LAND O'LAKES ZAMBIA INC.

DEVELOPMENT ACTIVITY PROGRAM

BASELINE REPORT

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1.0 INTRODUCTION AND OBJECTIVES

1.1 Introduction

Land O'Lakes Inc. in Zambia plans to implement a development program from 2004 to 2008. This program consists of 3 components namely dairy industry development, dairy livestock development and commodity storage and marketing. The program is partly an expansion of existing activities of the Dairy Enterprise Initiative in Zambia and will be implemented in 18 Districts and 6 Provinces in Zambia. These Districts and Provinces are indicated in Table 1.

Table 1: Districts and Provinces to participate in the LOL/ Zambia Development Program

Province	Districts
Central	Kabwe, Chibombo, Mumbwa
Eastern	Chipata, Petauke, Katete
Southern	Choma, Kalomo, Mazabuka, Monze, Kazungula
Copperbelt	Luanshya, Kitwe, Chingola
Western	Mongu, Kaoma
Lusaka Province	Kafue, Chongwe

In conformity with stated priority areas for Title II funding (USAID, 2004) a major objective of the program is to improve household food security among vulnerable populations in Zambia. This will be achieved through increased household income which will enable better access to food.

As an input into a Monitoring and Evaluation System for the program, a set of both monitoring indicators for the 3 components of the program and program food security impact indicators were initially developed. Two food security impact indicators were identified, are contained in an earlier paper (Chuzu, 2004) and are: a) months of adequate staple provisioning and b) increase in proportion of households eating at least 3 meals a day. Apart from these impact indicators 14 monitoring indicators were identified for the 3 program components. Monitoring indicators are contained in the Indicator Performance Tracking Table, IPTT.

In order to determine the starting level of identified indicators against which progress can be measured in future, a baseline survey was conducted in 12 Districts and 8 sites in Zambia in September 2004. This report presents a summary of initial findings of the baseline survey.

1.2 Objectives of the Survey

The overall objectives of the baseline survey were threefold:

- To strengthen the Land O'Lakes Development Activity Program Monitoring and Evaluation plan such that it better reflects the program impact on household food security status of program beneficiaries.
- To provide a more precise definition and understanding of the socio-economic status and vulnerability of program participants; and
- To provide a foundation for the design of a reporting system between implementing agencies and LOL/ Zambia and between LOL/Zambia and AID/DCHA/FFP

Specifically, the study aimed at defining the participants to be targeted by the project and to establish baseline values for monitoring indicators and food security impact indicators.

2.0 METHODOLOGY

The overall methodology was two-pronged and consisted of a formal survey and a participatory rural appraisal.

Quantitative data was collected in a formal survey using a questionnaire. Areas of inquiry in the questionnaire generally aimed at establishing the starting position for the identified indicators relating to the three program components as well as that for the two food security impact indicators. They included assessment of food access throughout the year, access to productive resources including land water and labor, income sources, aspects of livestock and dairy production, milk consumption and sales and level of awareness about the crop warehouse system.

Some questions included in the questionnaire were indicative of the fact that food security might not necessarily result in spite of anticipated income increase because of other related reasons. For example, even with income increase, income control by predominantly men could preclude improvement in the quantity and quality of food consumed. Hence the question about who controls income from various livelihood activities in the household is relevant. Another example is that where physical access to food is difficult, increase in incomes could do little to improve food access. Hence the inquiry about whether staple foods are available for purchase throughout the year.

Alongside administration of a formal questionnaire, a participatory rural appraisal was conducted in each of the surveyed areas. At least one and at most two PRA exercises were conducted in each surveyed district. The PRAs aimed at complementing the survey questionnaire with more qualitative information. A primary aim of the PRA was to identify vulnerable groups within the communities and the reasons for perceived vulnerability in order to inform the process of targeting for program activities.

Methods employed for the PRA were focus group discussions as well as general group discussions. Group discussions including men and women were used to generate community perceptions about an adequate diet, rank wealth in the community and to outline the labor calendar while the food calendar was pursued with women only focus groups. There was a variation in the way that income control issues were discussed. In the first districts, very susceptible data were obtained when discussing with both men and women together. As a result this approach was changed. Different results were obtained when discussing with the two groups separately. Results from separate groups of men and women seemed to be more reliable than those obtained from the combined group.

2.1 Sampling

As shown in table 1, 18 districts in 6 provinces constitute the sampling universe for the baseline survey. Not all of these districts could be covered due to time and money constraints. Two criteria were used to select 12 districts for survey. A primary consideration in selecting districts for survey was that all agro-ecological zones found in the 18 Districts should be represented. For most rural populations, agro-ecology is a major determinant of the pattern of livelihoods, and socio-economic opportunities and constraints. Districts were first classified into the relevant agro-ecological zones.

Secondly, two districts were selected randomly from each province. The reason for including this geographical consideration is that geo-political factors often impact on vulnerability status in various forms. Some provinces may have better infrastructure and health facilities etc than others, for example. The World Food Program has in the past performed its vulnerability assessment based on district level data. Some variables used to calculate vulnerability scores are percent population underweight, population within 12 km of a road, months of food aid and deviation (from a nine year cereal production average, cereals include maize, millet sorghum, rice and wheat) in per capita cereal production (Caldwell, 1993).

Given the first consideration that all agro-ecological zones in the 18 universe districts needed to be represented, this implies that where a province contained more than one agro-ecological zone, the districts first had to be grouped under the various zones and random selection from each zone made. Except for Southern Province each of the other 5 provinces contained at most two agro-ecological zones. In Southern Province Kazungula District was classified separately from other parts of the province because of somewhat different agro-ecology. Table 2 shows the districts selected for the survey and their agro-ecological location.

Table 2: Districts Selected for Survey by Agro-ecological Zone

Province	Selected District	Agro-ecological Zone
Central	Kabwe	Central, Southern and Eastern Plateaus
	Mumbwa	Central, Southern and Eastern Plateaus
Lusaka	Kafue	Luangwa-Zambezi Rift Valley; Central, Southern and Eastern Plateaus
	Chongwe	Luangwa-Zambezi Rift Valley; Central, Southern and Eastern Plateaus
Eastern	Petauke/Chipata	Luangwa-Zambezi Rift Valley; Central, Southern and Eastern Plateaus
	Chipata	Central, Southern and Eastern Plateaus
Copperbelt	Luanshya/ Chingola	Northern High Rainfall Zone
	Chingola	Northern High Rainfall Zone
Western	Kaoma/ Mongu	Western Semi-Arid Plains
	Mongu	Western Semi-Arid Plains
Southern	Monze/ Kalomo	Luangwa-Zambezi Rift Valley; Central, Southern and Eastern Plateaus
Southern	Kazungula	Central, Southern and Eastern Plateaus; Western Semi-Arid Plains

Sample Size

The number of households to be enumerated per district was calculated according to sampling guidelines by Magnani (1997). In the indicator paper (Chuzu, 2004) 2 food security impact indicators were proposed namely the number of months of adequate staple provisioning and increase in the proportion of households eating at least 3 meals a day. In both cases, there is progress when the proportion of households exhibiting the desired trait, i.e. consuming at least 3 meals a day or with increased months of adequate food provisioning, increases. The number of months of adequate staple provisioning however can also be measured as a mean across a population or sample. In this case an increase in the mean of months of adequate provisioning would signify progress.

The sampling guide provides 2 formulas with regard to sample size for indicators expressed as means and those expressed as proportions. For the baseline survey, the formula for indicators expressed as proportions was used because data that are required to substitute in the alternative formula were not readily available. The formula to calculate sample size for indicators expressed as proportions is given as:

$$\mathbf{n = D\ [(Z_\alpha + Z_\beta)^2 * (P_1(1-P_1) + P_2(1-P_2)) / (P_2-P_1)^2]}$$

Where:

n = minimum sample size per survey round or comparison group
D = design effect, a default value of 2 is assumed
P_1 = the estimated level of an indicator measured as a proportion at the time of the first survey
P_2 = expected level at some future date
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 (P_2-P_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 (P_2-P_1) if one actually occurred, β is the statistical power

The estimated baseline levels of both impact indicators were unknown prior to the survey and have been assumed as 0.50. The expected level of the indicators 2 years after the onset of the program and at the mid-term evaluation has been estimated at a minimum of 15%. α and β have been set at the minimum recommended levels of 0.95 and 0.80. Accompanying Z-scores for these levels are 1.645 and .840. Substituting these values into the formula, the total number of households to be sampled works out as follows:

$$n = 2\ [(1.645 + 0.840)^2 * (0.5(0.5) + (.65)\ (.35)) / (.65-.50)^2]$$

= 262 (264) households

Adding 10% contingency to this number to compensate for non-responses we get 262 * 1.10 = 288 households. Thus, it was planned to survey 288 households at each survey site or given the 8 survey sites, a total of 2,304 households. In practice, a total of 2,239 households were interviewed. A breakdown of these households per site is given in table 3.

Table 3: Number of Households Surveyed by Province and Site

Province	Site	No of Households Surveyed
Lusaka	Chongwe	286
Eastern	Chipata/ Petauke	299
Central	Kabwe	286
	Mumbwa	255
Southern	Kalomo/ Monze	287
	Kazungula	241
Western	Kaoma/ Mongu	301
Copperbelt	Luanshya/ Chingola	284
Total		2,239

2.2 Selecting Households for Interview

To select the households for interview, a multi-stage cluster sampling procedure was employed. First, all the wards within an estimate 50 kilometer radius of the district center/s were listed and grouped into four clusters according to whether they were located in the north, south, east or west of the district center. In various meetings prior to the survey, it was agreed that 50 kilometer radius was what could reasonably be expected to be covered by the program by the time of the mid-term review. It is planned to expand further out during the later stages of the program. Urban wards were left out of the listing.

From the listing of wards, one ward was randomly selected for enumeration from each cluster of wards. Thus in those sites with one District, 4 wards were selected for enumeration while 8 wards were selected in 2-District sites.

After listing or obtaining a listing of all villages in the selected wards, 3 villages were randomly selected from each ward, resulting in 12 selected villages per site in one-District sites and 24 villages in 2-District sites. From each of the selected villages, it was planned to interview 24 randomly selected households per village in one-District sites and 12 households per village in 2-District sites. Where available, village household listings were used to effect random household selection. Where no household listings existed, the random walk method was used to select households for interview.

Enumeration teams consisting 5 enumerators and a supervisor per site left for field work on September 13, 2004. Field work was completed on Sunday 26 September, 2004.

3.0 INITIAL FINDINGS

3.1 Staple Food Adequacy

One impact indicator to measure the Land O'Lakes Development Activity Program contribution to household food security is the number of months a household has (in)adequate staples. A decline in the number of months with inadequate staples would signify progress. First, households were asked the type of staples that they consumed in the past 12 months. Table 4 shows the four most important staples in each site.

Table 4: Most Important Staples Consumed in Past 12 Months by Site

Top 4 Staples	Number of Households Consuming	Proportion in Sub-sample Consuming (%)
Chipata/ Petauke (299)		
Maize	291	97
Sweet potatoes	108	36
Cassava	95	32
Rice	50	17
Chongwe (286)		
Maize	268	94
Sweet potatoes	195	68
Cassava	58	20
Rice	29	10
Mongu/ Kaoma (301)		
Maize	291	97
Cassava	258	86
Rice	134	45
Sweet potatoes	116	39
Kalomo/ Monze (287)		
Maize	248	86
Sweet potatoes	122	43
Sorghum	47	16
Cassava	45	16
Kazungula (241)		

Top 4 Staples	Number of Households Consuming	Proportion in Sub-sample Consuming (%)
Maize	216	90
Sorghum	95	39
Millet	73	30
Cassava	41	17
Mumbwa (255)		
Maize	242	95
Sweet potatoes	103	40
Cassava	70	27
Sorghum	45	18
Kabwe (286)		
Maize	259	91
Sweet potatoes	158	55
Cassava	91	32
Rice	18	6
Luanshya/ Chingola (284)		
Maize	274	96
Cassava	136	48
Sweet potatoes	109	38
Sorghum	26	9

It is evident in table 4 that maize is an important staple in all sites. Except at Monze/Kalomo site where 86 percent of the sub-sample reported having consumed maize in the past 12 months, over 90 percent of the households at other sites had consumed maize. Cassava was important in Mongu/Kaoma site and consumption of the four top staples was more balanced than at other sites where consumption was concentrated on one or two staples. Sorghum was an important staple in Kazungula District and sweet potatoes in Chongwe District.

3.2 Most Important Source of Staple Foods

The source of most staples consumed was predominantly own production, to varying degrees for different staples. For maize, between 84 and 99 percent of the households in the site sub-samples reported own production as the most important source staples. The proportions were lowest in Kazungula and Kalomo/ Monze Districts where 12 percent each of the households obtained maize from purchases.

In Mongu/ Kaoma Districts where cassava is an important staple, 96 percent of the households sourced it from own production while in Chipata/ Petauke, Kalomo/ Monze, Kazungula and Kabwe Districts between 21 and 34 percent of the households purchased their cassava.

Eighty four percent of those who consume sorghum in Kazungula District produce it. In Kalomo/ Monze Districts 47 percent of those that reported consuming sorghum obtained it as a gift, probably from a relief program.

Sweet potatoes were obtained mostly from own production except in Kazungula District where 48 percent of those consuming them purchased sweet potatoes. In any case sweet potatoes are not an important staple in this District.

3.3 Duration of Staples From Own Production

Households were asked if their own production of various staples lasted up to the next harvest. Table 5 indicates the responses for the four most important staples at each site. Proportions indicated are out of those that reported consuming the particular staple at each site.

Table 5: Proportion (%) of Households with harvests that don't last till next season

	Maize	S. Potatoes	Cassava	Rice	Sorghum	Millet
Chipata/ Petauke	74	88	82	96		
Chongwe	60	96	58	100		
Mongu/ Kaoma	83	84	38	90		
Kalomo/ Monze	73	94	79		96	
Kazungula	81		73		88	95
Mumbwa	62	91	82		80	
Kabwe	30	62	45	71		
Luanshya/ Chingola	31	37	20		50	
Sample Total	61	80	50	90	80	80

Between 30 and 83 percent of those consuming maize in various sites reported running out of maize before the next harvest. The problem was especially serious in Mongu/ Kaoma, Kazungula, Chipata/ Petauke and Monze/ Kalomo Districts where about three quarters and above of all households reportedly normally run out of maize before the next harvest.

It is not surprising that a majority of the households reported running out of sweet potatoes before the next harvest. Sweet potatoes are usually grown on small plots and tend to be seasonal as they are rarely stored.

Apart from maize, cassava is the only other one that was among the four most important staples at all sites. Cassava has the potential to supplement maize when it runs out because it can be stored in the ground and can be harvested when required. In areas where it is preferred, cassava can be used to prepare nshima either by itself or as an additive to maize meal. However, for various households cassava can only mitigate maize shortages if in those households cassava can last up to the next season or if the combination of maize and cassava can tide the household through to the next season. An assessment of quantities required for consumption during the season would be needed to make such a judgment.

The Luanshya/ Chingola site had the lowest proportion of households running out of the four identified main staples as compared to both other sites and the total sample.

When asked about how they filled the staple food gaps from own production, most households (over 50%) at various sites indicated that they purchased food. For Chongwe, Kalomo/Monze, and Kabwe Districts where less than 50 Percent of the households relied on purchases, the most important other ways that households filled food gaps was through barter and gift donation (probably relief).

One way to infer on the changes in household income over time is to study changes in the diet over time. As income rises, households will likely substitute inferior food with other foods. Survey respondents were asked if their households were currently consuming some staples that they did not consume 2 years prior to the study. Additionally, they were asked if they had stopped consuming some staples that they were consuming 2 years prior to the baseline study. Table 6 shows the number and proportion of households reporting on both aspects.

Table 6: Changes in Staple Consumption Over 2 Years

	Households that are consuming new staples		**Households that have dropped old staples**	
Site	**Number**	**Proportion in sub-sample**	**Number**	**Proportion in sub-sample**
Chipata/ Petauke	12	4	19	6
Chongwe	9	3	11	4
Mongu/ Kaoma	21	7	25	8
Kalomo/Monze	48	17	53	18

Kazungula	72	30	75	31
Mumbwa	38	15	43	17
Kabwe	12	5	16	6
Luanshya/ Chingola	19	7	25	9

At 3 sites, Kalomo/ Monze, Kazungula and Mumbwa, at least 15 percent of the sub-samples reported consuming new staples they had not been consuming prior to the survey. At Kalomo/ Monze Districts 90 percent of those reporting consumption of new crops had consumed either sorghum or wheat. These staples were most likely accessed as relief food as CARE International was involved in distributing wheat or sorghum for relief. At Kazungula about 80 percent of those that reported consuming new staples in the previous 2 years were consuming rice, cassava, and wheat. Wheat may also have been a relief food while cassava has been recently introduced for cultivation in some parts of the country notably by Program Against Malnutrition (PAM).

Most of those reporting having dropped certain staples in the past 2 years in Kalomo/ Monze had dropped either wheat or sorghum. In Kazungula District, they had dropped cassava, rice or wheat. In Mumbwa District, several crops reportedly had dropped out and none of these crops were predominant. They included rice, cassava, sweet potatoes, wheat and sorghum.

3.5 Perception of an Adequate Diet

During the participatory rural appraisal, communities were asked what they thought constituted an adequate diet. A response that featured prominently is that a household that eats well should have food throughout the year. Further, at all sites communities indicated that an adequate diet consisted of at least 3 meals, a morning meal and 2 main meals, one at or about midday and one in the evening. The contents of the meals varied according to site and what foods were available by site but the main meal consisted of Nshima and relish accompaniment. Nshima was made from whatever staples were local to the area.

PRA findings tally well with survey findings. In a normal period, not a hungry season, all sites except Luanshya/ Chingola reported consuming at least 3 meals a day (average=2.88 to 3.80). The Luanshya /Chingola average was 2.45. It is also interesting to note that when the data was disaggregated by gender of head of household, female-headed households reported a higher average number of meals consumed in a normal season than their male counterparts in Chipata/ Petauke, Chongwe, Kazungula and Luanshya/ Chingola sites.

Of the main meals reported at all sites, on average about two (1.91) to three (2.63) meals were considered to be main meals. The highest average of main

meals per day and the only average higher than 2.50 was found in Monze/ Kalomo site where on average 3 meals (2.63) were considered as main meals.

3.6 Regularity of Meal Consumption Impact Indicator

Based on an adequate diet defined by 3 meals and 2 main meals a day, table 7 shows sample and site average total and main meals per day by month. Main meals per day are indicated in brackets. According to this definition, Chipata/ Petauke, Mongu/ Kaoma and Luanshya/ Chingola sites fell below the average of 3 total meals in all months. At the other sites, there were between 4 and 6 months where the average was above 3 meals. These months of on average at least 3 meals per day tended to fall immediately after harvest beginning somewhere in March/ April and continuing on to August September or October. Survey findings corroborate those from the PRA that December, January and February are difficult months as concerns food availability.

Table 7: Sample and Site Average Total Number of Meals and Main Meals per Day, by Month

	Total Sample (N=2239)	Chipata/ Petauke (n=299)	Chongwe (n=286)	Mongu/ Kaoma (n=301)	Kalomo/ Monze (n=287)	Kazungula (n=241)	Mumbwa (n=255)	Kabwe (n=286)	Luanshya/ Chingola (n=284)
2003									
August		2.73 (2.12)	3.10 (2.08)	2.65 (2.32)	2.94 (2.53)	2.50 (1.90)	2.80 (2.01)	3.18 (2.02)	2.38 (1.86)
September		2.65 (2.06)	2.99 (2.07)	2.29 (2.11)	2.82 (2.47)	2.45 (1.87)	2.73 (1.98)	3.15 (2.02)	2.36 (1.85)
October		2.56 (2.03)	2.81 (2.05)	2.05 (1.94)	2.70 (2.40)	2.40 (1.83)	2.65 (1.96)	3.08 (2.00)	2.34 (1.83)
November		2.42 (1.95)	2.48 (1.97)	1.92 (1.78)	2.53 (2.28)	2.28 (1.76)	2.54 (1.89)	2.96 (1.98)	2.13 (1.62)
December		2.29 (1.84)	2.35 (1.90)	1.84 (1.67)	2.39 (2.16)	2.21 (1.70)	2.32 (1.73)	2.85 (1.94)	1.93 (1.47)
2004									
January		1.91 (1.58)	1.88 (1.59)	1.92 (1.71)	2.29 (2.09)	2.23 (1.71)	2.19 (1.63)	2.57 (1.83)	1.86 (1.47)
February		1.74 (1.48)	2.04 (1.60)	2.14 (1.92)	2.43 (2.26)	2.36 (1.79)	2.25 (1.67)	2.62 (1.81)	1.90 (1.56)
March		2.18 (1.70)	3.01 (2.02)	2.43 (2.15)	2.92 (2.53)	2.62 (1.98)	2.86 (2.02)	3.12 (1.99)	2.39 (1.88)
April		2.73 (2.12)	3.19 (2.07)	2.73 (2.38)	3.24 (2.68)	2.71 (2.03)	3.02 (2.11)	3.23 (2.01)	2.47 (1.94)
May		2.84 (2.18)	3.54 (2.15)	2.83 (2.48)	3.36 (2.71)	2.76 (2.07)	3.00 (2.11)	3.26 (2.02)	2.49 (1.95)
June		2.88	3.30	2.83	3.39	2.76	3.01	3.22	2.45

	Total Sample (N=2239)	Chipata/ Petauke (n=299)	Chongwe (n=286)	Mongu/ Kaoma (n=301)	Kalomo/ Monze (n=287)	Kazungula (n=241)	Mumbwa (n=255)	Kabwe (n=286)	Luanshya/ Chingola (n=284)
		(2.20)	(2.10)	(2.47)	(2.71)	(2.07)	(2.11)	(2.02)	(1.93)
July		2.87 (2.20)	3.29 (2.10)	2.81 (2.46)	3.37 (2.71)	2.74 (2.07)	3.01 (2.12)	3.21 (2.02)	2.45 (1.93)
No of Months with at least 3.00 average		0	6	0	4	0	4	5	0
Proportion (%) h/holds consuming at least 3 meals per day	63	52	74	47	74	57	71	91	37

3.7 Identification of Food Insecure Target Groups

From the literature certain types of households are known to be particularly vulnerable to food insecurity because of their characteristics. Such households include female-headed households, households with chronically ill members, elderly headed households with productive-age members and households headed by children by youth (C-SAFE, 2003). The reasons for food insecurity in the various cases emanates from a lack of productive resources and or assets (including labor), time constraints because of having to care for the chronically ill, increased dependency ratio as a result of households having to suddenly absorb young orphans or a combination of some of these reasons.

From the PRA it was found that one common cause of food insecurity among the poorer sections of the community was the inability of these households to break out of the poverty cycle. Most of these households were often preoccupied with how to source food. Even during the farming season and because of lack of food they spent their time looking for piece work on other peoples farms in order to get food. In the meantime, they neglect their own fields such that with poor management they have barely any crop to harvest and are therefore forced to continue offering their labor for petty wages.

In table 7 households in the sample are characterized according to known food insecure household types. The aim is to examine whether these types of households in the survey sample are worse in terms of food securityas compared to the sample averages.

Table 7:

Characteristic	Whole Sample	Chipata/ Petauke	Chongwe	Mongu/ Kaoma	Kalomo/ Monze	Kazungula	Mumbwa	Kabwe	Luanshya/ Chingola
Average size of household	6.7	6.2	6.7	7.1	8.1	5.3	6.7	7.0	6.8
Number of households/ (percentage) with chronically ill persons	548 (24)	76 (25)	74 (26)	123 (48)	87 (30)	61 (25)	52 (21)	31 (11)	39 (14)
Number of households/ (percentage) with orphans	925 (41)	93 (31)	140 (49)	178 (60)	128 (45)	99 (41)	106 (43)	80 (28)	101 (36)
Number (percentage) of female-headed households	561 (25)	80 (27)	89 (31)	74 (25)	59 (21)	72 (30)	72 (29)	56 (20)	59 (21)

REFERENCES

Caldwell, Richard M. 1993. A Preliminary Vulnerability Assessment of Zambia Based on District-Level Data. A report Prepared for the World Food Program and the International Fund for Agricultural Development.

Magnani, Robert. 1997. Sampling Guide. Washington D.C., USA: Food and Nutrition Technical Assistance Project (FANTA), Academy for Educational Development.

USAID. 2004. PL480 TITLE II FY 2005 Development Program Policies.