

**IMPACT OF CATTLE DAIRY FARMING ON SMALL SCALE
FARMERS LIVELIHOODS IN NORTHERN PROVINCE - A CASE
STUDY OF MPIKA DISTRICT**

**A RESEARCH REPORT PRESENTED TO THE DEPARTMENT OF
AGRICULTURAL ECONOMICS AND EXTENSION EDUCATION OF
THE UNIVERSITY OF ZAMBIA
BY CHARLES M CHIJOKE**

**In partial fulfilment of the requirements for the Degree of
Bachelor of Agricultural Sciences**

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ACKNOWLEDGEMENT

My sincere gratitude goes to my project supervisor, Ms D. J. Banda, for her untiring guidance throughout this study. I would also like to thank all members of staff of the Department of Agricultural Economics and Extension education, university of Zambia for her advice and well meaning criticisms.

My thanks also go to management and staff of the Mpika Dairy cooperative, for allowing me to use their premises to get data from some of the respondents, and compare with the records at the office. I also wish to thank the Ministry of Agriculture and Cooperatives, Zambia Agribusiness Technical Centre, World Vision Zambia and the Agricultural Support Programme for their insurmountable assistance during data collection.

DEDICATIONS

I dedicate this report to my wife, Gift, my daughters Valeria and Olivia and my mother Josephine, for their love understanding and patience, and my friends W. Lukubi and E. Malauni including all my classmates for their support and encouragement during my studies.

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List of Acronyms

ASP	Agricultural Support Programme.
CSO	Central Statistics Office.
FAO	Food and Agricultural Organisation
FNDP	Fifth National Development Plan
GDP	Gross Domestic Product.
Km	Kilometres
LDT	Livestock Development Trust
MACO	Ministry of Agriculture and Co-operatives
MCC	Milk Collection Centre.
NAP	National Agricultural Policy
NGOs	Non Government Organisations
PRSP	Poverty Reduction Strategy Paper
SLIC	Smallholder Livestock Intensification and Commercialisation
SPSS	Statistical Package for Social Science
WVZ	World Vision Zambia
ZATAC	Zambia Agribusiness Technical Centre
ZmK	Zambian Kwacha

ABSTRACT

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Poverty is most prevalent in rural areas where the main activity is agriculture. Dairy cattle production is one of the strategies that the government through the Ministry of Agriculture and Cooperatives, is using to reduce the poverty levels in the rural areas. The overall focus of this study was to establish whether the smallholder dairy farmers' welfare have improved after adopting dairy farming through the use of improved dairy breeds. Specifically the objectives of the study were to determine the income levels of the small scale farmers from dairy; to identify and determine the enterprises that contributes to poverty reduction, to determine the employment levels created by dairy farming, and to determine the extent to which dairy farming contributes to access to food.

The study was carried out in Mpika district of Northern Province of Zambia. Eight five small scale farmers were sampled. Forty famers were sampled from the non intervention areas while forty five were from the project areas. A questionnaire was used to collect primary data from the farmers. Additional data and information was collected through interviews with key stakeholders.

The study revealed that the adoption of improved dairy breeds in farming by the small-scale dairy farmers in Mpika has resulted into high levels of milk production leading to an increase in the income levels amongst the beneficiaries of improved dairy breeds. There has also been an increase in access to food, and creation of employment. The use of dairy cattle in rural areas, can lead into the improvement of the social welfare access, thus reduction in the poverty levels. Improved dairy breeds can increase the reduction of poverty levels far much faster than the local breeds through high productivity levels of up to 20 litre of milk per cow as compared to the recommended average 5litres of milk per cow per day.

CHAPTER 1: INTRODUCTION

1.1 Background

Poverty does not only mean low income levels of human development (education and development) but also a feeling of powerlessness, vulnerability and fear because poor people are not free (Thirwal 2005). The concept of poverty includes material deprivation (i.e. food, shelter) and access to basic services (i.e. health, education). Its manifestations include lack of income and productive resources sufficient to ensure sustainable livelihood; hunger and malnutrition; ill health; limited or lack of access to education and other basic services; increased morbidity and mortality from illness; homelessness and inadequate housing; unsafe environment; and social discrimination and exclusion. The contemporary focus on poverty in high income countries is on the relation between growth and the distribution of income. The concern is with inequality of distribution, rather than on the proportion of the population falling under some absolute poverty line. For low income countries, the focus is on the number and proportion of people falling under an absolute poverty line. The choice of focus is a philosophical one. In very poor countries it is the incidence of absolute poverty that matters most (Mellor 1999). Absolute poverty has long been defined in terms of the income required to provide a minimal food intake for a healthy life and the associated consumption of those so poor that the minimum food intake is all they achieve. The traditional measurement of absolute poverty is the proportion of the population falling under the defined poverty line.

The World Bank defines extreme poverty as living on less than US\$1 per day, and moderate poverty as less than \$2 a day, estimating that in 2001, 1.1 billion people had consumption levels below \$1 a day and 2.7 billion lived on less than \$2 a day (poverty Wikipedia 2007). Eighty percent of the Zambian population lives below the poverty datum line of \$2 or 67 percent on less than a dollar per day. 60 percent of the population live in rural areas (CSO 2007). 69 percent of the Zambian population is engaged in agriculture which contributes 27percent to the nation's gross domestic product (GDP). The livestock sector, according to Kaluba (1995) contributes 11 percent to the gross domestic GDP.

The incidence of poverty in Northern Province is 78 percent; the third highest after Western and Eastern provinces (CSO 2007). Cattle in East and southern African countries play many roles; they contribute to subsistence, nutrition, income generation, assets, security, social and cultural functions (Mwenya 2005). Hence, the livestock sector contributes to the development

of the country through generation of income and more so contributing to the reduction in poverty in the nation.

1.2 The Importance Of dairy Production

Globally, livestock contribute to the livelihood of approximately 70 percent of the worlds poor. In Africa livestock are vital for the poor households and prediction of future global demand for livestock products indicate considerable opportunities for African producers. Increased demand for livestock commodities in growing urban and peri-urban areas could promote markets for small scale producers and consequently increase their incomes (LEISA, December, 2005).

The importance of dairy production cannot be over emphasized. It provides employment; dairy production is labour intensive, well suited to labour abundant rural Zambia (Mellor 2003). Through milk sales, the income levels among the small scale farmers, accordingly, improves or gets improved. Dairy production can also contribute to the food security for the small scale farmers and improve the nutrition status specifically protein and possibly foreign exchange (Rogers et al 2003). For low income earners, it can also acts as store of wealth and organic fertilizers for crop production.

The demand for milk and milk products has been increasing rapidly in most provinces including those where milk was not common in the diet, for instance in parts of the Northern Province. It is known from Zambian history that tribes such as Tongas, Lozis, Cewas, Namwargas and Mambwes were traditional cattle keepers (Kaluba 1995), while the Bemba and Bisa tribes of Mpika district are keeping dairy cattle for the first time.

Improvement of dairy production on smallholdings can contribute to the uplifting of the standard of living for the rural population, and to the improvement of their socio-economic status. It may assist in halting rural emigration and perhaps reverse the urbanization process, where 60% of the Zambian population is found in the urban area (Kaluba 1995). The high urban population needs food which can be produced by the smallholder farmers.

Cattle dairying can also provide employment to many people both in rural areas as well as urban areas (Chindo 1995). Therefore, dairy production can play a major role in uplifting the national economy and the standard of living for the Zambian people.

The Northern Province of Zambia has 102, 025 herds of cattle and Mpika district contributes 13,326 herds (CSO 2007). The Agricultural Support Programme came into Mpika district and

started supporting famers in facilitating the reduction of poverty through increased income and food security, through a project called the Small Holder Livestock Intensification and Commercialization programme (SLIC). The programme that was initiated in July 2004 was to enable small scale farmers to profitably deliver to the markets the right type of livestock and livestock products at the right time for the optimum prices, in line with the National Agriculture Policy (NAP, 2004).

The SLIC programme started working with 30 farmers. The number has since increased to above 130. The Livestock Development Trust (LDT) provided in-calf Friesian dairy cattle to the small scale famers as well as the equipment and trained the farmers in the management of the animals. The Zambia Agribusiness Technical Assistant Centre (ZATAC), in 2005, trained the farmers in the management of livestock and marketing of milk, at a profit, and gave the farmers a start up loan consisting of dairy animals and milking equipment. This is as was recommended by Kristjanston et al in Kenya in 2004, a precondition to livestock sector undertaking to enable the small scale farmers come out of poverty. The Ministry of Agriculture and Cooperatives (MACO), through the department of veterinary services, provided extension services to the farmers. With this intervention it was envisaged that poverty levels among the small scale farmers in the district that had participated in the project would be reduced, as was the case in Namibia where dairy farming was being promoted due to ability to reduce poverty levels among the small scale farmers.

This therefore provides a more reason why poverty can be reduced through dairy production in agriculture and the more reason why the farmers in Mpika were facilitated by the ASP, ZATAC and LDT.

Since poverty is mostly a rural phenomenon, then improving the income, food security and nutrition situation of the majority poor will contribute significantly to alleviation of overall poverty in the country. It is therefore possible and applicable to Mpika district and thus important to asses whether there has been any reduction in the poverty levels or not.

1.3 PROBLEM STATEMENT

In Zambia about 67 percent of the population lives on less than \$1 per day (CSO 2007). A large a growing number of Zambians are food insecure, which entails that a significant number can not obtain enough food. The reason being that they do not have sufficient income to purchase enough food. Hence, increased income through the use of the dairy enterprise is assumed to reduce on poverty levels. Studies have shown that Livestock make a substantial

contribution to household food security by providing income, quality food, fuel, building material, fertilizer and assets for a majority of rural households in developing countries (Buyu et al 2005). Livestock act as a bank, in terms of food security, foodstuff conversion, and as tangible assets that can be sold or exchanged in times of need.

By 2007, 347 small-scale farmers in Mpika district had adopted dairy farming. The question to ask is that, after adopting the dairy farming technology, have the small-scale farmers in Mpika District, improved their livelihood through improved nutrition status, income levels and job creation? The extent, to which dairy production has improved the welfare of the small scale farmers in Mpika district, is not known, as there are no reports in the district or the Ministry of Agriculture and Cooperatives (MACO). Therefore, is a knowledge gap about the contribution of dairy towards poverty reduction specifically in Mpika district.

1.4 STUDY OBJECTIVES

1.4.1 GENERAL OBJECTIVES

To determine the impact of cattle dairy production on the livelihoods of small scale farmers.

1.4.2 SPECIFIC OBJECTIVES:

- To establish how much the dairy enterprise for small scale farmers in Mpika, contribute to the gross margin of the farm.
- To identify and determine the enterprises that contributes to poverty reduction for the small scale farmers in Mpika district.
- To determine the employment levels created by dairy farming among the small scale farmers.
- To determine the extent to which dairy farming contributes to access to food.

1.4.3 HYPOTHESIS

Smallholder dairy represents an important tool for reducing poverty in both rural and peri-urban areas. For the small scale dairy farmers, dairy farming is a means to escape poverty and sustain their families with particular benefits accruing to women and children.

- The more enterprises one has on the farm, the more the income.

- The higher the number of dairy cattle being kept, the higher the income.
- Improved dairy breeds can result into higher levels of income.

1.5 STUDY RATIONALE

For a long time now, the government of Zambia has had its emphasis on crop production (in particular maize which has received enormous subsidies and market infrastructure) yet this initiative has not alleviated hunger and poverty among the rural communities (Chindo 1994) through increased income or ensuring access to food at all times. This is due to the fact that crop production is usually adversely affected by drought and other natural disasters as compared to cattle dairy. Most rural communities have been asking for relief food year after year due to crop failure. This failure could be attributed to the fact that crop farming is seasonal and depends largely on rainfall patterns which in most cases are unpredictable.

With 67 percent of Zambians living below the poverty datum line, other avenues such as dairy farming come in handy in alleviating poverty especially in areas of Northern Province where culturally, they were not keeping cattle, hence the need for the research to find out whether the income levels, access to food and employment of the small scale dairy farmers have been improved or not. The study will also help the Government, Non Governmental Organisations and other service providers to come up with interventions that will facilitate the promotion of more dairy farming projects and improved extension services, and also to evaluate their efforts as to whether the general objectives of reducing poverty among the rural people through the use of dairy cattle has been achieved.

This study is important because agricultural technology, its development, transfer and adoption are fundamental in increasing productivity, rural incomes, and economic growth and subsequently in contributing to poverty reduction. Despite the fact that the study is a requirement for me to acquire the Degree in agriculture, the study will increase the body of knowledge for the Ministry of Agriculture and Co-operatives especially the Departments of Veterinary and Livestock Development, and Marketing and Cooperatives.

1.6 STUDY SCOPE

The research study operated within the confines of Mpika district in four agricultural camps of Northern Province. These were Mpika main, Mpepo, Luchembe and Kopa camps. The sampling scope was from the ASP beneficiary farmers that also have improved dairy breeds and access to a centralised selling point of milk at the Mpika dairy cooperative, and those

outside the ASP without a centralised selling point and having traditional cattle breeds for milk. The study concentrated on social, economic, livestock and crop production aspects.

1.7 STRUCTURE OF REPORT

This research report is divided into five (5) chapters and is laid out as follows: after presenting the study introduction and background, statement of the problem, study purpose, study significance and study scope in chapter one, chapter two presents a discussion on the literature review, chapter three presents the research methodology. Study findings are presented and discussed in chapter four and the paper concludes with chapter five which contains the study conclusions and recommendations. The report also has an attachment of the questionnaire, the data collection tool that was used in the research.

CHAPTER 2: LITERATURE REVIEW

2.1 POVERTY AND RURAL DEVELOPMENT

The World Bank defines extreme poverty as living on less than US\$1 per day, and moderate poverty as less than \$2 a day, estimating that in 2001, 1.1 billion people had consumption levels below \$1 a day and 2.7 billion lived on less than \$2 a day (poverty wikipedia 2007). Eighty percent of the Zambian population lives below the poverty datum line of \$2 or 67 percent on less than a dollar per day. 60 percent of the Zambian population live in rural areas (CSO 2007) and that 69 percent of the Zambian population is engaged in agriculture which contributes 27 percent to the GDP. The livestock sector contributes 11 percent to the GDP (Kaluba 1995). The incidence of poverty in Northern Province is 78 percent; the third highest after Western and Eastern provinces (CSO 2007). The Ministry of Agriculture and Cooperatives has come up with various strategies of reducing poverty and food insecurity among small scale farmers. One of the strategies is diversification into other farming activities like dairy farming. Research and development partners have been working to alleviate poverty through the use of livestock Buyu et al (2005). When farmers produce milk; they can ensure regular year-round income not found with arable crops.

2.2 EMPIRICAL STUDIES

There is clear evidence to show that dairy farming, especially using improved dairy breeds is highly profitable, hence can be used in raising the living standards of the rural people. Improvement of peoples' incomes in general and enhancement of milk production, processing and marketing, can likely lead to poverty alleviation through dairy farming in both fronts: enhancing incomes as well as improving access to food and nutrition status (Limbu 1999).

Kristjanston et al (2004) carried out a study in western Kenya where it was recognized that livestock was vital to the economies of many developing countries like Zambia. Livestock is a source of food, more specifically proteins for human diets, income, employment and possibly foreign exchange. In the study it was revealed that households can be moved out of poverty through livestock production of dairy animals. The study further highlighted the key role that livestock can play in the reduction of poverty among the rural people. On farm

diversification of income sources, away from the sole reliance on crop through investment in livestock such as dairy helped most of the farmers escape from poverty. Given that investment in large animals such as dairy is typically beyond the poorest in the society, the study found that projects that provide a heifer or loan to buy a sheep or a goat could provide a one time transfer sufficiently substantial to help households lift themselves out of poverty. The findings of the research are supported and can thus be applied elsewhere in the developing countries; which suggests that they have more relevance beyond Kenya, hence there application in Zambia through programmes such as Heifer international, World Vision and ZATAC through ASP.

Studies have also shown that agricultural growth, particularly livestock, can have an impact on the growth of the economy through employment creation. In India, it was found that wage earnings of poor self employed farmers grew faster than earnings from any other source and were a major cause of decreased poverty. Agriculture is of course by far the largest employer in essentially all low income countries. Thus, agricultural productivity increase has a major effect in reducing poverty, and the effect is relatively greater in its impact on the poorest and the distribution of income among the poor (Mellor J, 1999) and this can contribute to the creation of employment.

In Zambia, estimates suggest that every \$1 of additional farm income creates a further \$1.50 of income outside agriculture (DFID 2005). This implies that additional income from dairy can contribute to national growth such as employment creation in other industries as well as supporting other industries such as the confectionery industry that depends on the raw materials from agriculture as a source of raw materials.

Studies have also shown that technological change in agriculture can alleviate poverty both directly by raising the welfare of poor farmers who adopt the innovation, as well as indirectly through the effects on the price of food for net buyers, and labour effects in agriculture. The use of improved animal breeds can tremendously improve productivity of the local breeds and that would result into a reduction in poverty. It is thus in line with this hypothesis, that some farmers in Mpika district were given 60 Friesian dairy breed cattle on loan from ZATAC.

Studies have also proved that improved dairy breeds can contribute a larger proportion in poverty reduction than crops (Valenzuela et al. 2004). Hence the participation of the small scale farmers in Mpika district other than just diversification is a major step in rural poverty

reduction and inequality reduction because growth in smallholders' incomes reduces rural poverty.

Studies have also shown that what African countries south of the Sahara lack, is access to new technology and both input and output markets (Reiquam, 2006). Rural non-agriculture employment depends on smallholder agriculture, because it's rural agriculture that can support other industries like confectionery. Dairy can therefore create jobs indirectly in other industries and play a major role in reducing unemployment common in the rural Zambia by also inter linking and creation of employment. This would thus contribute to the reduction of poverty levels among the rural community of Zambia. Further more, agriculture productivity growth may have more immediate multiplier effects in improving the wellbeing of the majority of the poor due to the fact that most of the world's poor households reside in rural areas, and agriculture comprises the largest component of the rural economy in most developing countries (Hertel et al 2004). Therefore, dairy has a positive effect in the reduction of poverty across all of the developing countries. Even if farmers can not get a market for their products they will be assured of adequate food to eat. This, itself, is poverty alleviation. (Limbu, 1999).

The dairy farming can thus be used in the reduction of poverty among the small scale farmers. Such interventions have been used in Kenya, Namibia and many other countries of the world. In Namibia poverty among small scale farmers was being fought through milk production in 2004, by the government and FAO. Northern Namibia suffered from a high level of poverty and food insecurity (FAO report, 2008).

2.3 TYPES OF CATTLE DAIRY PRODUCERS:

There are three main categories of dairy producers in Zambia; commercial, traditional/small-scale dairy farmers and emergent.

2.3.1 Traditional Producers:

These are small sale farmers both in terms of productivity of milk per cow per day and level of animal husbandry. Productivity range between 1-3 litres of milk per day. Traditional open range grazing with movement of cattle in search of water and pasture is the norm. Animal disease control is weak and often reactive rather than preventative. This category of farmers produces rears mostly local breeds. Ninety percent of the total estimated number of cattle in

Zambia, i.e. 1,038,661 (projected from the 2004 CSO statistics), are raised by this category of farmers. Of this total, 49% are heifer, cows and calves. This category of farmers contribute about 40% of the total annual marketed milk (190 million litres out of the required 253 litres/annum representing a 25% deficit) while the balance is produced by commercial and emergent farmers, (Mukumbuta et al, 2006).

2.3.2 Emergent Producers

These are small scale farmers with improved productivity above 3 litres of per cow per day but have not yet reached the average productivity of the commercial farmers. The emergent farmers typically own dairy breeds of cattle and usually also have traditional animals. They invest more deliberately in animal husbandry and dairy development to increase milk production. They employ improved animal husbandry practices such as crossing of exotic breeds with local breeds. They commonly procure dairy equipment, established dairy infrastructure such as milking parlours and take initiative to always seek better markets for their dairy products.

2.3.3 Commercial Producers

There are about 70 commercial producers in Zambia, with dairy herd about 10 percent of the total cattle population. Most of the milk produced by the commercial farmers is marketed through the large milk processors while some process part of it themselves. This category of farmers, contributes about 60% of the national milk production (Mudenda et al2006).

2.4 PRODUCTION SYSTEMS

In Zambia, dairy production systems are affected by the ecological zones.

2.4.1 Agro-ecological Zones

Small scale dairy farmers engage in a variety of production systems in adaption to the agro ecological zone in which they are situated as well as other social economic factors of livestock production. Zambia has three ecological zones; I, II, and III. Zones I and II are semi arid and sub humid where the majority of the small scale farmers practice mixed crop-livestock production systems. The largest number of cattle population is in Zone II and the lowest (only 3 percent of the total cattle population) is found in Zone III.

Zone I is characterised by low rain fall (600-700mm per annum), high temperatures and acidic poor soils of pH 4. Natural grazing is poor and low carrying capacity.

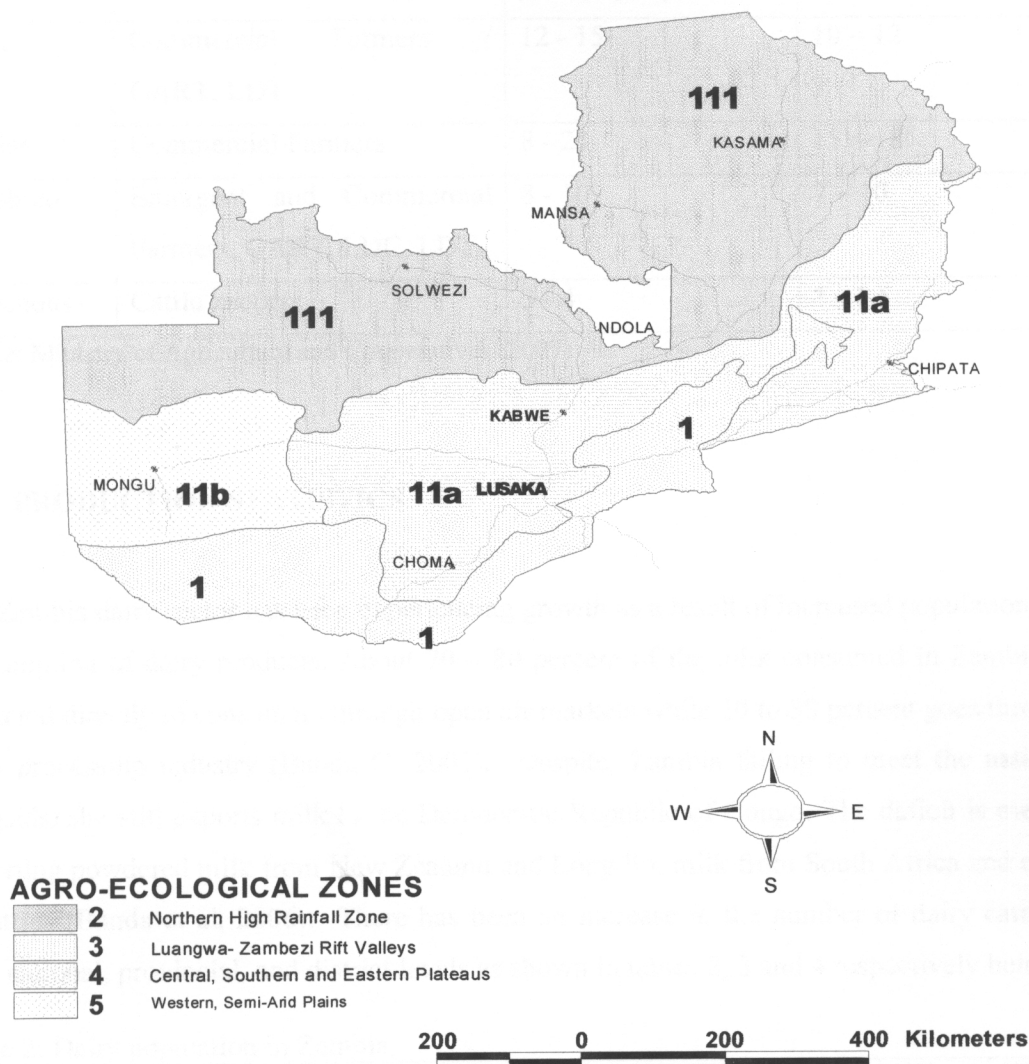
Zone II is characterised by moderate rainfall (800-1000mm per annum). The vegetation comprises of the miombo woodlands and this zone is richly endowed with flood plains and dambos as a source of grazing during the dry season.

Zone III is characterised by high rainfall (1000 – 1,400mm) per annum and moderate temperature. The vegetation is close to miombo woodlands which give good browse for livestock during the dry season. This applies to Mpika district.

Dairy production systems prevalent among the smallholder farmers include the following:

- Pastoral / Free grazing- this is an extensive system where cattle are left out to graze without restriction in the morning and come back to the kraal in the evening. This system is mostly employed by the traditional producers with local breeds and on communal land.
- Semi – zero grazing- mostly employed by emergent farmers that have cross breeds. The animals are allowed to graze within restricted areas. Movement of animals is from time to time restricted and confined for zero grazing.
- Zero grazing – This is an intensive system where small holder producers keep the dairy animals in a confined grazing space. This helps to curb the spread of diseases to exotic breeds but also renders the administration of nutrition and drugs highly cost effective. There are not many small holder dairy farmers in this category in Zambia.

Figure 1: Agro ecological zones of Zambia



Source: Ministry of Agriculture and Cooperatives (2008)

The local traditional breeds that are kept by the small holder producers are Senga, and Zebu, that may have been crossed with Tonga, Barotse or Angoni. These breeds have low milk yields that range from 1 – 5 litres per day under good animal husbandry practices. The average production of milk from the traditional breeds is 1-1.5 litres per cow per day. Various support organisations commonly distribute improved breeds of cattle to smallholder farmers such a Dairy F1 (Friesian x local) Friesian, Jersey and Guernsey. Sources of various breeds are exemplified in Table 1.

Table 1: Sources of cattle breeds for small holders

Breed	Source	Average expected yield(Kg/day)	Yields obtained (kg/day)
Jersey	Commercial Farmers / GART, LDT	12 - 15	10 – 12
Friesian	Commercial Farmers	8 - 25	15 – 18
Crossbred	Emergent and Commercial Farmers, GART, LDC, LDT.	8 - 10	7 – 10
Indigenous	Cattle keepers	3 - 4	1 - 1.5

Source: Ministry of Agriculture and Cooperatives (2007)

2.5 PRODUCTION STATISTICS

The Zambia dairy sector has been experiencing growth as a result of increased population and consumption of dairy products. About 70 – 80 percent of the milk consumed in Zambia, is marketed directly to consumers through open air markets while 20 to 30 percent goes through dairy processing industry (Banda G, 2006). Despite, Zambia failing to meet the national demands, she still exports milk to the Democratic Republic of Congo. The deficit is met by importing powdered milk from New Zealand and Long life milk from South Africa and other countries (Banda et al, 2006). There has been an increase in the number of dairy cattle at both national, provincial, and district levels as shown in tables 2, 3 and 4 respectively below

Table 2: Dairy population in Zambia

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Cattle	2,701,000	2,747,000	2,905,000	2,620,987	2,490,990	2,517,550	2,375,453	2,341,970	2,799,965	2,678,767	2,457,563

Source: MACO data (2007)

Table 3: Northern Province cattle population

Year	2000	2001	2002	2003	2004	2005	2006	2007
Cattle	99,716	116,824	108,818	105,565	108,727	129,989	115,672	102,025

Source: MACO data (2007)

Table 4: Cattle population of Mpika District

Year	2002	2006	2007
Cattle	8340	12,797	13,326

Source: MACO data (2007)

Mpika district has 341 small scale farmers keeping cattle for dual purpose; i.e. for milk and beef. Institutions keeping cattle are only four; that is Zambia college of Agriculture, Lwitikila high school and Chilonga mission hospital. The population of cattle kept by two commercial farmers is 464 herds of cattle, while small-scale holders have largest share of 12,894 dairy herd cattle.

2.6 AGRICULTURAL VISION ON THE DAIRY INDUSTRY

The current dairy strategy (2002 – 2011) is governed by National Agricultural Policy and Agricultural Commercialization Programme (2000 – 2004) and this is a major shift from the traditional concept of rearing animals to market orientated dairy production system.

There has been growing enthusiasm by the private sector, NGOs and livestock trusts to participate in dairy production by targeting small-scale farmers in the rural and peri – urban areas.

The use of improved dairy breeds; improved nutrition and feeding strategies; improved fertility management; good animal husbandry and animal health care practices have been identified as key areas requiring attention in order to enhance dairy productivity.

This study has shown that dairy production has many benefits especially among the smallholder farmers.

The smallholder dairy farmers have a relative advantage over households without dairy animals, through (a) increased incomes from milk sales (b) improved nutritional status at household level, due to increased intakes of milk (c) improved food security through out the year and at critical times of the year (November – December) when hunger is eminent and (d) increased crop production as a result of access to organic manure from dairy animals

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

This section shows the methods and procedures that were used to achieve the stated objectives. It gives information on the study sites, data collection and data analysis tools that were used in the study.

3.2 STUDY SITES

The sample survey was undertaken in Mpika district of Northern Province. It covered four camps, namely Luchembe, Kopa, Mpika main and Mpepo. The sample consisted of small-scale dairy farmers in project areas and non project areas. The project area in this case was taken to mean those under the Agricultural Support Programme (ASP) where dairy farmers received improved dairy breeds, while non project areas implied those outside the ASP operation areas and was having traditional cattle. Mpika district located 860km north of Lusaka, was chosen for the reason that the area has a back ground of people not keeping cattle traditionally but have started due to the intervention by the non governmental organisations (NGOs). The areas also have some people who have migrated from other areas as well as institutions near by such as Zambia college of Agriculture and the farmer training centre hence making it an appropriate study area.

3.3 DATA COLLECTION METHODS

A sample of 85 households was purposively selected from the camps to include representative samples of areas with farmers' dairy cattle; in project areas and non project areas. In all, 45 farmers from the project areas, and 40 from non project areas, were selected. Purposive sampling was used to select the sample, from areas where dairy cattle was being kept. Hence a quasi experimental design of the project impact was determined. The type was a control and an intervention was to be compared in terms of their contribution to the welfare by only looking at the results and not a pre test. Primary data was collected by means of structured questionnaires administered as interviews while secondary data was collected from the Ministry of Agriculture and Cooperative at the headquarters and also from Mpika district.

3.4 ETHICAL CONSIDERATION

There was an assurance to the respondents that the information that was availed to this study was going to be used as such.

3.5 DATA ANALYSIS

The field data was analysed in SPSS to produce descriptive statistics and the output was organized using EXCEL in order to produce summarized data. Descriptive statistics were used so as to come up with a summary of the effects of dairy cattle on the livelihoods of small scale farmers and understand a preliminary change in technology from indigenous breeds of dairy cattle to improved breeds.

CHAPTER 4: STUDY FINDINGS

4.1 INTRODUCTION: The chapter highlights the findings from the study as follows:

4.2. DISTRIBUTION OF THE SMALL-SCALE DAIRY FARMERS

The number of farmers in the district carrying out dairy farming is 347. Table 5 below shows the distribution of the small scale dairy farmers according to the villages that of the sampled small scale dairy farmers.

Table 5: Distribution of Small scale dairy farmers

Village	Frequency	Percentage
Danger hill	1	1.2
Chilikisha	2	2.4
Malashi	13	15.3
Kanchibiya	9	10.6
Chibansa	1	1.2
Chikwanda	15	17.6
Mufubushi	11	12.9
Chipundu	4	4.7
Kopa	6	7.1
Luchembe	3	3.5
Mpepo	4	4.7
Kasenga	6	7.1
Chewe	1	1.2
Mundu wa Ntanga	1	1.2
Mutamba	1	1.2
Mansha	5	5.9
Mwasulwa	1	1.2
Chibwa	1	1.2
Total	85	100.0

Source: Own Survey Data (2008)

Chikwanda has the largest number of sampled small-scale dairy farmers of 17.6 percent, followed by Malashi at 15.3 percent and Mufubushi with 12.9 percent. Chikwanda village and Malashi dairy scheme are in the proximity of the milk collection centre hence the large number of small-scale farmers being present. Kanchibiya, Mansha and Mufubushi are in the farm blocks.

4.3 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

The demographic characteristics of the survey sample in table 6 on the next page, shows that the majority of the small-scale dairy farmers (71.8%) were males and 28.2% were females. The difference is due to the fact that dairy production is labour intensive that requires entrepreneurial engagement every day. The dairy cows need to be fed every day with close

monitoring of health and nutrition status. Milk also need to be delivered by the farmers to milk collection centre and other markets promptly before it ferments into sour where fresh milk is required by the market. This often implies daily walks or bicycle rides to milk collection centre, which in some cases can be located up to 20km from the farm steady. However, women are actively participating in dairy production due to the promotion of gender equity by the NGOs.

Table 6: Demographic distribution

Category		Frequency	Percent
Sex	Male	61	71.8
	Female	24	28.2
Age	20- 25	3	3.5
	26 – 40	73	85.9
	Above 40	9	10.6
Education Background	Primary	57	67.1
	Secondary	15	17.6
	Tertiary	11	12.9
	None	2	2.4

Source: Own Survey Data (2008)

The table also shows an age distribution of 86 percent being between 25 to 40 years of age. This is an active and energetic age group, which is very necessary for the labour intensive dairy production activity.

The table further shows that the majority of the small scale dairy farmers had been to primary school, 67.1%, with a minority of 2.4% as having not been to school. Only 17.6% had had been to secondary school and tertiary education was at 12.9%. The basic education levels, therefore, implies that it becomes easy for the extension agents to promote innovations such as dairy, very easily.

4.4 AGRICULTURAL ACTIVITIES

The following are the major agricultural activities of the area that the small-scale dairy farmers are involved in.

4.4.1 CROP PRODUCTION: the following were the crops that the sampled small scale dairy farmers were growing: Maize, sunflower, cassava, beans, leaf vegetables, Garlic, Onion, groundnuts, Soya beans, leaf vegetables, onion, green maize, finger millet, sugarcane sorghum, and Irish potatoes.

4.4.2 LIVESTOCK: the following were the dairy cattle, Beef cattle, pigs, chickens and goats

Table 7 below is a summary of all the enterprises that the sampled small scale dairy farmers in Mpika district were keeping.

Table 7: Small scale agricultural activities

Enterprise	Frequency	Percentage
Cassava	5	5.9%
Dairy	85	100.0%
Maize	82	96.5%
Beans	10	11.8%
Groundnuts	40	47.1%
Soya beans	8	9.4%
Sunflower	22	25.9%
Vegetables	13	15.3%
Goats	12	14.1%
Pigs	11	12.9%
Chickens	21	24.7%
Garlic	1	1.2%
Onion	5	5.9%
Beef	3	3.5%
Green maize	2	2.4%
Oranges	2	2.4%
finger millet	8	9.4%
sugarcane	3	3.5%
Sorghum	3	3.5%
Irish potato	2	2.4%

Source: Own Survey Data (2008).

The table shows that of the sampled small-scale dairy farmers 96.5 percent were also growing maize. This is because maize is a staple food. Other enterprises were groundnuts with 47 percent, chickens with 21 percent which is an easy source of protein and easy to keep as compared to other livestock such as pigs and Goats. Only 14.1% of the farmers were keeping goats because they were regarded to be difficult to control in terms of grazing and browsing. The results further shows that farmers have diversified by having more than one enterprise on the farm.

4.51 MAIN FARM ENTERPRISES

The enterprise with the highest income is as shown in the table 8 below; this was after considering the best four income enterprises held on the farm from the table above. Only the best four enterprises were chosen using the choice of the enterprise with the highest gross margins.

Table 8: Income from the major enterprises

Farm Enterprise	Frequency	Percent
Dairy	70	82.4
Maize	8	9.4
Pigs	2	2.4
Chickens	4	4.7
Onion	1	1.2
Total	85	100.0

Source: Own Survey Data (2008)

The table shows that the dairy enterprise was ranked as the highest source of income with 82.4 percent of the respondents ranking it as number one using the gross margin. The next one was Maize, followed by Pigs, chickens and lastly Onion with 9.4, 2.4, 4.7 and 1.2 percent respectively. Only one farmer ranked onion as the major source of income on the farm. The result shows that the farmers had four major sources of income on the farm in the order as shown in table 8 above.

4.6 INCOME DISTRIBUTION FROM DAIRY BREEDS.

Table 9 below shows the distribution of income from the different breeds of dairy cattle that were kept by the sampled small scale farmers.

Table 9: Dairy gross margins

Breeds Kept	Amount of Gross Margin in Kwacha							Totals
	0-500000	500001-1000000	1000001-2000000	2000001-3000000	3000001-4000000	40000001-50000000	above 50000000	
local	1	5	11	12	9	2	2	42
Exotic breeds	0	0	4	1	7	2	18	32
Cross breeds	0	0	0	0	2	0	9	11
Total	1	5	15	13	18	4	29	85

Source: Own Survey Data (2008)

The table shows that with improved breeds, a high contribution to the income levels of above K5, 000,000 per annum was archived for 21.17 percent of the participants. With the local

breeds, only 0.02 percent had the income levels above K5, 000,000. Higher incomes were obtained from improved dairy breeds than from the local breeds. The local and cross breeds were kept by the farmers outside the project area.

4.7 INCOME FROM NUMBER OF DAIRY CATTLE KEPT

Income levels of the farmers as a result of dairy cattle kept by the small sale farmers were as shown in table 10 on the next page.

Table 10: Income due to increase in number of cattle

Number of Dairy cows	Gross margin Dairy						
	0-500,000	500,001-1,000,000	1,000,001-2,000,000	2,000,001-3,000,000	3,000,001-4,000,000	4,000,0001-5,000,000	above 5,000,000
1 cow	1	4	3	1	2	1	6
2cows	0	1	11	2	6	0	6
3cows	0	0	0	6	4	0	8
4cows	0	0	0	2	1	1	2
5cows	0	0	1	2	2	0	2
6 and above	0	0	1	0	3	1	5
Total	1	5	16	13	18	3	29

Source: Own Survey Data (2008)

The table shows that only 29 of the sampled farmers have a number of cows above 6 and were in the high income level of above K5, 000,000 per annum after paying off the loan. With a large number of cattle kept, the farmers obtained high income levels than those with few numbers of cows.

4.8 NUTRITION

Nearly all the households have acknowledged having taking part in the consumption of milk as shown in table 11 on the next page; and that 96.5 percent said that they consume milk and 3.5 percent did respond that their households do not consume milk. The high consumption of milk according to the respondents is due to a change in traditional habit of not consuming sour milk and not keepers of cattle traditionally.

Table 11: Selling all the milk or not

Category	Response	Frequency	Percent
Consume milk	Yes	82	96.5
	No	3	3.5
Selling of all the milk	Yes	11	12.9
	No	74	87.1
Frequency of meals after the project	once a day	5	5.9
	twice a day	33	38.8
	thrice	47	55.3
Balanced Diet without the project	Yes	13	32.5
	No	27	67.5
Balanced diet with the project	Yes	29	64.4
	No	16	35.6

Source: Own Survey Data (2008)

The table also shows that about 87 percent of the respondents did not sell all the milk while 12 percent sold all the milk. The results show that the respondents were consuming some of the milk thereby improving the accessibility to food and nutrition status improvement.

The table further shows that there was an improvement to the accessibility to food by the fact that 55 percent of the respondent, are having meals thrice per day, while 38.8 and 5.9 have meals twice and once a day respectively. There is also a higher percentage (64.4) of project beneficiaries accessing a balanced diet as compared to those outside the project (32.5). The reason for the difference is due to the fact that improved dairy breeds have higher productivity than local or cross breeds of dairy cattle, thereby resulting into higher income levels for the farmers to access other sources of food.

The major sources of protein for the small scale dairy farmers were Beef, Fish, Beans, caterpillars and sour milk.

4.9 1 ACQUISITION OF ASSETS

The response to the acquisition of assets as a result of going into dairy production is as shown in table 12 on page 23.

Table 12: assets as a result of going into dairy

Response	Frequency	Percent
Yes	59	69.4
No	26	30.6
Total	85	100.0

Source: Own Survey Data (2008)

The table above shows that 69.4 percent of the respondents have accumulated assets while 30.6 percent have not. Asset accumulation is as a result of improved incomes from dairy.

4.92. ACCUMULATION OF ASSETS

The value of the assets accumulated from the income from the dairy enterprise, is as in table 13 below.

Table 13: value of assets from dairy production

Asset Value in Kwacha	Frequency	Percent
less than K1,000,000	10	11.8
1,000,001-2,000,000	23	27.1
2,000,001-3,000,000	8	9.4
3,000,001-4,000,000	12	14.1
More than 5,000,000	5	5.9
Total	58	69.4
Didn't accumulate assets	26	30.6
Grand Total	85	100.0

Source: Own Survey Data (2008)

The table above shows that 11.8 percent of the farmers had the value of their assets below K1, 000, 000, while 5.9percent of the small scale dairy farmers had the value of their assets above 5,000,000. The mean asset value was a range from K1, 000, 000 to K 2,000,000. The 30.6 percent of farmers that did not accumulate assets were farmers from the non intervention areas who were using traditional dual purpose breeds of cattle. The assets accumulated were ranging from cash at the bank, roofing sheets, oxen, breeding stock, bicycles, Oxcarts, Television set, Farm house, radios and Beef cattle.

The main and common asset is the bicycle. It shows how a bicycle is important in the household or to a farmer. It is used to transport feeds, fertilizers, as transport to hospital and other activities that need transportation. With a bicycle one is respected in the village hence a status symbol. The bicycle was also important in the transportation of milk to the milk collection centre.

4.10.0 EFFECTS ON THE HOUSEHOLD WELFARE

The effect of dairy on the livelihoods of the small scale farmers was as shown in table 14 below.

Table 14: areas of welfare improvement

Category of Improvement	Frequency	Percent
Income	8	9.4
income and food	25	29.4
income, food and employment	8	9.4
income and asset accumulation	10	11.8
income, food and assets	23	27.1
All	7	8.2
income and employment	1	1.2
Total	82	96.5
No gain in social welfare	3	3.5
Total	85	100.0

Source: Own Survey Data (2008)

The table above shows that there was an 8.2 percent of the respondents that had their welfare improved in terms of increased income, access to food, employment creation and asset accumulation while 3.5 percent of the respondents attributed to no effect in the improvement of the welfare. These were farmers that did receive an intervention of improved dairy breeds. The table also shows that 29.4 percent of the respondents had improvements in income and food. This shows that dairy production plays an important role in the improvement of the small scale farms. The table also shows that

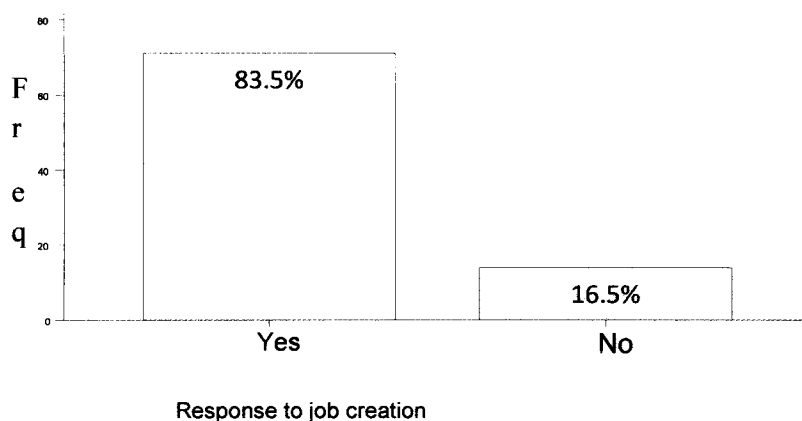
- 27.1 percent have increased income, assets and food.
- income, food and employment, and income only were 9.4 percent, respectively
- income and asset accumulation 11.8 percent
- income and employment 1.2 percent

At household level, there was a general increase in food due to the fact that milk was also being consumed in form of sour milk in thick porridge. Increase in income, food and assets have dominated. Increased incomes according to the farmers’ explanations were more pronounced towards January to April due to better grazing pasture land resulting in better nutrition status of the cows.

4.11 JOB CREATION

There is an increase in terms of job creation due to the farmers’ adoption of dairy from 2005 to 2008, as shown in figure 2

Figure 2: Response to job creation

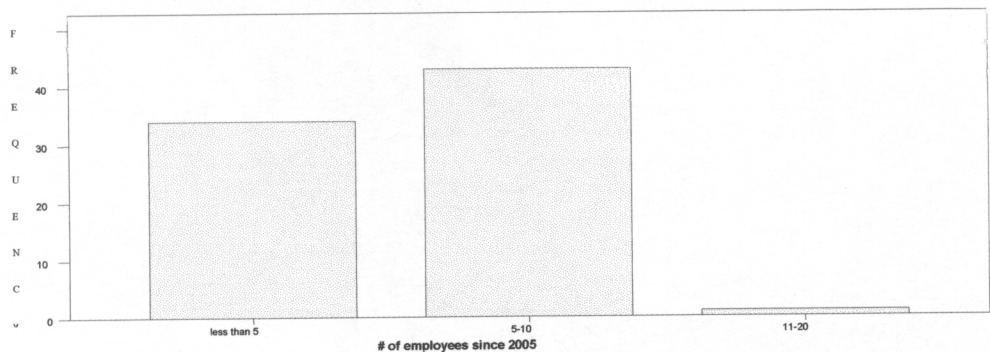


Source: Own Survey Data (2008)

The figure above shows that 83.5 percent had their dairy enterprise create employment directly while 16.5 percent did not. The employment created was in the form of taking milk to the milk collection centre, feeding the cows and general management of cows. The number

of employees on the farm on average was in the range of 5-10 as shown in the figure 3 on the next page.

Figure 3: Number of employees in dairy



Source: own data (2008)

The laborious nature of taking milk to the milk collection centre coupled with the long distances covered oftentimes requiring cycling of bicycles seem to be the major reason for the higher numbers of males compared to females involved in dairy production. Smallholder dairy farming is a labour intensive activity that requires entrepreneurial engagement in every day of the week 365 days a year. This often implies daily walks or bicycle rides to the milk collection centre, which in some cases can be located up to 40km. An employee has to deliver the milk twice in a day on a bicycle as shown in the figure 4 below.

Figure 4: An employee taking milk to the milk collection centre

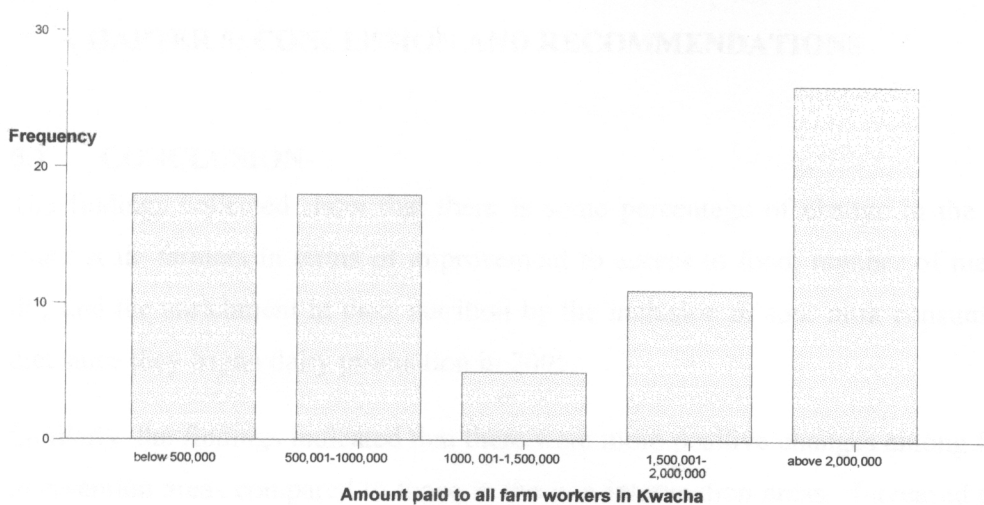


Source: Own survey data (2008)

The amount of money paid to the workers varied as it depended on the number of dairy cattle one had. Those with a large number of cows, were able to pay higher wages. The amount paid is as shown in the figure 5 on the next page.

The Figure shows that the average income of the workers on the farm was ranging between 1,000,001 to 1,500,000 per annum. The seemingly high wages were according to farmer interviewed attributed to dairy production.

Figure 5: Amount paid to farm workers annually



Source own survey data (2008)

2.2 RECOMMENDATIONS

- The Government should ensure that the minimum wage is set at a level that is sufficient to cover the basic needs of the workers and to provide a decent standard of living.
- The Government should ensure that the minimum wage is set at a level that is sufficient to cover the basic needs of the workers and to provide a decent standard of living.
- The Government should ensure that the minimum wage is set at a level that is sufficient to cover the basic needs of the workers and to provide a decent standard of living.
- Given the low milk prices (i.e. 1 litre for 1000 Kwacha) being received by Mpika Dairy farmers, there is need to make available appropriate dairy breed animals.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

The findings collected show that there is some percentage of change in the livelihood of small scale farmers in terms of improvement to access to food, number of meals taken per day and the enrichment in their nutrition by the inclusion of sour milk consumption in their diet since they began dairy production in 2005.

Similarly, the findings indicated that there were more positive changes among farmers in the intervention areas compared to those in the non intervention areas. Increased acquisition of assets like bicycles, radios, employing of workers on the farm and increased income on the farm have been some of the clear indicators that they are slightly better than those outside the intervention.

In terms of job creation there is direct job creation to the small scale dairy farmers as well as indirectly through the employment to the rural community who were working on the farms either seasonally or through out the year.

Hence, dairy farming plays a major role in the improvement of the general welfare of the small scale farmers in Northern Province, Mpika district in particular.

5.2 RECOMMEDATIONS

- It is recommended that more programmes that enable the farmers to sustain the production levels be implemented because better breeds or technologies are a necessity to accelerate development and sustainability.
- Based on the observation that most of the interviewed farmers were financially handicapped and could not increase their dairy enterprises through acquiring improved dairy breeds, it is being recommended that Government and other financial institutions should provide revolving loan schemes that will enable dairy farmers purchase dairy animals and inputs required in dairy production.
- Given the low milk yields (i.e. 5 litres per cow per day) from local breeds among Mpika Dairy farmers, there is need to make available appropriate dairy breed animals

which give optimum yields of milk (i.e. recommended yields of 15 – 20 litres) if the dairy industry is to prosper.

- Dairy production has proven to be one of the agricultural activities that have potential to enable small scale farmers increase incomes in Mpika district and therefore calls for exerted efforts for such schemes to be promoted at a larger scale.

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APPENDICES

Appendix 1: Household Survey Questionnaire

SECTION A: PERSONAL DETAILS

1. Date of interview _____
2. First Name: _____ Surname: _____
3. Village: _____ Block: _____
4. Gender

Female [] Male []
5. Age at Last birth date _____
6. Marital status:

a. Single []

b. Married []

c. Divorced []

d. Widowed []

e. Separated []
7. Level of Education:

a. Primary []

b. Secondary []

c. Tertiary []

d. None []
8. What is your level of production?

a. Commercial []

b. Medium []

c. Small scale []
9. How long have you been farming? _____ Years.
10. Do you keep dairy cattle?

a. Yes []

b. No []
11. How long have you been practicing dairy cattle farming? _____ years
12. Have you benefitted from any NGOs that have been giving cattle to farmers?

a. Yes []

b. No.

(If no proceed to question 15) []

13. Which NGO gave you the dairy cattle? _____ []

14. How many dairy animals where you given? _____ []

15. How many dairy animals do you have? _____ []

16. Which breed of dairy cattle are you rearing on your farm?

a. Local breeds []

b. Cross breeds []

c. Exotic breeds such as Friesian. []

d. Others specify. []

SECTION B: INCOME AND ENTERPRISES

17. How many farm enterprises do you have on the farm?

a. One []

b. Two []

c. Three []

d. Four []

e. More than four []

18. What are the four major enterprises that are on your farm?

a. Dairy cattle []

b. Maize []

c. Groundnuts []

d. Beans []

e. Vegetables []

f. Goats []

g. Pigs

19. Which enterprise gives the highest income?

a. Dairy cattle []

b. Maize []

c. Groundnuts []

d. Beans []

e. Vegetables []

f. Goats []

g. Pig []

20. What were the output levels for each enterprise per year? Please fill in the table below in Kgs, litres of milk, etc as applicable.

Production Levels				
Name of enterprise/year	Dairy farming (In litres)			
2005				
2006				
2007				
2008				

21. For each of the enterprises, complete the tables below

Total Sales				
Name of enterprise/year	Dairy farming			
2005				
2006				
2007				
2008				

Total Expenses				
Name of enterprise/year	Dairy farming			
2005				
2006				
2007				
2008				

22. What were the gross margins for the four years for each enterprise? Fill in the table below.

The Gross Margin				
Name of enterprise/year	Dairy farming			
2005				
2006				
2007				
2008				

23. Where were you selling the farm produce?

- a. Near by farmers []
- b. At the main market []
- c. At the market and at the farm []
- d. To other districts. []

24. Has your income levels on the farm increased or decreased since 2005?

- a. Yes []
- b. No. []

SECTION C. EMPLOYMENT CREATION:

25. Do you work for any organisation?

- a. Yes []
- b. No []

(If no, move to question 28).

26. If yes, name the organisation. _____.

27. Is the organisation you work for agricultural related?

- a. Yes []
- b. No []

28. Have you employed some people on the farm?

- a. Yes []
- b. No []

(If no, move to question 33).

29. In which enterprises of the farm do they work?

- a. Dairy cattle []
- b. Maize []
- c. Groundnuts []
- d. Beans []
- e. Vegetables []
- f. Goats []
- g. Pigs []

30. How many workers have you employed since 2005?

- a. Less than Five. []
- b. Between five and ten []
- c. Between ten and twenty []
- d. Above twenty []

31. Does the worker/s work for you throughout the year?

- a. Yes []
- b. No only seasonal []

32. How much do you spend on the worker/s wages yearly?

33. Does any member/s of your family, work on the farm?

- a. Yes []
- b. No. []

(If no, move to question 35)

34. How much do you pay the family member/s for working on the farm?

35. Are there some people working in the dairy enterprise?

- a. Yes []
- b. No. []

(If No move to question 37)

36. From 2005, how many people have you employed in the dairy enterprise?

SECTION D: ACCESS TO FOOD.

37. What are the major sources of the following categories of food for your household?

a. Proteins. _____

b. Carbohydrates. _____

c. Vitamins. _____

38. Does your household, consume milk?

a. Yes []

b. No []

(If no move to question 43)

39. When did you start consuming milk? _____

40. How many times do you consume milk?

a. Once a day []

b. Twice a day []

c. Once a week []

d. Others specify. _____.

41. How much milk in litres do you consume per month? _____ []

42. Where do you get the milk from?

a. the farm []

b. the neighbouring farms []

c. the main market []

d. Own farm and others. []

43. Do you sell all the milk produced at the farm?

a. Yes []

b. No []

44. Do you buy other food requirements from the money realised from selling milk?

a. Yes []

b. No []

45. How many times does your family have the main meal?

a. Once a day []

b. Twice a day []

c. Three times a day []

46. Do your meals contain all the nutrients required by the body?

a. Yes []

b. No (if no proceed to question 48) []

47. How many times do you have a balanced diet?

a. Through out the year []

b. Since immemorial []

c. Others specify []

48. Where you having a balanced diet before you started keeping cattle?

a. Yes []

b. No []

SECTION E: GENERAL QUESTIONS

49. Are there some assets that you have acquired as a result of you going into dairy production?

a. Yes []

b. No []

(If No move to question 51)

50. Fill in the table below

	Name of Asset Acquired Asset	Value	Year acquired
1			
2			
3			
4			
5			

51. Do you think that the dairy farming has improved your welfare?

a. Yes []

b. No []

(If no, move to question 53).

52. In what areas has it improved your welfare?

a. Increased income. []

b. Improved access to food []

c. Increased employment []

d. Increased assets []

53. Are you growing in your dairy farming activity?

a. Yes []

b. No. []

Give reasons for your answers

-END -