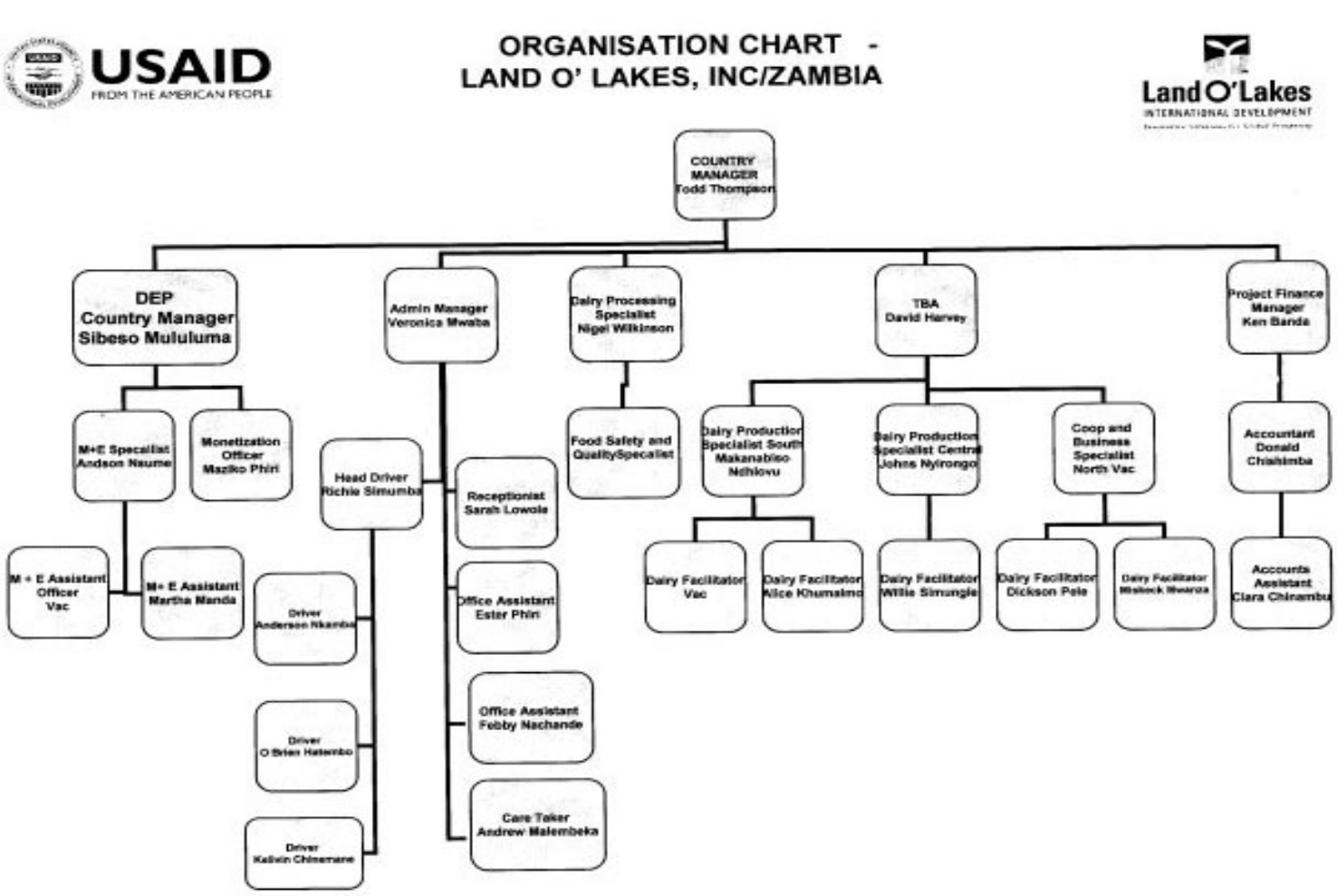
By the final evaluation in August/September 2008, the LOL team had not yet completed its January-March 2008 quarterly report, or had started working on the subsequent April-June report, much less the July-September report. The most recent Fiscal Year report was for FY 2007 (October 2006-September 2007); FY 2008 would not probably be completed before November 2008. Data included in these reports summarize some of the key information coming from project beneficiaries, MCC and partner processor milk purchase data, and other data. A sub-sample of project direct beneficiaries provides quarterly statistical data on their dairy operations – certainly some of the most useful data obtained by the project. These data provide additional information about the IPTT indicators. These reports, however, are not required by either USAID Zambia or FFP in Washington DC, so this delay is less significant than it might otherwise appear to be.

To its credit, LOL Zambia realizes the importance of regular monitoring of certain key data sets for its own management purposes. The principal reason for delays in this reporting can be explained: only one person – the M&E leader – is responsible to put these data sets together for these reports, linking it to narrative reports given by component technical leaders. Given the workload on this one person (who has one assistant), expectations for timely production of these reports are entirely unrealistic. If considered important by the LOL management team (and this is considered very important by this consultant), then there needs to be greater decentralization of data collection, analysis and reporting among the senior management team for timely completion of these reports – with the M&E leader providing assistance to team in data formats. For example, information related to AI should be closely monitored and reported upon by the AI technician; data on direct beneficiaries' receipt of in-calf heifers and pass-ons should be closely monitored and reported on by the animal production specialist. Cross training of technical staff on the key data sets jointly agreed upon for monitoring among direct beneficiaries and MCCs would also help spread the task of field supervision, training, and responsibility for information completeness. This should NOT be considered the task of the M&E leader alone.

3.3 Staffing & Capacity Building

Figure 12 below provides the existing version of the LOLZ's organizational chart or organogram. This evaluation worked principally with the program management unit under David Harvey, and included significant participation by the M&E Specialist and his team. David Harvey and his three subject specialists provided leadership in building the capacity of the CLWs and extension workers linked to the DAP (cf. Tables 4, 5 & 6).

Figure 12: LOL Organizational Chart



3.4 DAP M&E System and Life of Project Results

M&E as practiced by this DAP, has been highly centralized within Zambia for its implementation. LOLZ has certainly been fortunate in having an extremely capable M&E technician leading the effort during the past couple of years. Yet given the workload within the program, the M&E unit was excessively overburdened. M&E tasks included quarterly collecting IPTT data for FFP, obtaining more focused data for the quarterly management reports, organizing and maintaining other data sets (on MCCs, processors), involvement at the field level in defining 'vulnerable households' in the process to select beneficiaries of future distribution of heifers within cooperative groups, and in producing the various reports for the project. Expectations were unrealistic, and the burden carried by this component of the program was not properly shared among team members. This led to long delays in reporting and probably has also had an impact on data quality. Other members of the LOLZ field team, particularly subject specialists, do not appear to have been adequately accountable for data and reporting in their own areas of responsibility. This is not to say, of course, that field staff was not involved. Indeed, without their assistance in providing beneficiary details, records of animals in the field, and herd growth, training attendance lists, the M&E team could not have been able to collect all the needed data. The program would have benefited from greater decentralization of responsibility and division of labor for data collection and analysis. This consultant would strongly agree with the mid-term evaluation statement that "*considerable amounts of*

staff time and other program resource…were invested…in tracking (the IPTT indicators) of MIHFP, HDDI, and IDDI, when these indicators in fact conceal many of the program's benefits".[63] This is true of the IR indicators as well.

The 2006 mid-term evaluation discussed the program's use of M&E at some length, and made a number of accurate observations and recommendations, which do not appear to have had any impact on changing behavior or priorities within the program. The project's organogram above shows that M&E is off on the left side of the chart, under the DEP country manager overseeing program monetization, and not integrated in any functional way within the field operational unit (perhaps as a side box linked to either the Country Manager and Chief of Party, or Field Manager, David Harvey, for example). In practice, the M&E specialist participates in all Monday and other periodic technical staff meetings. Field M&E management receives input/oversight from LOL USA headquarters, which provides backstopping support – efforts that need to be also closely coordinated by the in-country LOL country manager.

From this consultant's perspective, the DAP would have been better served by focusing more resources on maintaining close interaction/training support of direct project beneficiaries throughout the year, each year – with regularly maintained data indicators at household and MCC levels. Some of the resources to do this could have been achieved by scaling back the three bi-annual surveys (baseline, mid-term, and final evaluation quantitative surveys) requested by FFP. It is not apparent that these large quantitative data sets have been used in the past or will lead to any kind of management decisions by program leaders or FFP itself. The process of quarterly/annual data collection should itself be part of the effort in training to farmers – and not removed from it. Using LOL's targeting approach, and beneficiary data, all but two of the 12 IPPT data indicators are acquired through the quarterly data acquisition process – which is considered excellent. It would not have been necessary to conduct quite as extensive bi-annual surveys to obtain the data required for the two goal-level indicators and responding to FFP's need to measure 'population level impact'. The essential question is what kind of impact dairy is actually having on smallholder vulnerable households and at what cost, and if the project is succeeding in removing them permanently from their former vulnerable status.[64]

In the project's quarterly reports, it is clear that the M&E unit has been tracking and reporting on a number of indicators – though reporting has been greatly behind schedule. However, when reviewing information reported from one quarter to the next, the reader can be somewhat frustrated by finding different data sets reported from one quarter to the next – and left wondering how trends illustrated in one report continued through the next period.[65] One comes away with the impression that the project had not determined which indicators and trends were important, and should be followed from one period to the next. For example, in the FY 2006 report we are given a useful illustration of the monthly average liters/milk produced per farmer. But we don't see how this trend is followed up in subsequent reports. Also seeing this trend by province (or per cow) would have been useful. Or another example: In the last quarter for which a (partial report and) data are available (Jan-Feb-March, 2008), we are given an

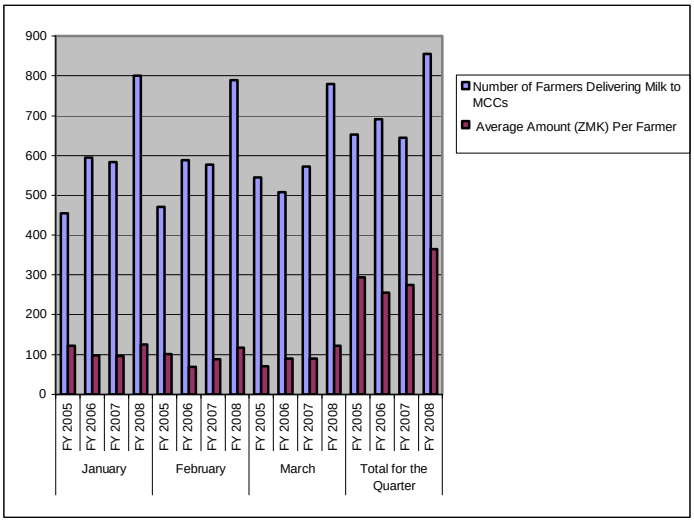
[63] LOL Mid-Term Review, John Keyser, October 2006, p.72.

[64] As described by the LOL M&E specialist, the quarterly farmer beneficiary performance surveys collects information on the provision of technical assistance and adoption levels which are part of the information provided in annual results reports. There has also been a quarterly assessment of the food security status to provide triangulation data for the bi-annual impact surveys that have longer recall periods (12+ months). The quarterly surveys also provide on the constraints experienced by farmers in order to identify problems that need to be addressed as quickly as possible. This permits collection of data that might affect the achievement of desired objectives and gives the M&E unit an opportunity to assess the quality and adoption of records to inform the program field staff of their performance. Data are broken down by region, and MCC, to facilitate appropriate and quick local responses. The survey also allows the program to capture total household dairy income, as MCC income figures leave out community sales and quantities consumed by household and calves.

[65] Some of this may be explained by staff changes in the M&E unit, over time. With greater decentralization of M&E, a larger team of multi-disciplinary specialists would be responsible for refining information requirements within specific areas of project intervention, and regularly tracking and reporting upon important trends.

interesting table entitled "*Gross Total Income and Gross Average Household Income Accrued From the Sales of Milk to the MCCs Compared Over Second Quarters of Fiscal Years*" (c.f. Figure 13 below, re-calculated for $).

Figure 13: Average Income (US $) Per Farmer, January-March, 2005-2008) [66]



Month of the Quarter	Fiscal Year	Number of Farmers Delivering Milk to MCCs	Average Amount (US $) Per Farmer
January	FY 2005	455	122
	FY 2006	595	97
	FY 2007	584	97
	FY 2008	801	126
February	FY 2005	471	101
	FY 2006	588	69
	FY 2007	577	88
	FY 2008	789	117
March	FY 2005	545	71
	FY 2006	508	89
	FY 2007	573	89
	FY 2008	780	122
Total for the Quarter	FY 2005	652	294
	FY 2006	692	255
	FY 2007	645	274
	FY 2008	855	365

The project has similar data for each month of the year, back to 2004, and can disaggregate this by Milk Collection Center. In fact, it would be possible to track a sub-sample of specific farmers, across time, to analyze the growth in their dairy enterprises. It would be useful to see the overall trend in household income per month, per average household, from the beginning of the project – with this information updated from one quarter to the next in each project report. As it is, we see that # of farmers/month have increased between 2005 and 2008, as has income per farmer; $365 * 4 = $1,460 average income per dairy household per year – but we don't actually have the data to show that this is so for the entire year. Review of different pieces of project data suggests the actual figure is over $1,000/year, but less than this $1,460. It is important to understand that the project actually has the necessary data; the issue concerns how these data are regularly reported upon over time.

3.4.1 Indicator Performance Tracking Table (IPTT)

Review of the 12 indicators used over the past four years (cf. Annex 7), the way these data were acquired during this period, and the actual clarity and usefulness of these for purposes of LOL management, and FFP reporting needs (not to speak of USAID/Zambia itself), suggests the following:

(1) Overall, LOL IPTT indicator results by the end of the fourth year of project implementation show excellent results and impact among program beneficiaries. With the additional fifth year (no-cost extension), it is certain **that the project will meet, and in most cases, greatly exceed life-of-project (LOA) targets.**

[66] LOL January-March, 2008 Quarterly Report, p. 7. Data have been extracted from Table 3.1.1.

(2) Given the information actually available within this DAP, and the much broader impact this project has been having within Zambia's agricultural sector and districts/provinces where MCCs and the beneficiary smallholder dairy farmers are located, additional indicators of impact could perhaps have been chosen and regularly reported upon through an expanded IPTT. Examples of some of these are suggested below, as LOL considers similar projects elsewhere. [67]

- Actual volume of milk produced on daily basis at household level (1st and 2nd milkings)
- Total daily value of milk actually sold by beneficiary smallholder dairy farmers – to as well as outside the MCC
- Amount of milk actually consumed, on a daily basis (often each day), by beneficiary households
- % of farmers receiving in-calf heifers who have actually passed on a heifer calf.
- % of AI undertaken with LOL support that have been successful (as % of total given)
- Total value and # of liters/week given by beneficiary household in barter (for labor or commodity) and
- % of LOL beneficiary smallholder dairy farmers providing milk for labor or barter to other community members at least once/year
- # of orphans and other small children (under 12) in direct beneficiary households
- % of direct beneficiary households with orphans or headed by a widow.
- Total # of improved dairy cattle possessed by targeted smallholder households.
- % of all in-calf heifers or pass-ons given out that have been registered in the name of a household woman
- % of all in-calf heifers or pass-ons given out, or recipients of successful AI with traditional cattle that were given to a 'hard-core vulnerable' by capable household.
- % of direct beneficiaries of an in-calf heifer or pass-on who have correctly maintained at least 6 months of LOL suggested records of the household's dairy operation.
- % of direct beneficiaries of an in-calf heifer or pass-on, or AI offspring who possessed at least three months of stored forage/feed for their animals in April/May (for dry season).

(3) The LOL Zambia DAP IPTT data did not prove to be particularly useful to USAID/Zambia in OP reporting requirements. In spite of the fact that this is a centrally funded project, no initiative seems to have taken place to better incorporate important results of this FFP project within USAID's in-country agricultural impacts. USAID/Zambia itself only included information from one indicator (# of smallholder farmers trained) within their annual OP report to Washington each November, though all of the IPTT indicators, as well as many data sets accessible to the project, are of direct relevance to USAID's SO #8 within Economic Growth in Zambia.

(4) When designed, FFP and LOLZ focused project results reporting on a very narrow set of impact and outcome indicators, summarized in the project's IPTT. During the start-up of the project, a general survey established baseline values for each. Two of the twelve indicators measuring impact at the goal level were reported upon every other year (baseline-FY 2006-FY 2008 quantitative surveys) – as one would not expect change at this level to happen so quickly. The other ten indicators were tracked through data collected at the field level and managed by the M&E leader each year. FFP received annual results

[67] This was not done because of the presumed 'cost' of acquiring and recording these data. However, most of these data are part of the program for direct beneficiaries in farmer household record keeping (an area that seems to have been somewhat neglected over record keeping at the MCC level – also extremely important. Some of these data have always existed through the farmer performance quarterly surveys – only not reported upon. These are the kind of data that a FFP program would presumably want to be able to demonstrate clearly. Some of these indicators are now part of the new MYAPS LOL dairy project – an outgrowth of this DAP in the Southern Provinces.

reports on the project – consisting essentially of reporting and a brief discussion of the results on the IPTT table. The FY 2006 results report was only 10 pages long, plus annexes.

(5) **Project Goal 1: Increased number of months of adequate household food provisioning (NMAHFP).** With a life of project (LOP) target of 10 months of secure food provisioning, and an initial 2004 baseline of 6.4, the project's IPTT reports an achievement of 8.73 months by the end of year 4, or 87.3% achievement of its target. This result is actually not different from the mid-term result (87%).[68] This figure comes from the recent quantitative survey. Based on the consultant's interviews with a sub-sample of some of the direct beneficiaries interviewed, the actual value is almost certainly higher, closer to 11 or 12 months of food security.[69]

Annex 10, Table 3.1.0 provides the NMAHFP data across the four sub-groups sampled, with an average value of 8.73. It is noteworthy that the population control group (non-LOL households) was not greatly different at 8.17 (also with a standard deviation over 3)! Looking at the data on NMAHFP, it quickly becomes evident that the direct beneficiaries of an in-calf heifer or pass-on realized the highest values: female headed households of recipients of in-calf heifers averaged 9.84 months of food security; male headed households were a bit less at 9.3 months of food security. Recall that these results, for most households, are from the proceeds of only one milking cow.

Table 19: End of Project NMAHFP

	Female	Male	Grand Total
1: In-calf heifers Average of NMAHFP	9.84	9.30	9.38
2: Pass-on cattle Average of NMAHFP	9.31	8.90	9.00
3: Technical Assistance Average of NMAHFP	8.67	9.35	9.25
4: Non LOL DAP Average of NMAHFP	7.31	8.39	8.17

When looking further into the details, we will learn that female headed households in Central and Copperbelt provinces averaged above 10 months of food security – with a standard deviation of 1 or higher. Taking both quantitative and qualitative surveys into consideration, **the project has probably already achieved its target for NMAHFP among those receiving in-calf heifers, or pass-ons**.[70] With the increase in herd size, and an additional milking cow, this will certainly be the case by the end of the project, next September 2009.

[68] While it is true that the mid-term was focused towards project beneficiaries, and the final evaluation towards population level impact, the latter also sought to measure the impact of project beneficiaries (the three first sub-groups).

[69] The consultant initially asked direct beneficiaries about the benefits of the cash flows they had received from their sales of milk. Almost to a person, these farmers (men or women) reported that they had been able to obtain the needed household supplies through additional maize purchases, and had also had the milk itself to supplement household diets – particularly during the hunger months. When those who had participated in the quantitative survey were asked how they had answered the question on NMAHFP, they said they had reported 7 or 8 months of food security. Why did they say this when they had just informed us that they had had sufficient food reserves throughout the past year? It appears that farmers, when directly asked about food security, can not bring themselves to actually admit to having sufficient food – for a multitude of reasons. They did not have enough of their own food (i.e. maize in their own granary). They could not be sure that they would be food secure in the future. Maybe the project would no longer help them if they said they were food secure. Purchases using milk receipts somehow 'didn't count'. Even though the enumerators were warned about this possible kind of response, it is almost impossible to actually control for such perceptions at the farmer level. For such an important issue, it is far better to base information on real data – i.e. household level farmer milk sale and consumption records. While it is true that milking cows go dry for periods of time, the majority of them do appear to be milking during the hunger months. Being more certain of this fact would justify more careful analysis of field level data being currently obtained by MCCs from LOL beneficiary farmers, or even their own household level books. Also given the variability observed in responses to the question, some farmers are stating that they are near food security (i.e. 11+ months of food).

[70] Recipients of AI are expected to be impacted in a similar manner, but their 'improved cows' resulting with AI with traditional cows are not yet old enough to bear a calf, and produce milk.

Establishing the target groups for the semi-annual quantitative surveys proved challenging. When the 2004 baseline was conducted, LOL had not yet determined, through targeting, where MCCs would be developed. Not all areas covered by baseline were subsequently worked in. By the end of the project, and final quantitative survey, the specific districts and provinces were somewhat different from the original baseline sites. This made comparisons of the indicators established for Goal 1 and Goal 2 difficult. For example, while the 2004 baseline established 6.4 months for 'number of months of adequate Household Food Provisioning' (NMAHFP), the final evaluation required a reanalysis of baseline data for the provinces/districts covered by the final evaluation quantitative survey – which led to a different baseline value: 7.5 (c.f. Table 20 below). This was then compared to the results in 2008, for the same provinces/districts (though with randomly selected different farmers of course), with the result of 8.3.

Table 20: NMAHFP Resample Values for Baseline (2004) and Final Evaluations (2008)

		PROVNAME	DISTNAME							
		Copperbelt	Copperbelt Total	Lusaka	Lusaka Total	Southern			Southern Total	Grand Total
SURVEY	Data	Chingola		Chongwe		Kalomo	Kazungula	Monze		
Baseline	Average of NMAHFP	9.19	9.19	7.26	7.26	6.95	8.03	6.95	7.29	7.45
	Standard Deviation of NMAHFP	3.25	3.25	2.42	2.42	3.09	3.18	3.09	3.15	2.95
Final	Average of NMAHFP	9.15	9.15	8.40	8.40	8.62	8.55	7.40	8.18	8.30
	Standard Deviation of NMAHFP	1.50	1.50	3.99	3.99	2.59	3.84	4.30	3.65	3.54
Total Average of NMAHFP		9.17	9.17	7.46	7.46	7.82	8.28	7.18	7.74	7.80
Total Standard Deviation of NMAHFP		2.62	2.62	2.78	2.78	2.96	3.52	3.74	3.44	3.23

These results, representing an overall average of all beneficiaries from all areas represents an improvement for farmers in food security. Despite high standard deviations of 3 or more, however, the higher NIMAHFP is statistically significant with "a p-value less than 0.001". [71]

Survey households were asked whether or not meals over the past 12 months were adequate to meet the family's staple food needs. Reponses confirm that LOL assisted dairy households have performed somewhat better than non-supported households (Annex 10, Table 3.1.3).

	Adequate	Inadequate
Household heads of those receiving in-calf heifers:	10.43 months	1.57 months
Household heads of those receiving pass-ons:	10.31 months	1.69 months
Household heads of those receiving LOL technical assistance only:	10.29 months	1.71 months
Non LOL DAP household heads surveyed:	9.6 months	2.4 months

Linked to the above question was whether or not area households are currently consuming food groups not consumed before the initiation of the DAP in 2004. LOL supported vulnerable households receiving in-calf heifers claimed a dramatic increase (72%) in their ability to purchase and consume additional food, thanks to the additional income coming from the sale of their milk, while the control group experienced no significant change in food consumed. Those receiving pass-ons is lower, perhaps reflecting the fact that animals received have not yet calved, while those in the TA only group may have benefited from AI to their traditional cattle and some subsequent milk sales to their MCC (Annex 10, Table 3.2.3).

Households responding	**"Yes"**
Household heads of those receiving in-calf heifers:	72%
Household heads of those receiving pass-ons:	44 %
Household heads of those receiving LOL technical assistance only:	11 %
Non LOL DAP household heads surveyed:	0 %

[71] Personal communications with Frank Valdivia & Andson Nsune, LOL M&E statistics calculations, Nov. 14, 2008.

Of these additional foods purchased and consumed, the top five categories, in order of priority, were:

(1) Fresh or sour milk, yoghurt or other milk products
(2) Oil, fat, butter
(3) Sugar or honey
(4) Rice, bread, or other wheat based products
(5) Fresh or dried fish (Annex 10, Table 3.2.4).

When a household's own staple food production for the year was not adequate, the great majority stated that they purchased needed supplies out of household income (744 responses out of 1866 responding), followed by 'other' (393 responses) – probably from extended family support, followed by working for food (a form of barter exchange)(93 responses). Bartering some commodity like milk for food was only mentioned 11 times, close to the selling of some asset for food (14 responses) (Annex 10, Table 2.5.2).

From the final evaluation quantitative survey (Annex 10, Table 5.3), 285 households were asked if they were able to produce more food now, as a result of LOL intervention (Table 21 below). The majority, particularly among female-headed households – responded with an overwhelming yes, as shown below:

Table 21: Proportion of Households Producing More Food after LOL's Intervention

Survey Group	PROVNAME	Female		Male		Grand Total	
		n	%	n	%	n	%
1: In-calf heifers	Central	7	**86%**	44	61%	51	65%
	Copperbelt	12	**67%**	48	46%	60	50%
	Lusaka	1	**100%**	25	56%	26	58%
	Southern	24	**67%**	124	69%	148	69%
	All Areas	44	**70%**	241	62%	**285**	63%

Increased incomes from the sale of milk permits these households to either purchase additional food, as needed, or to use milk in the form of barter to hire someone to work either supporting the dairy work (gathering grass for feed, construction of cow enclosures, taking milk to market, etc.), or help in the cultivation of some field. Qualitative survey interviews found that many households engage neighbors to construct the ridges upon which maize will be planted at the beginning of the rainy season, for example.

(6) Project Goal 2: Household Dietary Diversity Score (HDDS)

HDDS, another mandatory FFP indicator, was used as a proxy measure for the socio-economic level of households, with the hypothesis being that positive impact would lead to a diversification of food consumed by the household. Certainly, based on the qualitative field interviews, all beneficiary households consistently pointed to the additional food (and other benefits) brought to their households because of the regular flow of income from milk sales to both MCCs and locally. Quantitative survey results from Table 3.2.1 (Annex 10), for those receiving the improved dairy cattle (in-calf heifers and pass-ons) had a HDDS of **6.4 food groups**, a slight, though statistically significant, improvement over the baseline [72] of 6.05 food groups, representing **91% of the project's target of 7** food groups by this time. With a standard deviation of at least 2, at least half the sample had realized up to 8 food groups. This value is also significantly higher than the non-LOL sub-group, recorded with 4.6 food groups.

In Table 22 below, survey sub-groups 1 and 2 (in-calf heifer and pass-on recipients) are combined, and compared to sub-groups 3 and 3 (recipients of technical assistance and non-LOL DAP households). We see a very significant difference between the two groups – the first receiving benefits of dairy, and the latter without these benefits. Note that groups 3 and 4 had an average HDDS value (even lower than the

[72] This baseline indicator was only established in 2006.

initial LOL baseline from 2004! The recipients of technical assistance are still waiting to receive a future pass-on, and non-LOL DAP area households also have not received an improved dairy cow.

Table 22: End of Project HDDS Value

			Confidence Intervals	
	Survey Group	Grand Total	Lower	Upper
Groups 1 & 2	Total Average of HDDS	**6.4**	6.15	6.61
	Total StdDev of HDDS	2.2		
	Total Count of HH	337		
Groups 3 & 4	Total Average of HDDS	**4.8**	4.66	4.96
	Total StdDev of HDDS	2.1		
	Total Count of HH	765		
	p-value	9.2627E-28		
	alfa	0.05		

Table 23 below (Annex 10, Table 3.2.2) breaks out the percentage of the different types of food groups consumed by the four sub-groups of the quantitative survey: cereals, roots and tubers, vegetables, fruit, meats, eggs, fish, pulses/nuts, oil/fats, sugar/honey, and miscellaneous. Taking the top eight food categories, the results show that program beneficiaries with milking cows very clearly are consuming a wider range of foods than those not selling milk. With-in the 'non LOL sub-group', they are also clearly obtaining some milk for their household's consumption as well, purchasing this from either a neighbor with a milking cow, or at the MCC, representing another positive impact within the community. A few may have possessed a traditional cow milked in the rainy season (southern Province).

Table 23: Food Groups Consumed

Food Group	In-Calf Heifer	Pass-Ons	Technical Input	Non-LOL sub-group
Cereals	100%	100%	100%	100%
Vegetables	94%	94%	94%	92%
Oil/Fats	77%	85%	65%	62%
Milk/Milk Products	70%	46%	50%	31%
Sugar/Honey	61%	52%	41%	32%
Fish	54%	50%	35%	37%
Miscellaneous	41%	42%	21%	17%
Fruit	33%	52%	28%	26%

Table 24: Changes in Food Consumption Patterns

	In-Calf Heifer	Pass-Ons	Technical Input	Non-LOL sub-group
% Change	73%	44%	11%	0%

Table 24 (Annex 10, Table 3.2.1) underlines this impact by showing that 73% of in-calf heifer beneficiaries are now consuming food groups not consumed prior to this DAP, with 44% of recipients of pass-ons also showing this trend.[73] The sample of households NOT benefiting from LOL assistance reported no change in consumption patterns; those with LOL technical input show some change.

[73] One would expect the households with pass-ons to show somewhat lower rates than those first receiving an in-calf heifer, as many with pass-ons have not benefited as long with milking, and some have not even begun milking.

(7) Strategic Objective 1: Increase in average household income from dairy sales

Households obtaining an improved dairy cow, and subsequently beginning to sell milk either locally or through their MCC are expected to realize increased household incomes. With a pre-project baseline of $578 per household/per year on income, this DAP has **exceeded its life-of-project goal, with a significant increase to $872 per household/per year**. This represents net income (sales minus costs of production). Data are determined from multiple sources (MCC books, structured household questionnaires, farm books, PRA). Based on the qualitative survey interviews with many of these same farmers, and review of many of their farm books, it was evident that documented income was probably significantly less than the real value of the milk sold (or bartered) by these households. This is because many households only deliver morning milk to their MCCs (which may be slightly more than evening milk), some prefer to sell locally (at sometimes higher prices/liter than given by MCC), and many give milk in form of barter to neighbors for other food and/or services. This consultant estimates that actual net income from possession of one milking cow is in fact exceeding $1,000.

Table 25: Increased Household Incomes (K) from Sales of Milk

		Copperbelt Total	Lusaka Total	Southern Total	Grand Total
Baseline	Average of Annual Milk		4,574.79	5,398.36	5,368.59
	StdDev of Annual Milk		8,162.47	15,222.84	15,011.69
	Count of HH		6	160	166
Final	Average of Annual Milk	2,182.17	27,646.89	6,295.77	8,556.11
	StdDev of Annual Milk	1,428.22	56,237.33	8,539.25	21,182.63
	Count of HH	6	20	152	178

In the quantitative survey data below (Table 26), reported annual incomes from all sources among the recipients of in-calf a heifer was considerably higher than that received by non LOL DAP neighboring households. Details by province can be viewed in Annex 10, Table 8.1. Income for male-headed households was also higher than in female-headed households.

Table 26: Annual Incomes – all sources (US $)

	Sex		
Survey Group	Female	Male	Grand Total
1: In-calf heifers Average of SumOfEarnings	1,050.22	1,450.89	1,389.80
1: In-calf heifers Count of HH	43	239	282
2: Pass-on cattle Average of SumOfEarnings	911.90	1,120.84	1,068.60
2: Pass-on cattle Count of HH	13	39	52
3: Technical Assistance Average of SumOfEarnings	908.95	1,475.98	1,387.30
3: Technical Assistance Count of HH	33	178	211
4: Non LOL DAP Average of SumOfEarnings	265.02	629.68	554.33
4: Non LOL DAP Count of HH	112	430	542
Total Average of SumOfEarnings	580.56	1,042.85	957.36
Total Count of HH	201	886	1087

Dairy incomes turn out to represent a higher percentage of total income for female-headed households than for male-headed households (cf. Annex 10, Table 8.3)

Table 27: Proportion of Dairy Income in Total Household Income

	Sex		
Survey Group	Female	Male	Grand Total
1: In-calf heifers Average of Percent	67.31%	60.35%	61.39%
2: Pass-on cattle Average of Percent	67.23%	52.84%	57.26%
3: Technical Assistance Average of Percent	73.85%	53.34%	55.39%
4: Non LOL DAP Average of Percent	43.06%	56.12%	55.65%

Quantitative survey data in Table 27 demonstrate that, for the in-calf heifer and pass-on recipient sub-groups, the most important sources of household income comes from dairy households, followed by gardening/irrigated agriculture. For the sub-group receiving only technical assistance (without animals), the major sources of household income come from gardening/irrigated agriculture, followed sale of livestock or livestock products. For the non-LOL supported sub-group, the major sources of household income come from gardening/irrigated agriculture, followed by piecework and sale of livestock or livestock products. Details about the ranking of other sources of income may be seen in Annex 10, Table 8.2.

The final quantitative survey provides some additional detail on this. Recipients – 285 of them - of in-calf heifers responded "Yes" to whether or not they are able to now produce more food as a result of LOL dairy interventions (Table 28 below). They further noted how milk income from their dairy cow contributed to this:

Table 28: In-Calf Heifer recipients (all areas)

	Male		Female		Total	
	n	%	n	%	n	%
Able to Buy Drought Animals with Milk Income	241	0%	44	0%	285	0%
Able to Buy Farming Implements with Milk Income	241	1%	44	0%	285	1%
Able to Buy Farming Inputs with Milk Sales	241	**30%**	44	**41%**	285	32%
Able to Buy Fertilizer with Milk Income	241	**6%**	44	**9**%	285	7%
Able to Buy Required Seeds with Milk Income	241	**3%**	44	0%	285	3%
Increased Knowledge due to TA Received	241	**6%**	44	**7%**	285	6%
Incentives offered by LOL e.g. Loans	241	0%	44	0%	285	0%
No Hunger due to Buying Food with Milk Income	241	2%	44	0%	285	2%
Soil Improvement with Pasture Production	241	1%	44	0%	285	1%
Use of Cattle Manure to Improve Soil	241	**9%**	44	**5%**	285	8%
Using Milk Income to Hire Labor	241	**2%**	44	**7%**	285	3%

It is noteworthy that a greater proportion (7%) of the female-led households stated that they were able to use milk income to hire labor.

The top five responses for the use of general household income among all sub-groups surveyed were:

(1) Purchase of staple foods (22%)
(2) Purchase of groceries (soap, oil, sugar, etc.)(21%)
(3) Educational/school fees (18%
(4) Purchase of non-staple foods (12%)
(5) Purchase of clothing (8%) (Annex 10, Table 3.3.6).

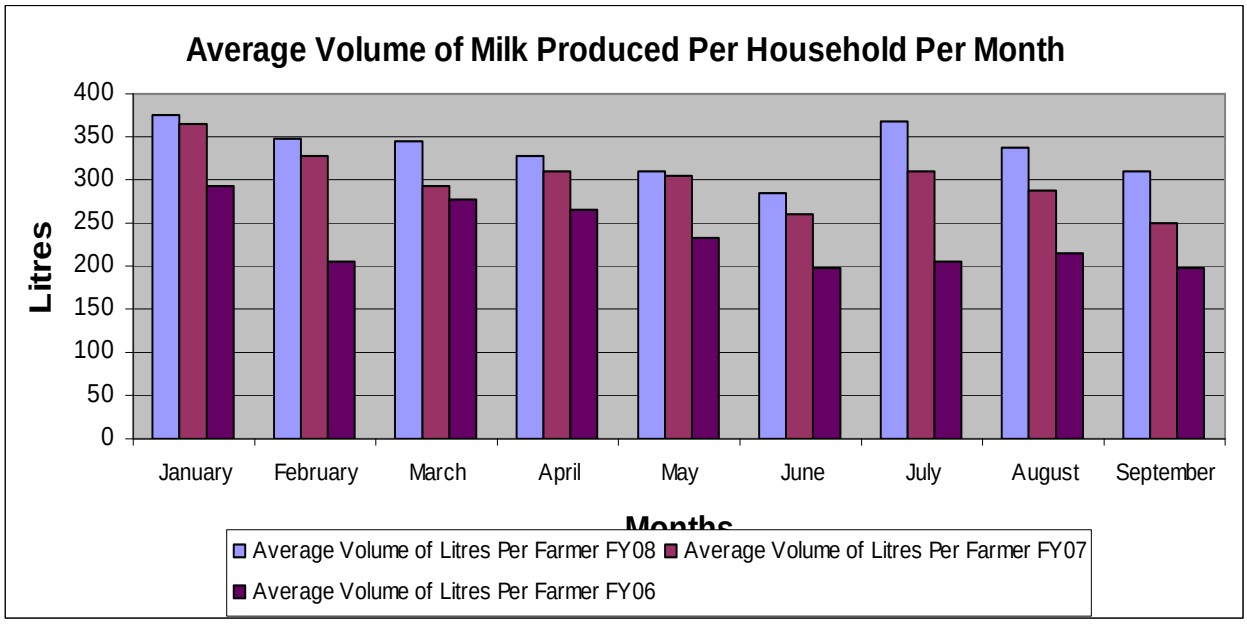
(8) Intermediate Result 1: Increased Productivity of Smallholder Dairy Farmers
Intermediate Result 1.1: Increase in Milk Produced by Smallholder Farmers

Most farmers receiving in-calf heifers and pass-ons through this DAP had never kept dairy cattle in the past, so they actually began at "zero" in terms of milk production. However, the project, for its baseline, took a measure of milk produced by those with traditional cows, in those areas, such as Southern Province, where many had free grazing animals. This baseline was 2,700 liters/household/year. A target was established of 3,300 liters/household/year.[74] By year four of this project, 3,888 liters of milk per beneficiary household was measured, **which exceeds the life-of project goal by 18%.** However, as already noted above, this data recorded from farm record books (linked with MCC records, and the quarterly farmer structured surveys) may be under-reported. In the Copperbelt, it is well known that the bulk of milk is still sold locally, as prices received can be double that offered by the MCC (e.g. Kitwe region with price of 4,000K vs. 2,000K for MCC)). The bottom line, however, is that LOL has clearly demonstrated that smallholder dairy can dramatically increase household incomes through milk production, and volumes can be increased through better management.

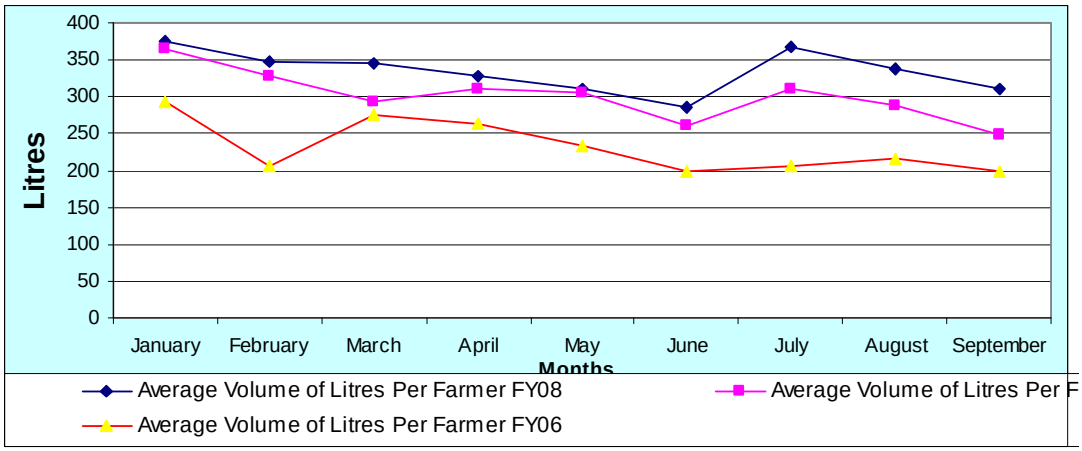
(9) Intermediate Result 1.2: Increase in Average Yield of Dairy Cattle

As can be seen in the Figure 14 below, the trend is for milk production for smallholder households to increase during the rainy season months (November-March), when it is easier to obtain forage for the animals. These are also the 'hunger months' when food resources for vulnerable households are at their lowest (or finished), so milk income during this time is especially significant for them. Interestingly, commercial farmers, who are better organized to grow and store forage for the dry season needs realize their highest milk production during the dry season. As LOL smallholder dairy farmers begin to manage better their own land for forage, and store forage, one would expect productivity during the dry season to increase as well. Milk volumes/farmer have increased from 2006 to 2008.

Figure 14: Monthly Average Liters of Milk Produced per Farmer [75]



[74] For LOA program targets, see Table 3.1 of LOL Zambia October-December 2007 Quarterly Report, p. 13.
[75] LOL Fiscal Year 2006 Results report, November 22, 2006, p. 5.



LOL began in 2004 with a baseline value of 4 liters/cow/day, with an end-of-project target of 10 liters/cow/day. By the end of year four, project data give a result of an average 7.05 liters/cow/day, or 70.5% of target. With improved pasture management and management of animals in general, LOL smallholder dairy farmers should be able to attain the target set by the end of next year. Indeed, field interviews by the consultant in September showed that most beneficiaries were exceeding 12 liters/day/cow (with two milkings) – many with as much as 33 liters/day (cf. also Figure 3 from actual beneficiary daily milking logs.) Average milk yields (liters per cow per day) for the project dairy cows (Figure 15 below) appears low to this consultant, based on interview responses concerning daily yield, and observed field notebooks of beneficiary households. However these are averages that include low productivity seasons, and long after a cow has delivered its calf. One woman, for example, reportedly had milked her cow non-stop for over two years, and was only receiving about 4-6 liters/day currently.

	Area/Milk Collection Center (MCC)						
	Central	**Copperbelt**	**Choma**	**Lusaka Area**	**Magoye**	**Monze**	**Average (All Areas)**
Increase in Average Yield of Dairy Cattle (Liters Per Cow per Day)							
Maximum	**24.0**	**22.0**	**16.0**	**17.0**	**8.8**	**16**	**25.00**
Minimum	**1.0**	**1.0**	**1.0**	**1.0**	**2.0**	**2**	**1**
Average	***6.90***	***7.45***	***5.60***	***6.50***	***4.6***	***7.03***	***6.42***

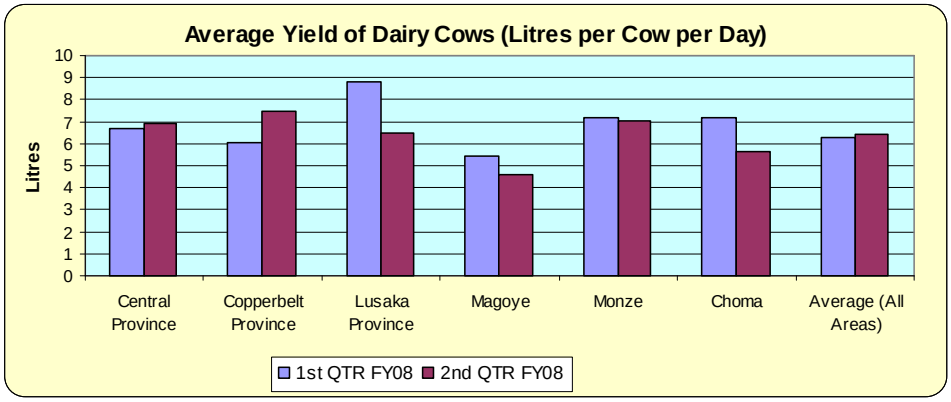


Figure 15: Average Yield of Dairy Cattle (Liters per Cow per Day)[76]

[76] LOL January-March 2008 Quarterly Report. p, 9, Data table shown is Table 3.3.1.

(10) Intermediate Result 1.3: Number of Smallholder Farmers Owning Improved Dairy Cattle

Beginning at the outset of the project with zero animals distributed to smallholder households, and with an end-of-project target of 1,000 animals distributed, this DAP has succeeded in distributing 854 animals (in-calf heifers + pass-ons + AI successes), or 85.4% of the project's EOP target (cf. Table 1). With the plans already in place for additional distribution of in-calf heifers into the Copperbelt in coming months, plus further distributions of pass-ons from existing cattle in other zones, this DAP will have achieved its LOP target by the end of next year.

As noted elsewhere, the number could have been significantly higher had there been less mortality, a more equal distribution of live births (female vs. bull calves), and earlier application and better success with the AI program. Nevertheless, MCC smallholder herds of improved dairy animals are increasing, as evidenced by the increasing production of milk/farmer and per zone.

(11) Intermediate Result 1.4: Number of Smallholder Farmers Trained

With an end-of-project target for training of 2,723 smallholder farmers, LOL has already exceeded its target by 9% with 2,723 farmers trained. This number also will continue to grow during the last year of the project. This number includes multiple members within some of the recipient households, as well as many households on the 'wait-list' to receive pass-ons during the coming year.

LOL has undertaken multiple other kinds of training that do not show up in this figure, including the special training of selected beneficiary households, and their families, to become local community livestock workers. Others trained include members of MCC's in management positions. This DAP has made significant efforts to provide group training opportunities for program beneficiaries in the field. As pointed out elsewhere, however, greater effort should have been given to more 'hands-on' training at the individual household level in terms of management practices and record keeping – areas which remain weak. This should be a priority during the final year of the project.

(12) Intermediate Result 2: Improved Productivity of Dairy Industry
Intermediate Results 2.1: Gross Average Value of Milk sold by Milk Collection Centers

As pointed out by the project, "*the market linkage provided to smallholder producers by MCCs has continued to be an important factor in the dairy chain". MCCs provide their members a ready market for their produce*".[77] The baseline value in 2004 for LOL supported MCC sales (to processors, counter sales, and other) was $61,300. A life-of-project target was established at $77,344 per year per MCC. The number of MCCs used for calculations changed from year to year, with only the more successful ones being counted (6 in FY 2007, 10 in FY 2008). As new MCCs began, their own production would drag down the overall average. **By the end of FY 2008, LOL had already exceeded its target by 112%.** Though clearly illustrating significant progress, this indicator does not begin to tell the whole story.

Of greater interest is the total volume and value of milk being produced by all of the LOL supported MCC smallholder farmers, as a percent of national dairy production (reported elsewhere in this report). Also significant, and perhaps equally important, is the actual volume/value for specific MCCs, linked to the number of smallholder households providing the milk. These are data sometimes reported upon within the project's quarterly reports. As evidenced from Figure 16 below, the performances of individual MCCs varied widely, as shown for FY 2007.

[77] LOL FY 2007 Results Report, November 2007, p. 7.

(13) Intermediate Result 2.2: Average Volume of Milk Sold by Milk Collection Center

Each MCC, depending on location, possesses different options for selling their milk. Some, located in the center of town marketplaces, enjoy brisk over-counter sales of fresh and sour milk, as well as milk products developed by the MCC (e.g. yoghurt). LOL has assisted MCCs in developing their markets, most important being those with processors like Parmalat or Zimmilk. LOL considers 4,000 liters/month as a threshold that a MCC must surpass in order to become financially sustainable; yet less than half of MCCs have currently succeeded in this respect. Bulk milk sales (fresh and sour) to other buyers also take place (e.g. hospitals, schools). Most of the milk sold in FY 2007 by MCCs was supplied by the members of the dairy cooperative (93%), while 7% represented milk bulked from non-members (small commercial farmers). With a baseline established at 245,400 liters/year/MCC in 2004, LOL has been able to exceed its LOA target of 294,500 liters by 5%.

As the Figure 15 shows, most of the MCCs performed best between October and April, corresponding to the rainy season months as well as the hunger months for most rural households. As noted by the project, "the incomes from the sale of milk, together with the consumption of milk…enabled households participating in the program to be food secure through the hunger season".[78] By April of each year, through at least October, most households are able to begin eating produce from their farming efforts.

Figure 16: Average Volume of Milk Sold by MCC in FY 2007

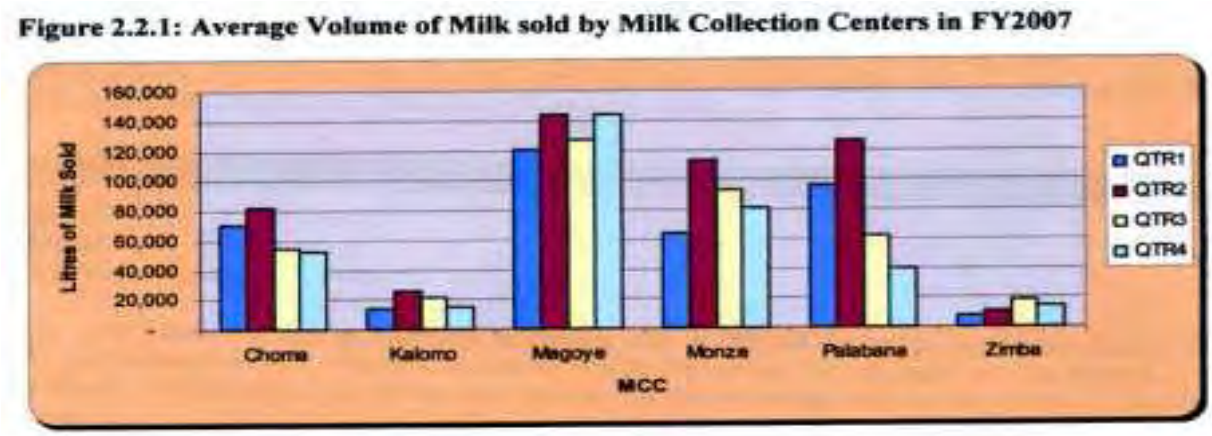


Figure 7b, presented earlier, illustrated the nature of the value curve for the milk purchased from smallholder dairy farmers by the ten leading project supported MCCs; the curve is almost identical for the volume of the milk purchased, provided in Table 7. Volumes have steadily increased for most MCCs between 2004 and 2008.

(14) Intermediate Result 2.3: Number of Smallholder Farmers Delivering Milk to MCCs

Over the life of this project, the number of MCCs has risen, fallen, and risen again. Three MCCs failed for reasons completely outside the project's ability to influence one way or the other. In FY 07, Kazungula, Sikaunze, and Nakasangwe MCC smallholders were hit by a cattle disease outbreak in which all cattle were destroyed by the government. They have yet to be replaced. Furthermore, long delays in connecting new MCCs in the Copperbelt to electricity further delayed activities. Nevertheless, in spite of these challenges, the project has moved from its baseline of 600 households delivering to the LOL supported MCCs in 2004 to 879 by end of the FY 2008, 70% of the LOA target. Based on current

[78] LOL FY 2007 Results Report, November 2007, p.8

progress within the Copperbelt, as well as continued growth within the other MCC, it is highly probably that the project will have reached its target of 1,250 households delivering milk to at least 10 MCCs by the end of the project in September, 2009.

(15) Intermediate Result 2.4: Volume of Milk used by Targeted Processors to Produce Dairy Products

Project efforts have been successful in helping to link various private sector dairy processors with MCCs in different regions – often providing special technical support or specialized equipment that will facilitate this to happen. This is particularly true in developing improved means of transporting milk to processing centers from MCCs, in providing MCCs with the right size cooling tanks to hold milk for processor pickups, and helping to develop milk pickup points along highways to which MCC farmers can gather to bulk their milk. The original baseline of 32 million liters has been expanded beyond the anticipated LOA target of 41,480 million liters per year to 41,537 million liters. With Copperbelt MCCs coming on line in the coming months, LOL will have significantly exceeded their project targets by the end of the project in 2009.

(16) Intermediate Result 2.5: Capacity Utilization of Dairy Processors

At the outset of this DAP, in 2004, dairy processors with whom LOL was working were operating at only 26% of their capacity to produce dairy products (see discussion under processors 2.6.6). By the end of FY 2008, the project had been able to assist these processors to expand their operations, reaching 37% of capacity. Capacity is also a seasonal thing, with milk volumes changing from month to month – with large commercial farmers being the prime producers during the dry season, and MCCs the prime producers during the rainy season. While some of this expansion has come from increased production within the mid to large-scale commercial dairy farm sector, the greatest expansion has actually come from small-scale dairy, as represented by the MCCs. Processors see continued growing demand not only within Zambia, but prospects for export regionally, meaning that they are themselves doing as much as they can to purchase milk from the growing number of MCCs, in some cases even initiating their own rural MCCs. The competition among processors for MCC milk is also benefiting farmers in ever rising prices given for each liter of milk purchased, with added price incentives for higher grades of milk.

3.4.2 Quarterly Beneficiary Surveys

In addition to the bi-annual (baseline, mid-term, final) surveys, the LOL M&E team led quarterly structured household surveys among a sub-sample of beneficiary households – data intended to complete the IPTT data needs for monitoring, as well as providing a measure of regular impact and progress among households benefiting through the targeted MCCs. At the time of these end-of-quarter surveys, household level farm books as well as MCC data records were reviewed and registered. Within the Performance Indicator Reference Sheets (PIRS) of the project, notification was given about 'known limitations to data quality'. These usually included reference to:

(1) Reluctance of farmers to disclose this information by farmers, especially of sales outside MCCs.
(2) MCCs and Farms books accuracy
(3) Sampling errors, non-response errors, interviewer bias
(4) Most farmers' inability to determine volumes of milk consumed by calves (or themselves for that matter).

Efforts were made to deal with these potential issues, but, in the consultant's opinion, were generally fairy poorly accomplished. Dealing with these issues became largely the task of the M&E leader, one person covering an entire program. Local project extension agents and community livestock workers did little, if anything, to actually improve efforts at this level; most of their efforts were focused on weekly or biweekly group meetings discussing selected training topics. Though good in itself, this was clearly not

sufficient to assist household level efforts to follow instructions on keeping adequate and correct financial and other records, including daily milk production and uses.

3.5 LOL DAP Final Quantitative Survey

3.5.1 Methodology Used

The quantitative survey followed a protocol prepared by the consultant in collaboration with the LOL field team (cf. Annex 4). LOL field M&E leader Andson Nsune developed a questionnaire format partially based on the original baseline conducted by LOL in 2004, with input from the consultant and LOL home M&E staff (cf. Annex 5). External field enumerators were recruited and trained in the use of this survey instrument in August and began administering the survey within the four provinces over two weeks.[79]

The sample size for the evaluation was calculated using the guidance provided in the FANTA Sampling Guide[80]. A total sample of 1,120 was determined necessary to detect changes in key impact indicators, particularly the MAHFP. In the end, 1102 households were surveyed using the guidance provided; this sample size has proven sufficient to allow the program to detect changes in the key impact indicator, which is Months of Adequate Household Food Provisioning (MAHFP). To establish plausible links between project inputs and impacts at the population level, the sample was broken down into the following sub-groups of respondents.

Table 29: Breakdown of Sample into Groups of Beneficiaries

S/N	Category of Respondents	Number of Respondents	Actual Respondents
1	Beneficiaries of in-calf heifers from the program	257	285
2	Beneficiaries of pass-on heifers from the program	46	52
3	Farmers receiving technical assistance from the program, including AI, but who have their own animals	257	214
4	Households that did not participate in the LOL DAP	560	551
	Total:	1120	1102

For categories 1 to 3, the respondents were sampled using simple random sampling from alphabetically arranged lists prepared for each intervention site in the district. Once these lists had been developed and the specific locations of the farmers had been determined, an equal number of households that did not participate in the LOL DAP were interviewed. For consistence and elimination of bias in selection of such respondents, the point where the last direct beneficiary was interviewed marked the beginning of the Random Walk. During the random walk, the sampling interval was calculated as a ratio of:

The number of households that did not participate in the LOL DAP in a Village/Location
The sample size of households that did not participate in a Village/Location

The random walk method was used in cluster surveys and is relatively widely known. This method entails randomly choosing a starting point and direction of travel within a sample cluster, then conducting interviews in the nearest households. In this case, a skipping procedure guided by the sampling interval

[79] A more detailed description of the methodology used in this survey is included in the survey protocol in Annex 4, including a section written by Frank Valdivia, LOL M&E manager in St. Paul, Minnesota, who provided special expertise in this area.
[80] The sample size was arrived at after using the sample size calculation for indicators expressed as means *(FANTA Sampling Guide, Robert Magnani, December 1997)*

was added to eliminate possible biases in selecting respondents in communities with many households to be interviewed using this approach.

3.5.2 Discussion of Survey Results

Data input, cleaning data, and compilation of the data tables from the survey took four weeks longer than had been anticipated. Some of the results of this survey have already been reviewed under the discussion of the IPTT indicators. The survey, however, provided extensive other information, only some of which is presented here. As it turned out, the groupings of sub-groups of beneficiaries was significant, particularly when it was possible to further distinguish between female and male-headed households. The full list of data tables presented under Annex 10 used in this evaluation report is given here:

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The LOL field team will need to undertake additional review of the complete survey results to determine which elements may be useful for future program implementation. I have extracted from these data tables information directly linked to topics discussed and placed throughout this document. Information presented below provides further details to program impacts discussed elsewhere.

(1) Household Head Gender Distribution

While the LOL DAP, in some areas, seemed to favor women as recipients of the in-calf heifers, as well as pass-ons, it is clear from the table above that only 16% of the sample beneficiary households were constituted of women-led households. Based on the consultant's field interviews, which were almost always more heavily weighted towards woman recipients, it also seemed that when the animal was registered in the name of the women, that better results seem to be the outcome. This line of thinking will be continued through a number of other data tables, to demonstrate that there is quantitative data support for this reasoning.

Table 30: Household Head Gender Distribution

	Female	Male	Total
1: In-calf heifers Count of HH	44	241	285
2: Pass-on cattle Count of HH	13	39	52
3: Technical Assistance Count of HH	33	181	214
	90	461	551
	16%	84%	
4: Non LOL DAP Count of HH	113	438	551
Total:	203	899	1102

(2) Household Characteristics

The quantitative survey sample of 1120 households reported an average household size of 8 individuals, of whom 3.5 were children under 12, and 50% were female (cf. Table 31 below). Yet, a closer look at these data also shows some significant differences (Annex 10, Table 1.5). Within the Central Province for example, for pass-on recipients, households were much larger – averaging 17 in female headed households and 11 in male headed households, and household children were also numerous (10 in female headed households and 4 in male headed households). The average age of household heads was 50 for female-led households and 47 for male-headed households (Annex 10, Table 1.2). The educational level of the household heads, by sub-group, was interesting, as it suggests that there is no internal reason that program dairy households cannot keep dairy records (Annex 10, Table 1.3). The reasons for doing so must lie elsewhere.

	Primary Education	Secondary Education
Household heads of those receiving in-calf heifers:	42%	43%
Household heads of those receiving pass-ons:	42%	50%

Household heads of those receiving LOL technical assistance only:	54%	32%
Non LOL DAP household heads surveyed:	57%	30%

The majority of household heads surveyed, among all sub-groups, were monogamously married (68%), while 13% were either widowed separated female-headed households (Annex 10, Table 1.4). Polygamous households were most common in the Southern and Central Provinces.

Table 31: Household Composition

	Female	Male	Grand Total
Total Average of People in HH	6.8	8.3	8.0
Total Average of CHILDREN	2.9	3.6	**3.5**
Total Average of MAL CHILDREN	1.5	1.9	1.8
Total Average of FEM CHILDREN	1.4	1.7	1.7
Total Average of ADULT	3.9	4.7	4.5
Total Average of MAL ADULT	1.7	2.4	2.3
Total Average of FEM ADULT	2.2	2.3	2.2
Total Average % of Adult	57.0%	56.2%	56.3%
Total Average % of Children	43.0%	43.8%	43.7%

Most households are supporting children in primary or secondary school, which supports the frequent comment from dairy households about the importance of regular milk income in paying for school fees and supplies (Annex 10, Table 1.6).

% Households with Students attending school:	**Female**	**Male**
Household heads of those receiving in-calf heifers:	43%	39%
Household heads of those receiving pass-ons:	38%	36%
Household heads of those receiving LOL technical assistance only:	38%	41%
Non LOL DAP household heads surveyed:	37%	33%

(3) Vulnerability Status of Beneficiary Households

Nine categories of vulnerability were identified, and all households interviewed were asked if any members of any of these kinds of people were represented in their households (Annex 10, Table 2.1-2.6). These included the critically ill (HIV/AIDS, TB), orphans under 12 years of age, the elderly, and child headed households, widowed, separated or divorced, and households with a high dependency ratio. Table 32 below indicates that among female led households, 84% possessed such individuals; 93% of households receiving pass-ons had such individuals. Indeed, **any** female led household is by definition vulnerable – so actually 100% of female-headed households are considered vulnerable. Among the male-headed households, we see a somewhat lower rate of possessing the vulnerable classes of individuals, though still fairly high. This finding seemed to be born out in the qualitative surveys as well where the female headed households in many cases not only had more vulnerable individuals, but larger numbers of orphans as well. If indeed true, this strongly argues for greater focus towards female-headed households being the recipients of in-calf heifers and pass-ons (in an environment of limited numbers of animals to give out). Here, FFP would see the greatest impact on up lifting of vulnerable households. It is noteworthy that even among the non-LOL supported control group, the female-headed households there also possessed higher frequencies of vulnerable individuals.

Table 32: Smallholder Dairy Farmer Vulnerability Status

	Female	Male	Grand Total
1: In-calf heifers Average of Vulnerable _HH	84.09%	67.78%	70.32%

1: In-calf heifers Count of HH	44	241	285
2: Pass-on cattle Average of Vulnerable _HH	92.31%	74.36%	78.85%
2: Pass-on cattle Count of HH	13	39	52
3: Technical Assistance Average of Vulnerable _HH	75.76%	66.30%	67.76%
3: Technical Assistance Count of HH	33	181	214
4: Non LOL DAP Average of Vulnerable _HH	87.61%	57.54%	63.79%
4: Non LOL DAP Count of HH	113	438	551

The incidence of orphans in these households is also dramatic (Table 33 below). Note again that in almost all cases, female-headed households more often cared for orphans than male-headed households. In many provinces this was true in 100% of the cases! Note also that those 'receiving technical services' appear to lower vulnerability ratings and well as have less orphans, suggesting that LOL has done a good job to this point in prioritizing those who should receive the in-calf heifers and pass-ons. The non-LOL households, with the exception of female-headed households - generally also had the lowest numbers with orphans as well – sometimes less than 28% of the rates as the other sub-categories.

Table 33: Incidence of Orphans among Dairy Beneficiary Households

			Female	Male	Grand Total
In Calf Heifers	Central	Average of Orphans	28.57%	40.91%	39%
	Copperbelt	Average of Orphans	75.00%	47.92%	53%
	Lusaka	Average of Orphans	100.00%	56.00%	58%
	Southern	Average of Orphans	50.00%	49.19%	49%
Pass-Ons	Central	Average of Orphans	100.00%	25.00%	40%
	Copperbelt	Average of Orphans	100.00%	75.00%	83%
	Lusaka	Average of Orphans		80.00%	80%
	Southern	Average of Orphans	70.00%	57.69%	61%
Tech. Assist.	All sites	Average of Orphans	54.55%	42.54%	44%
Non LOL Assist.	All sites	Average of Orphans	53.98%	27.63%	33%

(4) Dairy Households Use of Dairy Income

Annex 10 Table 3.3.7 provides details, by province, for the principal uses of dairy income among households possessing a dairy cow. Only the recipients of the in-calf heifers or pass-ons represent households with improved dairy cows. Some of the other households in other two groups possessed one or more traditional cows which provided some milk, usually only in limited supplies in the rainy season. This is why, for the non-LOL group, responses are limited – income was very limited as well. LOL assisted households clearly indicate that educational fees and food purchases ranked highest in terms of priorities, followed by purchase of clothing, agricultural inputs, and veterinary services (e.g. AI)(Table 34 below). Health/medicine costs probably ranked high in the 'other' category.[81] These priorities were confirmed in the household qualitative surveys.

Table 34: Dairy Household use of Milk Income

	In-Calf Heifers	Pass-Ons	TA Services	Non LOL HH
Educational Fees	18	17	13	4
Groceries (oil, sugar, soap..)	15	12	10	4
Ag. Inputs	8	6	6	2
Clothing	6	0	4	1

[81] 'Other' includes labor for crop production, labor for livestock raising, dowry, and purchase of farm implement.

Non-Staple Foods	10	9	3	1
Stable Foods (maize)	16	16	11	5
Vet. Services	8	5	6	2
Saving/Banking	1	0	0	0
Travel	1	2	1	0
Total:	**83**	**67**	**54**	**19**
Other	**9**	**27**	**38**	**80**

(5) Household Payments for Agricultural Activities

Annex 10, Table 4.1 provides the details of priorities for use of household income to purchase in cash, or in kind (form of barter) for the performance of agricultural services in the 4 provinces worked in by this DAP. Table 35 below clearly shows that LOL recipients of in-calf heifers and pass-ons have indeed rearranged their revenue streams – with about 23% of it now going to the up-keep and care of their dairy cattle. Though the actual reported amounts spent on each category represent only what households were willing to admit it spending in these categories, the table clearly shows the higher revenues linked to the dairy households. It is also noteworthy that the TA recipients – many of whom this table suggests were of perhaps better off than recipients of improved animals spent the most of the four sub-categories in agricultural pursuits, suggesting they are more diversified perhaps. Closer reading of the original data table also demonstrates just how important barter or in-kind payments are for both employing both casual and permanent labor. The use of barter – or in-kind payments - by all dairy households, in all provinces, was significant for the purchase of both labor services as well as food supplies. For example, of the 125,611 Zambian Kwacha ($37) used in purchasing the labor above, at least 10% was accomplished in the form of barter – probably milk. Milk, sour or fresh is frequently exchanged for both by dairy households with neighbors.

Table 35: Distribution of Cash & In-Kind Payments for Permanent or Casual Labor

	In-Calf Heifers	Pass-Ons	TA Recipients	Non LOL HH
	%	%	%	%
Crop Production	22	23	26	32
Dairy Production	22	23	12	6
Gardening	17	16	21	20
Livestock Raising	22	23	22	22
Marketing Ag. Produce	15	14	18	16
Total:	98%	99%	99%	96%
Total Average Ag. Payments	125,611	57,814	607,069	31,556
US $ Total:	**$ 36.94**	**$ 17.00**	**$ 178.55**	**$ 9.28**

LOL supported smallholder dairy households hired labor for a wide range of activities linked to their dairy enterprise. These included help in raising their calves (11 % of households), construction of kraal (14%), milking (14%), transportation (9%), feed preparation 13%), forage production (12%, and disease and veterinarian services for their animals (15%) (Annex 10, Table 4.2).

Though the actual amounts of money expended in this table are not particularly important, the values do show the relative importance of the different kinds of payments made. Once vulnerable households and recipients of in-calf heifers are paying out significant funds for support in raising their animals, money that clearly is coming from milk sales. Some exchange of milk for labor is taking place here as well.

(6) Dry & Wet Season Gardening

Availability of manure from dairy cattle is also helping households to realize greater gains from both dry and wet season gardening of mostly vegetables, but also green corn for household consumption. This is particularly true for households receiving in-calf heifers, who have had the time to become better established than the recipients of pass-ons, who are only just beginning to realize milk incomes in some cases. Irrigated dry season vegetable gardening has become an important complementary activity for dairy farmers, and was repeatedly cited as among the most important sources of household income, following dairy itself (Table 36 below). This gardening continues on into the rainy season as well (Table 37). Both females and male-headed households have been taking advantage of this new production activity. The complete data set from which this was extracted may be seen in Annex 10, Tables 5.4 and 5.4.1, where one may see that the control group of non-LOL households practice significantly less gardening in both rainy and dry seasons! Table 5.4.2 in this same annex shows that 60% of the in-calf heifer recipients used their dairy cows as the source of the manures for these gardens, while the non-LOL households rarely used such manures at all.

Table 36: Proportion of Households Involved in Dry Season Gardening

Survey Group	PROVNAME	Female		Male		Grand Total	
		n	%	n	%	n	%
1: In-calf heifers	Central	7	86%	44	65.90%	51	69%
	Copperbelt	12	50%	48	68.80%	60	65%
	Lusaka	1	100%	25	84.00%	26	85%
	Southern	24	71%	124	82.00%	148	80%
	All Areas	44	68%	241	77.00%	285	75%

Table 37: Proportion of Households Involved in Wet Season Gardening

Survey Group	PROVNAME	Female		Male		Grand Total	
		n	%	n	%	n	%
1: In-calf heifers	Central	7	86%	44	66%	51	69%
	Copperbelt	12	67%	48	71%	60	70%
	Lusaka	1	0%	25	76%	26	73%
	Southern	24	75%	124	76%	148	76%
	All Areas	44	73%	241	73%	285	73%

(7) Dairy Households and the Management of Pastures for Soil Improvement

One of the most important areas that still remains for LOL beneficiary households to manage better is the cultivation and use of improved forage crops for their dairy cattle – particularly important during the dry season months when grass can be difficult to obtain, and is of poor quality. Annex 10, Tables 5.5 & 5.6 provides data on the types of improved pastures LOL supported households are beginning to use. The fairly high frequency of some of these forage types is promising for the future success of these dairy farmers (Table 38 below). Rhodes grass, sun hemp, velvet beans, cow kandy, and pigeon peas appear to be the most widely used, to date, and the female-headed households seem to show a preference towards velvet beans. Field observations in the qualitative survey of the recipients of the improved cattle did not suggest that any of these forages have yet to make a major impact at the household level. The visit was towards the end of the dry season, and the few households that still had pre-cut forage for their animals had what looked like simple cut elephant grass. Farmers noted that they had to cut and mix this grass with purchased molasses, or their animals could not eat it. This remains an area to be strongly developed within the program.

Table 38: Recipients of In Calf Heifers and Pastures	**All Areas**

	Male		Female		Total	
Types of Pastures Used for Soil Improvement	n	%	n	%	n	%
Rhodes Grass	219	**7%**	**41**	**12%**	260	**8%**
Sun hemp	219	**43%**	**41**	**34%**	260	**42%**
Velvet Beans	219	**64%**	**41**	**51%**	260	**63%**
Cow Kandy	219	**3%**	**41**	**7%**	260	**4%**
Pigeon Peas	219	**11%**	**41**	**17%**	260	**12%**
Cow Peas	219	1%	41	0%	260	1%
Star Grass	219	0%	41	0%	260	0%
Sunflower	219	0%	41	0%	260	0%

3.6 Lessons Learned

(1) ***Indicators:*** *FFP efforts to keep the number of indicators tracked by the project to a minimum is very good, yet given the size of this program ($13 million), and the direct relevance of the program to USAID/Zambia's SO 5 economic growth objective area, opportunities were lost to capture and report on a number of impacts of this program at the beneficiary level.* Some of these data are reported in the project's quarterly reports, using a sub-sample of beneficiaries approach, but the data, unfortunately, are not used by USAID to report on in-country impact within the agricultural sector.

(2) IPTT Indicators: *Review of the IPTT indicators shows that much of these data are gathered at the MCC aggregate level, and do not reflect the actual results on direct beneficiaries of the program.* We do not actually know how much milk was produced each day at the household level (morning and evening milkings).[82] Indicator 4 gives the volume of milk received by the MCC from its delivering farmers, not all of whom are direct project beneficiaries. Furthermore, this milk is frequently only the milk from the first milking of the day, and does not include the second milking (and sometimes third milking) of the day. This latter milk often appears to be intended for local sales, household consumption, or other uses (e.g. barter or gifts), and can be almost equal in volume (and value) to the morning milking for that household. So the actual value under indicator #4 could be almost double that which is reported. Indicator 6 refers to the number of households who have received improved milking cows, but we do not know how many total improved cows these households now possess, or the average number of cows per household. [83]

(3) **Female-headed households and Vulnerability:** Statistical data as well as qualitative surveys among program beneficiaries indicates that female-headed households possess higher numbers of vulnerably classified individuals than do male-headed households. Given the limited resources represented by in-calf heifers and pass-ons, greater emphasis should probably be given to distributing these animals to female-headed households as first priority, understanding that some lower percentage of male-headed households will need to be included for political reasons. LOL attempts to have at least 30%

[82] Though the quarterly farmer performance recall surveys among a sample of farmers do attempt to **estimate** total daily amounts of milk and its use, more accurate completion of the record books in the hands of all dairy farmers would accomplish this as well, while training farmers in an essential skill.

[83] The final evaluation quantitative survey attempted to get at this number, showing an overall herd growth of 54% (Annex 10, Table 6.2). Yet the numbers appear questionable. For example, Table 6.6 concerning overall ownership of animals showed that the mean number of dairy animals being raised by households at the time of the 2004 baseline was 5.3, which **dropped** to 4.3 for the final survey in 2008. One would have expected a significant increase.

of beneficiary households be female – headed, but as seen, this objective was not quite reached. Many female recipients have been highly successful; some problems and challenges the project has encountered with such households can most likely be attributed to the fact that the extension agent providing training and support (and AI) is male.

3.7 Recommendations

(1) IPTT indicators of FFP supported projects (DAPs, MYAPS) should not be so narrowly defined along solely food security topics as to exclude or ignore important outcomes and impact being made by these projects for the economic growth of vulnerable populations. IPTT indicators should serve at least three purposes: FFP direct needs, USAID/Zambia SO #8 purposes, and key program management monitoring purposes.

(2) Include some of the key economic development data – as impact indicators – for USAID in their FY 08 and FY 09 SO #5 Economic Growth reporting of operational plans within Zambia each November, whether or not FFP feels these are needed for their own SO results. At the very least, this should include the volumes and values of milk produced by smallholder farmers entering the formal dairy processing markets.

(3) Include these additional indicators within a revised project IPTT. Though this may not be feasible for the existing DAP, continuing LOL efforts within these same regions through the existing MYAP should include these data to continue monitoring development and impact of efforts on smallholder households.

(4) Similar project efforts with smallholder households in other similar countries should be certain to include a greater range of process and impact indicators than this DAP has maintained.

(5) Flip the ratio of recipients of in-calf heifers and pass-ons from 30% female-headed and 70% male headed to the opposite: 70% of animals should be given to female-headed households, as a first priority, if they are represented within the target community and if they are able and willing. This will achieve the greatest impact on FFP's objective of targeting the vulnerable.

4.0 Concluding Remarks

Did this Land O'Lakes DAP project succeed in its goal to "*reduce food insecurity among vulnerable households*?" and "*increase the average household income from dairy sales*"? The answer would have to be a resounding 'YES'. This consultant has evaluated scores of projects over the past 20 years, including recently several DAPs involving cooperatives in Rwanda, a DAP in Uganda, and a DAP involving a consortium of 7 NGOs in neighboring Malawi. Every few years, a project comes along that stands out among others for its level of professionalism and impact on the beneficiaries in the sector it is working with. For this consultant, this has included an outstanding agricultural project in Uganda (Chemonics/IDEA project), the CAMPFIRE project in Zimbabwe, and a number of other community based natural resource management projects in Niger, West Africa. Some programs have developed outstanding components of larger projects, such as CRS/CARE and their I-Life partners in Malawi through their village savings and loan and small-scale irrigation programs, or ACDI-VOCA's efforts in addressing value chain linkages for coffee, cheese, and wheat cooperatives in Rwanda.

Land O'Lakes in Zambia has set a new standard of performance and impact for the DAPs in the region, completely transforming what were once vulnerable households into smallholder dairy farmer businesses, many with the potential to develop into small commercial dairy farmers in the years to come. In conservation programs, we often speak of the 'flagship species' that must be protected, because the habitat they require provides the sustenance for countless other species in a forest, woodland, or marine environment. In the same manner, there are 'flagship activities' that can have a similar impact on the economic livelihoods of community members throughout rural societies. An effective village savings and loan program – independent of banks or formal organizations – can represent a 'flagship activity' within some communities. Support to the development and improvement of dairy for smallholder households, in those areas where **dairy cattle** can be sustained, can have a similar dramatic impact. It is clearly a kind of 'flagship activity'. Within MYAPS in which LOL is a partner, MYAP partners should consider placing first priority in providing complementary support to dairy farmers in those activities that build strength into dairy communities: growing and selling forage/feed for these animals, village savings and loans for dairy and other farmers to diversify both their incomes and economic options. The cash that is injected into these rural communities with the sale of milk and other dairy products generates all forms of other economic opportunities and jobs. Children become better nourished, better educated. Some Zambian farmers even say their wives 'look more beautiful', divorced women (with milking cows) are asked to rejoin their polygamous households, family members wear better clothes – some even purchase cell phones and battery operated TV's – households that used to have next to NOTHING!

4.1 Key Lessons Learned

(1) **Smallholder Dairy Farmers**: *Smallholder dairy farmers represent an important and growing segment of Zambia's dairy industry. They are economically and politically critical to Parmalat and other processor's businesses.* From the smallholder dairy farmer's perspective, the first and foremost role of the MCC is as a place to regularly sell milk produced, and to receive income on a regular basis. Other potential benefits – e.g. MCCs as dairy activity hubs for inputs and extension services, dairy management training, though also important to farmers - are secondary.

(2) **Dairy Cows Distributed**: When in-heifer cows are introduced into a rural area, and given to a small farmer, the Jersey crosses have proven the most adaptable for smallholder households, consuming less feed than the Frisian black and white cows, for example, even though milk production is somewhat less.

(3) **Food Insecurity**: *The direct recipients of either an in-calf cow, or a later pass-on heifer (once they have calved and begun milking), have very definitely achieved household food security - twelve-month food availability* to this household. [84]

[84] No farmer, if directly asked about food security, will ever admit to this however – as clearly evidenced in the most recent quantitative survey. For a farmer, having 'food security' means having a granary full of maize, and does not readily take into consideration other household assets that may be sold in exchange for food or labor. Multiple farmers interviewed stated that they were food secure for only 6 or 8 months, only to learn after further probing that they had in fact purchased significant quantities of maize from the money earned from their milk, or put away other assets (money in bank account, purchase of another cow) that could generate additional income or be sold for unexpected food or other household needs.

(4) **Small Dairy Business Approach & Dairy Value Chain:** *The holistic business focus approach to smallholder dairy farmers, employed by LOL, has been a highly successful model for rural development in Zambia. Project focus, linking smallholder 'vulnerable' – but viable - farmers to a Milk Collection Center, which was then linked to a private sector run commercial dairy processors has been successful.* Some of the links of this value chain have been more successful than others, some sub-components of these links need further strengthening. However, one cannot focus on only one link of the dairy value chain, and expect overall success in dairy. Some dairy cooperatives have failed in Zambia because they were located in areas where they could not be linked to markets, for example.

(5) **Behavioral Change & Time:** *Major behavioral changes in societies take time.* Intensive dairy management represents major change. Teaching largely illiterate households to keep written record books on their dairy operations takes time. Population level impact will take at least ten years. At the rural smallholder household level economic change through dairy can be dramatic - within a two-year time frame. It is also easy to underestimate the time it will take to undertake what may, initially, seem easy. Establishing links for a completed MCC to the electric grid – even if only 50 feet away – has taken several centers in the Copperbelt more than a year to achieve – in spite of intensive efforts to move the process forward.

(6) **Flexibility:** *It is important in project implementation to retain flexibility in approaches taken to different regions, to different people groups, particularly between people with and without prior experiences with cattle.* Households in the Copperbelt, without cattle, were also more exposed to the formal business sector – many were retirees from the copper mines. Households in the Southern Province see the cow as a way of life and are pastoralists, using extensive grazing – and are unfamiliar with intensive management systems. One cannot foresee serious outbreaks of cattle disease or heifers producing more bull-calves and female calves.

(7) **Recipients of In-Calf Cows or Pass-ons and Changing Behavior:** *With the exception of the Southern Province, LOL project direct beneficiaries have in most cases been households without initially possessing dairy cows of their own – though many currently have or had possessed traditional cattle at some time.* In such cases, recipients are asked to practice a form of intensive management completely unknown to them. The learning curve for adoption of improved management of dairy cows is faster with households that have NOT formerly possessed cows.

(8) **Female Beneficiaries:** *Project prioritization of registering the gift of an in-calf heifer (and pass-ons) in the name of the household woman let to very important and long-lasting impact in both household dynamics and improved care of animals.* Women and their children are more frequently near the household's cow pens, and provide most of the care to enclosed cows. They prove better stewards of household milk receipts for household priorities and care of children and a woman's own security is enhanced, particularly in polygamous households. Milk incomes represent a greater share of total household income for female-led households, who also care for larger numbers of orphaned children.

(9) **Increased Incomes:** *Recipients of an in-calf cow, pass-on heifer, as well as beneficiaries of successful artificial insemination (AI) to either local or improved cows (Frisian or Jersey) very clearly have benefited from not only increased incomes, but also a regular stream of increased income through the sale of milk.* Peak incomes also coincide during former 'peak hunger months'.

(10) **Improved Nutrition:** *All households with a milking cow noted the dramatic impact on the nutrition of their children and household members in general.* This is also critically important in

the many households with HIV positive members, whose improved nutritional status leads to reduced susceptibility to opportunistic diseases.

(11) **Barter and Local Employment:** *Almost all smallholder dairy farmers, whether or not they deliver to a MCC, appear to practice some form of barter during the time their cow(s) are milking. Milk is exchanged for services or commodities.* This is particularly true during the months of program start-up until a local MCC is up and functioning; the length of time between start-up and ability to bulk milk locally (and sell to local processors) can have a major impact on the early success of a MCC.

(12) **Artificial Insemination (AI)*:*** *Once they have actually seen the results, AI has become a highly sought after input by smallholder dairy farmers, who are willing to pay for the service to the volunteer LOL trained Community Livestock Workers (CLWs).* Organized mass AI during the rainy season months appears to be the most viable method to use for smallholder farmers as their cattle have access to better and more feed.

(13) **Repossession:** *LOL insistence on repossession and replacement of poorly managed in-calf heifers given out represents both a courageous and remarkably successful, though traumatic, policy. Unfortunately, it has probably not been applied as often as it should have been.*

(14) **Record Keeping:** *Dairy enterprise record keeping at the household level, with the exception of a few households, does not appear to be taking place on a regular basis, and represents a threat to the future viability of household level enterprises.* Smallholder dairy farmers have adopted the regular use of recording milk daily sales in pocketsize record books – often registered by an employee of the MCC - but transferring this information to household dairy records on **all** sales, expenses, and milk use remains a challenge.

(15) **Cooperatives:** *Without professional managers and oversight, Zambian dairy cooperatives have an uncertain future. Where appropriate, alternative linkage relationships between smallholder dairy households and processors should continue to be an option.* This does not exclude seeking means of building capacity within farmer groups so that they may eventually be able to form into a cooperative, including the ability to place their bulked milk into competition with other processors. MCC management of some cooperatives are also becoming more aware of the need for properly paid professional dairy managers, and have been seeking ways of employing and paying for qualified managers.

(16) **Project M&E and Data Management:** *The M&E system in place is too centralized, but data being registered at the field level is rich. It tracks valuable process and impact indicators that should have been included within the project's IPTT and USAID/Zambia's SO 5 Economic Growth program objective indicators.*

(17) **Collaboration with Government of Zambia and Other Partners*:*** *Achievements realized by LOL could not have happened without effective early – and continuing – mutual respect, trust, and collaboration with colleagues in various departments of the Ministry of Agriculture and Cooperatives and private sector partners contributing to the dairy chain.*

(18) **Processors:** *Without the successful linking of smallholder dairy farmers to bulking centers and processors, the impact on vulnerable households could not have been realized. LOL was successful in working with processors to expand markets through additional products and advertisement to the general public.* Smallholder produced milk sales to the formal dairy sector

rose from almost nothing at the beginning of the program to 8% of all milk sales by the end of this DAP, with prices offered to farmers also increasing about 10%/year.

(19) **Transportation**: *Moving fresh milk from farmer to MCC to processor was a challenge met early by the project, leading to many creative solutions that appear to be working.* Heavy-duty bicycles - the major mode of transportation for a small holder to get milk to their MCCs – have been successfully introduced in some areas, and the expansion of their availability will be important to smallholder dairy farmers. The creation, by LOL, of rural-bases MCCs with their cooling milk tanks has encouraged processors to make the investment and effort to go to the farmers, and not require farmers to bring their milk to urban-based bulking centers. Over coming this particular hurdle was certainly one of most important accomplishments of the project. Furthermore, the creation and development of special tanks for processors like Parmalat to collect milk from different rural bulking centers – and keeping this milk separate until graded – was also a very important LOL initiative with long-lasting impact on the Zambian dairy industry.

4.2 Missed Opportunities

- **Early focus** to establish a full-time Cooperative/NCC Dairy Manager within LOL supported MCCs with executive authority for all dairy operations of cooperative and attention to financial management of association. For long established cooperatives, changing deeply engrained management practices may now be difficult.

- **Cross-training** of all senior technical leaders and extension agents might have helped to increase accountability for results and extend benefits more quickly within distant and diverse project sites. This is particularly true for project collection and management of important process and impact data that relied too heavily on a centralized, small team of 'specialists'.

- **Technical Support to MCCs/Farmers:** Though circumstances have changed over time, generally there has not been enough LOL led technical support – on the ground close to MCCs and their farmers – to maintain the quality of continued technical services communicated and adopted. The recent placement of a Peace Corp volunteer in the Copperbelt to support the MCCs is good. Project extension agents do not seem to have been able to provide the level of support needed. There is perhaps over-reliance on group training sessions and not enough direct extension agent to farmer (at farmer's residence) support for animal care and record keeping which is more costly in time.

- **Artificial Insemination**: AI could have been included as a project component from the first day of the project – and not in the 3rd year. Accelerated introduction of AI would have helped both recipients of in-calf heifers (after they had delivered that first calf), as well as upgrading the quality of the traditional cows many households possessed – thereby upgrading the aggregate MCC farmer herds more quickly.

- **Project Communication:** As the first of its kind, this dairy DAP is extremely rich in lessons that need to be much more widely communicated both within Zambia and in the region. Key targets of this communication include FFP, USAID, and national governments concerned with the issue of vulnerably – as well as potential future smallholder farmers. The project has made the effort to identify a number of success stories, but though topics selected are compelling, most could have been better written (c.f. Annex 15 for examples). Well-crafted success stories can be powerful tools.

4.3 Sustainability

(1) **Recipients of Dairy Cow:** Recipient households clearly greatly value their dairy cows, and have been willing to provide the effort needed, at the household level, to build adequate stalls and small corrals, to look for the best grass they can obtain for their animals, going out and cutting grass for their animals or hiring someone else to do so, often paying for this input with a ½ liter cup of milk for 1 large bag of cut grass – representing a local value of 2000 K/liter. Household members share in the care and milking of the cow.

(2) **Delays:** Yearlong delays in connecting several Copperbelt Province MCCs to electricity could severely limit the eventual sustainability of these sites, not having had the guidance of LOL, as they begin to collect milk, and begin the process of financial accountability and reporting to members.

(3) **Expansion:** As discussed in cost effectiveness below, the fact that over 2,732 households, encompassing almost 25,000 individuals - many already with improved dairy cows, or expecting to possess such in the near future - bodes well for the sustainability of this project's activities into the future. Improved cows are in the hands of once vulnerable smallholder farmers who have diversified their milk product sales beyond the MCC itself; they have also gained household economic gain through milk barter for other food commodities and services. While one can expect challenges to continue in the management of dairy cooperatives and specific MCCs, the actual ownership of the dairy cows, as well as technical learning and some equipment rests in the hands of smallholder farmers themselves. Having experienced the benefits of dairy to their lives, they will find a way forward in the continuing management of their dairy cows and of household risk.

4.4 Cost Effectiveness

Has this LOL DAP been cost effective – particularly when compared to partner NGO's both in Zambia and elsewhere who have received significant funding through FFP for 'development efforts' among vulnerable households and the rural poor in the districts and provinces worked in? Based on an over-all cost/benefit study of the actual expenditures made by this $ 10 million LOL DAP over the past four years, and the actual long-term assets and incomes generated by smallholder dairy farmers, it would appear that this LOL DAP has been a tremendous investment into the long-term well-being of thousands of vulnerable and rural smallholder farmers.

FFP's initial investment of $10 million, spread out over total direct beneficiaries of the project, was $3,660/household. However net benefits per household, generated by the program during the four years of implementation (investment minus total accrued benefits of $7,058,729), are about **-$120 per beneficiary,** or -1,077 per household.[85] Given the continuing expansion of quality dairy cattle in the hands of existing smallholder farmers, expanding milk sales, this will soon turn positive due to the expected value of future annual milk sales. **The entire cost of the project will have been recovered in terms of a positive net gain within two years** (by December, 2010). This represents at least $1,300,000 currently received each year by smallholder farmers from milk sales to their MCCs, and does not count the increasing value of their expanding herds – the milking cows and the bull calves growing up, being used for animal traction, or sold for increased household income. Nor does it include milk sales of over 300 dairy farmers in the Copperbelt just now beginning operations. This is a very good investment and is certainly cheaper than the yearly food relief once given to these vulnerable households and individuals! These smallholder farmers, in the absence of a major calamity, are no longer vulnerable, and no longer seek or want future food relief assistance.

Cost/Benefits of LOL Dairy DAP (estimate)

Project Cost to Date: October 2004 through September 2008):	$10,000,000 [86]

Many households have between 10 and 15 members, most of whom are children!

Cumulative Assets for Smallholder Dairy Households (2004-2008) – 4 years

- 685 Mature in-calf cows * 8 million K/cow $1,566,717 *current value, original + 1st generation
- 291 Bull calves * 2 million K/cow 391,429 *current value, 1st and 2nd generation
- 283 + 300 (583) F calves (1-16 months) * 4 million K/cow 666,286 *not yet passed on, 2nd, 3rd generation
- 116 AI crosses with local cows (female) * 3 million K/cow 99,421
- MCC assets: equipment (tanks, buildings)(>10 year life) 445,036
- Milk already sold to Processors through Sept. 2008: $2,759,010 *mostly from morning milking
- Milk sold locally (40% of morning milk + where MCC not buying) $1,103,604 *frequently sold for 2X price of MCC
- Anticipated milk sold to end of 2008 (4th Quarter) 243,365
- Anticipated mild sold to end of 2008 (40% morning milk): 97,346 *+ where MCCs not yet purchasing milk (e.g. Copperbelt or new centers)

Total:	$7,058,729
Project Cost/Household ($10,000,000/2732:	$3,660
Cost minus Existing Assets ($10,000,000 - $7,058,729)	$2,941,271
# of Direct Beneficiary Households:	2,732 (cf. Table 1)
# of Direct Beneficiaries (9 persons/household):	24,588 individuals
Project Net Benefits per Household:	**($ 1,077)**
Project Net Benefits per Beneficiary:	**($ 120)**

4.5 Measures of Unique Impact

4.5.1 Direct Beneficiaries: Over 2,732 smallholder vulnerable households have been direct beneficiaries of this DAP, of whom over 1,000 households, many with woman managing dairy cows, will have become food secure by the end of the project, and become part of the nation's formal dairy sector for the first time. Included with their cows were steel milk pails and cans, for which they paid from their deliveries of milk; this equipment helped to improve the quality of the milk delivered to the MCC.

4.5.2 Economic Uplifting: Unbelievable economic uplifting takes place when smallholder households have a milking cow – over $1,000/year from milking one cow, representing 70% of total vulnerable household income. This figure doubles with a second cow, which most will gain! Hundreds of once vulnerable households will definitely become small commercial dairy entrepreneurs as the number of milking cows' increases, and the use and sale of bull calves (grown up) expands.

[86] Total project funding is to be $12,566,000; with only $10,000,000 spent to date, the remaining unspent $2,566,000 will be used by LOL in a no-cost extension of the project through September 2009, thereby further extending the benefits of the [87] If mass AI treatments are undertaken during the rainy season months, when cows are in their best shape because of available feed, then calves will drop during a period when smallholder households may have more difficulty in providing the needed feed for their animals. The 'right time' for AI will need to be carefully determined by specific local circumstances.

4.5.3 Indirect Beneficiaries: Infusion of cash income into rural economies has an impressive rippling effect into numerous other economic activities for thousands of additional households within newly created dairy communities.

4.5.4 Milk as Smallholder Farmer Income: Among the 10 most operational MCCs, a total of $2,584,188 has already ended up in the pockets of smallholder dairy farmers. These same 10 MCCs have earned a total of $2,826,150 from milk sold to processors that LOL has linked them to, and the volume continues to increase (55% in 2008) as animal numbers increase. <u>These values probably represent only about 40% of the actual milk being sold/bartered by these households in fresh, sour, or yogurt forms</u>.

4.5.5 Increased National Demand for Milk: Parmalat, one of Zambia's largest private sector processors, between January-August 2004, purchased 12,941,628 liters of milk from some 21 commercial farmers, small scale commercial farmers, and began to purchase milk from four LOL supported MCC (102,859 liters – 4%). Four years later, its total volume has swelled by 11% and milk purchased by the same 4 LOL MCCs was 1,145,218 liters (8%) – a 41% increase for their small farmers! Smallholder dairy farmers are currently supplying about 8% of Parmalat's total volume of milk – and this sector is considered one of its fastest growing sources for future milk. As demand has increased,, prices per liter/milk has more than doubled in the same period from less than 1,000K/liter to 2,027 K/l now (for grade B milk) – and a 6% increase in projected each year. Other processors show similar trends.

4.5.6 First of their Kind Anywhere: The creative design and construction by LOL of 1,000 liter milk transportation tanks, built in India for this purpose, became a major project input encouraging urban-based processors to collect milk from rural based MCCs – previously required themselves to transport milk to a processor. Eight such tanks on Parmalat trucks permit Parmalat to keep bulked milk from separate MCCs and commercial farmers separate – allowing milk grading and higher prices for Grade A (2,400 K/l). These tanks will transform rural dairy opportunities both in Zambia and elsewhere. Creation of the 'containerized MCC, with its 500 liter milk cooling tank' at a cost of about $21,000 is also unique. These can be brought in to a rural site, dropped off a truck, linked to electricity, and the site is operational. They can also be as easily removed, if needed.

4.5.7 Zambian Processors Association: The creation, with LOL initiative, of the Zambian Processors Association as a private sector lobbying group for the rapidly expanding dairy sector within Zambia will directly benefit smallholder households.

4.5.8 Zambian smallholder dairy farmers: Once considered unable to contribute to the dairy market sector, such farmers have proven themselves, though this DAP, not only to be fully capable of providing marketable milk into the formal sector, but milk of a quality sometimes superior to that furnished by commercial farmers – currently approaching 8% of all milk produced in Zambia, from almost nothing five years ago.

4.5.9 LOL direct beneficiaries (in-calf heifer recipients) themselves cited the following impacts on their lives, given in order of priority (Annex 10, Table 10.6).

(1) Regular household income (18 %)
(2) Can pay for children to go to school (11 %)
(3) Increased Income (10 %)
(4) Ability to purchase needed foodstuffs (10 %)
(5) Ability to purchase food during the hunger months (5 %)

Other impact listed included being able to build better homes, purchase clothes, by farming inputs and tools, meet health related expenses, improved nutrition and diets, ability to pay for AI.

4.5.10 Training: Significant contribution to GOZ training of livestock extension agents, particularly in completely revised 2-week course in AI offered by NAIS.

4.5.11 Financial Transparency: Given the seriousness of the need for transparent financial management at MCCs, LOL's linkage with Herd Books Society of Zambia for data input, creating profit/loss statements and analysis is critical for MCC direct beneficiaries to understand their collective enterprise. As understanding increases, the prospects for the sustainability for their MCCs also increase.

4.6 Major Recommendations

4.6.1 Recommendations for Remaining Life of Project

- **Model Farmers**: Give priority to the public recognition of, and support to, 'model smallholder dairy farmers' within each zone of operation of all supported MCCs, and link beneficiary farmers to these model farmers. Most project sites include such households, whether they be a specific CLW, or other participating household – but their status as a 'model dairy farmer' does notappear to be officially recognized or promoted. These farmers become the role models and could help with inputs needed by neighbors, and eventually become small commercial farmers supplying MCCs.

- **Rural Milk Transportation**: Greatly expand diffusion of heavy-duty bicycles for transport of milk by smallholder farmers. Make this a private sector business opportunity, **not** necessarily managed though the MCC, but promoted by them. Consider establishing opportunities for development of transport entrepreneurs to collect and sell to the MCC, and having access to the 10, 20 and 40 liter steel milk cans.

- **Women Ownership of Dairy Cows**: Formalize, across all project MCCs the increased giving of in-calf heifers and pass-ons in the name of a household woman or female-headed household. Women everywhere and their children tend to be the major caregivers of animals, are always near them and most familiar with their needs. Such ownership increases a woman's security and status within a household; and women use increased income in a responsible manner.

- **Smallholder Dairy Enterprise:** Reinforce, during the last year of this DAP, field-level hands-on support and training to the direct beneficiaries of dairy cows or pass-ons received. Close monitoring should be encouraged through farm visits and not mainly on group meetings as in the past. This training should focus on personal record keeping, improved management of dairy cows, with attention to growing special feed for the dry season months. Provide direct linkages, where possible, to suppliers of needed inputs (medications, AI, dairy buckets and cans, plastic water vessels for calves, etc.) and through the MCC, consider encouraging private entrepreneurs for this purpose. Building the capacity within the dairy cooperative, as LOL is doing, to focus on the priorities of their dairy business can avoid some of the mistakes of the Small Dairy Development Program and similar programs in the past, where a private sector model was promoted, but internal cooperative capacity, priority setting with a clear business vision, was neglected.

- **Pass-ons:** Continue to monitor closely each succeeding generation of pass-ons, also keeping track of the increasing number of improved dairy cows possessed by all direct project beneficiaries. Ideally, as LOL has implemented in the Copperbelt, a cooperative MCC manager or their assistant would do this. Because of the importance of the pass-ons continuing beyond the life of the project – for the continued benefit of vulnerable households – FFP and USAID should identify some means of assuring continuity in monitoring for several more years beyond the life of the DAP.

- **Artificial Insemination**: **Southern Province**: Given the cost and failure rates associated with individual household level efforts in some locations, greater use of mass AI campaigns or targeted synchronization should be practiced, perhaps even eliminating individual AI for smallholder farmers. Targeted synchronizations, as well as mass AI treatments,[87] should be timed so that calving coincides with the start of the rainy season (October-November) (as with local wildlife), thereby providing milk when most needed by subsistence farmers. Group AI services would be paid for through price of milk given to farmers by their MCC. **AI: Elsewhere**: AI in regions where smallholders do NOT own cows will **not** help increase dairy ownership among vulnerable households. Continued giving of in-calf heifers to vulnerable-but-viable households is strongly encouraged where possible, while carefully tracking pass-ons from previous deliveries. Again, targeted synchronization probably is the best strategy for MCC improved herds, combined with mass AI.

- **Containerized MCC**: Expand the use of small 'containerized' MCCs as milk bulking centers over adding new, and costly, larger facilities. Special attention should be given to areas where a small commercial farmer(s) or processor would be willing to provide some technical and management support, in exchange for themselves having a bulking and collection point for their milk. Small commercial dairy farmers also face the challenge of cost of transport and volume of milk available when looking at the market; linking the needs of the two groups has already been proven by LOL to be a successful model for marketing and collaboration. Access to regular electricity will be the major constraint for such rural sites.

- **Cooperative Management:** Continue to encourage all cooperative groups working with LOL assistance to complete revision of their by-laws to reflect that the dairy business is their **principal focus**. Continue to warn cooperatives of the dangers of expanding efforts to other areas of endeavor outside this focus. Reduce efforts or even terminate LOL support during the last year of the project to cooperatives **not** willing to follow LOL guidance on these issues, and focus resources on those that do.

- **Cooperative Management:** Revise the role of the cooperative board members to one **solely** of oversight and setting of policy for the dairy initiatives of their members, centered on the MCC and possible satellite bulking centers. BoD should NOT be involved in direct daily management of the MCC.

- **Cooperative Management:** Recruit professional general managers with full management authority for the dairy cooperative's business, with production goals and incentives built in linked to salaries received. The top ten MCCs are capable of paying for such management. LOL might consider subsidizing part of the manager's salary for smaller MCCs during an initial year.

- **Cooperative Management:** Accelerate strengthening of MCC accounting using the Quick Book accounting systems designed for this purpose. Accelerate links of each dairy cooperative with

Herd Book Society of Zambia for financial data input, accounting, and production of financial statements. This gives the greatest promise for financial sustainability and transparent accountability to MCC smallholder members who will increasingly want to financial statements posted quarterly for each MCC. Clear financial statements, for MCC members, help them to maximize what comes to them, and understand what may be used for important secondary purposes. This is an area where tough love and LOL's leverage on MCC assets is strongly recommended.

- **Milk Purchases at MCC:** Consider payments twice/month and raise prices given to farmers quickly as processors raise prices. Consider **dividends** from profits of over-counter bulk sales (as % of milk provided by specific farmers). Keep margins low between price received by processor/sales and farmer-received price, with transparent financial reports on use of difference margin clearly reported (and posted where farmers can see them).

- **MCC Membership and Financial Accounting:** Reconstitute active membership (with Excel database linked to each). Create member bank accounts and transfer funds directly through banks into these accounts, thereby eliminating one major potential source of abuse. With such accounts established, support farmers for bank loans for additional milking cows and dairy inputs, and get the cooperative out of the business of handling membership loans.

- **Repossession:** Continue policy of repossession through the life of the project. The policy should be adopted for all similar programs of this kind with smallholder recipients of a dairy cow.

- **Communications:** LOL Zambia, before the end of the DAP, should develop two or three 7-10 minute professionally made multi-media creations (on CDs or video cassettes) telling the 'Zambia smallholder dairy story'. Each segment should highlight a major topic. Potential candidates could include a case study telling about the life of a vulnerable female-headed household – once receiving food aid – becoming a successful small dairy farmer (giving true details about income stream, uses and expenses, who take milk to MCC, her orphan children and household milk consumption, purchase of additional food, etc). Another short video could explain the different elements of the Zambia dairy value chain (smallholder to milk in grocery store), bringing in some of the unique elements developed for success (quality grading, transportation and bulking of milk, true MCC and processor statistics, etc), written as the story of another farmer.

- **End-of-Of Project Transfer of Assets**: Formalize, ASAP, the disposition of assets (particularly bulking tanks and equipment) provided by LOL to supported cooperatives – clarifying the value and share value for members of these assets. Use formal transfer of assets as a **point of leverage** for LOL recommended cooperative level changes remaining to be acted upon, with the option of removal of assets, mirroring repossession at smallholder household level. This could provide a unique opportunity for LOL to accelerate the needed changes within cooperative/MCC management required for long-term sustainability and reinforcing the interests of smallholder dairy households in their MCC.

4.6.2 Recommendations to Improve Design & Implementation of Similar Future Programs

- Recognize smallholder dairy as a 'flagship activity', in appropriate areas, to permanently improve the life of vulnerable-but-viable and other rural households into long-term food security. Successful, well-targeted placement of in-calf heifers directly into the hands of vulnerable-but-viable households – as many and as early as possible – will have the greatest long-term impact on

project target beneficiaries. Mass AI then should also be practiced, as early as possible, to further improve the quality of traditional cattle, whose offspring will also produce increasing quantities to local milk bulking centers.

- De-couple LOL from other NGO FFP programs in Zambia MYAPs and consider similar strategies for other countries receiving FFP, using LOL value-chain business model and its targeting approach. Other FFP NGO's, in areas of LOL intervention, could reinforce population base in development activities complementary to smallholder dairy development.

- Unless longer term in nature (e.g. 10+ years), modify FFP IPTT data approaches. Use baseline – mid-term – and final surveys for measuring long-term, goal level impact is certainly appropriate, but should be limited or focused to these purposes. A number of additional key process and outcome/impact indicators routinely monitored over the life of the project, and reported in quarterly reports through the IPTT, could have been helpful to both USAID/Zambia and FFP. Most USAID field missions provide useful models for the identification of key indicators for Program Objective, Program Area, and Program Element purposes of USAID field-mission operational plans for each country. Better integration of managing for results into USAID mission OP's would be a reasonable expectation.

- The use of a holistic, business approach, to smallholder dairy development is a development model worthy of replication. Holistic means addressing all important links of the dairy value chain, beginning with identifying of sites of farmer groups where transactions costs of dairy development and marketing are reasonable using LOL's targeting approach, but including the development of MCCs or satellite hubs, links to private sector milk processors and efforts to expand national milk consumption. It includes attention to suppliers of required inputs and links with government and other in-country partners for veterinary and other services.

Annexes for

Final Evaluation of

Land O'Lakes Zambia Dairy Development FFP DAP for Vulnerable Populations (September 2008)

List of Annexes

Annex 1: Consultant Scope of Work

Land O'Lakes/Zambia Title II Program

Terms of Reference
Final Evaluation to be completed by November 2008

Table of Contents

List of Acronyms

AI	Artificial Insemination
AIDS	Acquired Immune-Deficiency Syndrome
CFAARM	Consortium for Food security, Agriculture and nutrition, AIDS, Resiliency and Markets
C-SAFE	Consortium for the Southern Africa Food Emergency
DAP	Development Assistance Program
FANTA	Food and Nutrition Technical Assistance
FFP	Food For Peace
FY	Fiscal Year
GART	Golden valley Agricultural Research Trust
HIV	Human Immune-Deficiency Virus
HIZ	Heifer International Zambia
HQ	Head Quarters
HRW	Hard Red Winter
IPTT	Indicator Performance Tracking Table
LOL	Land O'Lakes
LOL/Z	Land O'Lakes Zambia
M&E	Monitoring and Evaluation
MACO	Ministry of Agriculture and Cooperatives
MCC	Milk Collection Center
MTE	Mid-Term Evaluation
NDS	Northern Dark Spring
SOW	Scope of Work
TA	Technical Assistance
TORs	Terms of Reference
USAID	United States Agency for International Development
WWS	World Wide Sires
ZDEI	Zambia Dairy Enterprise Initiative
ZDPA	Zambia Dairy Processor's Association

Terms of Reference
These terms of reference are meant to assist the Final Evaluation Consultant in her/his development of a protocol to accomplish the described Scope of Work below. As the evaluator**,** you are expected to propose how you will conduct the evaluation given the information in the Terms of Reference (TORs). The proposal should include a preliminary general protocol indicating the activities that are necessary to accomplish the evaluation including all key areas of your involvement in the entire evaluation.

Introduction
Since 2004, Land O'Lakes Zambia (LOL/Z) has been implementing a five-year P.L. 480 Title II program with the aim of promoting improved food security among rural smallholder farmers. The *Title II Development Assistance Program (DAP)* is a grant from USAID Office of Food for Peace (FFP), and aims to contribute to FFP's new Strategic Objective (SO) of "reducing food insecurity among vulnerable populations." The program is specifically designed to target the food access element of food security by working towards improved smallholder incomes through dairy development.

The program is being implemented in twelve districts in four provinces - Mazabuka, Monze, Choma, Kalomo and Kazungula in Southern province, Kafue (Mapepe) and Chongwe (Palabana) in Lusaka province, Chibombo in Central province and Kitwe, Chingola, Mufulira and Luanshya in Copperbelt province.

Program Background
Prior to the DAP, Land O'Lakes implemented the Zambia Dairy Enterprise Initiative (ZDEI) which was intended to stimulate the growth of the dairy industry by responding to the demand of the smallholder producers' participation in the value chain and to extend development assistance to more stakeholders in Zambia's Dairy Industry. The program focused on improving the quality of raw milk, developing new dairy products and expanding markets for Zambian produced dairy products and assisting processors in improving their product quality and plant efficiencies. The program beneficiaries of the ZDEI were not necessarily food insecure to qualify for program support.

Thus a lot of effort had to be made when Land O'Lakes started implementing the Title II program to address Food for Peace program requirements of working with food insecure households. As a result, a rigorous set of food insecurity selection criteria was developed for use in the selection of beneficiaries and groups to participate in the program.

Food security in Zambia is predominantly driven by the agricultural sector. However, with high dependency on rain-fed agriculture, unfavorable rainfall patterns always result in production deficits, which in turn affect the country's ability to feed itself. Further, even if adequate agricultural production levels are sufficient for assuring *food availability* at national level, food access at household level is never assured. Improving agricultural productivity through diversification of agricultural activities and ensuring sustainable market linkages is therefore critical to economic growth and food security improvements in Zambia.

Land O'Lakes' approach to reducing food insecurity is through the provision of technical assistance in the fields of dairy production and market linkages, which are expected to improve

rural communities' participation in the formal market and enhance household income and food security. Land O'Lakes thus provides a livelihoods alternative for poor households by offering them a more resilient agricultural activity.

This allows vulnerable households previously dependent on food aid to graduate out of poverty and be integrated into the formal market. By facilitating linkages between smallholder dairy producers and dairy processors, Land O'Lakes enables these smallholder producers to fully benefit from the availability of a stable market. This, in the long run, reduces the odds of these farmers falling back into poverty.

At the household level, the income stream that is available to dairy producers all year round, and increases significantly during the hunger months of November through February, assists program beneficiaries to attain permanent food security. Although the program does not actively endeavor to enhance beneficiary nutritional status (i.e. increasing food utilization or nutritional education), the program's efforts to increase milk production indirectly contribute to improvements in beneficiary household nutritional status. A majority of beneficiary households consume milk on a regular basis (72% measured at midterm), and most households consume a diverse diet, important for enhancement of the nutritional statuses of children and chronically ill individuals who are usually the main victims of malnutrition.

The program's primary target group is food insecure households – people who only have 6.4 months of adequate household food provisioning or less - that are willing to participate in a Dairy Development Program. The activities carried out by the program are aimed at achieving the following specific objectives which are expected to contribute to the reduction in household food insecurity among these vulnerable communities:

- Enhance the productivity of smallholder dairy farmers through the provision of technical assistance in dairy production which include training in various dairy management practices and cross breeding and stocking programs aimed at improving the genetic quality of smallholder dairy herds;
- Increase smallholder dairy farmers' incomes by enhancing their milk sales through the establishment of Milk Collection Centers and the development of reliable marketing channels.

In order to ensure a secure market for the raw milk produced by the program beneficiaries, Land O'Lakes/Zambia also provides support to dairy processors. Addressing both ends of dairy--production and processing--through the dairy value chain--enables producers to get the best price for their milk and ensures a viable market in which to sell their raw milk. Specifically, the program provides technical assistance to the Milk Collection Centres (MCCs), which were established to assist smallholder farmers to access a stable market and provide an opportunity for them to bulk their raw milk and sell to consumers and dairy processors.

Land O'Lakes/Zambia works with dairy processors, who purchase milk from MCCs, to improve their capacity utilization and new product development, thus ensuring their ability to provide smallholder dairy farmers with a steady market for their milk. In particular, Land O' Lakes Zambia has facilitated the formalization of purchase agreements between MCCs and dairy

processors. In this manner, both the producers and processors benefit because they support each other as part of an integrated dairy value chain. Working with processors was directly done by Land O'Lakes/Zambia until November 1, 2007. Since then it is being done by Land O'Lakes/Zambia as a subcontractor to another USAID funded project.

The program Monetization Office also monetizes hard red winter (HRW) and dark northern spring (NDS) wheat in Zambia to procure funds for program implementation. Due to Land O'Lakes/Zambia expertise and relationship with the Zambia National Farmer's Union (ZNFU), a national farmer's association, Land O'Lakes/Zambia is the lead monetization agency for Title II programs in Zambia, monetizing commodities for its own DAP, C-SAFE, CFAARM, and other food aid programs in the country. Land O'Lakes/Zambia also participates in the Bellmon analysis with C-SAFE (now CFAARM) partners.

As of this past year, ZNFU did not give permission for monetization to occur in Zambia, so a Third Country Monetization is under way in order to fund the program.

The program is also involved in promotional and educational campaigns that are industry driven and conducted through the Zambia Dairy Processors Association (ZDPA) to emphasize the nutrition importance of milk and other dairy products. The promotional and education campaigns are aimed at increasing per capita consumption of milk in Zambia and thus market demand. This would in turn have the impact of increasing the incomes of smallholder dairy farmers as demand increases. Specific activities include:

- Dairy promotion campaigns
- Youth Lifeskills program aimed at promoting consumption of dairy products among the youth and HIV/AIDS prevention messaging, through avenues such as sport.

The program also had another component, Warehouse Receipts System, which was implemented by Zambia Agricultural Commodity Agency (ZACA). The Warehouse Receipts System allowed farmers, traders and processors to deposit stocks of non-perishable agricultural commodities with certified privately run commercial warehouses who issued transferable warehouse receipts as evidence of the deposit. Unfortunately, it was dissolved by USAID in 2006.

In order to successfully implement the Title II DAP in all the above areas and components, LOL/Z has partnered with the following organizations since activities commenced in March 2004.

- Golden Valley Agricultural Research Trust (GART)
- Heifer International Zambia (HIZ)
- Ministry of Agriculture and Cooperatives (MACO)
- Zambia Agricultural Commodity Agency (ZACA), contract ended 2006
- Zambia Dairy Processors' Association (ZDPA)
- World Wide Sires (WWS), contract ended September 2007

Evaluations and Assessments

Baseline

During September 2004, a baseline study was carried out whose main objectives were the following:

- Strengthen the program's monitoring and evaluation plan so that it better reflected the impact on household food security of program beneficiaries
- Provide a more precise definition and understanding of the socio-economic and vulnerability circumstances of program participants
- Provide a foundation for the design of a reporting system between implementing agencies and Land O'Lakes Zambia and between Land O'Lakes Zambia and USAID/FFP.

Eight survey sites in six provinces were chosen based on agro-ecological and geographical location. Twelve districts were included in the survey. A total of 2,239 households were surveyed at the population level of which 25 percent were female headed households. Participatory rural appraisals were also conducted at each site.

Preliminary Assessment

In addition to the baseline, a preliminary assessment of the program was conducted in August 2005. In order to obtain the best possible representation of the program areas, a sample of beneficiary farmers from different operational areas of Southern Province were randomly selected using a simple random sampling system. A relatively smaller sample was selected due to time and resources constraints associated with larger samples. The areas covered included Sikaunzwe in Kazungula District, Simakakata in Kalomo District, Bwacha in Choma District, Kayuni and Ntheme in Monze District.

A questionnaire was developed and administered to the twenty selected farmers and their households in each of the four districts. All these farmers were beneficiaries of the program in one way or another and most importantly, all these households had received at least one dairy heifer from the program.

The information gathered from this questionnaire included the following:

- Services received from Land O'Lakes Zambia program and the implementation status of these services received
- Benefits accrued from the services received from the program
- Monthly Incomes for the households both before and after their participation in the Land O'Lakes Zambia program
- The household food situation since participants started participating in the program
- Indirect benefits accrued by neighboring vulnerable households not participating in the program

This assessment provided insights into how the program was helping vulnerable households reduce their food insecurity and cope with natural disasters like drought. Program impacts were expected to continue as the program intensified its activities and targeted more vulnerable households.

The analysis attempted to bring out this understanding through different approaches including:

- indicating the levels of adoption of different technologies
- showing possible impact on the beneficiaries' incomes
- the indirect benefits accruing to non-beneficiaries
- the impact of dairy cattle distribution on food security status of the households.

The results were encouraging and showed that the program's activities had already started showing some positive impacts on its beneficiaries.

Mid-Term Evaluation (MTE)

During July/August 2006, a midterm evaluation was conducted by an independent consultant and the MTE team. The consultant assessed the program's progress with the help of the MTE team, which conducted the quantitative household survey of the Smallholder Dairy Development component. The quantitative data was able to support the consultant's main findings—increased beneficiary income and an increase in the average number of months households were food secure were achieved through the program's Smallholder Dairy Development activities.

Sixteen producer groups and Milk Collection Centers from four provinces and ten districts participated in the survey. Five hundred twenty-three (523) households were randomly selected from all groups of beneficiaries to take part in the survey.

The methodology used a formal survey where enumerators were employed to administer the structured questionnaire to the respondents. In order to administer and collect the information in a uniform and consistent way, all the twelve enumerators and three supervisors underwent four days training before they pre-tested the questionnaire in the field. At the end of the training, three teams composed of one supervisor and three enumerators were formed and deployed in the field for a period of two weeks and carried out interviews with the households in their homesteads. The survey covered the districts where the program has been implemented in the past two years. The Mid-Term Evaluation report also provided interest findings.

Final Evaluation Objective

As the Land O'Lakes/Z Title II Program is in its penultimate year, a final evaluation has been scheduled to assess the impact of the program on the food security status of vulnerable households in targeted populations. This implies evaluating the program's achievements in meeting the goals and objectives of the program and indicator targets set against baseline values. The final evaluation is expected to establish plausible links between program inputs and outcomes/impacts, and draw lessons for improvement of future Title II Multi-Year Assistance Programs (MYAPs) or similar future activities.

The consultant will be expected to address the following in the evaluation:

- *Outcomes and Impacts of the Program:* The evaluator will be expected to analyze quantitative and qualitative data and report on the outcomes and impacts of the program on beneficiary households. Outcomes refers to the effects of the more immediate tangible benefits (increased yields of dairy cows, increased household milk production, improved management of dairy enterprises, increased dairy incomes, etc.), while impacts refer to

changes in the lives of targeted rural households (improved food security, increased dietary diversity, improved resilience of targeted households to cope with shocks and natural disasters affecting food security).

The observable changes in communities, in relation to the baseline and established objectives, should have resulted directly from program activities.[1] However, it is not to be confused with effectiveness. It is important to determine the effect of all of the effective activities.

- *Effectiveness:* The evaluator is also expected to examine, as systematically and objectively as possible, how well the program attained its overall goal and strategic objectives and whether the achievements were efficient and sustainable. Focus may be placed on but not limited to: cost per beneficiary (taking into account pass-on activities), provision of technical assistance (TA) through farmer groups/cooperatives and utilising Trainer of Trainers (TOTs), community based breeding programmes, and MCCs as a cost effective way of integrating vulnerable households into formal markets.

  While the cost per beneficiary appears high, some would argue that this one time investment eliminates the need to continuously purchase and transport food rations for beneficiaries and their households whenever there is a shock or food insecurity situation. This must be taken into account when calculating the cost-effectiveness of the program. Additional cost-effectiveness measured by the final evaluation may include spread effects where indirect overall improvements in food security levels may result from increased commercial activity related to dairy and milk availability in the program areas. In addition, while Title II defines direct beneficiaries as farmers who receive direct training or technical input from the program, entire households - which may be very large - benefit from the training of one or two individuals.

- *Lessons Learned:* The evaluator is also expected to draw key lessons learned (positive and negative) in the past four years LOL/Z has been implementing it's DAP. The evaluator should illustrate best practices for replication in future Title II Programs. Areas of interest may include comparison of the business approach (AI services, and cooperative/MCC Capacity Building with emphasis on Financial Viability, etc.) that LOL/Z has undertaken vs. the classic Title II food distribution approach.

- *Sustainability:* This refers to how the program activities will continue after the program ends, such as the degree to which beneficiary farmers will continue to manage their dairy enterprises; MCCs will continue with viable operations; beneficiaries will remain resilient to food security shocks and food secure after the program comes to an end; financially viable AI services will continue; pass-ons will continue; and so forth. Overall, the evaluation needs to establish whether targeted beneficiaries will continue to have long-term positive benefits resulting from the program, including organizations whose capacity has been built by the program that may provide some continuation of the services once the activity has completed.

[1] Peter Oakley, Brain Pratt and Andrew Clayton, "Outcomes and Impact: Evaluating Change in Social Development," INTRAC NGO Management and Policy Series No. 6 (Oxford: INTRAC, 1998) 35.

- *Crosscutting Issues.* The consultant will also be expected to evaluate how well the program has addressed and integrated cross-cutting issues such as Gender, HIV/AIDS as it relates to household livelihoods, reported benefits from on-farm milk consumption, and Environmental Compliance. An evaluation on their effect and effectiveness on beneficiaries is important to designing future projects.

Evaluation Methodology

The evaluation approach will be conducted in two stages: 1) quantitative and 2) qualitative. The quantitative stage will be conducted first in late August 2008 under the FE consultant's supervision. The qualitative stage will follow the quantitative data collection; the data will be available for processing and analysis under the supervision of the FE consultant. In having a two stage evaluation, the FE team will have an opportunity to review and develop qualitative data collection instruments with the FE consultant as necessary to capture the remaining information needs through focus group discussions, participatory learning activities and other qualitative activities. The FE consultant is expected to be available via email and telephone before her/his arrival to Zambia when s/he will administer the qualitative data collection. The FE consultant is expected to finish qualitative analysis and report writing after leaving Zambia.

The evaluation will involve the program's donors, partners, government agencies, and other stakeholders. Their involvement will vary from key informant interviews to focus group discussions, and other similar activities. Hired enumerators administer all data collection.

Per USAID/FFP evaluation guidelines, the Final Evaluation will be based on the wider population level, which would include non-direct beneficiary households in targeted communities. Non-beneficiary households will also be analyzed for overall program affect and effectiveness. A scientifically-based sampling frame will be developed to address the sample size and sample locations.

Composition of the Final Evaluation (FE) Team

The evaluation process will be lead by the Country Manager. The final evaluation team comprises of the consultant, LOL/Z staff and HQ staff. The consultant will work with the following program staff in carrying out the evaluation (see other team roles and responsibilities in Appendix 2):

Core Team:

- Land O'Lakes Zambia Program Manager (Team Leader)
- Land O' Lakes Deputy Country Manager
- Land O'Lakes Zambia Field Technical Manager (Field Team Supervisor)
- Land O'Lakes Zambia M&E Specialist (Survey Team Supervisor)

Support Team:

- Land O'Lakes Zambia Field Staff
- Local Enumerators and Data Entry Clerks
- HQ M&E Manager
- HQ Institutional Capacity Building Team (until September 30, 2008)

Consultant Scope of Work
The purpose of this scope of work is to provide information and outline the specific tasks expected of the contracted consultant. The consultant is expected to conduct a critical review of Land O'Lakes' implementation of the DAP to date, assess progress and constraints in the achievement of the program's goal and objectives, review past survey results and, finally, provide recommendations and strategies that may improve such future Title II programs and possibly implementation during the final phase of the program.

A list of potential questions for the evaluation is in Appendix 1. These will guide the consultant in this evaluation. More specific discussion about the most relevant questions to address will be identified in cooperation with the FE team during the planning period.

Specific Tasks
The consultant will provide the following services as well as other activities, which are deemed necessary by Land O'Lakes Zambia so long as such activities are in line with the purpose and objective of this scope of work:

a. Undertake a literature review of the program documents and other relevant documents including, but not limited to the following
    i. approved DAP document
    ii. Food Security Strategy Paper
    iii. Baseline Survey report
    iv. Mid-Term Review Report
    v. Annual Results Reports for 2004, 2005, 2006 and 2007
    vi. Technical Report FY 2005
    vii. IPTT Table
    viii. Land O'Lakes/Zambia DAP Performance Management Plan
    ix. FANTA Food Access Indicator Manuals
    x. Any other program documents to get acquainted with the program activities and indicators.
b. Provide a protocol to establish an implementation plan that lays out how the consultant envisions conducting the evaluation. This will be part of the planning process via email correspondence and telephone conference calls.
c. Develop with the FE team the quantitative questionnaire instrument via email correspondence and telephone conference calls.
d. Develop in collaboration with the FE team the qualitative instrument for the evaluation. Engage with key informants, staff, beneficiaries, cooperative members, government officers, other relief agency partners, private sector partners, other stakeholders, and other community members as needed to collect qualitative information for the evaluation.
e. Synthesize, analyze, and interpret both the data from the quantitative survey and the qualitative study.
f. Based on the evaluation, develop a Power Point presentation, present and submit to Land O'Lakes/Zambia.
g. Consultant will fully address the concerns, comments, and issues raised during the presentation of the final evaluation report.

h. Prepare an evaluation report addressing the objectives of this final evaluation as outlined in this Scope of Work, including recommendations on the overall Land O'Lakes/Zambia Title II program for potential similar future project.

Level of Effort and Required Expertise
Forty (40) days are authorized to complete this consultancy. The selected consultant is expected to have strong expertise in program evaluation, specifically, evaluations of focused income-based food security programs as well as technical aspects of dairy activities. The consultant is also expected to have Title II experience as FFP M&E requirements are stringent.

The consultant is also expected to work in a variety of settings and with a number of different people that will include members of staff, government officials, local government extension officers, cooperative groups and community members in rural and urban environments.

Relationship and Responsibilities
The consultant shall perform the tasks described above under the general guidance of the Country Manager for the Land O' Lakes/Zambia office. The consultant will also be working closely with the Deputy Country Manager and the Field Technical Manager during the evaluation component and shall consult with the M&E Specialist for Land O'Lakes Zambia office and the H/Q M&E Manager, on questions and matters regarding the survey, which they will coordinate before the in-country qualitative study which will be conducted by the consultant.

During the evaluation, the consultant is also expected to be in contact with the HQ/M&E Manager, and the HQ/Food Security Research Specialist, via email and telephone conference calls when deemed necessary by the Evaluation Manager. There is a chance that at one time, the consultant may meet the HQ/M&E Manager and HQ/Food Security Research Specialist in which case, he/she will be available for questioning and inquiry. The FE team will also liaise with USAID FFP officer at the mission level and in Washington, DC.

Deliverables
The following are the expected deliverables of the Final Evaluation:

a. Evaluation Protocol
b. Quantitative questionnaire instruments
c. Qualitative data collection instruments
d. A presentation to the Land O'Lakes/Zambia Office and Partners before leaving the country.
e. An electronic version of the final presentation prepared based on the evaluation.
f. An evaluation report that includes the following:
    - Executive Summary
    - An introduction containing the objectives of the SOW and a brief description of the program
    - Methodology
    - Results/Findings and Lessons Learned
    - Actionable recommendations to improve the design and implementation of similar future projects;

- Data limitations
- Include all appendixes as described in the main report

g. One (1) electronic file of the clean (final) quantitative and qualitative data collected.
h. One (1) electronic folder of any applications, modules, and scripts developed to organize, process and analyze the data.

Timeframe

For the consultant, the assignment is expected to take forty (40) days. If more consultancy person-days are required, the Country Manager may allocate 1-5 days per approval after a written request has been received from the consultant. Activities to be conducted are as detailed in the specific tasks section above and may include but are not limited to:
As indicated in the attached timeline, the consultant will be involved in the planning process (second week of June), and will be required to remotely manage and plan the planning activities and the quantitative data collection until the consultant travels to Zambia to conduct the qualitative study.

As one of the first deliverables, the consultant will develop a more concrete and defined timeline and allocation of the number of person days in the protocol document, which will be discussed and finalized with the Land O'Lakes Zambia FE team.

Estimated Consultant Number of Persons Days

1.	Preparatory Meetings	1 day
2.	Literature review of program documents	2 days
3.	Prepare and finalize protocol	2 days
4.	Assist in the development of the quantitative survey questionnaire with the rest of the FE team	2 days
5.	Assist in data processing and analysis with the M&E Team	5 Days
6.	Conduct qualitative survey of the evaluation; interview and/or conduct focus group discussions and other group activities as appropriate. Field visit with stakeholders	13 days
7.	Data/information synthesis, analysis and interpretation	5 days
8.	Prepare final evaluation report	8 days
9.	Conduct presentation	1 day
10.	Revise final evaluation report based on comments from presentation	1 day
	Total	40 days

APPENDIX 1: Final Evaluation Questions

Effects and Outcomes

- To what extent has the program improved incomes of beneficiary households in targeted communities in relation to the baseline status?
- How have the program activities affected the direct and indirect beneficiaries' food security?
- How have program activities affected the capacity of beneficiary households to cope with shocks and natural disasters that affect food security?
- How have the program activities changed lives (improved access to education, improved food security, improved dietary diversity and health status of family members in targeted households, and others) of households in targeted communities?
- Are there other unintended but important outcomes and impacts (increased milk consumption in communities, increased employment opportunities, etc.) that have been realized in targeted communities as a result of program activities?
- To what extent has the program improved the capacity of cooperatives and MCCs which have been used as vehicles for delivering goods and services to targeted households?
- To what extent has the LOL/Z Title II DAP improved the capacity of government agencies and other partners in the implementation of dairy development programs?
- Do the stakeholders have a sense of ownership of the program? What are their views on program implementation and progress?

Effectiveness

- How effective has the business approach used by the program been in the attainment of the program's goals and objectives (improved food security and increased incomes) compared to the classic Title II food distribution approach?
- How efficient has the program been in attaining its goals and objectives? What has been the average cost per beneficiary taking into account pass-on activities, training through TOTs, etc.? If calculated based on the total household members directly benefiting from dairy income and milk consumption, what would the cost per beneficiary be?
- What is the program status with respect to target outputs in terms of quantity, quality and timeliness? What factors impede or facilitate the production of such outputs?
- Do the outputs contribute to the achievement of the strategic and intermediate objectives of the program?
- Which components are most critical and/or effective in achieving program objectives and intermediate results?
- Does the monitoring and evaluation system appropriately address the program's objectives and indicator targets?
- How effective was the technical assistance provided throughout the program? To what degree was the TA adopted among beneficiaries?
- How effective was a business oriented and community based AI program in improving the ownership of improved dairy cows among households in targeted communities?
- How effective was the program in targeting vulnerable households using its developed selection criteria?
- What aspects of the program were particularly ineffective?

Sustainability

- What mechanisms have been put in place to ensure sustainability of program results?
- Are program activities and technical assistance related to adoption of better practices sustainable, i.e., are participants likely to continue receiving TA after the program ends? Are MCCs likely to continue operating and remain financially viable after the program ends? Are pass on activities going to continue after the program ends?
- To what extent will targeted beneficiaries continue to access long-term positive benefits after the program comes to an end?
- To what extent will other local or donor resources continue to be available to perform the activities the program now conducts that will require continuation after the end of the program?

Cross-cutting Issues

- What effect is the program having, if anything, on the livelihood of the women beneficiaries and their households?
- How has the program affected the gender based relationships in targeted households?
- What can be said specifically, if anything, about the program's contribution on those affected by the HIV/AIDS and their households?
- What effect is the program having, if anything, on the capacity of households to mitigate environmental effects of scaled up dairy activities in their communities?
- How can programs such as this one improve and increase its impact on these cross-cutting activities or others on beneficiaries and their households?

Lessons Learned and Recommendations

- What are the main lessons that can be drawn from the program experience since its inception?
- In particular, what have been the main lessons learned regarding targeting and working with vulnerable households?
- What are the best practices in formulating, implementing, reporting, monitoring and evaluating a Food security/Dairy Development program that need replication in future Title II programs?
- What corrective actions are recommended regarding the design, implementation, reporting, monitoring and evaluation of the program?
- What actions are recommended to follow up or reinforce initial benefits from the program?

APPENDIX 2: Other Roles and Responsibilities

Evaluation Team Leader (Country Manager)

Evaluation Team Leader will provide administrative oversight of the overall evaluation in its entirety, including making all the major decisions related to the evaluation. The Team Leader will provide input as needed throughout the evaluation process and will also be the primary liaison with the FE consultant when a major decision needs to be made regarding the final evaluation. His specific responsibilities will be as follows:

- Provide the final decision on big decisions such as the selection of FE consultant, final review of SOW, timeline and final report
- Facilitate the approval of the FE budget
- Facilitate the processing of the selected consultant's contract
- Discuss with consultant about objectives of the FE and SOW during the beginning of the in-country fieldwork.
- Ensure the FE is conducted according to the SOW.
- Oversee the work being conducted by the FE consultant

Field Team Supervisor (Field Technical Manager)

The Field Team supervisor will be responsible for providing the consultant with an overview of the Program's field activities. The consultant will need to visit program sites and engage with various stakeholders. The Field Team Supervisor will assist in the development of a schedule of meetings between the Consultant and Program Stakeholders including beneficiaries, implementing partners and other Government and non-government organizations. He will also actively participate in the review of FE planning documents as well as provide technical oversight to the Consultant.

Survey Team Manager (M&E Specialist)

The Survey Manager will ensure that all operational and logistical aspects of the survey are completed accurately and appropriately as planned in the timeline. During the planning period, the SM will be responsible for finalizing the timeline and FE consultant SOW based on comments made by the FE team. He will also provide some technical input in the management of the whole evaluation process, including liaising with the Consultant on the quantitative and qualitative data collection, interpretation and analysis process. The SM is the logistical liaison between the FE consultant and the FE team and his specific responsibilities will be as follows:

- Revise and finalize the timeline per discussion among Zambia team
- Revise and finalize the SOW as necessary with support from Zambia team
- Provide FE consultant program documentation for review
- Provide the FE consultant with all relevant Program document as stipulated in this Scope of Work
- Engage FE consultant in protocol development with support from FE team

- Hire and train enumerators for quantitative data collection with supervision from FE consultant
- Ensure all logistics are in place and available for the enumerators and FE consultant for their fieldwork period
- Train data entry persons with supervision from FE consultant to enter data accurately
- Address all field problems and quality control with FE consultant

- Support Frank Valdivia (HQ/M&E Manager) in data processing and cleaning with supervision from FE consultant

Technical Support from Headquarters

Institutional Capacity Building (ICB) team (Mara Russell and Chung Lai) and Frank Valdivia (HQ/M&E Manager) will work with LOL/Z to plan and prepare for the Final Evaluation, including supporting the calculation of the sampling size, developing timeframe, reviewing data collection instruments, and ensuring quality evaluation. Technical support is critical to ensure that the evaluation is objectively conducted and document relevant and required indicators and activities. The ICB team and Frank Valdivia will be the technical liaison with the FE consultant to ensure FFP final evaluation and M&E requirements are followed and observed.

- Support LOL/Z in preparation and implementation of an outstanding final evaluation.
- Ensure the evaluation is completed within the agreed timeframe and that it addresses Food for Peace's requirements
- Will provide comments and input to all technical aspects of the evaluation.

Annex 2: Documents Consulted

Pia Chuzu, "Development Activity Program Baseline Survey Report", Zambia Alliance for People and Environment, Report #7, December 6, 2004.

John Keyser, LOL Zambia, "Mid-Term Review", Title II Development Activity Program, October, 2006.

LOL Zambia Report, "October 1, 2007 – December 31, 2007 Quarterly Report", Zambia Title II Development Assistance Program, January 2008.

LOL Zambia Report, "January – March 2008 Quarterly Report", Zambia Title II Development Assistance Program, 2008 (incomplete)

LOL Zambia Report, "Final Evaluation Survey, Interviewers Instruction Manual", Zambia Title II Development Assistance Program, August 2008.

LOL Zambia Report, "Monitoring and Evaluation Performance Management Plan", Zambia Title II Development Assistance Program, Revised in November 2007 (includes revised PIRS)

Misc. FANTA Documents (Program Evaluation Manual, Sampling Guide, Food Access Indicator Guideline, MAHFP 2007, Technical Notes, etc.), 2006-2007.

Agricultural Support Program, "Evaluation of the Smallholder Livestock Intensification & Commercialization Initiative", January 5, 2008.

LOL Annual Results Report, FY 2006, November 2006
LOL Annual Results Report, FY 2007, November 2007.

LOL Zambia Title II DAP Final Evaluation Survey, Interviewers Instruction Manual, August 2008.

David Daka, "Smallholder Dairy Development Program, Past, current, and Way Forward", The Zambia Dairy Industry, Land O'Lakes, Zambia, 2006.

Fidelis Zvomuya, "The Future is Technology", Dairy Mail Africa, July 2007, p. 14.

National Artificial Insemination Course, Dairy Record Keeping (5 pp), Ministry of Agriculture & Cooperatives, NAIS

Annex 3: Individuals and Organizations Met For Purpose of Evaluation

Land O'Lakes Zambia
Todd Thompson, Zambia LOL Country Manager
Sibeso Mululuma, Program Manager
David Harvey, Dairy & Livestock Development Program Manager, Field Technical Manager
Andson Nsune, M&E Specialist (Leader), Survey Team Manager
Martha Assistant M&E Specialist
Makabaniso Ndhlouvu, Dairy Production
Evans Lwanga, Business & Cooperatives Development Specialist
Dr. Johns Nyirongo, Dairy Production Specialist
Nigel Wilkinson, Dairy Processing Specialist

Chung Lai, LOL M&E Advisor, Washington DC
Frank Valdivia, M&E Manager, LOL Minnesota Headquarters
Mara Russell, Institutional Capacity Building
Mary Lucht, LOL Minnesota, Logistics

USAID/Zambia
Dann Griffiths, SO 5 Team Leader, Economic Growth

Dairy Processing Organizations, Zambia
Parmalat, Piet Theron, Managing Director
Parmalat, Martin Njovu, Quality Manager
Zammilk, Barthlomew Mbao, Milk Plant Manager
Surprise Dairy, David Combrink, Owner and Dairy Farm Manager (300 dairy cows)

Ministry of Agriculture & Cooperatives, Zambia (MACO)
Mr. David Daka, Deputy Director, Livestock Development Branch
Mr. Mwansa, Registrar of Cooperatives
MACO National Artificial Insemination Services
Kabemba Mwambilwa, Livestock Officer
Peter Sokela Mwelwa, Assistant Laboratory Technician
Jethro Siaziyu Siadunka, Veterinary Assistant
Vincet Simoongwe, Principal Agricultural Research Officer, Livestock

Zambia Milk Collection Centers
Palabana: MCC Board (met with 6 members – Vice Chair and female members, Secretary and 3 male members)
: Manager and his assistant (employees of Board for MCC)
: Three farmers bringing in milk to test, weigh, and sell to MCC, watched procedure.
Fisenge MCC Manager
Kwashama MCC staff
Chibombo MCC staff
Liteta MCC staff
Choma MCC staff
Monze MCC staff
Zimba MCC
Kalomo MCC

Other Partners
Heifer International, Zambia, Dr. Barnabas Chitalu, Acting Country Manager
University of Zambia, School of Veterinary Medicine, Disease Control, Professor Girja Pandey

Annex 4: Final Evaluation Protocol

Protocol for Land O'Lakes Title II Program Final Evaluation

0.0 Introductions

For the final evaluation of its Title II Development Activity Program (DAP) in Zambia during the fall of 2008, Land O'Lakes was required to engage the services of an outside consultant with long term Monitoring and Evaluation (M&E) experience, and experience with Title II programs in particular. Dr. Richard A. Swanson, Economic Anthropologist, with such experience, was engaged in mid-June 2008 to begin the process for this evaluation, which would include information from both a quantitative and qualitative survey of Land O'Lakes dairy program activities among small households in twelve (12) districts of Zambia, with special focus on food security issues of vulnerable households. This protocol document lays out the general outline and expectation for activities to be pursued for this evaluation, based on the terms of reference provided. The actual anticipated scheduling of various activities is attached (Annex 3).

This final evaluation has been built upon a baseline survey within 12 districts of six provinces, among 2,239 Zambian small households, of which 25% were female-headed households, undertaken in 2004.[1] The baseline helped to identify the initial beneficiaries for the program, and provided a general idea of the socio-economic characteristics of smallholder Zambian households. A subsequent mid-term survey was undertaken in 2006 with a more targeted group of project beneficiaries to begin to access the impact being made upon these households.[2]

The consultant will use four principal sources information to complete the final evaluation of Land O'Lakes Title II DAP program in dairy program development among smallholder households.

(1) Review of existing project documentation, including earlier 2004 quantitative baseline survey and 2006 mid-term survey among program beneficiaries.
(2) Review and analysis of quantitative Time Series Data from sampled beneficiary populations and the milk collection centers (as presented in Quarterly Reports), found in LOL's Lusaka database.
(3) Quantitative Survey to be undertaken by in-country LOL staff in August 2008, prior to the consultant's arrival. The consultant will have provided input into the sampling and questions to be asked in the survey.
(4) Qualitative Survey, led by the consultant, during the month of September, 2008 among program beneficiaries, stakeholders, and partners.

Together, these four sources of information will be used to evaluate the project in reaching its stated objectives of reducing food insecurity among vulnerable communities (and their households).

0.1 Project Hypothesis

At its outset in 2004, this project put forth a development hypothesis on how it would achieve its stated objectives: The hypothesis states that (key concepts bolded):

> *"Household **food insecurity** will be reduced among **vulnerable populations** in Zambia through **increased incomes** generated **from the sale of milk and other dairy related products**. This income would enable **better access to food** which would in term **reduce food insecurity** – particularly during the **hunger months'** between December and March each year."*

[1] Pia Chuzu, DAP /Baseline Survey Report, Land O'Lakes, December 6, 2004.
[2] John C. Keyser, Mid-Term Review, Land O'Lakes, October 2006.

The key concepts bolded above will be a major focus for the evaluation. To implement the hypothesis among Zambian smallholder dairy households, the project focused on three interrelated areas:

1. Improve the genetic quality of dairy cattle owned by smallholder farmers, thereby increasing their milk output. This is achieved through:
   - The distribution of improved in-calf dairy animals;
   - A pass-on scheme whereby each recipient of an improved dairy animal passes on the first female animal to another beneficiary household;
   - Provision of artificial insemination services to help improve and/or maintain the genetic quality of (dairy) animals owned by beneficiaries so that their productivity can be enhanced.
2. Increase the quantity and quality of raw milk supplied by smallholder producers to milk processors; thereby increasing incomes of these producers. This is done through the provision of technical assistance in:
   - Animal nutrition and health;
   - Pasture establishment and management, and;
   - Milk quality assurance.
3. Provision of Market Linkages through:
   - Formation of farmer associations and Cooperatives;
   - Establishment of, and support to Milk Collection Centers where beneficiaries bulk their milk;
   - Provision of market integration services through the facilitation of linkages to dairy processors.

Targeting of households, beginning in the second year of the project, was towards those defined as 'Vulnerable[3]' – defined as having access to less than 6 months of food supplies each year - yet also capable of receiving and managing livestock and the accompanying training packages required.

Comment [AN1]: The Third Component was not necessarily removed but was removed was the provision of support to processors, the youth lifeskills programs and campaigns designed to increase milk demand which are now being done by ZDPA

1.0 Evaluation Methodology

Title II final project evaluations, as recommended by Food and Nutrition Technical Assistance (FANTA), should focus towards project impact on the 'general population' within which program beneficiaries are located. One FANTA technical document states that a final evaluation for a Title II Development Assistance Program (DAP) "*is focused on population-level impacts, establishing plausible links between inputs and impacts, whereas the mid-term is oriented toward effects on participant households.*"[4] Yet, at the same time, one of the major purposes of a final evaluation is to determine the actual results (impacts) achieved by the project and lessons learned, so as to inform similar future program activities within the country or elsewhere. FANTA reference documents also note that: *"USAID's Food for Peace Office does not require that evaluations attribute effects to the project. Thus there are no compelling reasons preventing a project from selecting a Simple Pre-Post design and in many cases, this type of design is appropriate for a Title II project.*[5].

The final evaluation of this project will seek to both assess, as much as possible, the effect of the project on the 'general population', defined as specific, geographically defined, communities within which the project has been working over the past four years. However, to achieve true and lasting (sustainable) impact, four years (2-3 years in most cases for this Land O'Lakes project) **is not** a sufficient period of time to judge impact at the population level. Results would not be particularly meaningful. From this consultant's experience, this period should be closer to 10 years in length to permit diffusion of ideas,

[3] Title II DAP Food Security Startegy Paper, Land O'Lakes, 2006, Page 6.
[4] USAID FANTA Technical Notes #3, Patricia Barnard, "Title II Evaluation Scope of Work", April 2002.
[5] USAID FANTA Technical Notes #11, Bergeron, Swindale, et, al, "Evaluating Title II Development Orientated Multi-Year Assistance Projects (MYAPs)", March 2006, p.2.

changed behavior, and adjustment to variable climatic factors over time. Therefore, the quantitative survey, using a Simple Pre-Post sample methodology, will attempt to gain initial understandings of what may be happening at a larger population level. However, expectations for significant impact at this level should not be expected.

Of much greater importance, after four years of project implementation should be the question: *Do program activities – at least among the targeted beneficiaries – REALLY have the impact suggested by the initial project hypothesis above*? *Do impacts appear sustainable for at least these people and the MCCs providing a market for milk production*? These are the key questions this evaluation will seek to answer. To do so, we will stratify the project's beneficiary population', from the general population sample, into those groups that have directly benefited from the project in one way or another or have indirectly benefited or not benefited at all, as defined below. Information from the qualitative survey, led by the consultant, and further analysis of the quantitative data sets currently regularly obtained by the project from a sample of beneficiary households and MCCs, will also fill in details about what is actually taking place within program areas of intervention.

2.0 Quantitative Survey

The consultant will work with the LOL Zambia field team and the LOL HQ FE support team in redesigning the final evaluation quantitative survey instrument into an appropriate instrument using many of the baseline questions, but also adding new questions for this final evaluation. This final evaluation survey instrument will be presented in an Annex of the final evaluation report. The M&E Specialist (Andson Nsune), in Zambia, will take the lead in redesigning the new survey instrument and receive feedback from the consultant and LOL team prior to finalization of the survey instrument.

The final evaluation quantitative survey will focus on only those districts and communities (villages) in which the project has been involved and distributed cattle. The survey will not be conducted in provinces or districts outside areas of intervention – as the project has not been implemented in some of the districts surveyed during the baseline survey in 2004. The LOL Title II DAP Project has maintained records on the total number of households within the villages worked in, from which beneficiary households have been selected for different program benefits. The sample for the survey will be drawn from this base (see Table 1 below prepared by LOL Zambia field team). Statistical calculations based on FANTA guidelines, with priority focus given to the main project impact indicator *(# of months of adequate household food provisioning)*, suggest that a sample of 1120 households would be adequate.[6] The LOL team believes that this sample would be large enough for comparisons of different groups at the province level for all categories except for beneficiaries of passed-on cattle and also economically feasible for the project. Variability linked to other indicators measuring annual household incomes or milk production would require much greater sample sizes (8,022 and 2,246 respectively). However, unless based on actual household written records, recall information on such subjects is highly suspect in terms of accuracy or reliability. Therefore the consultant believes a sample of 1,120 is adequate.

[6] Frank Valdivia, LOL M&E Manager based in Minnesota will define the specific break-out of this sample by district, with input from LOL M&E advisor Chung and Andson Nsune, LOL Zambia Field M&E leader. The format for the template for these calculation (given in annex) was prepared by Robert Magnani for FANTA in December 2007.

Final Evaluation Sampling Frame

Name of Community/Village/Area	Households who have been in program for more than 1 Year	Total Number of Households in Community/Village/Area	Proportion of Beneficiary Households
Mufulira District-Copperbelt Province			
Musakashi	6	14	43%
Kangwena	8	18	44%
Kapolopolo	13	30	43%
Total	**27**	**62**	44%
Chingola District- Copperbelt Province			
Kayowelo Zone	13	34	38%
Mapande Zone	6	34	18%
Muchinshi Zone	16	29	55%
Mapande Zone	14	34	41%
Total	**49**	**131**	**37%**
Kitwe District- Copperbelt Province			
Kwashamukwenu	19	51	37%
Nshakalabe	27	200	14%
Mazeli	10	51	20%
Total-Kitwe District	**56**	**302**	**19%**
Chibombo District- Copperbelt Province			
Chikuni Village-Mukotongwa	5	26	19%
Liambo Village-Mukotongwa	6	25	24%
Mwalubona Village-Jordan	3	42	7%
Kashaya Village-Jordan	4	52	8%
Mulimba Village-Chabanene	4	37	11%
Mpwangana Village-Chabanene	6	26	23%
Chitetele Village-Chabanene	11	39	28%
Liteta A&B Village-Mushikili	10	200	5%
Ndeke A Village-Mushikili	1	15	7%
Ndeke B Village-Mushikili	2	13	15%
Buleze Village-Mushikili	1	21	5%
Muntanga Village-Mushikili	1	16	6%
Nkoloma Village-Mushikili	2	43	5%
Mwachilele Village-Mushikili	1	19	5%
Mpoola Village-Mushikili	3	41	7%
Fungwe Village-Mushikili	1	9	11%

Name of Community/Village/Area	Households who have been in program for more than 1 Year	Total Number of Households in Community/Village/Area	Proportion of Beneficiary Households
Chapu Village-Mushikili	3	33	9%
Puyu Village-Mushikili	2	12	17%
Chisaka Village-Mwanfumba	8	70	11%
Mwanfumba Village-Mwanfumba	9	32	28%
Lwimbo Village-Mwanfumba	4	40	10%
Katumba Village-Mwanfumba	1	25	4%
Total-Chibombo District	**88**	**836**	**11%**
Lusaka District			
Palabana Area	28	59	47.46%
Total-Lusaka District	**28**	**59**	**47.46%**
Kafue District			
Mapepe	12	210	5.71%
Total – Mapepe	**12**	**210**	**5.71%**
Monze District			
Kayuni East	12	18	66.67%
Kayuni West	88	120	73.33%
Choongo Village - Nteme	5	22	22.72%
Chimpati Village-Nteme	2	82	2.44%
Mbamunya Village-Nteme	3	57	5.26%
Himakoma Village-Nteme	1	58	1.72%
Kajamba Village-Nteme	5	59	8.47%
Masenge Village-Nteme	4	58	6.90%
Chungu Village-Nteme	1	22	4.54%
Chipapa Village-Nteme	1	27	3.70%
Hampakama Village-Nteme	2	26	7.69%
Makwangula Village-Nteme	3	16	18.75%
Total-Monze District	**127**	**565**	**22.47%**
Choma District			
Siyokwa Village-Mtandalike	1	15	6.67%
Makili Village - Mtandalike	1	15	6.67%
Cheenzu Village-Mtandalike	1	1	100.00%
Mutandalike Village-Mutandalike	2	11	18.18%
Munganga Village - Mutandalike	5	24	20.83%
Ben Mulalu Village - Mutandalike	6	30	20.00%
Sepande Village - Mutandalike	3	22	13.64%

Name of Community/Village/Area	Households who have been in program for more than 1 Year	Total Number of Households in Community/Village/Area	Proportion of Beneficiary Households
Siakayuwa Village - Mutandalike	1	10	10.00%
Namashoba Village - Pangwe	5	109	4.57%
Simusokwe Village-Pangwe	2	91	2.19%
Munagaba Village - Pangwe	4	73	5.48%
Simata Village-Pangwe	5	80	6.23%
Siachobe Village-Mtandalike	1	91	1.10%
Sianyanga Village-Mtandalike	3	55	5.48%
Siakachecka Village -Masopo	14	54	25.92%
Masopo Village - Masopo	10	95	10.53%
Siazeni Village - Masopo	6	32	18.75%
Chilumbi Village-Masopo	10	24	41.66%
Mbole Village – Masopo	3	36	8.33
Silukuta Village- Masopo	8	20	4.00%
Sikalongo Settlement-Masopo	11	120	9.17%
Nzumba Village - Masopo	10	41	24.39%
Siamalambo Village - Masopo	8	26	30.77%
Chikwayi Village-Masopo	3	27	11.11%
Chuundwe Village-Masopo	2	34	5.88%
Munamputu Village-Masopo	5	42	11.90%
Sianachula Village-Masopo	2	52	3.85%
Siankope Village - Masopo	2	28	7.14%
Sichinde Village-Masopo	2	54	3.70%
Simakwama Village-Masopo	3	23	13.04%
Ushimba Village-Masopo	2	32	6.25%
Ziyani Village-Masopo	2	26	7.69%
Simuchembu Village - Masopo	2	72	2.78%
Siachimputi Village - Masopo	3	18	16.67%
Fundabanyama Village - Masopo	13	52	25.00%
Siamungala Village - Masopo	14	56	25.00%
Sebbwenungu Village - Masopo	5	30	16.67%
Namoonza Village - Masopo	5	27	18.52%
Total	**185**	**1,648**	**11.23%**
Kalomo District			
Mutala/Bbelo Community	55	212	25.94%
Kinnerton -Kinnerton/Mancom	28	32	87.50%

Name of Community/Village/Area	Households who have been in program for more than 1 Year	Total Number of Households in Community/Village/Area	Proportion of Beneficiary Households
Chikoli Settlement-Chikoli	30	41	73.17%
Simakakata Community - Simakakata	24	120	20.00%
Total	**137**	**405**	**33.83%**
Kazungula District			
Katapazi Village-Katapazi	5	60	8.33%
Mpoola Village - Katapazi	5	30	16.67%
Makanisa Village-Katapazi	8	23	34.78%
Libonde Village - Katapazi	9	57	15.78%
Sande Village- Katapazi	2	14	14.28%
Silipi Village - Katapazi	1	5	20.00%
Siakwale Village-Katapazi	2	18	11.11%
Sinanfu Village - Katapazi	4	43	9.30%
Siazyombo Village - Katapazi	4	28	14.29%
Siambelele Village- Katapazi	**5**	29	17.24%
Mungala Village - Katapazi	**3**	12	25.00%
Mupotola Village-Manyemunyemu	13	26	50.00%
Sianyinyite Village-Manyemunyemu	11	22	50.00%
Mumbwatasai Village-Manyemunyemu	12	28	42.86%
Siatontola Village - Manyenyemu	3	15	20.00%
Sialwindi Village- Manyemunyemu	3	18	16.67%
Total	**90**	**428**	**21.03%**

The external consultant will not be in Zambia for the implementation of the quantitative survey, but will help in the design of the survey instrument itself, and the review of sample size and stratification of groups for special focus. LOL Zambia will hire and train enumerators on the survey instrument and involve them in a pretest of the survey instrument. A survey-training manual, used during the Mid-Term Review will also be revised and used for the training of these enumerators. The experienced LOL Zambia M&E Specialist will pre-test the survey instrument on August 8th, and, after some expected modifications and input from the extended LOL team, including the consultant, will launch the actual survey on/about August 14th, completing it on August 29th.

After protracted discussions involving the LOL Final Evaluation Team and the Consultant, it was agreed that the households to be surveyed be stratified as follows;

(1) Group One: Households classified as clearly "vulnerable" at the time of entry into the program, who received an incalf cow , and with at least one year of owning the cow given by the project.
(2) Group Two: Households classified as "vulnerable" – who received a passed on heifer from the intitial project beneficiaries of in-calf cows , and have owned this pass-on for at least since they received it.
(3) Group Three: Households with their own animals and did not receive either an in-calf dairy cow or a pass on from the program but received Artificial Insemination Services and/or Technical Assistance from the program. These should have also been keeping records for atleast one full year.
(4) Group Four: Households that either indirectly benefited or not benefited at all from the program and living in the same communities with direct beneficiaries.

There will be other sub-groups that we may want to tease from the data, and the way the date will be collected and coded at entry should permit such selection (e.g. a general group of households with training, but not receiving heifer/calf, for example).

The consultant will give a review of the 2004 baseline survey instrument to the Zambia LOL field team, in June 2008, with suggestions about modifications for the final evaluation quantitative survey. Each of the section of that questionnaire will be reviewed with recommendations about which questions to keep or exclude. A number of key questions will also be provided for inclusion at the end of the survey instrument, some open-ended in nature and requiring coding after completion of the survey. Coding within the first pages of the questionnaire should permit grouping sampled household responders into the different grouping above.

A conference call , between the external consultant and LOL key field staff Andson Nsune, Sebeso Mululuma) and home office personnel (Frank Valodivia, Lai Chung) will be conducted in June to launch specific activities in preparation for the quantitative survey. The strategy for defining sample size will be discussed, and a decision on sample size will be finalized in July, with special input from the LOL M&E Team (Andson and Frank).

The first Draft of the survey instrument for the quantitative survey will be sent to the consultant and LOL management team by the LOL Zambia M&E Specialist, in July, taking into consideration the consultant's suggestions. This instrument will be developed after referring to a number of questionnaires (the baseline questionnaire, the mid-term questionnaire, the farmer targeting questionnaire, and the farmer performance monitoring survey questionnaire) to come up with a good and comprehensive draft questionnaire. Reviews and modifications through two subsequent drafts are planned, with the final version for the training and pretesting completed by early August

Following hiring of a group of enumerators and their training using a prepared manual for this purpose, a trial run pre-test will be made in August. Any unanticipated issues will be communicated by email by the LOL Zambia M&E Specialist to the consultant and other members of the Final Evaluation (FE) team for rapid decisions for reproducing the final survey instrument. At this point, the final survey instrument will developed as needed for the sample of households to be surveyed, and the field survey begin August 14 and continue for two weeks.

During the second week of the field survey, six (6) data clerks will be hired and trained in Lusaka in anticipation of beginning data entry by August 28. Data entry is expected to take about two weeks, until the second week of September. Cleaning and Validation of Data will start in the Third Week of September after the consulted has already arrived in the country. The final data set and table generated during data analysis will be made available to the consultant before his departure for the US.on 30th September.

Preliminary development of data tables from these data will also be done by the LOL M&E Team. The consultant has requested that tables similar to those developed for the baseline be prepared with these data, showing the data stratified into at least the 4 groups mentioned above by province. The consultant will be responsible for analyzing and reviewing the data from the quantitative survey and extract information to be used in the evaluation report. **Mean**, **Median**, and **Standard Deviation** will be provided for these data. The external consultant will expect to receive initial sets of data tables from this survey in the week prior to his departure for the US, and will further review and discuss these data with the LOL FE Team via email and conference calls after his arrival in the US. This information will help fine-tune some of the questions that will be posed through the qualitative survey.

During that first week in Zambia, the consultant will provide further guidance about the format for reporting these data (tables, grafts, charts, etc.) and spend some time with the LOL Zambia M&E Specialist in analyzing and reviewing the quantitative data available from the survey. One of the tasks that the LOL M&E Specialist will need to do, to aid the consultant in comparing the FE quantitative data with the baseline, will be to re-analyze the baseline data set so it includes the same group of provinces and districts that the program operates in for the final evaluation quantitative survey (and excluding the rest), using the same tables of the baseline.[7] As the baseline was done on a wider population level, including provinces and districts that LOL is not actually operating in, this re-analysis of the baseline data is essential for final evaluation comparative analysis purposes. The consultant may also look at the more generalized data from the existing baseline reports, but some variation from the baseline earlier report should be expected with the more limited group.

While the consultant is in the field during the subsequent two weeks, the quantitative data sets should be completed and prepared for the consultant's complete review and analysis between September 19 and 25, including merging of this data with information gained through the qualitative field surveys with program stakeholders and beneficiaries. This review will continue through the remainder of the consultant's time in Zambia, and in the following week after departure.

2.0 Qualitative Survey

Information to be obtained by the consultant through the qualitative survey portion of this evaluation will take a number of forms, as outlined below. A set of guiding questions will be prepared by the consultant, prior to arrival in Zambia, and revised following the first week of meetings and contacts. These questions

[7] Given all that the M&E field officer is responsible during the next weeks, it is not clear when he will have the time to complete this task. He may need assistance from the LOL home office for this, so that absence of these data do not delay the final analysis by the consultant.

will be grouped towards different focus groups, as defined below. Annex 3 provides an initial list of some leading questions that might be asked, while also seeking answers to questions posed in Annex 1. Annex 3 also provides a list of the kind of groups that will be interviewed (either specific individuals or small groups). Questions posed by the consultant will incorporate the key evaluation questions compiled by the LOL field team and provided to the consultant (Annex 1), and will be focused towards the issues of impact and sustainability.

(1) The consultant will receive a full briefing by the LOL country manager and senior technical team, with priority given to what the LOL team feels to be the principal accomplishments made over the life of the project, as well as lessons they have learned. This presentation should be made in PowerPoint if possible, with a hardcopy for the consultant, and should include what program management considers to be the most significant data to support the accomplishments outlined. To the extent that it is possible, as much time-line data, over as long a period as possible, should be provided at this time for what LOL program management considers its strongest case for impact (the type of data sets presented in quarterly reports would be appropriate). At this meeting, the consultant would like to hear and have a question/answer period with the senior technical leaders of the program, providing them also an opportunity to outline areas of program accomplishments, challenges, and where efforts may not have reached expectations (and why). The consultant would like to hear from program management if and how their Performance Management Plan was (or was not) a useful tool for program monitoring over the life of the project, with some special attention to the usefulness of the IPTT and data sets collected. Suggestions for improvements or modifications would be welcome.

(2) A meeting with USAID/Zambia CTO and the Food for Peace officer designate within the mission should be set up for the 2nd or 3rd day after the consultant's arrival. The consultant will meet with this group in one combined meeting. The purpose of the meeting will be to hear from USAID itself its perception of the program, its challenges, accomplishments, and working relationships. The consultant will have a list of questions to ask, including some on the effectiveness and timeliness of project reporting, how project information fits into the mission's own PMP and needs for information in reporting within their Operational Plan each November within USAID's new strategic framework. Are program indicators adequate, useful, timely, and meet the management purposes of the mission.

(3) During the first week in Zambia, and during the fourth week, the consultant will want to meet with Lusaka based stakeholders and partners of the project (partner organizations like Heifer International, semi-structured interviews with key government agency personnel linked to program and milk entrepreneurs who purchase bulk milk from the milk collection centers for direct consumption, or process it into other dairy products). Different links in the milk industry chain, from producer to final consumer of various products, will need to be understood, and representatives along this chain met by the consultant. The consultant would like to try to understand the possible potential market for milk and milk products in Zambia (export regionally?) and investments and prices provided. If there are data on this, or special studies looking at this, the consultant would like to see them. Issue of long-term sustainability of the industry within Zambia of importance. Guidance will be required by the consultant, from the LOL field management team, about who these key groups and individuals are, and help in setting up interviews with them. To these meetings, a LOL Zambia staff person may accompany the consultant. Who the key groups and individuals are that should be met will be established during the first day, following the initial briefing, and interview schedules subsequently set up.

The consultant asks that data sets be established for the small and medium processors with whom LOL has been working, who have been purchasing milk from the MCCs. Historical

data about the volume of milk purchased (value as well), and how these private sector firms have themselves grown over the past four years. This group is an important beneficiary group that impacts the entire value chain. The consultant will also wish to visit a number of Lusaka based stores that sell products produced by these processors – to evaluate scale of potential impact being made upon consumers as well.

If LOL must hire some additional short-term help during the evaluation period to put these data sets together from the processor partners, in a timely basis, then this should be done. This same person might also be able to assist the LOL M&E team in quickly putting together time series data from the MCC data sets, presented in quarterly reports (see Annex 3 observations on this). These data are as important as the quantitative data to be obtained from direct project small-holder beneficiaries – as they are part of the economic chain linking farmers to markets which ultimately farmers must have if they are to sell their milk, and do so in to the future.

(4) During the two weeks in the field interviewing program beneficiaries, a number of target groups can be defined (below). Before meeting farmer beneficiaries in a district, it would be useful to have a **short** meeting with LOL local area staff. After introductions, the area team leader may give the consultant a short **written summary** of their area accomplishments and challenges, and brief summary of how they organize their work with local households (ten minutes maximum). Most of the time in this meeting will be spent answering questions that the consultant will be asking them.

It will also be important to meet with dairy households within the districts/communities visited who may not be direct beneficiaries of the project. These farmers will nevertheless have the opportunity of selling their milk to the locally established MCC, and represent part of the impact the project is having on the larger population in the area.

The consultant will require an interpreter with the small group meetings with the program beneficiaries below. Familiar field project staff may accompany the consultant to the interviews, and can serve as interpreters, if they are able to do so.[8] The consultant will interview small groups of such farmers (and not have a group meeting that includes two or more of the categories below combined). The consultant would like interviews to be scheduled in village communities with households where 10% or more of households have been program recipients for a year or more (and preferably at least two years)(see sampling data). This means household identification and contact prior to the consultant's arrival will be necessary to be sure they are willing and able to meet the consultant, and representative. A proposal for these interview schedules should be ready for the consultant's review during the first week upon arrival. Groups may be split on gender lines if this is necessary for frank dialogue (especially true of female-headed households).

Meetings with 4-10 people will take between 1 and 1.5 hours each, assuming people are present when we arrive on site. Enough time should be planned for travel between meetings. Since notion of time is not the same, the consultant suggests two meetings in the morning, two in the afternoon after about an hour break (which can be spent in travel).

- Project classified vulnerable (at time of entry into program) households beneficiaries who have received heifer/calf (preferably with at least 2 years experience with project); some

[8] More is gained by having someone that the program beneficiaries are familiar with, and trust, than an effort to maintain some type of supposed objectivity by having a translator unknown to the people, with possible lack of understanding of local conditions/local expressions and moving around the area.

of these should be women-led households. Key question: do they still consider themselves vulnerable? This group probably represents the majority of current program beneficiaries.

- Project classified strong dairy farmers (who may have been part of project from very beginning before the focus towards 'vulnerable' households. Purpose: get an idea of what a successful Zambian small dairy farmer might look like, and learn from such households the impact of dairy. If the farmer can bring records, do so.
- Households who have been trained in dairy record keeping, and have been doing so for at least one full year. They should come to the interview with their household dairy records. Consultant would like a copy of their specific records (if possible). Purpose: Link their comments to data we hope to gain through quantitative survey on whether or not such farmers may be more 'successful' than others because of such training and practices.
- Households that have received AI (at least a year or two ago) and training (but not heifer/calf). (The quantitative survey instrument should provide a means of sorting out this sub-group).
- Households that are not currently part of the program. Purpose: Understand why they are not involved in dairy and their observations of neighboring households in their community with new dairy activities.

During the time in the field, the consultant will also need to visit the milk collection centers (MCC) in the districts visited, as well as a couple of local counter sale locations outside the MCCs. Monze, in particular, should receive good representation, given the dramatic production and sales efforts here. At the MCCs, a brief meeting (about an hour) with the Center operations manager will be spent being shown the operation and records of the farmer's delivering milk. Each center visited should have prepared (perhaps with the assistance of LOL project field personnel from their recorded data sets), prior to consultant's arrival, a brief handout on the history/statistics of the center (# of farmers bringing in milk, liters of milk processed by recorded periods of time, and how they dispose of the milk (to processors), expenses, etc. A center financial statement would be useful too. During the final week back in Lusaka, some of these MCC data may be investigated in greater detail from the LOL project's database.

3. Key Evaluation Personnel

Annex 2 of this document, prepared by LOL, presents the roles and responsibilities of the key LOL personnel involved in this evaluation:

(1) Evaluation Team Leader (Zambia Country Manger): Todd Thompson
(2) Field Team Supervisor (Field Technical Manager): David Harvey
(3) Survey Team Manager (M&E Specialist): Andson Nsune
(4) Technical Support for LOL Headquarters: Chung Lai, M&E Advisor
Mara Russell: Institutional Capacity Building
Frank Valdivia (HQ/M&E Manager)
(5) Final Evaluation External consultant: Dr. Richard Swanson
(6) Data Collection Personnel for the Quantitative Survey

Districts Surveyed	Kitwe, Chingola, Mufulira and Chibombo	Lusaka, Monze, and Kazungula
Supervisors	Henry Nsontwa	Phedelis Mazuba
Enumerators	Pricilla Kabwe Silvia Mwale Chisanga Chilemu	Mubika Mlulonda Matilda Chaongopa Fellon Malambo
Districts Surveyed	Choma	Kalomo, Mazabuka and Chibombo
Supervisors	Dene Manyika	Kelvin Munjile
Enumerators	Sylvester Chingulu Helen Namunji Mabvuto Lungu	Manga Mwanang'ombe Malama Kennedy Ilukena Mbangweta

(7) Data Entry Personnel for the Quantitative Survey

1. Choolwe M. Nchimunya
2. Clive Mutenekelwa
3. Ethel Nkhoma
4. Zandile Makombe
5. Namulinda S. Phiri
6. David Sichone

4. Deliverables

Deliverables under the contract with the external consultant include the following:

(1) Evaluation Protocol (this document)
(2) Quantitative questionnaire instruments (Annex of final report)
(3) Qualitative survey data collection instrument (Annex of final report: these are a list of prompting questions prepared by the consultant for guiding interviews with different groups within the qualitative survey (LOL management team, LOL field team, USAID, Collection Center personnel, project partners, milk product processors).
(4) PowerPoint Presentation (given at end of consultancies, summarizing initial major findings/results and lessons learned)

(5) Final Evaluation Report
(6) One Electronic file of clean (final) quantitative data collected (qualitative data will be constituted by field note summaries)
(7) One Electronic file of any files used to organize, process, or analyze quantitative data (these are tables, charts, grafts created from quantitative data survey). LOL project reanalyzed data tables from baseline will also be included, as appropriate.

5. Time Frame

Significant long term thought, planning, and team effort has gone into the preparation of this final comprehensive evaluation. This is evident in Table 3 below showing the detailed time line initially prepared by the LOL field team, and subsequently managed by the evaluation consultant. Though created as a guide to track timely team efforts for this evaluation, it will also be considered as a final record of what actually took place, and when, and will be revised accordingly throughout the months leading up to and through the evaluation period.

Annex 1: Final Evaluation Questions

Effects and Outcomes

- To what extent has the program improved incomes of beneficiary households in targeted communities in relation to the baseline status?
- How have the program activities affected the direct and indirect beneficiaries' food security?
- How have program activities affected the capacity of beneficiary households to cope with shocks and natural disasters that affect food security?
- How have the program activities changed lives (improved access to education, improved food security, improved dietary diversity and health status of family members in targeted households, and others) of households in targeted communities?
- Are there other unintended but important outcomes and impacts (increased milk consumption in communities, increased employment opportunities, etc.) that have been realized in targeted communities as a result of program activities?
- To what extent has the program improved the capacity of cooperatives and MCCs which have been used as vehicles for delivering goods and services to targeted households?
- To what extent has the LOL/Z Title II DAP improved the capacity of government agencies and other partners in the implementation of dairy development programs?
- Do the stakeholders have a sense of ownership of the program? What are their views on program implementation and progress?

Effectiveness

- How effective has the business approach used by the program been in the attainment of the program's goals and objectives (improved food security and increased incomes) compared to the classic Title II food distribution approach?
- How efficient has the program been in attaining its goals and objectives? What has been the average cost per beneficiary taking into account pass-on activities, training through TOTs, etc.? If calculated based on the total household members directly benefiting from dairy income and milk consumption, what would the cost per beneficiary be?
- What is the program status with respect to target outputs in terms of quantity, quality and timeliness? What factors impede or facilitate the production of such outputs?
- Do the outputs contribute to the achievement of the strategic and intermediate objectives of the program?
- Which components are most critical and/or effective in achieving program objectives and intermediate results?
- Does the monitoring and evaluation system appropriately address the program's objectives and indicator targets?
- How effective was the technical assistance provided throughout the program? To what degree was the TA adopted among beneficiaries?
- How effective was a business oriented and community based AI program in improving the ownership of improved dairy cows among households in targeted communities?
- How effective was the program in targeting vulnerable households using its developed selection criteria?
- What aspects of the program were particularly ineffective?

Sustainability

- What mechanisms have been put in place to ensure sustainability of program results?
- Are program activities and technical assistance related to adoption of better practices sustainable, i.e., are participants likely to continue receiving TA after the program ends? Are MCCs likely to continue operating and remain financially viable after the program ends? Are pass on activities going to continue after the program ends?
- To what extent will targeted beneficiaries continue to access long-term positive benefits after the program comes to an end?
- To what extent will other local or donor resources continue to be available to perform the activities the program now conducts that will require continuation after the end of the program?

Cross-cutting Issues

- What effect is the program having, if anything, on the livelihood of the women beneficiaries and their households?
- How has the program affected the gender based relationships in targeted households?
- What can be said specifically, if anything, about the program's contribution on those affected by the HIV/AIDS and their households?
- What effect is the program having, if anything, on the capacity of households to mitigate environmental effects of scaled up dairy activities in their communities?
- How can programs such as this one improve and increase its impact on these cross-cutting activities or others on beneficiaries and their households?

Lessons Learned and Recommendations

- What are the main lessons that can be drawn from the program experience since its inception?
- In particular, what have been the main lessons learned regarding targeting and working with vulnerable households?
- What are the best practices in formulating, implementing, reporting, monitoring and evaluating a Food security/Dairy Development program that need replication in future Title II programs?
- What corrective actions are recommended regarding the design, implementation, reporting, monitoring and evaluation of the program?
- What actions are recommended to follow up or reinforce initial benefits from the program?

Annex 2: Other Roles and Responsibilities

Evaluation Team Leader (Country Manager)

Evaluation Team Leader will provide administrative oversight of the overall evaluation in its entirety, including making all the major decisions related to the evaluation. The Team Leader will provide input as needed throughout the evaluation process and will also be the primary liaison with the FE consultant when a major decision needs to be made regarding the final evaluation. His specific responsibilities will be as follows:

- Provide the final decision on big decisions such as the selection of FE consultant, final review of SOW, timeline and final report
- Facilitate the approval of the FE budget
- Facilitate the processing of the selected consultant's contract
- Discuss with consultant about objectives of the FE and SOW during the beginning of the in-country fieldwork.
- Ensure the FE is conducted according to the SOW.
- Oversee the work being conducted by the FE consultant

Field Team Supervisor (Field Technical Manager)

The Field Team supervisor will be responsible for providing the consultant with an overview of the Program's field activities. The consultant will need to visit program sites and engage with various stakeholders. The Field Team Supervisor will assist in the development of a schedule of meetings between the Consultant and Program Stakeholders including beneficiaries, implementing partners and other Government and non-government organizations. He will also actively participate in the review of FE planning documents as well as provide technical oversight to the Consultant.

Survey Team Manager (M&E Specialist)

The Survey Manager will ensure that all operational and logistical aspects of the survey are completed accurately and appropriately as planned in the timeline. During the planning period, the SM will be responsible for finalizing the timeline and FE consultant SOW based on comments made by the FE team. He will also provide some technical input in the management of the whole evaluation process, including liaising with the Consultant on the quantitative and qualitative data collection, interpretation and analysis process. The SM is the logistical liaison between the FE consultant and the FE team and his specific responsibilities will be as follows:

- Revise and finalize the timeline per discussion among Zambia team
- Revise and finalize the SOW as necessary with support from Zambia team
- Provide FE consultant program documentation for review
- Provide the FE consultant with all relevant Program document as stipulated in this Scope of Work
- Engage FE consultant in protocol development with support from FE team

- Hire and train enumerators for quantitative data collection with supervision from FE consultant
- Ensure all logistics are in place and available for the enumerators and FE consultant for their fieldwork period
- Train data entry persons with supervision from FE consultant to enter data accurately
- Address all field problems and quality control with FE consultant

- Support Frank Valdivia (HQ/M&E Manager) in data processing and cleaning with supervision from FE consultant

Technical Support from Headquarters

Institutional Capacity Building (ICB) team (Mara Russell and Chung Lai) and Frank Valdivia (HQ/M&E Manager) will work with LOL/Z to plan and prepare for the Final Evaluation, including supporting the calculation of the sampling size, developing timeframe, reviewing data collection instruments, and ensuring quality evaluation. Technical support is critical to ensure that the evaluation is objectively conducted and document relevant and required indicators and activities. The ICB team and Frank Valdivia will be the technical liaison with the FE consultant to ensure FFP final evaluation and M&E requirements are followed and observed.

- Support LOL/Z in preparation and implementation of an outstanding final evaluation.
- Ensure the evaluation is completed within the agreed timeframe and that it addresses Food for Peace's requirements
- Will provide comments and input to all technical aspects of the evaluation.

Annex 3: Leading Questions for Qualitative Survey

Questions for LOL Field Team

1. Explain Targeting for project beneficiaries (and issue of "vulnerable households") What % of households are considered 'vulnerable'
2. Who owns MCCs? How is it organized? A cooperative? Who runs it?
3. 2441 farmers 'trained" – an aggregate cumulative figure (no double counting)?
4. 10 MCC, reduced to 6 MCCs in 2008. Why?
5. Why is price of a liter of milk at MCC lower than 'open market'? Too many 'social benefits?
6. How do partners work together? (LOL, Heifer Int., GART, HIZ)
7. 797 with improved dairy cows in 2008. Is this correct?
8. Total cost of program to data. See financial data.
9. What is inflation rate?
10. cost/benefits for project? Cost/beneficiary – Have they calculated this?
11. How effective do they feel the project has been in reaching its goals/objectives? How could it have been better; changes for MYAPS?
12. What kind of spread effects have they observed?
13. Experience with IPTT; was it used as a management tool? How? What data do they consider as the most useful of impact made. Any specific indicators they wish they had included now (that they didn't think of at beginning). For future?
14. What do they feel are the most important lessons learned over the past few years?
15. Are they effectively reaching the 'most vulnerable' households in the targeted areas?
16. How many in-calf heifers have actually been given out to date (at least 1000?). How much milk are these heifers currently producing (can you disaggregate this)?
17. How many farmers are actually contributing milk to MCC (all groups)?
18. How many milk processor groups are currently purchasing from MCCs (3 in MTR). Do you have records about their increasing volume of milk purchased, value of sales?
19. Any idea of what the size of Zimbabwe's milk deficit is? (volume of milk currently imported + volume of local sales of milk)?
20. Where are the bottlenecks in value chain for milk – from producer to consumer?

Questions for Small holder Dairy Households (September 2008)/Production Supply Side (meet with women separately)

1. How long have you been engaged with LOL and what specific assistance have you found particularly helpful and why. Most important assistance received?
2. Have you received training from LOL technicians? What kind? What was the most useful? What was not very helpful? What other kind of training would you like to receive?
3. Hunger Months between December and March last year – where you better off because of LOL assistance. Explain. How do you see the coming year? Would you say that you are not food self-sufficient through the entire 12 months of the year?
4. Household gardening during the hunger months? Access to water? What is most important for vulnerable households?
5. Record keeping of dairy expenses and income? Please show me what you are doing, and if this has been helpful.
6. Micro-credit? How do you save money earned from your farm activities and dairy production?
7. How much of your milk production do you sell to others, besides the MCC? How much more do you earn from such sales ($/liters), than from MCC? How much is consumed at home? By whom?

8. Name two ways of improving production of their milk (eg. Supplemental feeding, pasture establishment, animal disease prevention, etc).
9. What are their goals for future production (# of animals, etc.). Is there space for this?
10. Sustainability of household level efforts?
11. What is the current condition of heifers received from LOL (disease, feed).

Questions for Demand Side (Milk Collection Centers, Dairy Processors (small and medium, and large?), Retail and Wholesale Vendors, etc.)

1. How has the demand for milk been for your company over the past few years? Any specific data you can give me on this ($ net, total liters purchased/sold, etc.)?
2. How do you see the future market for your products? Why?
3. What kind of assistance, if any, have you received from LOL?
4. Sustainability of efforts in Zambia?
5. What 'other' services are provided to farmers providing milk? (Are they all members, like a cooperative?)(credit/revolving funds, inputs, artificial insemination, nutrition clubs, HIV/AIDS training), etc.)? How do these 'distract' from principal marketing mission.
6. Is MCC managed as a business? Good financial records? Are members informed about cost, benefits, etc.? Who is perceived as the 'real owner' of the MCCs? How are books kept and audited?

Questions for USAID/FFP

1. General comments about LOL performance under this contract?
2. Has required reporting (quarterly reports, annual reports, etc.) met expectations? Were they received on time? (Note comment that QR did not seem to be expected or demanded).
3. Great quarterly reports. Why not semi-annual? Time to prepare is great. Are they really used?
4. How has LOL project contributed to USAID Zambia's reporting requirements in November Operational Plan reporting? To which USAID Zambia OP indicators, or custom indicators, does LOL contribute?
5. Has progress towards reaching annual and end-of-project targets been satisfactory? Were targets realistic (too high, or too low)?
6. How could LOL program in the future be improved for data reporting?
7. Where does USAID Zambia consider LOL's greatest impact to have been made?
8. Where has there been less impact than hoped for or expected? (and why)
9. How could the program have been strengthened?

Other General Questions

1. What happened to the Warehouse Receipt system?
2. Why reduction in MCCs from 10 to 9 or less?

Groups to Interview:

1. MCC (good ones and poor ones) (of the 10 worked with)
2. Small and Medium Milk Processors (who purchase milk from MCCs)
3. Households receiving dairy cows

4. Households receiving calf from dairy cows distributed
5. Households receiving AI (not among above group)
6. Households led by Women
7. USAID/Zambia and FFP
8. Dairy Consumers (how is this addressed)(go to stores where milk is sold, and interview some buyers)(consumer surveys for desired products?)
9. Heifer International Zambia (HIZ)
10. GART-Golden Valley Ag. Research Trust
11. Zambia Dairy Processors Association (milk promotion and ed. Campaignes)

Tables/Figures to Prepare from Existing MCC Data:

1. Data should exist from LOL M&E for all MCCs and farmers involved in these, as currently reported through quarterly reports - for FY 2005, FY 2006, FY 2007, and FY 2008 (recognizing that Sept. data will not yet be available for FY 2008). Please create data tables and figures, especially for indicators, over these timelines.
2. Show Figure of Monthly Average Liters of Milk Produced Per Farmer, for as long as data exist to present time (eg. FY 2006 until July 2008). Show # of farmers involved at each month on a line. If can also break out this data by MCC, would be good.

Annex 4: Overall Methodology Employed

1.0 Methodology [9]

The overall evaluation methodology was two-pronged and consisted of a quantitative survey and a qualitative study.

1.1 Quantitative Survey

The quantitative survey followed a protocol prepared by the consultant in collaboration with the LOL Final Evaluation (FE) Team based on the terms of reference provided. The survey itself was managed by the LOL/Z M&E Team through the following steps.

1.1.1 Instrument Development

Quantitative data were collected in a formal survey using a questionnaire that was designed to capture the key impacts and outcomes of the program on targeted communities and in surveyed households (see Annex 5). To ensure the information collected met the evaluation objective, the survey tool was designed to collect comparable information to the baseline survey that was conducted in 2004. Efforts were also made to ensure that the survey tool collected information about the vulnerability of the respondents to provide information on the program's targeting criteria inline with the program's Food Security Strategy Paper developed in 2005.

The tool was also extensively reviewed by FE Team members, the consultant and field staff. It was also pre-tested during the enumerator training after which it was further revised to come up with a final version.

1.1.2 Sampling

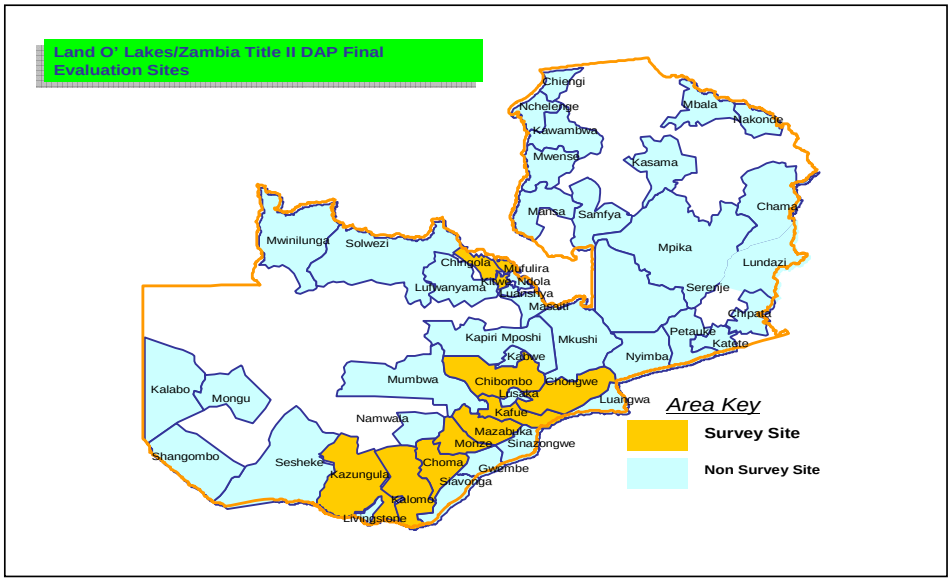
In order to ensure a representative sample was drawn, the respondents were drawn from all communities in which the dairy cows bought by program funds were distributed. As the table below shows, 181districts in 4 provinces constituted the sampling universe for the survey. The table also shows the different Sub-Grantees LOL worked with to implement the program since its commencement.

Study Site (district)	Province	Implementing Partners
Chongwe, Kafue	Lusaka	World Wide Sires, Ministry of Agriculture
Mazabuka, Monze, Choma, Kalomo, Kazungula	Southern	World Wide Sires, Golden Valley Agricultural Research Trust, Conservation Farming Unit; Ministry of Agriculture
Chibombo	Central	Ministry of Agriculture
Kitwe, Mufulira, Chingola	Copperbelt	Heifer International, Ministry of Agriculture

[9] This section was written by Frank Valdivia, LOL M&E Manager, St. Paul, Minnesota

The map below shows the geographical spread of the survey sites in the country. Using the FANTA sampling guide for indicators expressed as means, a total sample size of 1,120 was determined. This sample was determined as being able to detect desired changes in the key impact indicator of the program; Number of Months of Adequate Household Food Provisioning (NMAHFP).

Map of Survey Sites Country Wide



The formula to calculate sample size for indicators expressed as means is given as:

$$\mathbf{n = D\,[(Z_\alpha + Z_\beta)^2 * (sd_1^2 + sd_2^2)/(X_2 - X_1)^2]}$$

Where:

n = required minimum sample size per survey round or comparison group
D = design effect of the study in cluster multi-stage sampling
X_1= the estimated level of an indicator at the time of the first survey or for the control area.
X_2= the expected level of the indicator either at some future date or for the project area such that the quantity (X_2-X_1) is the size of the magnitude of change or comparison-group differences it is desired to be able to detect.
sd_1 and sd_2 = expected standard deviations for the indicators for the respective survey rounds or comparison groups being compared.
Z_α = the Z-score corresponding to the confidence level with which it is desired to be able to conclude that an observed change of size (X_2-X_1) would not have occurred by chance, α is the level of statistical significance
Z_β = the Z-score corresponding to the degree of confidence with which it is desired to be certain of detecting a change of size (X_2-X_1) if one actually occurred, β is the statistical power.

To establish plausible links between program inputs and impacts at population level, the sample was broken down into the following sub-groups of respondents.

Table 2.1.2.2 Break Down of Sample into Groups of Beneficiaries

S/N	Category of Respondents	Number of Respondents	Actual Respondents
1	Beneficiaries of in-calf heifers from the program	257	285
2	Beneficiaries of Pass-On Heifers from the Program that kept the passed-on animals for at least one year	46	52
3	Farmers receiving technical assistance from the program, including AI, but who have their own animals	257	214
4	Households not directly targeted by the DAP	560	551
Total		**1120**	**1102**

The table above shows that a response rate of 98% was achieved by the survey. For categories 1 and 3, the respondents were sampled using random sampling from alphabetically arranged lists prepared for each survey site. For beneficiaries of in-calf heifers, the sampling was done using lists of farmers with animals that were still alive at the time of the survey. For beneficiaries of program technical assistance, the lists were prepared once with the survey teams were in the districts. For beneficiaries of passed on heifers, a complete enumeration was done for households that had kept a passed-on dairy cow for more than a year.

Once these lists had been developed and the specific locations (Villages) of the farmers determined, an equal numbers of households that were not directly targeted by the program were interviewed using the random walk method. For consistence and elimination of bias in the selection of such respondents, the point where the last beneficiary was interviewed marked the beginning of the random walk. During the random walk, the sampling interval was determined as a ratio of;

The number of households not directly targeted by the LOL DAP in a Village
The sample size of households not directly targeted by the LOL DAP in a Village

The use of the random walk in cluster surveys is relatively widely known. This method entails randomly choosing a starting point and direction of travel within a sample cluster, then conducting interviews in the nearest households. In this case, the choice of a standardised starting point and a skipping procedure that guided by the sampling interval, were added to eliminate possible biases in selecting respondents in communities with many households to be interviewed using this approach.

It must be noted that the number of beneficiaries of in-calf heifers interviewed was more than the targeted sample size. This happened due to the reclassification of the households during data analysis. Because the sample for beneficiaries of in-calf heifers only included households with animals that were alive, there were many households that received in-calf heifers which had been interviewed as beneficiaries of technical assistance because their animals had died and we still participating in program activities awaiting replacements of their animals by groups, or receipt of passed on cows.

1.1.3 Data Collection

To allow for comparison between the baseline and final evaluation, field data collection took place during the same period of the year. To ensure high quality data was collected, enumerators underwent data collection training for five days. A field pre-testing of the instrument was then conducted to determine the applicability of the instrument. Data collection was then conducted from August 14-30 2008.

1.1.4 Data Entry and Analysis

CS-Pro, SPSS, MS Access and MS Excel were used for data entry, cleaning and analysis.
A parallel analysis for quality control purposes was then undertaken for key impact and outcome indicators. All the outputs were packed into an excel file which was sent to the consultant for preparation of the report.

1.2 Qualitative Research

The qualitative survey coupled with field observations was aimed at offering a correct and complete understanding of the complex reality as indicated by the quantitative survey. It was also during this period that additional data on the dairy industry in Zambia was corrected through discussions held with management and staff of processors, LOL/Z DAP implementing partner organisations, and government agencies working with the program.

The main methods of data collection during the qualitative phase of the final evaluation included the following;

- In Depth Interviews with LOL Staff which were preceded by a briefing section which outlined the goals and objectives of the program, the targeting and implementation strategy, as well as the performance and outcomes/impacts of the program on targeted households and communities.
- In-Depth Discussions with Management and Staff of processing firms to collect data on commercial farmer and small scale farmer production trends, diary industry environment, government policies and many more.
- In-Depth Discussions with management and staff of LOL/Z DAP implementing partner organisations
- In Depth Discussions with staff of key government agencies liked to the development of the dairy industry in Zambia
- Focus groups discussions with cooperative board members, AI technicians/Community Livestock Workers (CLWs) and farmers in all the regions (i.e provinces) where the program had been implemented
- In Depth Interviews with selected farmers to gain more insights into the impacts of the program at household level

The information gathered through the above procedures together with data collected from other sources outlined in 1.2, provided the information upon which this final evaluation report was based.

1.3 Data Quality Assurance and Data Limitations During the final evaluation

This section outlines the data quality assurance plan put in place during the evaluation to ensure quality data was collected and that quality information was obtained for the overall usefulness of the findings of the evaluation. It also highlights limitations in the data collected to the readers of this report. Data quality assurance was mainstreamed in evaluations procedures as detailed below;

1.3.1 Data Quality Assurance Plan

1.3.1.1 Instrument Development

During the process of developing the instruments, the quest to improve data quality was made through the development of a user-friendly tool that flowed logically from one section to the other and one that despite requesting detailed information, would not over burden the respondents. It is also important to note that the discussions held during the process of developing the instrument ensured that all the relevant data required for measurement of desired impacts and program outcomes were collected. These discussions included the LOL field team, the final evaluation consultant, LOL Washington and MPL support personnel. The pre-test also insured that the questions were tested for clarity and where problems were identified, necessary remedial measures were undertaken.

1.3.1.2 Enumerator Training

The training conducted for enumerators along with its pre-test of the survey instrument was probably one of the most important data quality assurance activities that ensured that the survey met its scientific requirements. The main objective of the training was to ensure that enumerators had a common understanding of the questions in the instrument leading to their uniform questioning so that the variations in the responses were truly due to differences in households rather than lack of uniformity in the question process by enumerators. Supervisors received additional trainings to help them adhere to scientific principles when sampling respondents in the field.

1.3.1.3: Data Collection

The survey manager supervised field data collection and worked with each of the four survey teams to ensure the data quality assurance activities were undertaken as specified. Working with some teams during the first days highlighted problems whose solutions were communicated to all groups for harmonisation. Survey teams were also given strict guidelines to ensure all the interviews were done in the households with well specified call-back and interviewing procedures to avoid biases and preconceived responses as stipulated in the training manual. Supervisors were also tasked to hold daily meetings (some of which were attended by the survey manager) after fieldwork to address issues emerging during data collection including those that had a direct effect on data quality. Each questionnaire was checked by the supervisor and certified ready for entry by appending his signature once he/she was satisfied with the quality of the work done by the enumerator.

1.3.1.4: Data Entry

The training of data entry clerks on the data collection tool using the developed training manual was essential to ensure enumerators scrutinised the questionnaires before entering. This allowed the survey manager and the M&E assistant who was tasked to supervise the data entry clerks to correct many errors before the data was actually entered. The M&E assistant also documented the solutions to queries raised by data entry clerks. This ensured that all queries on a particular issue were handled a consistent and uniform manner. The use of CS-Pro was decided to provide a user-friendly entry template and that would not have overburdened the data entry clerks. Workload was also scheduled in such a way that the data entry clerks had apple time to complete one questionnaire and make necessary corrections by having a target of 14 questionnaires per day.

A double entry procedure was undertaken for 15% of the questionnaires allocated to each data entry clerk. This procedure was followed by rigorous checks in the two datasets of the 15% of the questionnaires entered which reviewed differences in less than 1% of the questionnaires with double entry.

1.3.1.5: Data Cleaning

The key approach undertaken in ensuring data quality during the data cleaning process was the adoption of automatic editing for common, easily recognisable errors and selective editing targeted at cases that had the most important impact on survey estimates. Another way through which data quality was ensured was through specialisation of the in-country and HQ M&E staff. Once the data was entered and preliminary cleaning had been undertaken by the in-country M&E staff, the M&E manager at HQ undertook an independent assessment of each data set leading to a continuous process of back and forth communication until the dataset was declared ready for data analysis.

During data entry, the focus was also on checking for all outlying and missing values and correcting them by rigorously checking the filled in questionnaires for data entry errors and then using call backs to the respondents to resolve more difficult cases after exhausting all alternatives. This was made possible by an adaptation undertaken by enumerators of writing telephone numbers on questionnaires answered by other members of the household who were not the head of the household.

1.3.1.6: Data Analysis

A key mechanism put in place to ensure data quality during data analysis was the carrying out of a parallel analysis procedure for key impact and outcome indicators using different analytical software packages at LOL HQ and LOL/Z offices. The M&E Manager used access and excel while the survey manager used SPSS to arrive at same results for key impact and outcome indicators and comparisons with baseline results. To ensure credibility in the obtained statistics for vital indicators, measures of variability (standard and standard errors) and levels of statistical significance were also computed whenever possible and presented as part of the outputs provided to the consultant.

1.3.2 Data Limitations

Despite all the efforts put in place through the above specified data quality assurance activities, there were some limitations in the data collected that were as follows;

- Poor record keeping especially among dairy households not directly targeted by the program affected the quality of the milk production and sales data to some extent because the survey had up to a one year recall period for the last month of July, 2007 from August, 2008 when the survey was conducted. Despite the extensive training in good interviewing skills for enumerators, some beneficiary farmers were reluctant to disclose the volumes of milk sold in informal markets as they aimed to create a good impression of themselves. Most of the milk records present in households targeted by the DAP was also biased towards MCCs sales after production with noticeable gaps in household and calf consumption.
- The comparison of baseline and final evaluation results was only possible for five districts outs of the 11 districts surveyed. This resulted from the differences in the districts surveyed at baseline and the districts where the program was finally implemented.
- There were also challenges faced while trying to achieve the comparison between the baseline and the final evaluation. Data on yields of dairy cattle was collected as average household yields for all cattle of the same breed. Recent practices used by LOL in the farmer performance survey break down these data to each milking animal in the household. The decision to for gore this option was taken to ensure the tool did not overburden the respondents yet correcting data to allow for comparison of results of the final evaluation with the baseline.

Annex 5: Final Quantitative Evaluation Survey Instrument

LAND O' LAKES/ZAMBIA

FINAL EVALUATION HOUSEHOLD SURVEY AUGUST 2008

Identification	
Questionnaire ID ☐☐☐☐☐	**Province:**……. ☐
District:……. ☐	**Milk Collection Center (MCC):** ☐☐☐ ……
Farmer Group…….. ***(For beneficiaries only)***	
Household Serial Number ☐☐☐☐☐	**Village/Locality:** ……
Date of Interview: Date:……/ Month:……/2008	
Response Status **1. Complete 2. Refusal 3. Non Contact 4. Incomplete (State Reason)……** ☐	

E-Code	**Name of Enumerator**	**Signature**	**Date Interview Completed**
S-Code	**Name of Supervisor**	**Signature**	**Date Checked**

Enumerator's Introduction Guide

My name is ***(Insert your names)*** and I have been hired by Land O'Lakes/Zambia to participate in the final evaluation of the Title II Development Assistance Programme (DAP), which Land O'Lakes has implemented since 2004. Your household was randomly selected among many in ***(insert name of village/community).*** The purpose of this interview is to understand the impact of this program. The information will also be used to improve future similar programs either in Zambia or in other countries. The information will be used to prepare reports, but will not include any specific names.

The interview is expected to last around 45 minutes. If you have inquiries about this survey, contact the Land O'Lakes/Zambia office at telephone 01 263929 or the Chairperson of your local Land O'Lakes Farmer Group or Milk Collection Centre.

This survey is voluntary and you can choose not to take part. This will not affect your ability to receive Land O'Lakes assistance now or in the future. However, we would really appreciate it if you would answer the questions honestly and openly.

- **SEEK COMPREHENSION:** Do you have any questions about any of the things I have just said?
- **SEEK VOLUNTARY AGREEMENT:** Are you willing to participate in this interview?

Enumerator: ***The household head and his or her spouse are the only permissible respondents in this survey. Ideally, the respondent should be the spouse but efforts should also be made to have the head of the household head except in female headed households. In exceptional circumstances, a responsible member of the household may be called to assist. Refer to the guidance in the questionnaire manual.***

SECTION 1.0: DEMOGRAPHIC AND BACKGROUND CHARACTERISTICS

From Q1.1 to Q1.28, circle one of the codes that correspond to the answer the respondent has given or write the answer in the spaces provided for uncoded responses unless instructions have been given to circle more than one response.

No.	Questions and filters	Coding categories		Skip to
1.1	Name of Respondent			
1.2	Sex of the respondent.	Male Female	1 2	
1.3	Age of Respondent at Last Birthday ***Ask for NRC card if they Don't Know***	Age In Completed Years Don't Know	[____][____] 888	
1.4	What is the highest level of school attended by the Respondent?	Primary Secondary College/university None of the Above	1 2 3 4	
1.5	Respondent's relationship to the household head?	Spouse Brother/Sister Brother/Sister in Law Child (Son/Daughter) Nephew Cousin Grandchild Self Other, specify_____	1 2 3 4 5 6 7 8 9	***If Self, Skip to 1.10***
1.6	Name of Household Head			
1.7	Sex of Household Head	Male Female	1 2	
1.8	Age of Household Head at Last Birthday ***Ask for NRC card if they Don't Know***	Age In Completed Years Don't Know	[____][____] 888	
1.9	What is the highest level of school attended by Household Head?	Primary Secondary College/university None of the Above	1 2 3 4	
1.10	Household Head's marital status. ***READ the list and ask them to select which one best fits their situation.***	Single Monogamously Married Polygamously Married Divorced Widowed Separated Other (Specify)_____	1 2 3 4 5 6 7 8	
1.11	How many people normally live in this household? ***Ensure the Interviewee includes himself/herself.***	[____][____]		
1.12	How many are?	***1.12.1*** Children Under 12 Years) — Male	[____][____]	
		1.12.1 Children Under 12 Years) — Female	[____][____]	
		1.12.2 Adults (12 Years and Above) — Male	[____][____]	
		1.12.2 Adults (12 Years and Above) — Female	[____][____]	
1.13	How many members of this household have been chronically ill in the last 3 months or have been living a sickly life?	[____][____]		***If (0), Skip to 1.15***
1.14	How many of these chronically ill members are?	***1.14.1*** Children Under 12 Years) — Male	[_____]	
		1.14.1 Children Under 12 Years) — Female	[_____]	
		1.14.2 Adults (12 Years and Above — Male	[_____]	
		1.14.2 Adults (12 Years and Above — Female	[_____]	

No.	Questions and filters	Coding categories	Skip to
1.15	How many members of this household are orphans?	[____][____]	***If (0) Skip to 1.17***
1.16	How many of these orphans are children under 12 years old?	[____][____]	
1.17	How many members of this household are in school? ***Enter Zero (0) if there are no members in a particular level of school***	Primary School [____][____] Secondary School [____][____] College/University [____][____]	
1.18	Has your household participated in Land O'Lakes (LOL) Development Assistance Program (DAP) activities?	Yes 1 No 0	***If No, Skip to 1.20***
1.19	How long has your household been participating in Land O'Lakes activities? ***Ask for when they started participating and enter number of years and months after calculating.***	Years [____] Months [____][____] Don't Know 888	
1.20	Has your household received a dairy cow directly from any organisation in the past four years?	Yes 1 No 0	***If No, Skip to 1.23***
1.21	How many dairy cows has your household received in the past four years?	[____][____]	
1.22	From which organization did your household receive a dairy cow? ***Do not read out the responses provided but circle one or more if household received cows from many sources as appropriate; Probe as necessary***	Land O'Lakes 1 Heifer International 2 World Vision 3 GART 4 MACO 5 Other, specify_____ 6	
1.23	Has your household received passed-on dairy cattle from Land O'Lakes in the past 4 years?	Yes 1 No 0 Not Applicable 777	
1.24	Has your Household received Technical Assistance on Dairy improvement or Management in the past four years?	Yes 1 No 0	***If No, Skip to 1.26***
1.25	Which organization provided technical assistance on dairy management to your household in the past four years? ***Do not read out the responses provided but circle one or more if household received Technical Assistance from many sources as appropriate; Probe as necessary.***	Land O'Lakes 1 Heifer International 2 World Vision 3 GART 4 MACO 5 Other, specify _____ 6	
1.26	Has any one in your household kept dairy records of milk production, costs, and income for at least one full year?	Yes 1 No 0 Not Applicable 777	
1.27	Has your household participated in the LOL supported Artificial Insemination (AI) program with cattle not received from LOL during the past four years?	Yes 1 No 0 Not Applicable 777	
1.28	Has your household sold milk and other dairy products through milk collection centres or bulking centres developed/ supported by LOL in the past four years?	Yes 1 No 0 Not Applicable 777	

SECTION 2.0: NUMBER OF EATING OCCASSIONS, STAPLE SOURCES, DIETARY DIVERSITY AND MONTHS OF INADEQUADE HOUSEHOLD FOOD PROVISIONING.

2.1. (Number of Daily Eating Occasions)- During the past 12 months, did your household consume any staple food ***(e.g. Maize, Cassava, Sorghum, Millet, Sweet potatoes, Rice)*** during the following meals?

Eating Occasion	**Month recall (1=Yes, 0=No)**											
	Jul 08	Jun 08	May 08	Apr 08	Mar 08	Feb 08	Jan 08	Dec 07	Nov 07	Oct 07	Sep 07	Aug 07
	2.1.1	**2.1.2**	**2.1.3**	**2.1.4**	**2.1.5**	**2.1.6**	**2.2.7**	**2.2.8**	**2.2.9**	**2.2.10**	**2.2.11**	**2.2.12**
a. A morning meal with **staple** foods												
b. A morning meal without staple foods												
c. A midday meal with **staple** foods												
d. A midday meal without staple foods												
e. An evening meal with **staple** foods												
f. An evening meal without staple foods												
2.2 Adequacy of Meals: ***"Adequate when family was able to meet its staple food needs"***												
Codes ***1. Adequate*** ***2. Moderately Adequate*** ***3. Inadequate***												

2.3 (Month of Adequate Household Food Provisioning – MAHFP) Now I would like to ask you about your household's FOOD supply during different months of the year. When responding to these questions, please think back over the last 12 months. **(*FOOD supply refers to staple food that may have been produced, purchased, gifted etc…)***

2.3.1. In the past 12 months, were there months in which you did not have enough FOOD to meet your family's needs?	**1= Yes** **0= No**	***If NO, Skip to 2.4***

ENUMERATOR: DO NOT READ THE LIST OF MONTHS BELOW.

WORKING BACKWARD FROM THE CURRENT MONTH, PLACE A ONE IN THE BOX IF THE RESPONDENT IDENTIFIES THAT MONTH AS ONE INWHICH THE HOUSEHOLD DID NOT HAVE ENOUGHFOOD TO MEET THEIR NEEDS.

2.3.2. If yes, which were the months (in the past 12 months) in which you did not have enough FOOD to meet your family's needs?

Jul 08	**Jun 08**	**May 08**	**Apr 08**	**Mar 08**	**Feb 08**	**Jan 08**	**Dec 07**	**Nov 07**	**Oct 07**	**Sep 07**	**Aug 07**

2.4 STAPLE FOODS

Now I would like to ask you about the staple foods consumed by this household. ***Start with one staple food and complete the answers for all the following questions before proceeding to the next staple food mentioned.***

From the list below, what staples has this household consumed in the past 12 months? ***(Enumerator read out the foods listed below and enter the codes of staple food chosen by respondent)***		What was the main source of this staple food in the past 12 months? ***See codes below.***	Did this household grow this crop in the past 12 months? **1=Yes,** **0=No** ***If No, Skip to 2.4.5***	Did you sell any of this staple crop after harvest to raise money for any household expenses in the past 12 months? **1=Yes,** **0=No** **777=Not Applicable**	During the past four years, does the main staple food from own production normally last up to the next harvest? ***1=Yes,*** ***0=No*** **777=Not Applicable** **If Yes, go to 2.4.6**	How do you usually fulfill the staple food gap? ***Use codes below except for own production***
2.4.1		**2.4.2**	**2.4.3**	**2.4.4**	**2.4.5**	**2.4.6**
Name of staple food	Code					
a.		a.	a.	a.	a.	a.
b.		b.	b.	b.	b.	b.
c.		c.	c.	c.	c.	c.
d.		d.	d.	d.	d.	d.
e.		e.	e.	e.	e.	e.

Staple Names and Codes for 2.4.1	**Codes for 2.4.2 and 2.4.6**		
1=Maize 2= Cassava 3=Sorghum 4=Millet 5=Sweet potatoes 6=Rice 7=Wheat 8=Other, specify _____	1=Own Production 2=Purchase with income 3=Food Aid 4= Gift	5=Battering commodities with food 6=Purchase with Loan/Credit 7= Selling Assets to buy Food	8=Purchase with remittances 9=Working for food 10 Other, specify _____ 777=Not Applicable

2.5 COPING STRATEGIES

2.5.1	Over the past four years, have you been affected by a shock or a sudden event?	**1= Yes**	**0= No** *go to **2.6***

2.5.2 If there is not enough food in your household, does your household……? **1=Yes** **0=No**		**2.5.3** ***If yes to Q2.5.2***, how often in past six months? 1 = Four to six times 2 = Two to three times 3 = Once a month 4 = Twice a month 5 = Once a week
a. Limit portion sizes at meal time?		
b. Reduce the number of meals eaten in a day?		
c. Borrow food or purchase food on credit?		
d. Rely on less preferred and less expensive food?		
e. Rely on help from friends or relatives?		
f. Harvest immature crops (e.g. green maize)		
g. Rely on working for food or casual labour for food		
h. Restrict consumption by adults in order for small children to eat?		
i. Consume seed stock held for the next season?		
j. Send children to eat with neighbors?		

k. Send household members to beg?		
l. Rely on gathering wild foods, and hunting?		
m. Skip entire days without eating?		
n. Rely on sales of wild or natural products? (e.g. Firewood, fish, e.t.c)		
o. Other, Specify_____		

2.6. **(Household Dietary Diversity Score - HDDS):** Now I would like to ask you about the types of foods that your household consumed yesterday? ***NOTE: Firstly establish that these days were normal or usual days and not Special days i.e. holidays, public or family celebration – Refer to the manual for more instructions.***

2.6.1. FOOD CODE	**FOOD TYPES**	**2.6.2.** Did your household **consume** these food types Yesterday **1=Yes, 0=No**
	Did your household consume any of the following foods ***(TIME)*** during the day or at night? ***READ THE LIST OF FOODS ROW AFTER ROW. PLACE AN APPROPRIATE RESPONSE IN THE BOX***	
A	Nshima or any other foods made from millet, sorghum or maize?	
B	Any rice, bread, other foods made from wheat?	
C	Any pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside?	
D	Any Irish potatoes, cassava or any other foods made from roots or tubers?	
E	Any dark, green, leafy vegetables such as cassava leaves, bean leaves, rape, spinach, sweet potato leaves, or Pumpkin leaves?	
F	Any other vegetables such as cabbage?	
G	Any fruits?	
H	Any beef, pork, lamb, goat, rabbit wild game, chicken, duck, or other birds??	
I	Any eggs?	
J	Any fresh or dried fish including Kapenta?	
K	Any beans, peas, bambara nuts, or lentils?	
L	Any sour milk yogurt, fresh milk or other milk products?	
M	Any oil, fat, or butter?	
N	Any sugar or honey?	
O	Any beverages such as coffee, tea?	

No.	Questions and filters	Coding categories			Skip to
2.7	From the food types in the previous table, are you currently consuming any foods that you could not have before you participated in the LOL DAP? ***(LOL beneficiaries only)***	Yes 1 No 0 Not Applicable 777			***If No or N/A, Skip to Section 3.0.***
2.8	What are the food types that you are currently consuming that you could not have before you participated in the LOL DAP? ***(Use the Food Codes from column 2.6.1)***	**2.8.1**	**2.8.2**	**2.8.3**	
		☐	☐	☐	

SECTION 3.0: LABOR ACTIVITIES

3.1 Now I would like to find out about labour usage for your agricultural activities ***during the last 12 months***: (***Ask one labour activity at a time. Note that if the respondent says YES in 3.1.2, continue with the rest of the questions, otherwise go to the next labour activity. If no labour used for all activities, go to 3.2***

3.1.1 Labour Activity	**3.1.2** Did the household use any labour for***….(3.1.1)***? **1=Yes 0=No**	**3.1.3** Household Labour/ Members		**3.1.4.** Hired Labour for Cash Payment						**3.1.5.** Hired labour for in Kind Payment					
				3.1.4.1 Permanent Workers			**3.1.4.2** Casual Workers			**3.1.5.1** Permanent Workers			**3.1.5.2** Casual Workers		
		Number of		Number of		**3.1.4.1.3** Amount Paid (Zmk)	Number of		**3.1.4.2.3** Amount Paid (Zmk)	Number of		**3.1.5.1.3** Value of in kind payment (Zmk)	Number of		**3.1.5.2.3** Value of in kind payment (Zmk)
		3.1.3.1 Males	**3.1.3.2** Females	**3.1.4.1.1** Males	**3.1.4.1.2** Females		**3.1.4.2.1** Males	**3.1.4.2.2** Females		**3.1.5.1.1** Males	**3.1.5.1.2** Females		**3.1.5.2.1** Males	**3.1.5.2.2** Females	
a=Crop Production															
b=Livestock Rearing															
c=Dairy Production															
d=Fish Farming															
e=Gardening															
f=Marketing of Agricultural Produce															
g=Selling Labour to other Farmers															
h=Other, specify _____															

3.2 Now I would like to find out about labour for your dairy activities during the past 12 months: (***Note that question in the table below should only be asked to households with cattle. Ask one labour activity at a time. If the respondent says YES in 3.2.2, continue with the rest of the questions, otherwise go to the next labour activity. If no labour used for all dairy activities, go to Section 4)***

3.2.1 Labour Activity	**3.2.2** Did the household use any labour for**….** *(3.2.1)*? **1=Yes 0=No**	**3.2.3** Household Labour/ Members		**3.2.4.** Hired Labour for Cash Payment						**3.2.5.** Hired labour for in Kind Payment					
				3.2.4.1 Permanent Workers			**3.2.4.2** Casual Workers			**3.2.5.1** Permanent Workers			**3.2.5.2** Casual Workers		
		Number of		Number of		**3.2.4.1.3** Amount Paid (Zmk)	Number of		**3.2.4.2.3** Amount Paid (Zmk)	Number of		**3.2.5.1.3** Value of in kind payment (Zmk)	Number of		**3.2.5.2.3** Value of in kind payment (Zmk)
		3.2 3.1 Males	**3.2.3.2** Females	**3.2.4 1.1** Males	**3.2.4 1.2** Females		**3.2.4.2 1** Males	**3.2.4.2.2** Females		**3.2.5.1.1** Males	**3.2.5.1.2** Females		**3.2 5.2.1** Males	**3.2.5.2.2** Females	
a=Construction of Parlour/kraal															
b=Milking															
c=Forage production															
d=Feed Preparation															
e=Feed Conservation															
f=Calf rearing															
g=Disease prevention and Medical provision															
h=Transportation / marketing															
i. Other, specify _____															

SECTION 4.0 AGRICULTURAL PRODUCTION AND HOUSEHOLD INCOME

Section 4.1: Agricultural Production (Crops, Pastures and Gardening)

No.	Questions and filters	Coding categories	Skip to
4.1.1	How much total land (in Hectares) did your household own and/or rent in the past 12 months? ***Let respondent answer using units they are most familiar with then convert to Ha using conversion tables provided.***	Total land owned [_____.____] ha Borrowed/rented land [_____.____] ha Don't Know 888	
4.1.2	How much land did you cultivate in the last 12 months? ***Let respondent answer using unit they are most familiar with then convert to Ha using conversion tables provided.***	Total land cultivated last season [____.___] Don't Know 888	***If all land was cultivated, Skip to Q4.1.4***
4.1.3	What are the reasons for not cultivating all your land in the past 12 months? ***Do not read the list. Circle all that is mentioned by the respondent***	Lack of seed 1 Lack of fertilizer 2 Inadequate labour 3 Poor rainfall 4 Sickness 5 Lack of animal draught power 6 Some fields are no longer productive 7 Furrowing to rejuvenate the land 8 Land left for grazing 9 Virgin land 10 Other_____ 11	
4.1.4	Compared to before you joined the LOL DAP, has your household been able to produce more food in recent production seasons? ***(LOL beneficiaries only)***	Yes 1 No 0 Not Applicable 777	***If No or N/A, Skip to Q4.1.6***
4.1.5	If the answer to Q4.1.4 is Yes, what is the main reason why your household has been able to produce more food in recent seasons than before you joined LOL DAP?	1…… .	
4.1.6	Has your household been involved in dry season vegetable gardening in the past 12 months?	Yes 1 No 0	***If No, to both Q4.1.6 and Q4.1.7, Skip to Q4.1.9***
4.1.7	Has your household been involved in rain (wet) season vegetable gardening in the past 12 months?	Yes 1 No 0	
4.1.8	If yes to question Q4.1.6 or Q4.1.7, what has been the main method of soil improvement in your vegetable garden? ***Compost manure is aerobically decomposed remnants of organic matter 'Green Manure'.***	None 0 Fertilizer Application 1 Cattle Manure Application 2 Chicken Manure Application 3 Using Compost Manure 4 Other Specify_____ 6	
4.1.9	Has your household been involved in the production of forage and pasture in the past 12 months? ***(Only For Households with Cattle)***	Yes 1 No 0 Not Applicable 777	***If No or N/A, Skip to Section 4.2***
4.1.10	What fodder/pasture crops did your household grow in the past 12 months? ***Do not read the list. Circle all that is mentioned by the respondent.***	Rhodes Grass 1 Sun Hemp 2 Velvet Beans 3 Cow Kandy 4 Pigeon Peas 5 Other Specify_____ 6	

No.	Questions and filters	Coding categories	Skip to
4.1.11	How did your household acquire the forage and/or pasture seeds planted in the past 12 months? ***Do not read the list. Circle all that is mentioned by the respondent.***	Cash Purchase 1 Credit (Cash or Actual Seed) 2 Grant from an Organisation 3 Own Seed from previous crop 4 Given by research branch or extension staff 5 Given by Relative or Neighbour 6 Other, specify 7	***If 2 and/or 3, go to 4.1.12. Otherwise Skip to 4.1.13***
4.1.12	If the forage/pasture seed was received on credit or through a grant from an organization, which organisation provided the seed? ***Do not read the list. Circle all that is mentioned by the respondent.***	Land O'Lakes 1 Heifer International 2 World Vision 3 GART 4 MACO 5 Other, specify_____ 6	
4.1.13	Has your household also used some of these pasture/folder crops for soil improvement?	Yes 1 No 0	***If No, Skip to Section 4.2***
4.1.14	Which forage/pasture crops has your household used for soil improvement in the past 12 months?	Rhodes Grass 1 Sun Hemp 2 Velvet Beans 3 Cow Kandy 4 Pigeon Peas 5 Other, specify_____ 6	

SECTION 4.2 LIVESTOCK PRODUCTION

Now I would like to talk to you about livestock production activities in your household.

	Questions and filters	Coding categories	Skip to
4.2.1	Does any member of your household own or raise any kind of livestock/poultry?	Yes 1 No 0	***If No, Skip to Section 4.5***
4.2.2	What type of livestock/poultry is owned or raised by any member of this household? ***Do not read the list. Circle all that is mentioned by the respondent) Probe as necessary. Other Birds include Guinea fowls, Ducks, Pigeons e.t.c.***	Traditional Cattle 1 Beef Cattle 2 Dairy Cattle 3 Goats 4 Sheep 5 Pigs 6 Rabbits 7 Chickens 8 Other Birds 9 Bee Keeping 10 Other, specify_____ 11	***If Cattle is raised, Skip to Q.4.2.4***
4.2.3	If the household does not raise any cattle, what is the main reason for not owning or raising cattle? ***Do not read the list. Circle only one main option.***	No access to cattle 1 Too expensive to maintain 2 Herd wiped out by disease 3 Not interested 4 Not a common cultural practice 5 Don't know how to raise cattle 6 Taken by the owners 7 Other, specify_____ 8	
4.2.4	How many different cattle does the household own/raise?	**Breed** / **Cows /Heifers** / **Bulls/oxen** / **Calves** Pure Crosses Traditional	
4.2.5	What is your current cattle management system?	Free range 1 Zero Grazing 2 A combination of both the above 3 Not Applicable 777	

4.2.6	Is this different from LOL distributed animals? ***(LOL beneficiaries only)***	Yes 1 No 0 Not Applicable 777	***If No or N/A Skip to 4.2.8***
4.2.7	What is the current cattle management system for cattle or pass-on animals received from LOL DAP?	Free range 1 Zero Grazing 2 A combination of both the above 3 Not Applicable 777	
4.2.8	Has your household used Artificial Insemination on cattle received from the LOL DAP?	Yes 1 No 0 Not Applicable 777	***If NO or N/A skip to 4.2.11***
4.2.9	If your household used Artificial Insemination on cattle received from the LOL DAP, what was the result? ***Do not read the list. Circle all that is mentioned by the respondent.***	Still awaiting Pregnancy Diagnosis **(PD)** 1 The Cow is in-calf 2 More improved calf was born 3 Most of the calves born are bulls 4 The cow conceived after many AIs 5 The cow (s) did not conceive 6 Other, specify 8	
4.2.10	If your household used Artificial Insemination on cattle received from the LOL DAP, what is the number of surviving calves born from these A.I.s?	Bull Calves ☐☐ Heifer Calves ☐☐	
4.2.11	Has your household used Artificial Insemination on cattle not received from the LOL DAP?	Yes 1 No 0 Not Applicable 777	***If NO, or N/A, skip to 4.2.14***
4.2.12	If your household used Artificial Insemination on cattle ***not received*** from the LOL DAP, What was the result? ***Do not read the list. Circle all that is mentioned by the respondent.***	More improved calf was born 1 Most of the calves born are bulls 2 The cow (s) did not conceive 3 The cow conceived after many AIs 4 The cows was sick 5 Other, specify_____ 6	
4.2.13	If your household used Artificial Insemination on cattle not received from the LOL DAP, what is the number of calves born from these AIs in the past four years?	Bull Calves ☐☐ Heifer Calves ☐☐	
4.2.14	How far is the closest source of drinking water for cattle during the rain season?	Less than 500m 1 About 1 Km 2 More than 1 Km 3 Not Applicable 777	
4.2.15	How far is the closest source of drinking water for cattle during the dry season?	Less than 500m 1 About 1 Km 2 More than 1 Km 3 Not Applicable 777	

Now I would like to talk to you in detail about the different types of livestock raised by your household as indicated in **Q4.2.2** above. Please tell me more about the different types of livestock that are owned or raised by members of this household.

4.2.16.1 Type of livestock raised or owned. (***Use the response from Q4.2.2 above as the list of livestock owned/ raised. Ask about one type of animal at a time.)***	**4.2.16.2** Number of livestock raised.	**4.2.16.3** Of the number being raised, how many ***belong*** to the following members of the household?			**4.2.16.4** How many have died in the past 12 months?	**4.2.16.5** How many have been sold in the past 12 months? ***If '0', Skip 4.2.16.1***	**4.2.16.6** What were the main reasons for selling the livestock? **(Provide at most three problems in order of priority,** ***see codes below)***		
		4.2.16.3.1 Male	**4.2.16.3.2** Female	**4.2.16.3.3** Jointly owned					
a.									
b.									
c.									
d.									
e.									
f.									
g.									
h.									

Codes for Q4.2.16.6

1=To meet school fees
2=For Social event (e.g. wedding, funeral)
3=For loan repayment;
4=To meet household food shortage
5=For medical bills
6=Buy other livestock
7=Build better houses
8=Other (Specify)_____

4.2.17	Who makes the decisions on small livestock (goats, sheep, chickens, etc)?	Head of Household Spouse Both Other, specify_____ Not Applicable	1 2 3 4 777
4.2.18	How is this different from before you joined LOL DAP? ***(LOL beneficiaries only)***	Head of household is more involved Spouse is more involved Both are more involved No difference Not Applicable	1 2 3 4 777
4.2.19	Who makes the decisions on large stock (cows, bulls, etc)?	Head of Household Spouse Both Other, specify_____ Not Applicable	1 2 3 4 777
4.2.20	How is this different from before you joined LOL DAP? ***(LOL beneficiaries only)***	Head of household is more involved Spouse is more involved Both are more involved No difference Not Applicable	1 2 3 4 777

SECTION 4.3: DAIRY PRODUCTION

	Questions and filters	**Coding categories**	**Skip to No.**
4.3.1	Of the cattle on this farm, how many are dairy cattle***?***	Number of Cattle [____]	**If zero (0), Skip to Section 4.4**

4.3.3. Now I would like you to tell me more about the dairy cattle you own/raise and this household's dairy production activities. ***Ask questions about one breed of dairy cows at a time.***

4.3.3.1 Dairy animal Type	**4.3.3.2** Number of dairy cows/heifers currently being raised	**4.3.3.3** Number of lactating cows in the dry seasons of the past 12 months. ***If '0', Skip to 4.3.3.6***	**4.3.3.4** Amount of Milk produced during the ***dry season*** 1=Same as all year round 2=Lower than usual 3=Higher than usual	**4.3.3.5** Average litres per cow per day during the dry season	**4.3.3.6** Number of lactating cows in the rain season of the past 12 months. ***If '0', Skip to 4.3.3.9***	**4.3.3.7** Amount of milk produced during in the ***rain season*** 1=Same as all year round 2=Lower than usual 3=Higher than usual	**4.3.3.8** Average litres per cow per day during rain season	**4.3.3.9** Biggest problem faced in raising these animals **(*see codes below and place in order of priority*)**
a. Traditional cattle								
b. Cross dairy cattle								
c. Cross beef cattle								
d. Pure dairy cattle								
e. Pure beef cattle								

Codes for Q4.3.3.9

0=None
1=Animal Diseases
2=Poor nutrition and Pasture Management
3=Limited Grazing Land
4=Water shortages
5=Poor Milk production techniques
6=Lack of market for milk
7=Low milk price
8= Poor infrastructure (Roads, water supply, electricity)
9=Lack of supporting services (Veterinarian, A.I)
10=Lack of finance (Operating Capital)
11= High input costs (feed, medicines, equipment, other)
12=High labour costs
13=Lack or shortage of land for feed/folder production
14= Lack of information on markets
99=Other (specify)_____

4.3.4. FOR LOL BENEFICARIES ONLY: Now I would like you to tell me more about the animals your household received from Land O'Lakes in the past four years?

4.3.4.1 Heifer name/ Tag number		**4.3.4.2** Date received		**4.3.4.3** Recipient in household 1=Male 2=Female	**4.3.4.4** Animal received from? 1=LOL 2=Pass-on farmer	**4.3.4.5.** Pregnancy status at receipt 1=in-calf 2=not pregnant 3=Already with calf	**4.3.4.6** Is the cow alive now? **1=Yes** **0=No** ***If No, skip to Q4.3.3.8***	**4.3.4.7.** Are you currently milking this cow? **1=Yes** **0=No** ***If No, Why not?***	**4.3.4.8** Number of surviving calves born from this cow.	**4.3.4.9** Number of calves born from this cow that have been passed on.
4.3.4.1.1 **NAME**	**4.3.4.1.2** **Cow Id**	**4.3.3.2.1** **Month**	**4.3.3.2.3** **Year**							

For month code, use 1=January, 2=February, etc…12=December

4.3.5 What have been the 3 main production costs you have incurred in dairy production ***in the past 12 months? Ask for these production costs in order of priority starting with the most expensive.***		
4.3.5.1 Type of Production Cost ***(Use Codes Below)***	**4.3.5.2** How much money did you spend on this production cost? **(Zmk)**	**4.3.5.3** In comparison to the previous year, were these expenses: **1**= Higher than expected **2**= As expected **3**=Lower than expected
a.		
b.		
c.		
1= Purchase of Concentrate Feed/Molasses 2=Medicines and Veterinary Drugs 3=Labour for Spraying/Dipping 4= Folder/pasture production	5= Feed Conservation 6=Construction of parlour/kraal 7= Milking 8=Breeding Costs (includes AI)	9=Procurement of dairy equipment 10=Transportation of Milk 11=Co-operative Fees 12=Other, Specify_____

SECTION 4.4: MILK SALES

4.4. Now I would like to talk to you about milk sales in your household.

No.	Questions and filters	Coding categories		Skip to
4.4.1	Did your household sell any milk from own production in the past 12 months?	Yes No	1 0	***If No, Skip to Q4.4.3***
4.4.2	Where did your household sell its milk in the past 12 months? ***Do not read the list. Circle all that is mentioned by the respondent.***	Milk Collection Centre (MCC) Within the community/Neighbours Market within the community Market outside the community Traders Other, specify_____	1 2 3 4 5 6	

4.4.3 How much milk has your household produced and sold during the past 12 months? ***Ask questions 4.4.3.2 to 4.4.3.5 one month at a time. Note that if the respondent says there were <u>no cows</u> milked in that month (0 for 4.4.3.2), go to the next month. If no animals were milked for all months, go to Section 4.5.***

4.4.3.1. ***Start with July, 2008***	**4.4.3.2** Number of cows milked	**4.4.3.3** Total Litres produced	**4.4.3.4.** Sales to the MCC		**4.4.3.5** Sales within the community	
			4.4.3.4.1 Amount of Milk **(Litres)**	**4.4.3.4.2** Price per litre (Zmk)	**4.4.3.5.1** Amount of Milk **(Litres)**	**4.4.3.5.2** Value (Zmk)
a) July 2008						
b) June 2008						
c) May 2008						
d) April 2008						
e) March 2008						
f) February 2008						
g) January 2008						
h) December 2007						
i) November 2007						
j) October 2007						
k) September 2007						
l) August 2007						

4.4.4	Who decided how much milk to sell?	Head of Household Spouse Both Other, specify_____	1 2 3 4	
4.4.5	How is this different from before you joined LOL DAP? ***(LOL beneficiaries only)***	Head of household is more involved Spouse is more involved Both are more involved No difference Not Applicable	1 2 3 4 777	

SECTION 4.5: MILK CONSUMPTION

4.5 Now I would like to talk to you about milk consumption in your household. ***For questions in this section, circle the code that corresponds to the respondent's answer.***

No.	Questions and filters	Coding categories		Skip to
4.5.1	How often have adult members of this household consumed milk during the past week?	Never Every day Every two days Twice a week Once a week	0 1 2 3 4	***If Never to 4.5.1 and 4.5.2, Skip to 4.5.4.1***
4.5.2	How often have children of this household consumed milk during the past week?	Never Every day Every two days Twice a week Once a week	0 1 2 3 4	
4.5.3	What is the main source of this milk?	Own Production Cash Purchases Barter Gift (Given by Relatives/Neighbours) Other, specify	1 2 3 4 5	***If No, Own production, Skip to Section 4.6***

4.5.4.1 Apart from the milk sold, how did the Household utilize the rest of the milk during the past week? **Ask "For....."**	**4.5.4.2** **1=Yes** **0=No** (go to next item; if no all, go to **4.6**)	**4.5.4.3** If yes, what is the average litres utilized per day?
a) Household consumption		
b) Calf Consumption		
c) Gave to Relatives/Neighbours		
d) Other, specify		

SECTION 4.6: HOUSEHOLD INCOME STATUS

Now I would like to talk to you about sources of income for you household and how this income is utilized.

No.	Questions and filters	Coding categories		Skip to
4.6.1	What have been the sources of income for this household in the past 12 months? ***Do not read the list. Circle all that is mentioned by the respondent***	Sale of Livestock/livestock products Sale of milk/other dairy products Sale of rainfed crops Gardening/Irrigated Agriculture Formal employment Remittances/Gifts Trading Piecework Charcoal Burning Beer Brewing Fishing Black smith None Other, specify	1 2 3 4 5 6 7 8 9 10 11 12 13 14	***If None, Skip to Section 5***

No.	Questions and filters	Coding categories	Skip to
4.6.2	What has been the most important source of income for this household in the past 12 months? ***Use codes provided in Q4.6.1 above.***	Most Important Source of Income [_____]	
4.6.3	How many household members have been engaged in any of the household's income generating activities in **Q4.6.1** above in the past 12 months?	Number of Household Members [___][___]	

4.6.4. Now I would like to talk to you in detail about other income generating activities other than dairy mentioned in Q4.6.1. ***Skip to Q4.6.5 if only source of income for the household in Q4.6.1 is dairy. Remember that the reference period is the last 12 months. Use the codes for Income generating activities specified in Q 4.6.1 lease the box blank for other sources of income not represented by available codes.***

4.6.4.1 Income generating activity		**4.6.4.2** Number of household members involved			**4.6.4.3** Number of months this activity has been conducted	**4.6.4.4**.Total Amount Earned from this Activity
4.6.4.1.1 Name	**4.6.4.1.2** Code	**4.6.4.2.1** Males	**4.6.4.2.2** Females	**4.6.4.2.3** Total		
	a.					
	b.					
	c.					
	d.					
	e.					
	f.					
	g.					

Now I would like to talk to you about how your household has utilized its income in the past 12 months.

No.	Questions and filters	Coding categories	Skip to
4.6.5	What are the three (3) most important uses of income earned from sources marked in Q4.6.1 above? ***Do not read the list. Circle all that is mentioned by the respondent.***	Purchase of Staple Food 1 Purchase of Non-Staple Food 2 Purchase of Household Goods (e.g. Radios, T.V.s, e.t.c) 3 Education/School Fees 4 Payment of Dowry (Marriage) 5 Savings/Banking 6 Purchase of Clothing 7 Travel 8 Purchase of Agricultural Inputs 9 Purchase of Veterinary Services/Drugs 10 Labour for livestock Rearing 11 Labour for Crop Production 12 Purchase Farm Implements 13 Groceries (e.g. Soap, tooth paste, sugar, cooking oil) 14 None 15 Other Specify_____ 16	

4.6.6	What are the three (3) most important uses of your dairy income? ***Use codes in question Q4.6.5 above*** ***(Only for Households with Dairy Sales)***	First Most Important [____] Second Most Important [____] Third Most Important [____]	
4.6.7	Who decides how to use the proceeds from milk sales?	Head of Household 1 Spouse 2 Both 3 Other, specify_____ 4	
4.6.8	How is this different from before you joined LOL DAP? ***(LOL beneficiaries only)***	Head of household is more involved 1 Spouse is more involved 2 Both are more involved 3 No difference 4 Not Applicable 777	

SECTION 5: COOPERATIVE DEVELOPMENT SERVICES

In this section, I would like to find out about your household's participation in cooperative activities.

No.	Questions and filters	Coding categories	Skip to
5.1	Is anyone in your household a member of a Farmer Association or Co-operative?	Yes 1 No 0	***If NO, , Skip to 5.7***
5.2	What type of co-operative/association is this? ***Do not read the list. Circle all that is mentioned by the respondent. Probe for more specific answers***	Multi-purpose Co-operative/Association 1 Agricultural Co-operative/Association 2 Dairy Co-operative/Association 3 Farmer group 4 Other Specify_____ 6	
5.3	Is your cooperative/farmer association supported by Land OLakes DAP?	Yes 1 No 0	
5.4	How often do you participate in your co-operative's/association's activities/meetings?	Every Week 1 Twice a Month 2 Once a Month 3 Once in a while 4 Other Specify 5	
5.5	Give the main reason why any member of your household joined the co-operative/association? ***Do not read the list. Circle all that is mentioned by the respondent.***	Access to Agricultural Inputs 1 Access to Subsidized inputs 2 Access to loans 3 Access to the Milk Collection Centre (MCC) 4 Access to markets for agricultural products 5 Access to trainings 6 Learning from fellow farmers 7 Access to A.I. Services 8 Access to disease vaccines and drugs 9 Organizing, mobilizing and leadership skills 10 Other Specify_____ 11	
5.6	What is the main benefit your household has experienced from its membership to the co-operative/association? ***Enter the benefit code using the codes in 5.6 above in the space provided***	[_____] Other, Specify_____	
5.7	Is your household a member of the LOL supported Milk Collection Centre or Bulking Centre in your area? ***A bulking centre is place where farmers deliver milk to before it can be taken to an MCC, it can be a building or roadside collection point.***	Yes 1 No 0 There is no MCC or Milk Bulking Centre 777	

5.8	What benefits has your household experienced from selling milk through the MCC or Bulking Centre? ***Do not read the list. Circle all that is mentioned by the respondent.***	Our milk always passes the freshness tests 1 Access to animal feed 2 Access to animal vaccines and drugs 3 Access to AI Services 4 Access to Technical Assistance 5 Able to save money raised from milk sales 6 Learning from fellow farmers 7 Access to loans 8 Easier to sell milk than selling at the market 8 Other, specify_____ 9 Not Applicable 777	

SECTION 6.0: TECHNICAL ASSISTANCE

6.1. Now I would like to ask you about the technical assistance that you or any other member of your household has received from Land O'Lakes or other organizations during the last 12 months. ***(Ask about one type of Technical Assistance at a time)***

Service or Technical Assistance provided by LOL ***Ask***: Did you receive ….	**6.1.1.** During the last 12 months, did anyone in your household receive technical assistance from LOL on . . . ? **1=Yes** **0=No**	**6.1.2.** Has anyone in your household used/ applied this technical assistance? **1=Yes** **0=No**	**6.1.3.** Do you and your family members think the technical assistance is useful? **1=Yes** **0=No**	**6.1.4.** Other **main** source of this technical assistance **1=MACO extension officers** **2=NGO (specify)** **3=Private (e.g. vets)** **4= World Wide Sires (WWS)** **5=GART** **6=Heifer International** **9=Other (specify)**
a) Record Keeping				
b) Animal Nutrition				
c) Animal Health				
e) Calf Rearing				
f) Milk Handling and Hygiene				
g) Dairying as a business				
h) Folder/pasture establishment				
i) Feed Conservation				
j) Supplementary Feeding				
k) Artificial Insemination				

6.2	Which Technical Assistance have been the most useful and practical in improving your income? ***Rank three most useful TA. Use codes in 6.1, first column***.	1. [____] 2. [____] 3. [____]	

6.3	How have the Technical Assistance been useful in improving your income? ***Do not read the list. Circle all that is mentioned by the respondent.***	Increased Milk Yield 1 Now able to raise a dairy cow 2 Reduced costs of production because of ability to do many tasks 3 Reduced feed costs due to feed conservation 4 Now able to make/mix own concentrate feed 5 Now takes farming as a business 6 Now able to conserve feed 7 Improved breed of calves 8 Improved crop yields due to use of cow dung 9 Increased crop yields due to pasture production 10 More income resulting from increased Milk Sales 11 Improved animal health due to good feeding 12 Improved animal health due to disease prevention 13 Longer lactation periods for cows 14 Improved quality of milk 15 Reduced cow and calf mortality 16 Other, Specify	

SECTION 7.0: (*FOR LOL DIRECT BENEFICARIES ONLY)*

No.	Questions and filters	Coding categories	Skip to
7.1	Mention three (3) ways in which the LOL DAP has affected the living standards of your household? The response can be either positive or negative. ***Do not read the list. Circle three that are mentioned by the respondent.***	Our household has regular income now 1 Our household income has increased 2 Able to buy groceries 3 Now able to buy non-staple foods we were not able to 4 Children are able to go to school 5 Able to buy clothes 6 Built/building a better house 7 We are able to have food in hunger periods 8 Childrens' health has improved due to milk consumption 9 Able to meet health expenses 10 Able to buy household goods (Non productive assets) 11 Able to buy farming implements 12 Able to buy farming inputs 13 Able to produce more vegetables 14 We have more improved dairy animals 15 We have a dairy cow/cows 16 Our household consumes more milk now 17 Used milk income to buy other livestock 18 Paying for AI whether it is successful or not 19 Spend most our time looking for feed for animals 20 Lost a lot of money because our cow has never given us milk 21 Other, specify 22	
7.2	Apart from the direct beneficiaries of the LOL DAP, in what ways do you think community households have benefited from the LOL DAP? ***Do not read the list. Circle three that are mentioned by the respondent. CLW stands for Community Livestock Worker***	Milk is given by beneficiary households 1 Lower prices of milk due to increased supply 2 Availability of piecework in dairy activities 3 Milk is given to Households with sick people 4 Access to trained AI technicians 5 Access to trained ***CLWs*** for consultation 6 Availability of supplementary feed 7 Access to disease vaccines and drugs 8 Access to a hammer mill given by the program 9 Market for maize bran has been developed 10 Learning from direct beneficiaries 11 Other Specify 12	
7.3	Are there certain things that you feel should have been done differently?	Yes 1 No 0	**If NO, end interview.**
7.4	If yes to Q7.3 above, give at most three ways in which the implementation of the LOL DAP could have been changed to realize the maximum possible impact on your community? ***Enumerator: (Do not read the list. Circle all that is mentioned by the respondent.)***	MCC must be near farmers 1 AI system needs improvement 2 AI materials to be given to each group 3 Carrying out pregnancy diagnosis after AI 4 Veterinary staff should be near 5 Giving more improved/pure dairy cattle 6 Giving better milk producing breeds 7 Giving more cows (at least two) 8 Giving harmer mills to farmers 9 Giving more pasture seeds on credit 10 Giving farmers bicycles on loan 11 Giving households new animals if initial ones can't get pregnant 12 Allowing us to pass on even bull calves 13 Passing on the second calf 14 Allowing us to pass on the old cows received 15 Giving farmers clear information on pass-ons 16 Allowing us to use bulls in place of AI 17 Giving farmers loans to construct good kraals/parlours 18 Land O'Lakes should focus on direct beneficiaries, not MCCs 19 Other, specify_____ 20	

END OF INTERVIEW

THANK THE RESPONDENT FOR THEIR PARTICIPATION.

Annex 6: Qualitative Survey Leading Questions

Questions for LOL Field Team

1. Explain Targeting for project beneficiaries (and issue of "vulnerable households") What % of households are considered 'vulnerable'
2. Who owns MCCs? How is it organized? A cooperative? Who runs it?
3. 2441 farmers 'trained" – an aggregate cumulative figure (no double counting)?
4. 10 MCC, reduced to 6 MCCs in 2008. Why?
5. Why is price of a liter of milk at MCC lower than 'open market'? Too many 'social benefits?
6. How do partners work together? (LOL, Heifer Int., GART, HIZ)
7. 797 with improved dairy cows in 2008. Is this correct?
8. Total cost of program to data. See financial data.
9. What is inflation rate?
10. cost/benefits for project? Cost/beneficiary – Have they calculated this?
11. How effective do they feel the project has been in reaching its goals/objectives? How could it have been better; changes for MYAPS?
12. What kind of spread effects have they observed?
13. Experience with IPTT; was it used as a management tool? How? What data do they consider as the most useful of impact made. Any specific indicators they wish they had included now (that they didn't think of at beginning). For future?
14. What do they feel are the most important lessons learned over the past few years?
15. Are they effectively reaching the 'most vulnerable' households in the targeted areas?
16. How many in-calf heifers have actually been given out to date (at least 1000?). How much milk are these heifers currently producing (can you disaggregate this)?
17. How many farmers are actually contributing milk to MCC (all groups)?
18. How many milk processor groups are currently purchasing from MCCs (3 in MTR). Do you have records about their increasing volume of milk purchased, value of sales?
19. Any idea of what the size of Zimbabwe's milk deficit is? (volume of milk currently imported + volume of local sales of milk)?
20. Where are the bottlenecks in value chain for milk – from producer to consumer?

Questions for Small holder Dairy Households (September 2008)/Production Supply Side (meet with women separately)

1. How long have you been engaged with LOL and what specific assistance have you found particularly helpful and why. Most important assistance received?
2. Have you received training from LOL technicians? What kind? What was the most useful? What was not very helpful? What other kind of training would you like to receive?
3. Hunger Months between December and March last year – where you better off because of LOL assistance. Explain. How do you see the coming year? Would you say that you are not food self-sufficient through the entire 12 months of the year?
4. Household gardening during the hunger months? Access to water? What is most important for vulnerable households?
5. Record keeping of dairy expenses and income? Please show me what you are doing, and if this has been helpful.
6. Micro-credit? How do you save money earned from your farm activities and dairy production?

7. How much of your milk production do you sell to others, besides the MCC? How much more do you earn from such sales ($/liters), than from MCC? How much is consumed at home? By whom?
8. Name two ways of improving production of their milk (eg. Supplemental feeding, pasture establishment, animal disease prevention, etc).
9. What are their goals for future production (# of animals, etc.). Is there space for this?
10. Sustainability of household level efforts?
11. What is the current condition of heifers received from LOL (disease, feed).

Questions for Demand Side (Milk Collection Centers, Dairy Processors (small and medium, and large?), Retail and Wholesale Vendors, etc.)

1. How has the demand for milk been for your company over the past few years? Any specific data you can give me on this ($ net, total liters purchased/sold, etc.)?
2. How do you see the future market for your products? Why?
3. What kind of assistance, if any, have you received from LOL?
4. Sustainability of efforts in Zambia?
5. What 'other' services are provided to farmers providing milk? (Are they all members, like a cooperative?)(credit/revolving funds, inputs, artificial insemination, nutrition clubs, HIV/AIDS training), etc.)? How do these 'distract' from principal marketing mission.
6. Is MCC managed as a business? Good financial records? Are members informed about cost, benefits, etc.? Who is perceived as the 'real owner' of the MCCs? How are books kept and audited?

Questions for USAID/FFP

1. General comments about LOL performance under this contract?
2. Has required reporting (quarterly reports, annual reports, etc.) met expectations? Were they received on time? (Note comment that QR did not seem to be expected or demanded).
3. Great quarterly reports. Why not semi-annual? Time to prepare is great. Are they really used?
4. How has LOL project contributed to USAID Zambia's reporting requirements in November Operational Plan reporting? To which USAID Zambia OP indicators, or custom indicators, does LOL contribute?
5. Has progress towards reaching annual and end-of-project targets been satisfactory? Were targets realistic (too high, or too low)?
6. How could LOL program in the future be improved for data reporting?
7. Where does USAID Zambia consider LOL's greatest impact to have been made?
8. Where has there been less impact than hoped for or expected? (and why)
9. How could the program have been strengthened?

Other General Questions

1. What happened to the Warehouse Receipt system?
2. Why reduction in MCCs from 10 to 9 or less?

Groups to Interview:

1. MCC (good ones and poor ones) (of the 10 worked with)
2. Small and Medium Milk Processors (who purchase milk from MCCs)
3. Households receiving dairy cows
4. Households receiving calf from dairy cows distributed
5. Households receiving AI (not among above group)
6. Households led by Women
7. USAID/Zambia and FFP
8. Dairy Consumers (how is this addressed)(go to stores where milk is sold, and interview some buyers)(consumer surveys for desired products?)
9. Heifer International Zambia (HIZ)
10. GART-Golden Valley Ag. Research Trust
11. Zambia Dairy Processors Association (milk promotion and ed. Campaignes)

Ideas to Consider

1. Dairy bikes (for transportation constraints)
2. Micro-credit

Tables/Figures to Prepare from Existing MCC Data:

1. Data should exist for FY 2005, FY 2006, FY 2007, and FY 2008 (recognizing that Sept. data will not yet be available for FY 2008). Please create data tables and figures, especially for indicators, over these timelines.
2. Show Figure of Monthly Average Liters of Milk Produced Per Farmer, for as long as data exist to present time (eg. FY 2006 until July 2008). Show # of farmers involved at each month on a line. If can also break out this data by MCC, would be good.

Annex 7: LAND O'LAKES, INC / ZAMBIA
TITLE II DAP INDICATOR PERFORMANCE TRACKING TABLE (IPTT)

Indicator [1]	Base-line	FY2005 (Oct 04 to Sep 05)			FY2006 (Oct 05 to Sep 06)			FY2007 (Oct 06 to Sep 07)			FY2008 (Oct 07 to Sep 08)			FY2009 (Oct 08 to Sep 09)			LOA Target	LOA Achieved
		FY 2 Target	FY 2 Achieved	FY 2 % Achieved vs. Target	FY 3 Target (Mid-term)	FY 3 Achieved	FY 3 % Achieved vs. Target	FY 4 Target	FY 4 Achieved	FY 4 % Achieved vs. Target	FY 5 Target	FY 5 Achieved	FY 5 % Achieved vs. Target	FY 6 Target	FY 6 Achieved	FY 6 % Achieved vs. Target		
Goal (FFP/SO): Reduced Food Insecurity Among Vulnerable Populations[2]																		
G1. # of Mon hs of Adequate Household (HH) Food Provisioning	6.4 Months				9.4 Months	8.2 Months	**87%**				10 Mon hs	8.73	**87.3%**	10 Months			10 months	
G2. HH Dietary Diversity Score (HDDS)[3]						6.05	Baseline				7.0	5.3	**76%**	7.00			7.00	
Strategic Objective: Increased Incomes for Smallholder Farmers[4]																		
SO1. Increase in average HH income from dairy sales	$578				$636	$732	**115%**				$694	$872	**126%**	$872			$872	
SO2. Increase in average HH income from warehousing system[5]	0				5%	n/a					n/a			n/a			n/a	

[1] See Performance Management Plan for details of each Indicator in FY2007 Results Report

[2] In FY2008 the program conducted its Final Evaluation Since G1, G2 and SO1 values are impact and outcome indicators, they were collected at the population level so their values are comparable to the baseline values only

[3] HDDS was a new indicator in FY2006 and was collected during the Mid-term Review Indicator explanation is in the Performance Management Plan and the justification document in FY2007 Results Report

[4] In FY2008 the program conducted its Final Evaluation Since G1, G2 and SO1 values are impact and outcome indicators, they were collected at the population level so their values are comparable to the baseline values only

[5] ZACA was inadvertently dissolved by USAID hence the warehouse receipt component is no longer part of the program since 2006

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Indicator [1]	Base-line	FY2005 (Oct 04 to Sep 05)			FY2006 (Oct 05 to Sep 06)			FY2007 (Oct 06 to Sep 07)			FY2008 (Oct 07 to Sep 08)			FY2009 (Oct 08 to Sep 09)			LOA Target	LOA Achieved
		FY 2 Target	FY 2 Achieved	FY 2 % Achieved vs. Target	FY 3 Target (Mid-term)	FY 3 Achieved	FY 3 % Achieved vs. Target	FY 4 Target	FY 4 Achieved	FY 4 % Achieved vs. Target	FY 5 Target	FY 5 Achieved	FY 5 % Achieved vs. Target	FY 6 Target	FY 6 Achieved	FY 6 % Achieved vs. Target		
Intermediate Result 1: Increased Productivity of Smallholder Dairy Farmers																		
IR1.1 Increase in average Volume (liters) of milk produced by smallholder farmers	2, 750	2, 888	3, 038	**105%**	3, 025	2, 862	**95 %**	3, 166	3, 582	**113%**	3, 300	3,888	**118%**	3,888			3,888	
IR1.2 Increase in average yield of dairy cattle (liters per cow per day)	4	6.0	4.0	**67%**	8 0	7 8	**97 %**	9.	6.90	**76%**	10	7.05	**70.5%**	10			10.	
IR1.3 Number of smallholder farmers owning improved dairy cat le	0	250	204	**82%**	650	587	**91 %**	900	761	**85%**	1,000	854	**85.4%**	1,000			1,000	
IR1.4 Number of smallholder farmers trained	0	600	775	**129%**	1,200	1,911	**159 %**	2000	2414	**121%**	2500	2,723	**109%**	2,723			2,723	
Intermediate Result 2: Improved Productivity of the Dairy Industry																		
IR 2.1. Gross average value (US $) of milk sold by Milk Collection Centers per year	$ 61,300		$60,215		$ 85,500	$71,244	**83 %**		$96, 315		77, 344	$164,029	**212 %**	$164,029			$164,029	
IR 2.2. Average Volume of milk sold by Milk Collection Centers (liters/year)	245,400	257,700	202,800	**79%**	269,900	182,928	**68 %**	282,200	265, 850	**94%**	294,500	309,137	**105 %**	309,137			309,137	

Indicator [1]	Base-line	FY2005 (Oct 04 to Sep 05)			FY2006 (Oct 05 to Sep 06)			FY2007 (Oct 06 to Sep 07)			FY2008 (Oct 07 to Sep 08)			FY2009 (Oct 08 to Sep 09)			LOA Target	LOA Achieved
		FY 2 Target	FY 2 Achieved	FY 2 % Achieved vs. Target	FY 3 Target (Mid-term)	FY 3 Achieved	FY 3 % Achieved vs. Target	FY 4 Target	FY 4 Achieved	FY 4 % Achieved vs. Target	FY 5 Target	FY 5 Achieved	FY 5 % Achieved vs. Target	FY 6 Target	FY 6 Achieved	FY 6 % Achieved vs. Target		
IR2.3. Number of smallholder farmers delivering milk to MCCs	600	850	744	**88%**	1,250	797	**64 %**	1250	741	**59%**	1250	879	**70 %**	1250			1250	
IR2.4 Volume of milk used by targeted Processors to produce dairy products (liters/year)	(000) 31,908	10% *(000) 35,099*	21% *(000) 38,583*	**210%**	20% *(000) 38,290*	26% *(000) 40,256*	**130 %**	25% *(000) 39,885*	24% *(000) 39, 559*	**96%**	30% *(000) 41,480*	30.17% *(000) 41,537*	**100 %**	30% *(000) 41,537*			30% *(000) 41,537*	
IR2.5 Capacity Utilization of targeted Processors to produce dairy products	26%	29%	32%	**110%**	31%	33%	**106 %**	32%	32%	**100%**	34%	37%	**108 %**	37%			37%	
Intermediate Result 3: Improved Storage of Non-perishable Commodities[6]																		
IR3.1 Increase in commodity receipts used as collateral	0				35%	47%	**130 %**				n/a			n/a			n/a	
IR3.2 Number Of smallholder farmers trained	0	2,000	2,133	**107%**	3,000	3,000	**100 %**	n/a			n/a			n/a			n/a	
IR3.3 Increase In quantity of commodities deposited in certified warehouses by farmers	0 Mt	5,000 Mt	3,654 Mt	**73%**	10,000 Mt	17,000 Mt	**170 %**	n/a			n/a			n/a			n/a	

[6] The indicators under IR 3 do not have targets because ZACA, who was implementing this component, was dissolved by USAID

Indicator [1]	Base-line	FY2005 (Oct 04 to Sep 05)			FY2006 (Oct 05 to Sep 06)			FY2007 (Oct 06 to Sep 07)			FY2008 (Oct 07 to Sep 08)			FY2009 (Oct 08 to Sep 09)			LOA Target	LOA Achieved
		FY 2 Target	FY 2 Achieved	FY 2 % Achieved vs. Target	FY 3 Target (Mid-term)	FY 3 Achieved	FY 3 % Achieved vs. Target	FY 4 Target	FY 4 Achieved	FY 4 % Achieved vs. Target	FY 5 Target	FY 5 Achieved	FY 5 % Achieved vs. Target	FY 6 Target	FY 6 Achieved	FY 6 % Achieved vs. Target		
IR3.4 Number Warehouses certified	0	3	5	**167%**	6	5	**83%**	n/a			n/a			n/a			n/a	

Annex 8: Zambia Evaluation Daily Schedule Log

Date	Day	Work Days	Location	Activity Undertaken
May 29- June 6	multiple	0.5	Minnesota	Preparation Meetings via email/phone (segments over several days)
June 10-July 13			Minnesota	Prepare and finalize protocal, Literature Revew of Background Documents, Survey Instrument
10-Jun	Tuesday	0.5	Minnesota	Literature Revew of Background Documents
11-Jun	Wednesday	1	Minnesota	Literature Revew of Background Documents
16-Jun	Tuesday	1	Minnesota	Assist in development of quantita ive survey questionnaire (email and telephone conference calls), Protocol Development
19-Jun	Wednesday	0.5	Minnesota	Finalize quant survey instrument
25-Jun	Wednesday	0.5	Idaho	Finalize quant survey instrument, Conference Call with LOL FE team
26-Jun	Sunday	0.5	Uganda	Assist in development of quantita ive survey questionnaire (email), Protocol Development
July 1 - August 16				*Undertake Quantitative Survey by Zambia field team (over a period of 2-3 weeks)* *(Swanson will be working for 3 weeks in Jordan during this time - July 24-August 16)*
22-Aug	Friday	1	Minnesota	Developing Qualitative Survey Ques ions, Reading, Called Mary at LOL
25-Aug	Monday	0.5	Minnesota	Completed Draf ing of Leading Ques ions for Qualitative Survey
26-Aug	Tuesday	0.5	Minnesota	Meeting with Todd Thompson (Bruu House) 5:30 pm - 6:30
27-Aug	Wednesday	1	Minnesota	Prepared for conference call, missed call at 9 am; responded to summary of conference call, additions to protocol, other issues
28-Aug	Thursday	1	Minnesota	Additional Review of LOL background documents
29-Aug	Friday	1	Travel Day to Zambia	Preparation for Travel via Joberg, S.Africa, Departure at 3 pm.
30-Aug	Saturday	1	Travel Day to Zambia	Travel
31-Aug	Sunday	0	Zambia,Lusaka	Day off
1-Sep	Monday	1	Zambia,Lusaka	9:30 - 12:30 First Briefings in Lusaka with LOL team; 2:30-3:30 Meeting wi h Parmalat Quality Manager, Martin Ndhlovu; 4: Met with Nigel Wildenson
2-Sep	Tuesday	1	Zambia,Lusaka	8:00 - 9:30 USAID/Zambia; 10-11 Dr. Chitalu, Heifer International; 14:30-15:30 Mr. Mbao, Dairy Plant Manager, Processor Zammilk
3-Sep	Wednesday	1	Zambia,Lusaka	(President's Funeral) Begin to review quant. Data analysis results/analysis & MCC data sets
4-Sep	Thursday	1	Zambia,Lusaka	9:30 - 10:30 David Daka, Ministry of Ag, Deputy Director Animal Production; 2 pm Revisit to Parmalat for Data with Nigel pm review of quantitative survey data, review of formats for presen ing data for analysis with Andson and Martha
5-Sep	Friday	1	Zambia,Lusaka	10 am mee ing with Mr. Mwansa - Registrar of Coops, MINAGR; Review of quantitative data 14:00 - 16:00 Focus Group Discussion with Palabana MCC Board and Interview wi h MCC manager, Min of Ag. and Coops
6-Sep	Saturday	1	Zambia	Planning, Writing Day
7-Sep	Sunday	0	Zambia	Day Off (possible afternoon travel to field site loca ion for next morning interviews)
8-Sep	Monday	1	Zambia	Zamba Qualitative Survey, Provided Field Manager with Proposed Table of Contents of Draft Report, Kitwe, Fisenga & Kwashama MCCs
9-Sep	Tuesday	1	Zambia	Copperbelt Province, Mutenda MCC, interviews with project beneficiaries
10-Sep	Wednesday	1	Zambia	Copperbelt Province, Mutenda MCC, interviews with project beneficiaries
11-Sep	Thursday	1	Zambia	Copperbelt Province, Kwashumukwenu MCC beneficary interviews
12-Sep	Friday	1	Zambia	Lusaka Province, Chibombo & Liteta MCCs
13-Sep	Saturday	1	Zambia	Day of writing and review of past week interviews
14-Sep	Sunday	0	Zambia	Day Off
15-Sep	Monday	1	Zambia	Lusaka Province, Palabama MCC (second visit) his ime meeting wi h beneficiaries, travel on to Mazabuka, Met NAIS personnel for AI
16-Sep	Tuesday	1	Zambia	Kayuni MCC beneficiaries, meeting wi h AI technicians, Monze MCC
17-Sep	Wednesday	1	Zambia	Choma MCC and Masopo beneficiaries
18-Sep	Thursday	1	Zambia	Mtandalike, Kalomo MCC beneficiaries
19-Sep	Friday	1	Zambia	Kalomo MCC. Zimba, Kazungula beneficiaries, met Surprise Dairy Manager
20-Sep	Saturday	1	Zambia, Lusaka	Katapazi MCC beneficiaries in AM, travel back to Lusaka (8 hours), Dpt 9 Arr 5:30
21-Sep	Sunday	0	Zambia, Lusaka	Day Off
22-Sep	Monday	1	Zambia, Lusaka	Zambia, Lusaka; Synthesis, analysis, interpretation and wri ing day, Discussion with Todd Thompson
23-Sep	Tuesday	1	Zambia, Lusaka	Zambia, Lusaka; Synthesis, analysis, interpretation and wri ing day
24-Sep	Wednesday	1	Zambia, Lusaka	Zambia, Lusaka; Synthesis, analysis, interpretation and wri ing day
25-Sep	Thursday	1	Zambia, Lusaka	Zambia, Lusaka; Synthesis, analysis, interpretation and wri ing day, Discussion with David Harvey & Andson Nsume
26-Sep	Friday	1	Zambia, Lusaka	Prepare PowerPoint Presentation, Discussion wi h Nigel Wilkenson
27-Sep	Saturday	1	Zambia, Lusaka	Prepare PowerPoint Presentation, Writing Day
28-Sep	Sunday	0	Zambia, Lusaka	Day Off
29-Sep	Monday	1	Zambia, Lusaka	8 -10 am: Present PowerPoint Presenta ion as Evaluation Debriefing, Imput from LOL team and others
30-Sep	Tuesday	1	Zambia, Lusaka	Depart Lusaka at 6 pm for Joberg, and travel back to USA
1-Oct	Wednesday	1	Travel Day	Arrive in Minnesota in 3:30 pm, home by 6 pm.
2-Oct	Thursday	0	Minnesota	Day Off
3-Oct	Friday	0	Minnesota	Day Off
4-Oct	Saturday	0	Minnesota	Day Off
5-Oct	Sunday	0	Minnesota	Day Off
6-Oct	Monday	0.5	Minnesota	Revise Final Evalua ion report based on commments from presenta ion and provide Draft Report
7-Oct	Tuesday	0.5	Minnesota	Revise Final Evalua ion report based on commments from presenta ion and provide Draft Report
8-Oct	Wednesday	0	Minnesota	
9-Oct	Thursday	0	Minnesota	Did not receive some quant. field data until Thursday, Oct 23! Had planned to complete draft by Octobver 15! Two weeks past due date promised by
20-Oct	Monday		Minnesota	Receipt of initial batch of quantitative survey tables from Frank (Andson) (very late)(rest to come by end of week, was told)
23-Oct	Thursday	0.5	Minnesota	Receipt of some Quantitative Survey Data

8-Nov	Friday	0	Minnesota	Receipt of Quantitative Survey Data, completed.
10-Nov	Monday	1	Minnesota	Work on Draft Report
11-Nov	Tuesday	1	Minnesota	Work on Draft Report
12-Nov	Wednesday	1	Minnesota	Work on Draft Report
13-Nov	Thursday	0	Minnesota	Work on Draft Report
17-Nov	Monday	1	Minnesota	Work on Draft Report
30-Nov	Sunday		Minnesota	Final Draft Report sent to Todd Thompson in Zambia (cc to others); a pdf file sent two days later
				Agreed on 1 week for field review of draft; this actually took more than 2 weeks.
14-Dec		0	Minnesota	Comments received back from LOL field team
5-Jan	Monday	1	Minnesota	Received Comments back from LOL/Zambia - Complete Report based on comments
6-Jan	Tuesday	1	Minnesota	Final Revision and Completion of Evaluation Report
7-Jan	Wednesday	1	Minnesota	Final Revision and Completion of Evaluation Report
8-Jan	Thursday	1	Minnesota	Final Revision and Completion of Evaluation Report, Duplication at Kinkos
9-Jan	Friday	-	Minnesota	Final Report delivered to LOL, Minnesota (Ann Lucht) for forwarding to Zambia
		47	**Total Work Days**	

Annex 9: Dairy Processors Milk Purchases from MCCs

1. **Table 1: Parmalat**
2. **Table 2: Zammilk**

Table 1: Distribution of In-Calf Cows, Pass-ons, and Herd Growth

Name of MCC by Province: Copperbelt, Central, Lusaka, Southern	Farmer Group	HH Receiving In-Calf Cows from LOL	HH Receiving Pass-ons from LOL	HH receiving TA & Marketing Assistance, AI with Own Cattle and On Waiting List	Non-LOL Farmer Group Members Delivering Milk to MCC	Total Direct Beneficiary HH	Average Household Size	Total # of In-Calf Animals Received	# of In-Calf Animals that have Died	In Calf Cow Mortality Rate	Number of Surviving Calves			Herd Growth
											Heifer Calves	Bull Calves	Total	
Mutenda	Mutenda	44	14	60	-	118	8	49	5	10.20%	15	20	35	a
Musakashi	Mutenda	21	7	17	-	45	7	25	4	16.00%	9	14	23	76.00%
Kwashama	Nshakalabe	27	9	3	-	39	6	30	3	10.00%	16	15	31	93.33%
	Kwashamukwenu	17	14	21	-	52	7	19	2	10.53%	7	11	18	84.21%
	Mazeli	10	3	5	-	18	3	17	7	41.18%	4	4	8	5.88%
Chibombo	Chabanene	36	10	13	-	59	8	53	17	32.08%	23	16	39	41.51%
	Mukotongwa	11	-	7	-	18	7	18	7	38.89%	4	3	7	0.00%
	Jordan	7	-	7	-	14	14	9	2	22.22%	4	3	7	55.56%
Liteta	Mushikili	29	7	49	2	87	7	46	17	36.96%	9	16	25	17.39%
	Mwanfumba	19	-	17	1	37	6	25	6	24.00%	-	-	24	72.00%
	Chankumba	-	-	55	-	55	8	-	-		-	-	-	
Palabana	Palabana	18	23	17	6	64	6	22	4	18.18%	23	14	37	150.00%
Mapepe	Mapepe	12	-	64	-	76	8	12	-	0.00%	4	8	12	100.00%
Magoye	Mbiya	-	-	59	-	59	9	-	-		-	-	-	
	Luyando	-	-	50	-	50	11	-	-		-	-	-	
	Chitubamenda	-	-	32	-	32	9	-	-		-	-	-	
	Ngwezi	9	4	67	-	80	9	10	1	10.00%	6	5	11	100.00%
	Manyana/Munenga	5	1	36	-	42	9	7	2	28.57%	2	6	8	85.71%
	Pelusa	4	3	73	-	80	9	5	1	20.00%	3	2	5	80.00%
Monze	Nteme	17	7	48	-	72	9	63	46	73.02%	13	19	32	-22.22%
	Kayuni	14	8	77	-	99	9	28	14	50.00%	15	17	32	64.29%
	Other Monze Groups	-	-	246	-	246	9	-	-		-	-	-	
	Nakasangwe	-	-	50	-	50	-	-	-		-	-	-	
Masopo	Masopo	75	12	73	-	160	9	94	19	20.21%	42	31	73	57.45%
Choma	Bwacha	10	4	19	-	33	9	13	3	23.08%	4	6	10	53.85%
	Choma Dam	3	-	17	-	20	9	3	-		2	1	3	100.00%
	Mutandalike	22	17	68	-	107	9	26	4	15.38%	13	8	21	65.38%
	Pangwe	12	7	27	-	46	9	15	3	20.00%	4	8	12	60.00%
Kalomo	Mutala/Bbelo	5	3	47	-	55	11	13	8	61.54%	5	10	15	53.85%
	Mancom/kinnerton	13	5	15	-	33	12	20	7	35.00%	5	9	14	35.00%
	Chikoli	14	8	32	-	54	13	18	4	22.22%	16	9	25	116.67%
	Simakakata	11	9	15	-	35	15	18	7	38.89%	11	10	21	77.78%
	Other Farmer Groups	-	-	83	-	83	-	-	-		-	-	-	
Zimba	Zimba	-	-	25	-	25	8	-	-		-	-	-	
	Manyemunyemu	15	-	31	-	46	8	20	5	25.00%	12	10	22	85.00%
Katapazi	Katapazi	30	-	44	-	74	8	37	7	18.92%	12	16	28	56.76%
Sikaunzwe	Sikaunzwe	-	-	97	-	97	-	26	26	100.00%	-	-	-	-100.00%
Kazungula	Kazungula	-	-	44	-	44	-	-	-		-	-	-	
Fisenge	Fisenge	-	-	328	-	328	-	-	-		-	-		
Total		**510**	**175**	**2,038**	**9**	**2,732**		**741**	**231**	**31.17%**	**283**	**291**	**574**	**46.29%**

Table 2: LOL DAP Supported MCC

	1	2	3	4	5	6	7	8	9	10	Total:
MCC	**Magoye**	**Monze**	**Palabana**	**Kaloma**	**Choma**	**Nteme ***	**Zimba**	**Mapepe**	**Liteta ****	**Chibombo**	
Initial Price/Liter Received by farmer from cooperative:	1,000	990	1,600	1,236	1,296	990	954	1,250	1,185	1,000	
Initial Members (bringing milk)	210	49	1	21	29	34	19	28	17	32	
Date of Opening, First Sales	Oct-04	Oct-04	Oct-04	Oct-04	Oct-04	Feb-06	Apr-06	Feb-07	Nov-07	Jan-08	
Current Members (bringing milk) in January 2008	315	193	35	34	94	31	34	43	26	32	879
Date (Last month of records in 2008)	Sep-08	Sep-08	Sep-08	Sep-08	Sep-08	Jun-08	Sep-08	Sep-08	Sep-08	Sep-08	
Last Price/Liter Received by Farmer from Cooperative	1,500	1,500	1,974	1,600	1,664	1,150	1,198	2,018	1,181	1,783	
Farmer to Cooperative/MCC											
Total Volume/Liters of Milk Delivered January 2008	71,196	62,256	32,028	6,595	33,838	-	5,497	15,882	5,002	1,432	
Total Value of Milk Delivered January 2008	$ 106,794,000	$ 86,807,700	$ 42,340,355	$ 2,261	$ 14,502	$ -	$ 1,875	$ 6,353	$ 2,368	$ 4,091	
Average Value/Household of Milk Delivered January 2008	$ 97	$ 129	$ 346	$ 67	$ 154	$ -	$ 55	$ 148	$ 91	$ 128	
Total Volume/Liters of Milk Delivered in 2007	571,862	436,112	285,013	73,039	287,909	18,621	53,973	136,825	4,540	0	
Total Value/Liters of Milk Delivered in 2007	$ 209,557.99	$ 143,957	$ 113,912	$ 24,330	$ 100,176	$ 4,301	$ 16,707	$ 51,298	$ 1,819	0	$ 666,058
Average Value/Household of Milk Delivered in 2007	$ 1,361	$ 867	$ 3,560	$ 811	$ 1,431	$ 205	$ 619	$ 1,769	$ 546	0	
Average # of Households Delivering Milk to MCC in 2007	154	166	32	30	70	21	27	29	20	0	
Total Volume/Liters of Milk Sold to Coop, Cumulative through Sept 08	2,243,309	1,844,767	1,132,204	287,769	1,173,212	59,165	124,180	286,062	40,307	32,696	
Total Value of Milk Sold by Farmer to Coop, Cumulative	$ 841,806.7	$ 639,534	$ 489,109	$ 106,291	$ 458,730	$ 14,922	$ 41,828	$ 129,852	$ 18,937	$ 17,998	$ 2,759,010
Cooperative/MCC to Processor Sales											
Initial Price/Liter Received by Coop from Processor:	1,162	1,176	1,500	2,000	1,823	990	1,144	1,555	1,252	1,663	
Total Volume/Liters of Milk Sold to Processor/Cumulative	2,267,325	1,642,611	1,056,954	278,727	1,051,829.0	60,198	114,620.0	200,043	38,777	32,321	
Total Value of Milk Sold to Processor/Cumulative through Sept 2008	$ 965,749	$ 740,608	$ 465,381	$ 142,456	$ 491,674	$ 17,935	$ 54,765	$ 98,241	$ 20,196	$ 18,169	$ 3,015,175
Name of Purchasing Processor:	Parmalat	Parmalat	Parmalat	Surprise Dairy	Parmalat	Parmalat	Surprise Dairy	Dairy King	Zammilk	Zammilk	
Last Price received from Processor; Grade B per liter (Sept. 08)	2,200	1,996	2,027	2,095	2,049	1,459	2,500	2,098	1,812.0	2,000	

* Nteme: Records are not complete as this satelitte MCC (experienced some problems); Liteta ** I have extrapolated 2 months income to year for 2007 5,000,000

3,500 Zimbabwe K = $1.00 2000

Numbers of farmers delivering milk to their MCC rises and falls, depending on season of the year, and if their cows are milking or not. This peaks in December and January (rainy season) and, in the Southern Province, is greatly supplemented by milk also coming from traditional cattle now able to produce milk. Though quantity per cow is limited, numbers of traditional milking cows can be high in some areas. 2,857,143

Kazungula MMM crashed in June 2007, all cows distroyed by GOZ because of outbreak of Food and Mouth Disease. Nakasangwe, started in December 2005, also crashed for the same reason in September 2006. Sikaunzwe, started in October, 2004, also crashed at end of 2006.

Katapazi (Surprise Dairy); Fisengi (Parmalat); Masopo (Parmalat)

Annex 10: Final Quantitative Survey Data Tables

(LOL personnel Frank Valdivia & Andson Nsune created these data tables, Oct-Nov. 2008)

1.1 - Household Head Gender Distribution
1.2 – Household Head Age statistics
1.3 – Household Head Education
1.4 – Gender of Household Head and Marital Status
1.5 – Household Composition
1.6 – HH Members in School Level
2.1 – Chronically Ill People
2.2 – Orphans
2.3 – Dependency Ratio
2.4 - Elderly headed HHs and minor headed HHs
2.5 – Widowed & Separated Headed Households
2.6 – Vulnerability
3.1.0 - Months of Adequate Household Food Provisioning (MAHFP) -- Comparison between Final Evaluation and Baseline
3.1.1 - Number of Daily Eating Occasions
3.1.3 – Adequacy of Meals
3.2.1 - Household Dietary Diversity Score – HDDS
3.2.2 – Food Groups consumed by HHs
3.2.3 – HHs consuming Food Groups not consumed before participation in DAP
3.2.4 – Food groups Consumed after participation in the DAP
3.2.5 – Coping Strategies Index
3.3.1 – Frequencies of Staple Foods
3.3.2 – Frequencies of Main Sources of Staple Foods
3.3.3 – Households with staple food sales
3.3.4 – Own production of Staple Foods
3.3.5 – Staple Food Gaps
3.3.6 – Use of Incomes
3.3.7 – Use of Dairy Incomes (Frank)
4.1 - Labor Usage for Agricultural Activities
4.1.1 - Households Engaged in Agricultural Activity shown in table
4.1.2 - Household Members Engaged in Agricultural Activity shown in table
4.1.3 – Households Hiring Labor for Agricultural Activity
4.1.4 – Wages paid to hired Labor for Agriculture
4.2 - Labor Usage for Agricultural Activities
4.2.1 - Households Engaged in Dairy Agricultural Activity shown in table
4.2.2 - Household Members Engaged in Dairy Activity shown in table
4.2.3 – Households Hiring Labor for Dairy Activity
4.2.4 – Wages paid to hired Labor for Dairy Activity
4.6.4 - Dairy Incomes
5.1 - Households unable to cultivate all land
5.2 - Reasons for failing to cultivate all land
5.3 - Households producing more food with LOL intervention
5.4 - Households Involvement in Gardening
5.5 - Households using pastures for soil improvement
5.6 - Types of Pasture Crops used for Soil Improvement
6.1 – Households Receiving Cows from LOL
6.2 – Herd Growth and Productivity of Dairy Animals
6.3 – Households Receiving Passed-on Dairy Cattle from LOL
6.4 - Households owning dairy cattle
6.5 - Households without cattle
6.6 - Ownership of Cattle
6.7 - Households Cattle Management System
6.8 - LOL Beneficiary Household's Grazing System and use of AI
6.9 - Households use of AI on animals not received from LOL
6.10 - Livestock raised, Mortality
7.1.1 – Milk Yield per Breed; Season
7.1.2 – Lactating Cows per Breed; Season
7.1.3 – Milk Production – Compare with Baseline (Farmer Performance Survey Data an Option)

Sex	(All)

Table 10.1,2,3: Technical Assistance Received

Count of HH		Assistance Yes No								
		Received TA		Received TA Total	Used TA		Used TA Total	TA Useful		TA Useful Total
SurveyGro	TypeTA	No	Yes		No	Yes		No	Yes	
1: In-calf h	ANIMAL HEALTH	3	273	276	2	274	276	5	271	276
	ANIMAL NUTRITION		276	276		276	276	5	271	276
	ARTIFICIAL INSEMINATION	9	260	269	12	257	269	17	252	269
	CALF REARING	4	274	278	2	276	278	5	273	278
	DAIRYING AS A BUSINESS	2	278	280	5	275	280	6	273	279
	FEED CONSERVATION	2	276	278	1	277	278	2	276	278
	FODDER/PASTURE ESTABLISHMENT	3	279	282	3	279	282	5	277	282
	MILK HANDLING & HYGEINE	2	277	279	5	274	279	6	273	279
	RECORD KEEPING		270	270	108	162	270	10	260	270
	SUPPLEMENTARY FEEDING	4	273	277	2	275	277	4	273	277
2: Pass-on	ANIMAL HEALTH		48	48		48	48		48	48
	ANIMAL NUTRITION		46	46		46	46		46	46
	ARTIFICIAL INSEMINATION		46	46	2	44	46	3	43	46
	CALF REARING		49	49	1	48	49	1	48	49
	DAIRYING AS A BUSINESS		50	50	1	49	50	1	49	50
	FEED CONSERVATION		49	49	1	48	49	1	48	49
	FODDER/PASTURE ESTABLISHMENT	1	48	49	1	48	49	1	48	49
	MILK HANDLING & HYGEINE		49	49	1	48	49	1	48	49
	RECORD KEEPING		47	47	18	29	47	2	45	47
	SUPPLEMENTARY FEEDING		49	49		49	49	1	48	49
3: Technica	ANIMAL HEALTH	1	185	186	11	175	186	13	173	186
	ANIMAL NUTRITION		182	182	11	171	182	14	168	182
	ARTIFICIAL INSEMINATION	3	166	169	15	154	169	18	151	169
	CALF REARING	3	176	179	13	166	179	16	163	179
	DAIRYING AS A BUSINESS	2	176	178	16	162	178	18	160	178
	FEED CONSERVATION	2	180	182	9	173	182	12	170	182
	FODDER/PASTURE ESTABLISHMENT	6	183	189	14	175	189	16	173	189
	MILK HANDLING & HYGEINE	2	179	181	15	166	181	16	165	181
	RECORD KEEPING		180	180	119	61	180	28	152	180
	SUPPLEMENTARY FEEDING	4	175	179	15	164	179	18	161	179
4: Non LO	ANIMAL HEALTH		5	5	1	4	5	1	4	5
	ANIMAL NUTRITION		5	5	1	4	5	1	4	5
	ARTIFICIAL INSEMINATION	3	1	4	1	3	4	1	3	4
	CALF REARING	1	4	5	1	4	5	1	4	5
	DAIRYING AS A BUSINESS	1	4	5	1	4	5	1	4	5
	FEED CONSERVATION	1	4	5	1	4	5	1	4	5
	FODDER/PASTURE ESTABLISHMENT	1	4	5	1	4	5	1	4	5
	MILK HANDLING & HYGEINE	1	4	5	1	4	5	1	4	5
	RECORD KEEPING		4	4	2	2	4	1	3	4
	SUPPLEMENTARY FEEDING	1	4	5	1	4	5	1	4	5

Table 10.1,2,3: Technical Assistance Received

Count of HH						
		Received TA Tota	Used TA		TA Useful	
SurveyGroup	TypeTA		No	Yes	No	Yes
1: In-calf heifers	ANIMAL HEALTH	276	2	274	5	271
	ANIMAL NUTRITION	276		276	5	271
	ARTIFICIAL NSEMINATION	269	12	257	17	252
	CALF REARING	278	2	276	5	273
	DAIRYING AS A BUS NESS	280	5	275	6	273
	FEED CONSERVATION	278	1	277	2	276
	FODDER/PASTURE ESTABLISHMENT	282	3	279	5	277
	M LK HANDLING & HYGEINE	279	5	274	6	273
	RECORD KEEPING	270	108	162	10	260
	SUPPLEMENTARY FEEDING	277	2	275	4	273
2: Pass-on cattle	ANIMAL HEALTH	48		48		48
	ANIMAL NUTRITION	46		46		46
	ARTIFICIAL NSEMINATION	46	2	44	3	43
	CALF REARING	49	1	48	1	48
	DAIRYING AS A BUS NESS	50	1	49	1	49
	FEED CONSERVATION	49	1	48	1	48
	FODDER/PASTURE ESTABLISHMENT	49	1	48	1	48
	M LK HANDLING & HYGEINE	49	1	48	1	48
	RECORD KEEPING	47	18	29	2	45
	SUPPLEMENTARY FEEDING	49		49	1	48
3: Technical Assistance	ANIMAL HEALTH	186	11	175	13	173
	ANIMAL NUTRITION	182	11	171	14	168
	ARTIFICIAL NSEMINATION	169	15	154	18	151
	CALF REARING	179	13	166	16	163
	DAIRYING AS A BUS NESS	178	16	162	18	160
	FEED CONSERVATION	182	9	173	12	170
	FODDER/PASTURE ESTABLISHMENT	189	14	175	16	173
	M LK HANDLING & HYGEINE	181	15	166	16	165
	RECORD KEEPING	180	119	61	28	152
	SUPPLEMENTARY FEEDING	179	15	164	18	161

Annex 11: LOL DAP Financial Data (October 2007-September 2008)

This annex is omitted because it contains confidential financial information.

Annex 12: Magoye Smallholders Dairy Farmer's Cooperative Society Ltd., Profit & Loss, Janua ry through October 2007

This annex is omitted because it contains confidential financial information.

Annex 13: MCC Distribution of In-Calf Heifers and Pass-Ons

S/N	Name of MCC	Farmer Group	Farmers that Received In-Calf Animals from Land O'Lakes	Farmers that Received Pass_ons from LOL	Farmers receiving TA & Marketing Assistance and AI with Own Cattle and On Waiting List	Non-LOL Farmer Group Members Delivering Milk to Milk	Total Beneficiaries	Average Household Size	Total Number of In-Calf Animals Received	In-Calf Animals that have Died	In Calf Cow Mortality rate
	Mutenda	Mutenda	44	14	60	-	118	8	49	5	10.20%
	Musakashi	Mutenda	21	7	17	-	45	7	25	4	16.00%
	Kwashama	Nshakalabe	27	9	3	-	39	6	30	3	10.00%
		Kwashamukwenu	17	14	21	-	52	7	19	2	10.53%
		Mazeli	10	3	5	-	18	3	17	7	41.18%
	Chibombo	Chabanene	36	10	13	-	59	8	53	17	32.08%
		Mukotongwa	11	-	7	-	18	7	18	7	38.89%
		Jordan	7	-	7	-	14	14	9	2	22.22%
	Liteta	Mushikili	29	7	49	2	87	7	46	17	36.96%
		Mwanfumba	19	-	17	1	37	6	25	6	24.00%
		Chankumba	-	-	55	-	55	8	-	-	
	Palabana	Palabana	18	23	17	6	64	6	22	4	18.18%
	Mapepe	Mapepe	12	-	64	-	76	8	12	-	0.00%
	Magoye	Mbiya	-	-	59	-	59	9	-	-	
		Luyando	-	-	50	-	50	11	-	-	
		Chitubamenda	-	-	32	-	32	9	-	-	
		Ngwezi	9	4	67	-	80	9	10	1	10.00%
		Manyana/Munenga	5	1	36	-	42	9	7	2	28.57%
		Pelusa	4	3	73	-	80	9	5	1	20.00%
	Monze	Nteme	17	7	48	-	72	9	63	46	73.02%
		Kayuni	14	8	77	-	99	9	28	14	50.00%
		Other Monze Groups	-	-	246	-	246	9	-	-	
	Masopo	Masopo	75	12	73	-	160	9	94	19	20.21%
	Choma	Bwacha	10	4	19	-	33	9	13	3	23.08%
		Choma Dam	3	-	17	-	20	9	3	-	
		Mutandalike	22	17	68	-	107	9	26	4	15.38%
		Pangwe	12	7	27	-	46	9	15	3	20.00%
	Kalomo	Mutala/Bbelo	5	3	47	-	55	11	13	8	61.54%
		Mancom/kinnerton	13	5	15	-	33	12	20	7	35.00%
		Chikoli	14	8	32	-	54	13	18	4	22.22%
		Simakakata	11	9	15	-	35	15	18	7	38.89%
		Other Farmer Groups	-	-	83	-	83	-	-	-	
	Zimba	Zimba	-	-	25	-	25	8	-	-	
		Manyemunyemu	15	-	31	-	46	8	20	5	25.00%
	Katapazi	Katapazi	30	-	44	-	74	8	37	7	18.92%
Total			**510**	**175**	**1,519**	**9**	**2,213**	**298**	**715**	**205**	28.67%

Note: The number of farmers beneficting from the program currently stands at 685

512

Number of Surviving Calves			Herd Growth
Heifer Calves	Bull Calves	Total	
15	20	35	71.43%
9	14	23	92.00%
16	15	31	103.33%
7	11	18	94.74%
4	4	8	47.06%
23	16	39	73.58%
4	3	7	38.89%
4	3	7	77.78%
9	16	25	54.35%
		24	96.00%
-	-	-	
23	14	37	168.18%
4	8	12	100.00%
-	-	-	
-	-	-	
-	-	-	
6	5	11	110.00%
2	6	8	114.29%
3	2	5	100.00%
13	19	32	50.79%
15	17	32	114.29%
-	-	-	
42	31	73	77.66%
4	6	10	76.92%
2	1	3	100.00%
13	8	21	80.77%
4	8	12	80.00%
5	10	15	115.38%
5	9	14	70.00%
16	9	25	138.89%
11	10	21	116.67%
-	-	-	
-	-	-	
12	10	22	110.00%
12	16	28	75.68%
283	**291**	**598**	83.64%

84%

Southern Province

MCC	Monze	
Fgroup	Nteme	Kayuni
Membership Details		
Number of Farmers Receiving Support from the Program	72	99
Number of Farmers that Received Cattle from the Program	63	28
Number of Farmers Receiving Marketing & Technical Assistance/AI	72	99
Number of Farmers Delivering Milk to the MCC (2008)	30	40
Number of Farmers Delivering Milk to the MCC (Cumm from 2004)	34	60
Vulnerability Indicators		
Number of Female Headed Household Members	32	30
Number of Female Headed Household with LOL Cows	36	5
Number of Households with Chronically Ill People	11	11
Number of Households with Orphans	55	48
Average Household Size	9	9

	Number of Animals Received			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-
Year 2005	20	-	28	-
Year 2006	29	-	-	-
Year 2007	14	-	-	-
Year 2008	-	-	-	-

	Number of Animals Dead			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-
Year 2005	13	-	-	-
Year 2006	21	-	13	-
Year 2007	12	-	1	-
Year 2008	-	-	-	-

	Number of Farmers Receiving Cows			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-
Year 2005	20	-	28	-
Year 2006	29	-	-	-
Year 2007		-	-	-
Year 2008	-	-	-	-

	First Generation Calves Born			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-
Year 2005	3	8	-	-
Year 2006	14	6	6	8
Year 2007	2	7	7	6
Year 2008	-	-	2	3

	Second Generation Calves Born			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-
Year 2005	-	-	-	-
Year 2006	4	5	-	-
Year 2007	1	4	-	-
Year 2008	-	4	-	-

	Third Generation Calves			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004			-	-
Year 2005			-	-
Year 2006			-	-
Year 2007	-	5	-	-
Year 2008	1	1	-	-

	Surving Calves First Generation			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	9	6	15	17

	Surving Calves Second Generation			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	3	7	-	-

	Third Generation Calves			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	1	6	-	-

	Pass-Ons			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-
Year 2005	3	-	-	-
Year 2006	6	-		-
Year 2007	1	-	8	-
Year 2008	-	-	-	-

Membership Details	Mbiya	Luyando	Chitubamenda	Ngwezi	Manyana/Munenga	Perusa
Number of Farmers Receiving Support from the Program	59	50	32	80	42	80
Number of Farmers that Received Cattle from the Program	-	-	-	10	7	5
Number of Farmers Receiving Marketing & Technical Assistance/AI	39	50	-	45	20	80
Number of Farmers Delivering Milk to the MCC (2008)	20	30	12	45	15	80
Number of Farmers Delivering Milk to the MCC (Cumm from 2004)	39	50	32	80	20	80
Vulnerability Indicators						
Number of Female Headed Household Members	20	18	-	38	13	25
Number of Female Headed Household with LOL Cows	-	-	-	3	2	2
Number of Households with Chronically Ill People	10	9	7	8	7	13
Number of Households with Orphans	28	24	15	58	20	62
Average Household Size	9	9	11	9	9	9

Number of Animals Received

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	10	1	7	-	5	-
Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-

Number of Animals Dead

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	1	-	2	-	1	-
Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-

Number of Farmers Receiving Cows

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	10	-	7	-	5	-
Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-

First Gneration Calves Born

First Calves

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	4	3	1	4	2	1
Year 2007	-	-	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-

First Gneration Calves Born

Second Calves

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	2	2	1	2	1	1

First Gneration Calves Born

Third Calves

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-

Second Generation Calves Born

First Calves

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-

Second Generation Calves Born

Second Calves

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-

Surving Calves First Generation

First Calves

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-	4	3	1	4	2	1

Surving Calves First Generation

Second Calves

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-	2	2	1	2	1	1

Surving Calves First Generation

Third Calves

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-

Surving Calves Second Generation

First Calves

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-

Surving Calves Second Generation

Second Calves

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-

Pass-Ons

	Mbiya		Luyando		Chitubamenda		Ngwezi		Manyana/Munenga		Perusa	
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	4	-	1	-	3	-

Southern Province

MCC	Choma				Masopo
Fgroup	Pangwe	Mutandalike	Choma Dam	Bwacha	Masopo
Membership Details					
Number of Farmers Receiving Support from the Program	46	107	20	33	160
Number of Farmers that Received Cattle from the Program	15	26	3	13	94
Number of Farmers Receiving Marketing & Technical Assistance/AI	46	89	20	52	160
Number of Farmers Delivering Milk to the MCC (2008)	9	107	20	30	54
Number of Farmers Delivering Milk to the MCC (Cumm from 2004)	15	107	18	33	54
Vulnerability Indicators					
Number of Female Headed Household Members	1	23	8	6	38
Number of Female Headed Household with LOL Cows	1	17	-	1	26
Number of Households with Chronically Ill People	4	7	5	3	13
Number of Households with Orphans	16	38	26	23	72
Average Household Size	9	9	7	9	9

Number of Animals Received

	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-			-	-	-	-
Year 2005	-	-	-	-			-	-	-	-
Year 2006	15	-	26	-	3		13	-	54	-
Year 2007	-	-	-	-			-	-	20	-
Year 2008	-	-	-	-			-	-	20	-

Number of Animals Dead

	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-		-	-	-	-
Year 2005	-	-	-	-	-		-	-	-	-
Year 2006	3	-	1	-	-		3	-	-	-
Year 2007	-	-	1	-	-		-	-	12	-
Year 2008	-	-	2	-	-		-	-	7	-

Number of Farmers Receiving Cows

	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-
Year 2006	15	-	26	-	3	-	13	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-

First Generation Calves Born

	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-		-	-	-	-	-
Year 2006	4	7	14	6	2	1	5	4	38	30
Year 2007	1	2	-	-	-	-	1	2	11	15
Year 2008	-	-	1	5	2	-			1	-

Second Generation Calves Born

	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	1	1

Third Generation Calves

	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-

	Surving Calves First Generation									
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	4	8	13	8	2	1	4	6	41	31
	Surving Calves Second Generation									
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-			1	-
	Third Generation Calves									
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-				
	Pass-Ons									
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-
Year 2008	7	-	17	-	-	-	4	-	12	-

Southern Province

MCC	Kalomo MCC							
Fgroup	Mutala/Bbelo		Mancom/Kinnerton		Chikoli		Simakakata	
Membership Details								
Number of Farmers Receiving Support from the Program	55		33		54		35	
Number of Farmers that Received Cattle from the Program	14		18		26		26	
Number of Farmers Receiving Marketing & Technical Assistance/AI	55		33		54		35	
Number of Farmers Delivering Milk to the MCC (2008)	10		18		30		10	
Number of Farmers Delivering Milk to the MCC (Cumm from 2004)	18		20		30		15	
Vulnerability Indicators								
Number of Female Headed Household Members	6		4		6		14	
Number of Female Headed Household with LOL Cows	1		3		3		7	
Number of Households with Chronically Ill People	7		2		4		4	
Number of Households with Orphans	24		15		24		21	
Average Household Size	11		12		13		9	
	Number of Animals Received							
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-
Year 2005	13	-	18	-	18	-	18	-
Year 2006	-	-	2	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-
	Number of Animals Dead							
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-
Year 2005	6	-	-	-	4	-	7	-
Year 2006	2	-	7	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-
	Number of Farmers Receiving Cows							
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-
Year 2005	13	-	18	-	18	-	18	-
Year 2006	-	-	2	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-
	First Generation Calves Born							
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-					-	-
Year 2005	3	6	3	4	14	3	6	5
Year 2006	-	-					-	-
Year 2007	1	2	2	3	2	4	3	2
Year 2008								
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004							-	-
Year 2005							-	-
Year 2006							-	-
Year 2007							-	-
Year 2008	1	2	-	2	-	2	2	-
	Third Generation Calves							
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-
	Surving Calves First Generation							
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	4	8	5	7	16	7	9	10
	Surving Calves Second Generation							
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	1	2	-	2	-	2	2	-
	Third Generation Calves							
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-	-	-
	Pass-Ons							
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-
Year 2007	3	-	5	-	8	-	9	-
Year 2008	-	-	-	-	-	-	-	-

Southern Province

MCC	Katapazi		Zimba			
Fgroup	Katapazi		Zimba		Manyemunyemu	
Membership Details						
Number of Farmers Receiving Support from the Program	74		25		46	
Number of Farmers that Received Cattle from the Program	37		-		20	
Number of Farmers Receiving Marketing & Technical Assistance/AI	74		25		46	
Number of Farmers Delivering Milk to the MCC (2008)	8		18		8	
Number of Farmers Delivering Milk to the MCC (Cumm from 2004)	10		22		12	
Vulnerability Indicators						
Number of Female Headed Household Members	10		4		3	
Number of Female Headed Household with LOL Cows	6		-		-	
Number of Households with Chronically Ill People	7		5		8	
Number of Households with Orphans	34		11		23	
Average Household Size	8		8		8	
	Number of Animals Received					
	Cows/Heifer	**Bulls**	**Cows/Heifer**	**Bulls**	**Cows/Heifer**	**Bulls**
Year 2004	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-
Year 2006	37	-	-	-	20	-
Year 2007	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-
	Number of Animals Dead					
	Cows/Heifer	**Bulls**	**Cows/Heifer**	**Bulls**	**Cows/Heifer**	**Bulls**
Year 2004	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-
Year 2006	2	-	-	-	5	-
Year 2007	4	-	-	-	-	-
Year 2008	1	-	-	-	-	-
	Number of Farmers Receiving Cows					
	Cows/Heifer	**Bulls**	**Cows/Heifer**	**Bulls**	**Cows/Heifer**	**Bulls**
Year 2004	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-
Year 2006	37	-	-	-	20	-
Year 2007	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-
	First Generation Calves Born					
	Cows/Heifer	**Bulls**	**Cows/Heifer**	**Bulls**	**Cows/Heifer**	**Bulls**
Year 2004	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-
Year 2006	3	8	-	-	10	8
Year 2007	8	6	-	-	-	-
Year 2008	-	-	-	-	2	2
	Second Generation Calves Born					
	Cows/Heifer	**Bulls**	**Cows/Heifer**	**Bulls**	**Cows/Heifer**	**Bulls**
Year 2004	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-
Year 2008	1	2	-	-		-
	Third Generation Calves					
	Cows/Heifer	**Bulls**	**Cows/Heifer**	**Bulls**	**Cows/Heifer**	**Bulls**
Year 2004	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-
Year 2007	-	-	-	-		
Year 2008	-	-	-	-	-	-
	Surving Calves First Generation					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	11	14	-	-	12	10
	Surving Calves Second Generation					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	1	2	-	-	-	-
	Third Generation Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-
	Pass-Ons					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-

Copperbelt Province

MCC	Mutenda		Musakashi		Kwashama					
Fgroup	Mutenda		Sada		Nshakalabe		Mazeli		Kwashamukwenu	
Membership Details										
Number of Farmers Receiving Support from the Program	118		45		39		18		52	
Number of Farmers that Received Cattle from the Program	63		32		33		17		33	
Number of Farmers Receiving Marketing & Technical Assistance/AI	118		45		39		18		39	
Number of Farmers Delivering Milk to the MCC (2008)	-		-		-		-		-	
Number of Farmers Delivering Milk to the MCC (Cumm from 2004)	-		-		-		-		-	
Vulnerability Indicators										
Number of Female Headed Household Members	13		5		11		3		44	
Number of Female Headed Household with LOL Cows	6		5		11		2		6	
Number of Households with Chronically Ill People	-		3		2		1		2	
Number of Households with Orphans	47		17		15		7		20	
Average Household Size	8		7		6		7		7	
	Number of Animals Received				Number of Animals Received					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-
Year 2006	30	-	25	-	30	-	17	-	19	-
Year 2007	19	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-
	Number of Animals Dead				Number of Animals Dead					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-
Year 2006	2	-	2	-	1	-	-	-	-	-
Year 2007	7	-	2	-	1	-	5	-	1	-
Year 2008	-	-	-	-	1	-	2	-	1	-
	Number of Farmers Receiving Cows				Number of Farmers Receiving Cows					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004			-	-	-	-	-	-	-	-
Year 2005			-	-	-	-	-	-	-	-
Year 2006	30		25	-	30	-	17	-	19	-
Year 2007	19		-	-	-	-	-	-	-	-
Year 2008			-	-	-	-	-	-	-	-
	First Generation Calves Born				First Gneration Calves Born					
	First Calves				First Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004			-	-	-	-	-	-	-	-
Year 2005			-	-	-	-	-	-	-	-
Year 2006	12	7	7	11	-	-	-	-	2	2
Year 2007	0	9	1	2	10	11	4	4	7	2
Year 2008	5	9	-	-	4	1	1	1	-	-
	First Generation Calves Born				First Gneration Calves Born					
	Second Calves				Second Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	1	2	-	-	-	-	-	-
Year 2008	-	-	1	1	-	-	-	-	1	7
	First Generation Calves Born				First Gneration Calves Born					
	Third Calves				Third Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-

	Second Generation Calves Born				Second Generation Calves Born					
	First Calves				First Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-
	Second Generation Calves Born				Second Generation Calves Born					
	Second Calves				Second Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-
	Surving Calves First Generation				Surving Calves First Generation					
	First Calves				First Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	15	20	7	12	16	15	4	4	6	4
	Surving Calves First Generation				Surving Calves First Generation					
	Second Calves				Second Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-	-	-	1	7
	Surving Calves First Generation				Surving Calves First Generation					
	Third Calves				Third Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-	-	-	-	-
	Surving Calves Second Generation				Surving Calves Second Generation					
	First Calves				First Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	2	2	-	-	-	-	-	-
	Surving Calves Second Generation				Surving Calves Second Generation					
	Second Calves				Second Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-	-	-	-	-

	Pass-Ons				Pass-Ons					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	6	-	-	-	-	-	-	-
Year 2008	14	-	1	-	9	-	3	-	14	-

Central Province

MCC	Liteta						Chibombo					
Fgroup	Mushikili		Mwanfumba		Chankumba		Chabanene		Mukotongwa		Jordan	
Membership Details												
Number of Farmers Receiving Support from the Program	85		36		55		59		28		14	
Number of Farmers that Received Cattle from the Program	46		25		-		54		18		9	
Number of Farmers Receiving Marketing & Technical Assistance/AI	85		36		55		59		28		14	
Number of Farmers Delivering Milk to the MCC (2008)	15		17		1		15		7		7	
Number of Farmers Delivering Milk to the MCC (Cumm from 2004)	15		17		18		12		7		7	
Vulnerability Indicators												
Number of Female Headed Household Members	14		6		15		7		-		9	
Number of Female Headed Household with LOL Cows	10		2		-		5		-		7	
Number of Households with Chronically Ill People	5		2		3		3		1		-	
Number of Households with Orphans	32		12		18		22		9		6	
Average Household Size	7		6		8		8		7		7	
	Number of Animals Received						Number of Animals Received					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	46	-	-	-	-	-	53	-	-	-	-	-
Year 2007	-	-	25	-	-	-	-	-	18	-	9	-
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-
	Number of Animals Dead						Number of Animals Dead					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	7	-	-	-	-	-
Year 2007	12	-	3	-	-	-	5	-	7	-	-	-
Year 2008	5	-	3	-	-	-	5	-	-	-	2	-
	Number of Farmers Receiving Cows						Number of Farmers Receiving Cows					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	46	-	-	-	-	-	53	-	-	-	-	-
Year 2007	-	-	25	-	-	-	-	-	18	-	9	-
Year 2008	-	-	-	-	-	-			-	-	-	-
	First Gneration Calves Born						First Gneration Calves Born					
	First Calves						First Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	1	7	1	2	-	-	-	-	-	-	-	-
Year 2007	12	9	7	11	-	-	17	14	4	2	-	1
Year 2008	-	-	1	1	-	-			-	1	4	2
	First Gneration Calves Born						First Gneration Calves Born					
	Second Calves						Second Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	1	2	-	-	-	-	-	-	-	-	-	-
Year 2008	2	4	-	-	-	-	6	3	-	-	-	-
	First Gneration Calves Born						First Gneration Calves Born					
	Third Calves						Third Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-
	Second Generation Calves Born						Second Generation Calves Born					
	First Calves						First Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-

Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-	-	-
Year 2008	1	1		-	-	-	-	-	-	-	-	-
	Second Generation Calves Born						Second Generation Calves Born					
	Second Calves						Second Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	-	-	-	-	-	-	-	-	-	-	-	-
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-
	Surving Calves First Generation						Surving Calves First Generation					
	First Calves						First Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	8	15		24	-	-	17	13	4	3	4	3
	Surving Calves First Generation						Surving Calves First Generation					
	Second Calves						Second Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-
	Surving Calves First Generation						Surving Calves First Generation					
	Third Calves						Third Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-
	Surving Calves Second Generation						Surving Calves Second Generation					
	First Calves						First Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	1	1	-	-	-	-	6	3	-	-	-	-
	Surving Calves Second Generation						Surving Calves Second Generation					
	Second Calves						Second Calves					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-	-	-	-	-	-	-	-	-
	Pass-Ons						Pass-Ons					
	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-	-	-	-	-	-	-	-	-
Year 2005	-	-	-	-	-	-	-	-	-	-	-	-
Year 2006	-	-	-	-	-	-	-	-	-	-	-	-
Year 2007	6	-	-	-	-	-	7	-	-	-	-	-
Year 2008	1	-	-	-	-	-	3	-	-	-	-	-

22

Lusaka Province

MCC	Palabana		Mapepe	
Fgroup	Palabana		Mapepe	
Membership Details				
Number of Farmers Receiving Support from the Program	60		76	
Number of Farmers that Received Cattle from the Program	22		12	
Number of Farmers Receiving Marketing & Technical Assistance/AI	60		76	
Number of Farmers Delivering Milk to the MCC (2008)	35		45	
Number of Farmers Delivering Milk to the MCC (Cumm from 2007)	39		45	
Vulnerability Indicators				
Number of Female Headed Household Members	7		10	
Number of Female Headed Household with LOL Cows	5		2	
Number of Households with Chronically Ill People	2		-	
Number of Households with Orphans	17		33	
Average Household Size	6		8	
	Number of Animals Received			
	Cows/Heifer	**Bulls**	**Cows/Heifer**	**Bulls**
Year 2004	-	-	-	-
Year 2005	22	-	-	-
Year 2006	-	-	-	-
Year 2007	-	-	12	-
Year 2008	-	-	-	-
	Number of Animals Dead			
	Cows/Heifer	**Bulls**	**Cows/Heifer**	**Bulls**
Year 2004	-	-	-	-
Year 2005	1	-	-	-
Year 2006	1	-	-	-
Year 2007	1	-	-	-
Year 2008	1	-	-	-
	Number of Farmers Receiving Cows			
	Cows/Heifer	**Bulls**	**Cows/Heifer**	**Bulls**
Year 2004	-	-	-	-
Year 2005	22	-	-	-
Year 2006	-	-	-	-
Year 2007	-	-	12	-
Year 2008	-	-	-	-
	First Generation Calves Born			
	Cows/Heifer	**Bulls**	**Cows/Heifer**	**Bulls**
Year 2004			-	-
Year 2005			-	-
Year 2006	9	10	-	-
Year 2007	9	11	4	8
Year 2008	1	-	-	-
	Second Generation Calves Born			
	Cows/Heifer	**Bulls**	**Cows/Heifer**	**Bulls**
Year 2004	-	-	-	-
Year 2005	-	-	-	-
Year 2006	-	-	-	-
Year 2007	-	-	-	-
Year 2008	4	1	-	-
	Third Generation Calves			
	Cows/Heifer	**Bulls**	**Cows/Heifer**	**Bulls**
Year 2004	-	-	-	-
Year 2005	-	-	-	-
Year 2006	-	-	-	-
Year 2007	-	-	-	-
Year 2008	-	-	-	-
	Surving Calves First Generation			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	19	14	4	8
	Surving Calves Second Generation			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	4	1	-	-
	Third Generation Calves			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2008	-	-	-	-
	Pass-Ons			
	Cows/Heifer	Bulls	Cows/Heifer	Bulls
Year 2004	-	-	-	-
Year 2005	-	-	-	-
Year 2006	11	-	-	-
Year 2007	8	-	-	-
Year 2008	4	-	-	-

Annex 14: LOL Food Security Continuum

Annex 14: Food Security Continuum: Characteristics of Food Secure and Insecure People[*]

[*] Mara Russell, "Food Security Continuum," (Land O'Lakes: Washington, DC, February 2006) 1.

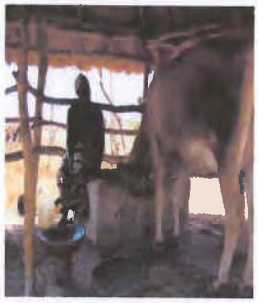
Most Food Secure (rich)	• Maintain livelihood strategies that are productive & take opportunities to invest in high input/high income strategies; • Diversify strategies as appropriate; • Invest in private sector activities that enhance the outcomes of the livelihood activities they are engaged in; • Food secure throughout the year; • Able to cope with most crises with few losses, • Invest in productive assets and passing along to others (family or community members. • Often have the option of leaving an area where a shock has occurred;
Relatively Food Secure (middle)	• Maintain livelihood strategies that are productive, • Looking to invest in strategies that require a higher input and result in a higher income earning level; • Can feed their families for most of the year, but still have problems during some months; unless there is a severe shock (such as an unpredictable severe natural disaster or security failure; • Most people will use assets to help cope with shocks rather than losing them to the shock situation, unless this is a protracted situation; • Can help other family members cope by including them in their households or contributing food or other goods to them; • Assistance is still required, especially when a severe shock occurs that lower their income substantially and/or ability to access food; • During a shock, some will fall below the poverty threshold into the next category.
Poverty Threshold	
Vulnerable but viable (vulnerable to poverty[‡])	• Know how to implement livelihood strategies and earn incomes from them but these are not sufficient to support the household throughout the year; • Household food insecurity exists but is reduced; • Households are still vulnerable to shock but can maintain some assets and strategies that may help them cope better with shock; • Assistance is required to enable them to ensure that their livelihood strategies will enable them to support their families throughout the year; • During a shock, most will fall into the next category.
Food Insecure (poor)	• Have some productive assets such as small stock and simple farm equipment; • Able to engage in productive or economic activity and to plan these activities; • Learning to manage low input/immediate return assets and strategies; • Earning too little to support themselves and their households with livelihood strategies (subsistence, but some improvements apparent; • Requiring much additional assistance as they build their productivity and earning potential of assets and livelihood strategies; • Can easily lose assets as result of a sudden shock; • During a shock, most will fall below the food security threshold into the next category.
Food Insecurity Threshold	
Extremely Food Insecure (extremely poor)	• No productive assets; • Due to poor health and/or lack of security people are unable to engage in productive or economic activity; • Subsistence livelihood. No ability to plan implementation of livelihood strategies due to their poverty situation and the unpredictable nature of certain shocks; • Will recover from shock but will require large amounts of assistance.

Annex 15: Selected Success Stories

Coping with Food Insecurity

Food Security through Milk Sales

Increasing Resilience against seasonal shocks



Productivity through learning

Creating Market linkages

Restoring the dignity of vulnerable people

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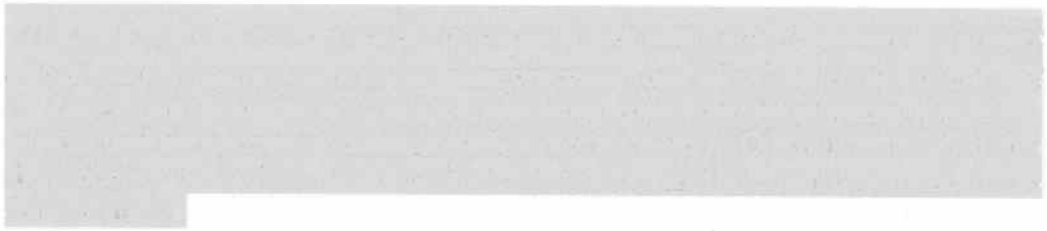

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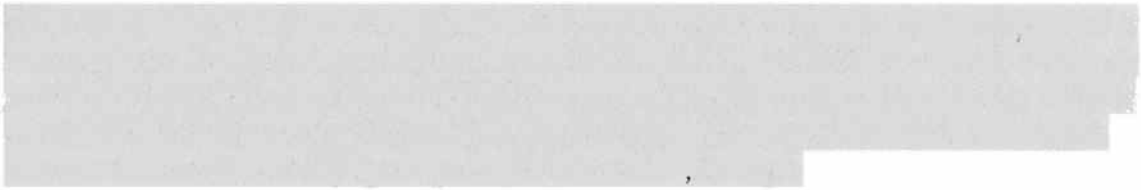

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Working in collaboration with other partners and thriving on the sin ages Land O Lakes trained over 212 farmers in dairy development preparing these farmers to be ready in less than six months to be ready to receive and maintain an incalf heifer. The training was very intensive with field based dairy development facilitators living within the communities and addressing the real issues on the ground. The farmers established fodder crops in December and January, 2007, attended trainings and cut hay from March onwards. Built housing and started preparing funds for animal health care from April onwards and received the heifers in June and July.

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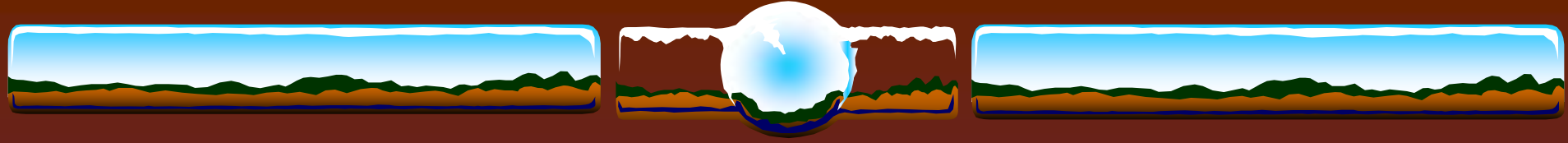
Annex 16: PowerPoint Presentation of DAP Final Evaluation Debriefing

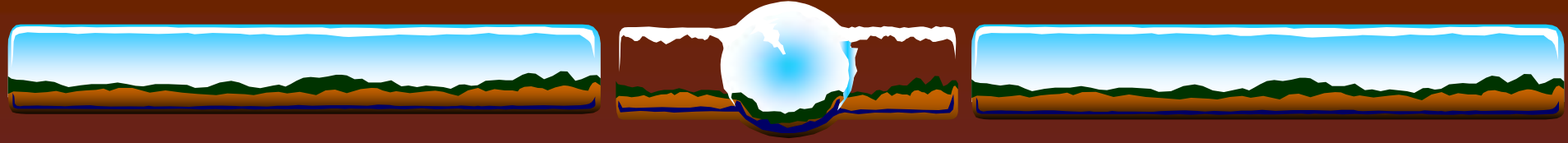


Land O'Lakes Zambia Title II Dairy Development

Food for Peace DAP for Vulnerable Populations

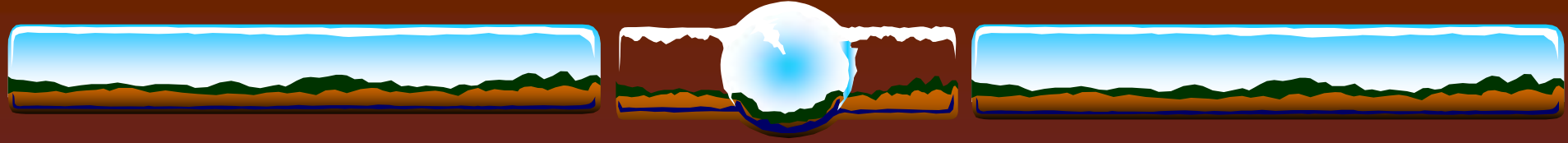
Final Project Evaluation

September 2008



Presentation Outline

- Project Hypothesis
- Key Lessons Learned
- Challenges
- Missed Opportunities
- Major Recommendations
- Unique Impacts
- Cost/Benefits of Dairy LOL DAP



Project Hypothesis

- “Household **food insecurity** will be reduced among **vulnerable populations** in Zambia through **increased incomes** generated from the **sale of milk and other dairy related products**. This income will enable **better access to food** which will in turn **reduce food insecurity** – particularly during the ‘hunger months’ between December and March each year.”

- IT IS TRUE! ALL TRUE!

Key Lesson Learned

Regional Specificity +
Comparative Advantage +
Correct Targeting (Geographic, Group, HH) +
Business/Value Chain Approach +
A Flagship Activity (e.g. dairy) +
Subject Professionals & $$ +
Time

=

Economic Security
For Vulnerable Smallholder Farmers

Key Lessons Learned (Cont.)

- **Small-Dairy Business Approach & Dairy Value Chain**: The holistic business focus approach to smallholder dairy farmers, employed by LOL, has been a highly successful model for rural development in Zambia.

- **Food Insecurity**: LOL direct recipients of either an in-calf cow, or a later pass-on heifer (once they have calved and begun milking), very definitely have achieved household food security – twelve-month food availability.

- **Behavioral Change & Time:** Major behavioral changes in societies take time. Intensive dairy management represents major change. Population level impact will take at least ten years. Underestimation of time to connect MCCs to electrical grid.

Key Lessons Learned (Cont.)

- ***Targeting:*** LOL's use of geographic, group, and household level targeting permits a realistic business orientated approach to dairy for smallholder household . However, efforts to target 'vulnerable' households exceeds standards set by other DAP NGOs who generally address the 'rural poor' making up the majority of most rural communities, and unnecessarily inhibited program flexibility to aggregate dairy farmers near MCCs.

- **FFP DAP Beneficiaries***:* Within a holistic and business approach to rural dairy development, all potential stakeholders for the existence of a MCC must be included: the 'rural poor' who with project assistance gain a dairy cow, as well as small commercial dairy farmers. Increasing milk volume to MCCs increases everyone's ability to gain a better market and draw processors with unique ability to provide some of the technical (Veterinarian, crop and fodder) and managerial support needed for MCC sustainability.

Key Lessons Learned (Cont.)

- **Cooperatives:** Without professional mangers and oversight, Zambian dairy cooperatives have an uncertain future. Alternative linkage relationships exist between dairy producers and processors.

- **Increased Incomes:** Recipients of an in-calf cow, pass-on heifer, as well as beneficiaries of successful artificial insemination (AI) to either local or improved cows (Frisian or Jersey) very clearly have benefited from not only increased incomes, but also a regular stream of increased income through the sale of milk. Peak incomes also coincide during former peak 'hunger months'.

- **Improved Nutrition:** All households with a milking cow noted the dramatic impact on the nutrition on their children and household members in general. Better nutrition for milking cows themselves remains a major challenge.

Key Lessons Learned (Cont.)

- **Barter and Local Employment:** Almost all smallholder dairy farmers, whether or not they deliver milk to a MCC, appear to practice some form of barter during the time their cow(s) are milking. Milk is exchanged for services or commodities.

- **Recipients of In-calf cows or Pass-ons.** With the exception of the Southern Province, recipients have in most cases been households without cows of their own. In all cases, recipients are asked to practice a form of intensive management completely unknown to them. The learning curve for adoption of improved management of dairy cows is faster when HH have NOT formerly possessed cows.

- **Female Beneficiaries:** Project prioritization of registering gift of in-calf cow (and pass-ons) in the name of woman led to very important and long-lasting impact in both household dynamics and improved care of animals.

Key Lessons Learned (Cont.)

- **Artificial Insemination (AI):** Once they have actually seen the results, AI has become a highly sought after input by smallholder dairy farmers, who are willing to pay for the service to the volunteer LOL trained CLWs - if effective.

- **Pass-Ons:** Though pass-ons have occurred, this has been a fairly disappointing component of the program. The numbers of pass-ons have clearly not reached the extent that had been initially expected within the program. Causes are multiple.

- **Bull Calves:** The LOL approach to what should be done with bull calves does not appear to be consistently followed everywhere – sometimes considered as a pass-on, sometimes not. Yet smallholder farmers consider them an important asset.

Key Lessons Learned (Cont.)

- **Repossessions:** LOL insistence on repossession & replacement of poorly managed in-calf heifers given out represents both a courageous and remarkably successful, though traumatic, policy. Not frequently enough applied.

- **Record Keeping:** Record keeping at the household level, with the exception of a few households, does not appear to be taking place on a regular basis and represents a threat to future viability of household level enterprises.

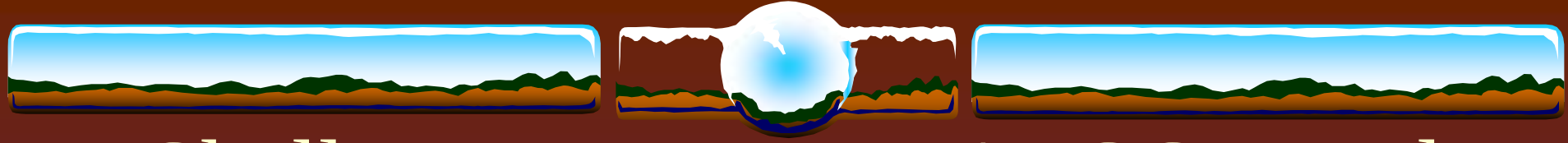
- **Project M&E and Data Management:** The M&E system in place is too centralized, but data rich. It tracks valuable process and impact indicators that should have been included within IPTT & USAID/Zambia's SO 5 Economic Growth program objective indicators.

Key Lessons Learned (Cont.)

- ***Smallholder Dairy Farmers:*** Smallholder dairy farmers represent an important and growing segment of Zambia dairy's industry. They are politically critical to Parmalat and other processor's businesses. To the smallholder dairy farmer, the first and foremost role of the MCC is as a place to regularly sell milk produced, and receive income on a regular basis. Everything else is secondary.

- **Collaboration with Government and Other Partners:** Achievements realized by LOL could not have happened without effective early – and continuing – mutual respect, trust, and collaboration with colleagues in various departments of the Ministry of Agriculture and Cooperatives and private sector partners contributing to the dairy value chain.

- **Processors:** LOL successful in working with processors to expand markets through additional products and advertisement to the general public, and linking small processors to smallholder dairy farmers. Smallholder produced milk from 0 % to close to 8 % into formal sector.



Challenges: Cooperative/MCC Level

- Cooperative Boards: management by committee or ‘lowest common denominator’, social welfare agency
- Cooperative boards are not business minded
- No MCC/Coop general manager with exec. authority
- Financial ccounting systems – members uninformed (no true ownership)
- Lack of identified ‘model smallholder dairy farmers’ within each zone of MCC
- AI (liquid nitrogen, semen sticks, methods for application)

Smallholder Dairy Enterprise

- Zambia Coop Model: No sense of Ownership
- Never Receive Financial Reports (posted)
- Don’t Know Share Value in Cooperative

- Price Received from MCC for milk sometimes significantly lower than local price farmers can obtain (esp. Copperbelt)(keep margins low)

- MCC payments may not be frequent enough (once/month)

- Most Contacts with LOL extension agent or CLW limited to weekly group meetings for training themes

- Poor Record Keeping at Farmer Level

- Farmers Ignoring Major Management Recommendations, often without consequences
- Dry Season Feed

Missed Opportunities

- **AI**: It was a lost opportunity not to have included AI as a project component from the first day of the project – and not in the 3rd year – as the aggregate MCC farmer herds could have been upgraded significantly.

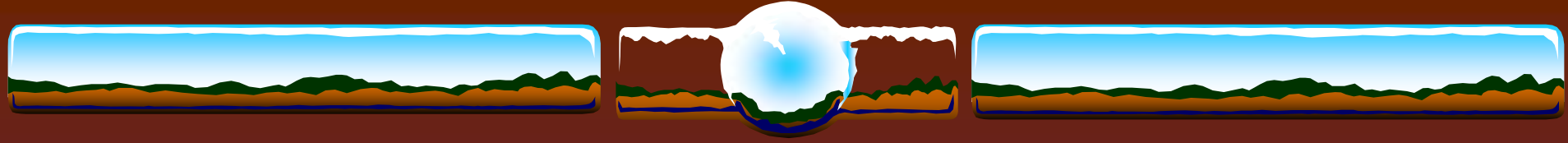
- **Cross-training** of all senior technical leaders and extension agents may have helped extend benefits within diverse project sites more quickly.

- **Early focus** to establish a full-time Cooperative/MCC Dairy Manger within LOL supported MCCs with executive authority for all dairy operations of cooperative & attention to financial management of association. May be too late for established ones.

Missed Opportunities (Cont.)

- **Alternatives and Flexibility:** Not, from the start, being more flexible to alternative approaches to linking smallholder dairy farmers to processors (e.g. small commercial farmers and/or processors managing MCC), and providing needed technical input to farmers to increase milk production.

- **Delays:** Year-long delays in connecting several Copperbelt Province MCCs to electricity could severely limit the eventual sustainability of these sites, not having had the guidance of LOL as they begin to collect milk, and begin the process of financial accountability and reporting to members.



Major Recommendations

- **Model Farmers:** Give priority to the identification of, and support to, ‘model smallholder dairy farmers’ within each zone of operation among MCCs currently supported. These farmers become role models and could help with inputs needed by neighbors, and eventually become small commercial farmers supplying MCC.

- **Rural Milk Transportation:** Greatly expand diffusion of heavy-duty bicycles for transport of milk by smallholder farmers. Make this a private sector business opportunity, not managed through MCC. Consider establishing opportunities for development of transport entrepreneurs to collect and sell to MCC.

Major Recommendations (Cont.)

- **AI – Southern Province**: Given cost and failure rates in some locations, greater use of synchronization should be practiced, perhaps eliminating individual AI for smallholder farmers. Implement synchronizations so calving coincides with start of rainy season (Oct/Nov), thereby providing milk when most needed by subsistence farmers. Group AI services paid for through price of milk given to farmers.
- **AI – Elsewhere**: AI in regions where smallholders do NOT own cows will not help increase dairy ownership among vulnerable households. Continued giving of in-calf heifers to vulnerable-but-viable HH encouraged, while carefully tracking pass-ons from previous deliveries. Again, synchronization probably best strategy for MCC improved herds.

- Prioritize use of the small 'containerized' MCC as milk bulking centers – with priority to areas where a commercial farmer or processor will provide technical and management support.

- Formalize, ASAP, disposition of assets provided to LOL supported cooperatives – clarifying value and share value for members of these assets. Use formal transfer of assets as point of leverage for cooperative level changes recommended, with option of removal of assets, mirroring repossession at smallholder HH level.

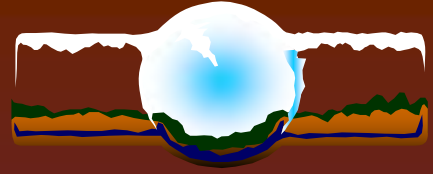
Food for Peace Strategies

- Recognize smallholder dairy as a ‘flagship activity’, in appropriate areas, to permanently lift vulnerable-but-viable HH into long-term food security.

- De-couple LOL from other NGO FFP programs in Zambia MYAPs and consider similar strategies for other countries receiving FFP, using LOL value chain business model and its targeting approach. Other FFP NGO’s, in areas of LOL intervention, could reinforce population base in development activities complimentary to smallholder dairy development.

- Completely modify FFP IPTT data approaches which over-emphasize large baseline – mid term - and final (and costly) major socio-economic surveys for measuring impact over identification of key process and impact indicators monitored over life of project. FFP Washington should learn from experience of USAID field missions in identification of key indicators for Program Objective, Program Area, and Program Element purposes of USAID operational plans for each country. Better integration of results into USAID mission OP’s required.

Major Recommendations (FFP)



Food For Peace

- Formalize across all project MCCs the giving of in-calf heifers and pass-ons in the name of a household woman or female-headed household. Women everywhere, and their children, tend to be the major care-givers of animals, are always near them and most familiar with their needs. Such ownership increases a woman's security & status within a household; and women use increased household income in a responsible manner.

- Continue policy of repossession through life of project. The policy should be adopted for all similar programs of this kind with smallholder recipients of a dairy cow.

Cooperative Management Level

- Encourage all cooperative groups working with LOL assistance to revise their by-laws to reflect that the dairy business is their principal focus, and become registered as as ‘Dairy Cooperatives’, and not as multi-purpose cooperatives. Reduce or even terminate LOL support during the last year of the project to cooperatives not willing to do this and focus resources on those that do.

- Revise the role of Cooperative board members to one solely of oversight and setting of policy for the dairy initiatives of their members, centered on their Milk Collection Center and possible satellite bulking centers. BoD should NOT be involved in management.

- Recruit Professional General Manager with full management authority for coop business (salary)(with production goals and incentives); top MCCs capable of paying for them.

- Accelerate strengthening of MCC accounting (QuickBooks or Excel); Linkage with Herd Books of Zambia for financial data input, accounting, and production of financial statements is essential.

Purchasing Milk

- Consider payments twice/month
- Create member bank accounts and transfer funds directly into accounts
- Support farmers for bank loans for additional milking cows and dairy inputs (and NOT coop management of loans)
- Keep margin low between price received by processor/sales and farmer received price, with transparent financial reports on use of difference margin.
- Raise prices quickly to farmers as processors raise prices
- Reconstitute active membership (with excel database linked to each)
- Consider dividends from profits of over-counter/bulk sales (as % of milk provided)

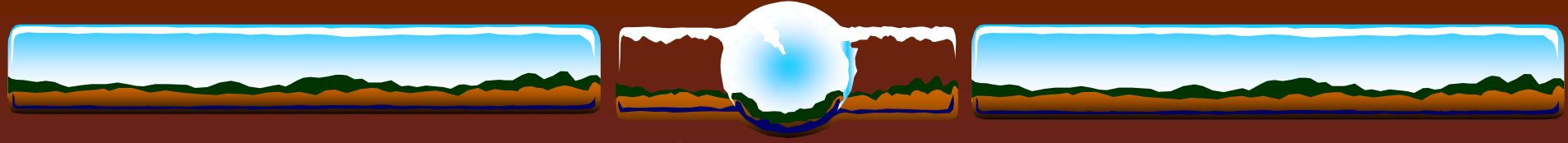
Smallholder Dairy Entrepreneur

- Reinforce, during the last year of the DAP, field-level hands-on support and training to the direct beneficiaries of dairy cows or pass-ons received. This should focus on personal record keeping, improved management of their animals.

- Direct linkages to suppliers of needed inputs (medications, AI, dairy buckets and cans, plastic water vessels for calves, etc.)

- Intensive training on developing feed for dry season feeding of milking cows.

- Continue to monitor closely each succeeding generation of pass-ons, also keeping track of the increasing number of improved dairy cows possessed by all direct project beneficiaries.



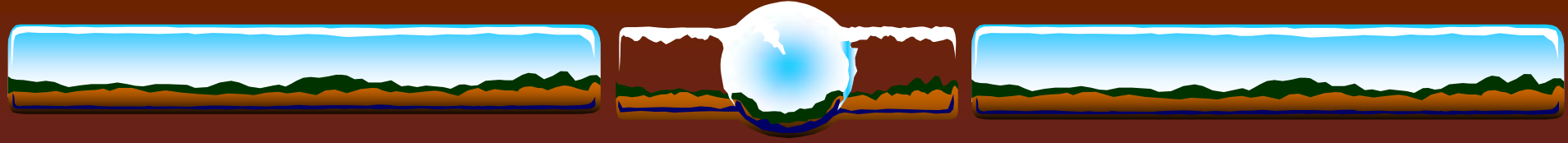
Unique Impacts

- Over 2,732 smallholder vulnerable HH have been direct beneficiaries of this DAP. Includes over 1,000 HH, with women (about 30%) managing dairy cows, that will become food secure by EOP, and part of nation's formal dairy sector.

- Unbelievable economic uplifting taking place when smallholder HH have a milking cow – over $1000/year from 1 milking cow, representing about 70% of total vulnerable HH income; doubled with a second milking cow! Potential to become small commercial dairy entrepreneurs as # of animals increase. Cell phones!

- Infusion of cash income into rural economies has an impressive rippling effect into numerous other economic activities for thousands of additional households within dairy communities – indirect beneficiaries.

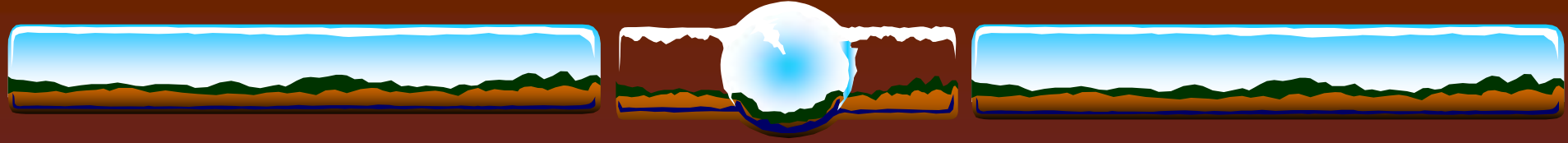
- Among the 10 most operational MCCs, a total of $2,584,188 has ended up in the pockets of smallholder dairy farmers. These same 10 MCCs have sold a total of $2,826,150 to processors, and the volume continues to increase (55% in 2008) as animal numbers increase. These values probably represent only about 40% of actual milk being sold/bartered by these HH in fresh, sour, or yogurt forms.



Unique Impacts

- Parmalat, one of Zambia's largest private sector processors, between Jan-Aug, 2004, purchased 12,941,628 liters/milk from some 21 commercial farmers, small scale commercial farmers, and began to purchase milk from 4 LOL supported MCC (102,858 liters – 4%). Four years later, its total volume has swelled by 11%, and milk purchased by the same 4 LOL MCCs was 1,145,218 (8%) – a 41% increase for their small farmers. Smallholder dairy farmers are currently supplying about 8 % of Parmalat's total volume of milk – and this sector is considered one of its fastest growing source for future milk. As demand has increased, prices per liter/milk has more than doubled in the same period from less than 1,000 K/l to 2,027 K/l now – and a 10 % / year increase is expected. Other processors show similar trends.

- First of their kind anywhere: creative design and construction by LOL of 1,000 liter milk transportation tanks, built in India became a major project input encouraging urban-based processors to collect milk from rural based MCCs – previously required themselves to transport milk to processor. Eight such tanks on Parmalat trucks permit them to keep bulked milk from separate MCCs and commercial farmers separate – allowing milk grading and higher prices for Grade A (2,400 K/l). These tanks will transform rural dairy opportunities both in Zambia and elsewhere.



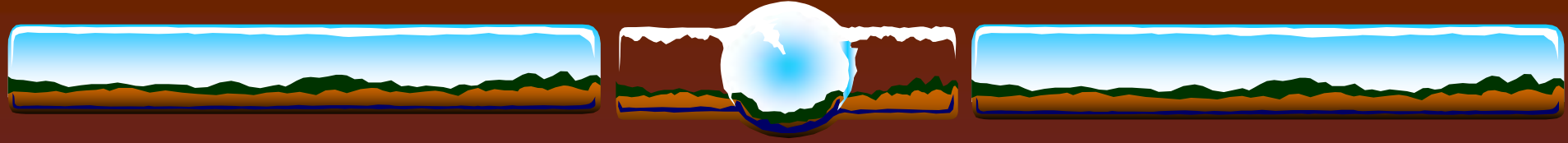
Unique Impacts

- Creation of Zambian Processors Association as a lobbing group for the rapidly expanding dairy sector will also directly benefit smallholder households.

- Zambian smallholder farmers, once considered unable to contribute to the dairy market sector, have proven through this DAP to not only be fully capable of providing marketable milk, but milk of a quality sometimes superior to that furnished by commercial farmers – currently approaching 8 % of all milk produced in Zambia – from almost ZERO five years ago.

- Significant contributions to GOZ training of livestock extension agents, particularly in completely revised 2-week AI training course offered by NAIS.

- Given seriousness of transparent financial management at MCCs, linkage with Herd Books of Zambia for data input, creating profit/loss statements, and analysis is critical for MCC beneficiaries understanding their collective enterprise.



Cost/Benefits of LOL Dairy DAP (Quick & Dirty)

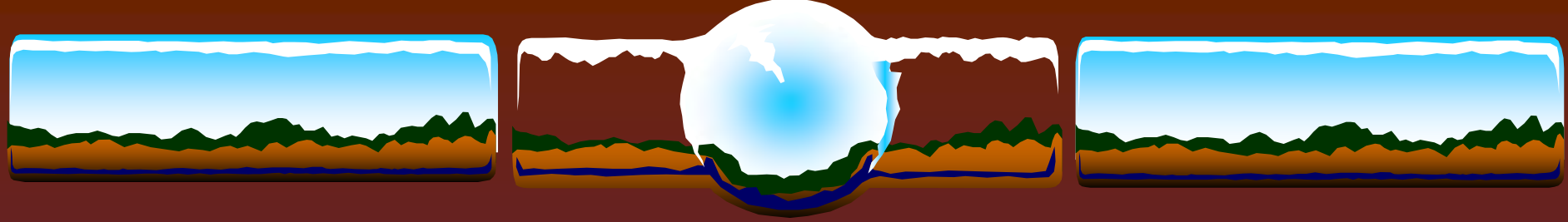
Project Cost to Date (10/04 – 9/08): $10,000,000

Cumulative Assets for Smallholder Dairy Households (2004-2008 – 4 years)

❖ 685 Mature in-calf cows * 8 million K/cow:	$ 1,565,717	*current value, original + 1st generation
❖ 291 bull calves * 2 million K/cow	$ 391,429	* current value, 1st and 2nd generation
❖ 281 + 300 (583) F. calves (1- 16 months) * 4 million K	$ 666,286	*not yet passed on, 2nd,3rd generation
❖ 116 AI crosses with local cows (female) * 3 million K	$ 99,421	
❖ MCC assets: equipment (tanks, buildings)(> 10 year life)	$ 445,036	
❖ Milk already sold to Processors through September 2008	$ 2,759,010	* mostly from morning milking
❖ Milk sold locally (40% of morning milk + where MCC not buying)	$ 1,103,604	* frequently sold for 2X price of MCC
❖ Anticipated milk to end of 2008 (4th Quarter)	$ 243,365	
❖ Milk sold locally to end of 2008 (40% of morning milk +)	$ 97,346	* + where MCCs not yet purchasing milk (e.g..Copperbelt or new centers)
Total:	$ 7,058,729	

Project Cost/Household ($10,000,000/2732)	$3,660	
Cost minus Existing Assets ($10,0000,000 - $7,058,729)	$ 2,782,332	
# Direct Beneficiaries (In-calf, pass-ons, AI, dairy training)	2,732	* cf. Table 1
# of Direct Beneficiaries (9 persons/HH)	24,588	
Net Benefits per Household:	($1,077) **	
Net Benefits per Beneficiary:	($ 120)	

***Given expansion of quality of smallholder dairy cows, expanding milk sales, the entire cost of project will have been recovered in terms of a net positive gain within 2 years from now with milk sales alone. ($1,300,000/year to farmers/year minimum from milk sales, not counting value of*



Thank-you

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