EVALUATION OF THE HEIFER PROJECT FOR WOMEN FARMERS IN MPIGI DISTRICT (UGANDA)

BY

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DECLARATION

I, **KALULE SEWALI ABBY,** hereby declare that this is my original work and has not been presented for a degree in any other University.

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DEDICATION

This work is dedicated to my dear husband **John Billy Kalule-Sewali**, my mother **Naome Tibalwa Kato** and my son **Henry Senjalla** (deceased) for their love, guidance, prayers and suffering they endured in my absence.

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DEFINITIONS AND ABBREVIATIONS

Definitions:

Beneficiaries - All the members of the households who received project in-calf heifers.

Breed - Animals which are genetically pure enough so as to have similar characteristics of colour and conformation and when mated together will produce offspring with the same characteristics.

Calf- The study adopts the word calf to refer to the one born.

Concentrate - Feedstuffs high in percentage of total digestible nutrients and low in fibre and moisture.

Cow - Mother of a calf.

Cull - To remove an animal below the standard of the animals in the remainder of the herd.

Dry Period - Indicates that cows are not in lactating stage.

Farmer-	A woman beneficiary who received a project cow.
Farmers' Input-	These are inputs that were provided by the farmer herself.
Female Headed Household -	Household where the farmer did not have a husband.
Heat-	Period when the female will accept service by the male.
Heifer-	Female cattle old enough to breed but who have not produced any offspring.
Household Head-	The major decision maker in a home
1 US $ -	Is equivalent to Ushs. 1,200/-
Lactation Period-	The period from calving to drying up.
Male headed Household-	Household where a farmer had a husband.

Non-Project Herd- All cattle in the project households that do not belong to the project cattle.

Project Herd- All cows, bulls and calves originating from the project cow.

Zero-grazing- The management of an animal (cattle) in a confined shed/stall.

Zone- Demarcation of project area within a sub-county.

Abbreviations

AAO	-	Assistant Agricultural Officer.
AI	-	Artificial Insemination.
APC	-	Age of Project Cow
DDC	-	Dairy Development Committee
FAO	-	Food and Agriculture Organisation.
HPWF	-	Heifer Project for Women Farmers
IDRC	-	International Development Research Centre.
MAAIF	-	Ministry of Agriculture, Animal Industry and Fisheries.
MFED	-	Ministry of Finance and Economic Development.
NDDP	-	National Dairy Development Programme.
NORAD	-	Norwegian Aid for Development and Cooperation.
RCs	-	Resistance Councils
SPSS	-	Statistical Package for Social Sciences
TMP	-	Total Milk Production
UNDP	-	United Nations Development Programmes
WFP	-	World Food Programmes
WHO	-	World Health Organsiation

ABSTRACT

This is an evaluation of the implementation of the Heifer Project for Women Farmers in Mpigi District, whose aim is to uplift the economic and nutritional status of the beneficiaries. A questionnaire was developed and designed to collect data on 40 project participants regarding demographic features, adequacy and timeliness of the project inputs, productivity of the project cows, farmers' management practices as well as project dropouts. Secondary information was obtained from the project office, chiefs and relevant Government departments regarding administrative and institutional aspects of the project. The data obtained were cleaned and analyzed using SPSS computer software package.

The demographic features of the study sample were representative of the Ugandan peri-urban society. Its inhabitants are generally literate and have a high dependency ratio. The disbursement of project inputs was bureaucratic and inadequate. Farmers contributed substantially to the project inputs except in areas where they were not properly advised. The productivity of the project cow in terms of milk yield and reproduction is considered adequate. Farmers displayed exceptionally good management practices in all those areas they were initially familiar with, though poor in areas where the training support and project staff guidance was inadequate.

Several benefits were associated with the project implementation notable among which were raising participants' incomes and improving their social status.

Successful implementation of HPWF in future will depend on elimination and streamline of bureaucratic controls in the project; advance credit and training to new project entrants; establishing appropriate fodder acreage to avoid overstocking; culling and replacing of low productivity cows; encouraging farmer cooperatives to mobilise savings; and, re-involvement of the project dropouts.

CHAPTER THREE

BACKGROUND INFORMATION TO THE STUDY AREA

3.1. GENERAL COUNTRY CHARACTERISTICS

The study was carried out in Mpigi District in Uganda. Uganda is a landlocked country lying astride the equator in East Africa (Figure 1). It covers an area of 241,000 km^2 of which about 197,000 km^2 is land. About 84 percent of the land is suitable for agriculture, eight percent forests and the rest (8%) is under National Parks, and game reserves. The country is divided into 39 districts and has a population of 16.5 million growing at a rate of about three percent per year (MAAIF, 1992). Most of the Uganda Government's political and administrative powers have been decentralized to the Districts. The Districts are divided into counties/municipalities, sub-counties, parishes, and villages which are ran by Resistance Council Committees (RCs): RC1 (Village level), RC2 (parish), RC3 (sub-county), RC4 (County or municipality) and RC5 (district).

Uganda can be divided into five climatic zones on the basis of rainfall distribution. Plenty of rain and varying altitudes allow for a wide range of food and cash crops cultivation.

Agriculture is the dominant sector contributing about 68 percent of Gross Domestic Product (GDP) and about 95 percent of total export earnings. With the exception of sugar cane and tea, agricultural production is dominated by 2.2 million small rural holdings of about 2 hectares each. Food production accounts for 75 percent of agricultural GDP and for 90 percent of cultivated area (MFEP,1992)

1.2 JUSTIFICATION OF THE RESEARCH STUDY

Traditionally, Ugandans have not practiced zero grazing as a dairy management system. The introduction of the HPWF which is based on the system of zero grazing and entrusted with women is new and has been generally accepted locally. Population pressure and increasing dietary needs require that more food is produced. It is a strong belief in this project that the more people learn about zero grazing, the more they will become involved and the better will be the availability of milk to families.

This study forms a basis for possible replication of the project in other areas. This is because it has been be first project of its kind in the area and also due to the need for income generating activities for women and replacing the diary herd that has been depleted during wars.

1.3 PURPOSE OF THE STUDY

The purpose of this study is to evaluate the implementation of the HPWF since its inception and to provide information concerning project processes and beneficiaries.

1.4 EXPECTED BENEFITS OF THE STUDY

This evaluation will provide important project information on :-

(a) HPWF implementation and constraints.

(b) Recommendations regarding improvement of the HPWF.

(c) Insight into the performance of the HPWF with regard to project beneficiaries.

The above information is expected to stimulate policy makers in identifying and formulating policies for further improvements in dairy credit programmes and income generation for women. It will also generate information on the performance of the project to the donors, staff and beneficiaries. Lastly, the information so gathered will form a basis from which other projects in the same area will be guided.

1.5 RESEARCH OBJECTIVES

1.5.1 Overall Objective

The main objective of this research has been to undertake an evaluation of HPWF from its inception to the current stage of its implementation (1987-1993).

1.5.2 Specific Objectives

1. To assess the timeliness of disbursement and adequacy of inputs in the project implementation.
2. To assess the productivity of the HPWF cows in terms of milk production and reproduction.
3. To examine the benefits of the HPWF cow to the woman and her family.
4. To assess the animal management practices of the farmers.
5. To identify constraints faced by the farmers in the management of zero grazing.

CHAPTER TWO

LITERATURE REVIEW

2.1 WOMEN IN ECONOMICAL ACTIVITIES

Andrey C. Burroughs (1990) analyzed women involvement in Business in the United States of America. He reported that nearly a quarter of the thirteen million small businesses in the country are owned by women and that this figure was increasing at least three times faster for women than for men. Most of the business owned by women were of retail and service nature for which they had better management skills. On average Burroughs reported that small business in which women were involved realized up to US $700 per month which was used for family upkeep and social involvement like participating in women groups and entertainment programmes. In another but related study by Sally Chew (1986), it was observed that women working together on small enterprises without the control of their husbands or parents was a new thing in Nicaragua. The women got involved in setting up cooperatives for sewing and managing food stores. As a result Chew reported that these activities rose hopes for the Nicaraguan women in their efforts to shrive for equality and economic independence in a male dominated society.

2.1.1 WOMEN IN COMMERCIAL FOOD PROCESSING

There is vast literature on Commercial food processing but when it comes to women involvement in this venture, it is noted that the activity is done on a small scale. For example Naiga

(1990) in her assessment of cereal processing in Uganda observed that women in small groups strewn all over the country one of her case studies in Tororo district showed that women were mixing millet flour with maize flour and packing it for sale. Despite marketing problems they were able to realize handsome income enough to meet their domestic needs. Naiga further observed that the project was able to add value to their crops compared to when they were selling them unprocessed.

2.1.2 WOMEN IN AGRICULTURE

Women are the major contributors in the agricultural sector of most developing countries and yet they are seen to be disadvantaged. In Ivory coast, for example, cotton in the pre-colonial era had been grown by women to meet family needs, yet husbands required that a portion of the crop which would be sold, must be grown on their personal fields, a practice which established the husbands's ownership of the product (Estienne et. al 1984)

Study on women in agriculture by E. Kyasimire (1990) showed that Uganda over 80% of the Agriculture and out of this women contribute about 70% of the total labour force. They are engaged in all sorts of agricultural activities but most of their contribution is in food production. In rural areas women provide labour for cash crops like picking of coffee, harvesting, drying, sorting of cotton, drying and storage. They are also involved

in small scale animal production for the family and marketing.

A.L. Makwavarara (1984) reported on women and food production in Zimbabwe. He said that women in Zimbabwe are in the exceptionally unenviable position of having to undertake such physically taxing farm labour as slashing planting, weeding and harvesting due to migration of the make farmers. Yet women play no role in the decision making process of the farm household.

2.1.3 Women in dairy farming.

It has been recognized that women have an important role in livestock care, processing and sale of livestock products and yet the significance of involving women directly in livestock development projects has not been realized. Though men generally own cattle in Africa, women are more responsible for the livestock production activities. This is due to the fact that livestock production is considered largely as a subsistence activity that squarely fits into other domestic activities. Where commercial milk production is encouraged, as in Kenya for example, income is usually paid to the husband who is the owner of the cattle and not to the wife who is usually responsible for the production activities (Nalwanga and Natukedde 1988).

In a few cases, women have owned, shared or controlled income from livestock. In a study carried out in rural India, it was observed that dairy cooperatives provided women with new roles and experience in animal and health care (Samjee and Cathy 1989). According to the authors, the women were given

opportunity to become principal managers on the farm, executing responsibilities ranging from cleaning up, feeding, milking, artificial insemination (AI) and marketing of milk.

Fieldman et al (1984), attempted to evaluate effects of the project on livestock production and on their income. The authors had difficulties in obtaining sufficient data on household incomes, but they found out that in the absence of other resources such as own-land and credit, women gained control of livestock through share arrangements among themselves. This offered them a source of income, independent of their husbands and other family members.

Ojok-Lonzy (1991), evaluated a heifer project of the Young Women Christian Association (YWCA) in Uganda. The project was intended to equip them with the knowledge, experience and career in modern dairy production. It was found that the project was able to raise the standard of living and the nutritional status of the beneficiaries.

2.2 Dairy Development in General

Dairy development could be based on various production systems, ranging from large capital intensive and highly specialized systems to small scale milk production within a mixed farming system (WP, 1988). Capital intensive production systems have been successful in Cuba and China.

The WP (1988), reported that dairy development depended on many factors such as a strong and long-term government commitments, adequate market and physical characteristics, such as water, soil and climate which determine feed, pasture and range availability. In addition, economic factors needed a full appraisal at the local level and should stress the relative profitability within the farming system and the land use patterns.

2.3 Dairy Farming in Uganda

The major policy objective of the dairy industry in Uganda is to promote small scale farmers, through increasing their returns in dairy farming; to achieve and maintain self-sufficiency in milk production and to ensure that the increase in production is environmentally sustainable.

In Uganda, cattle are reared for, among other things, milk production throughout the country under different production systems which range from semi-nomadic pastoralism at one end to zero grazing at the other. The average milk yield per day is 1.7 liters for indigenous cows, and about 5 liters for cross breeds on free range. The Friesian breed however, produces, on average, 11.3 liters per day on zero-grazing (MAAIF,1992).

2.4 DAIRY MANAGEMENT (ZERO GRAZING)

The advantages of zero-grazing as outlined by Ma and Macula (1990), are: increased milk production, good quality livestock, effective disease control, optimum land use, better use of manure, improved security of the livestock and acquisition of more knowledge on animal production.

Van de Val (1985), outlined the major constraints of zero grazing as: requirements for intensive labor, high initial cost, limited number of animals that can be kept, and breeding problems as most of the animals tend to have silent heat. Regarding the return on labor, the author concluded in general that the zero grazing system generated a return exceeding the farmer's alternative employment opportunities. Furthermore the cash-return on labor is supplemented by an income in kind in the form of milk for home consumption at a rate of 4 liters per farm per day or more. The cash-return on labor exceeds the salary of casual labor which enables farmers to hire labor during peak periods and sometimes even permanently.

2.4.1 FEEDING

Outer (1985) indicated that the most important factor in good livestock management and good animal husbandry, is the provision of high level feeding for the animal. Cattle fed well produce well. Normally the cost of feeding amounts to 50-75% of the total milk production costs. Feeds include fodder, crop residues and concentrates.

The following fodder species for zero grazing were recommended by Mpairwe (1991); *Pennisetum purpureum* (Napier grass), *Tripsicum laxum* (Guatemala grass) and legumes which include:- *Desmodium intortium, Centecema pubesceus, Leucaenea leucocephala* and *lablab purpureus* (Dolichos lablab). Like other crops, the planted pasture needs a lot of care, at least 2-3 weedings per year, but this increase the cost of production in terms of labor. Pasture management, amounts to 5-10% of the total production cost.

Tilee (1969) described work on Pennisetum purpureum on cutting regime at Kawanda Research Station in Uganda. The rainfall was bimodal, loamy soils, relatively low humidity and moderate temperature. At a stock rate of 2.5 animals per hectare (for animals managed under zero grazing) the yield was 12,500kg/ha/cut where a cut taken every ten weeks, milk yield of 500 liters per month would be obtained, assuming an average daily yield of 6.7 liters per cow.

Froemert (1969) indicated that under the zero grazing system when fodder is grown, one acre of Medicago sativa and 0.2 acres of elephant grass are sufficient to feed 3 exotic cows each yielding 12 liters per day. He further stated that zero grazing enables a higher stocking rate per acre, especially when tall grass like elephant grass is grown.

Stocking rate, soil fertility and rainfall determine the productivity of pasture. In Uganda it is estimated that improved pasture carry one livestock unit per acre, and unimproved pasture is estimated at 3 acres for each unit in the zero grazing system (MAAIF 1991).

Mukasa (1991) reported that it is more economical to feed animals on pasture. The pasture should be good, that is, they should be a mixture of planted grass and legumes at a ratio of at least 7:3 in order to obtain 4.5 kg of milk per day and any additional litre of milk are brought by supplementary feeding of with dairy meal.

Maize stover is the most widely used crop residues for zero-grazing in Kenya. The limitation, however, is its low protein content, but its energy content is acceptable if it is cut when green (Outer, 1985). Outer further states that sweet potato vines, combine high protein content with a good digestibility if grown on fertile soils. The vines also form a very good supplement to a ration consisting of napier grass/maize stover. [MAAIF (1988)] however, discouraged feeding of sweet potato vines as well as banana peelings because these vary widely in nutritive value. This is because these crops residues are bulky, fibrous and deficient in protein, energy and minerals. These feeds according to MAAIF can nevertheless be fed to dry cows and other livestock on the farm.

For greater milk yield, cows should be given concentrates. These are recommended for cows which produce more than 7 kgs of milk per day. They should be fed dairy meal or dairy cubes at a rate of 1 kg for every extra 1.5 kg of milk above the 7 kgs. It is also recommended that the animals be given mineral licks at all times, (DDP, 1989).

Nsubuga (1989) stated that dairy cows must consume sufficient water in order to produce large quantities of milk. The amount of water drunk by animal depends on ambient temperature, kind of feed eaten by the animal, type of cow and quality of the water.

In support of Nsubuga'claim, Etgen and Reeves (1987) observed that each litre of milk produced requires a cow to drink 5 liters of water and also 3-4 liters of water are consumed by an animal for each unit of dry feed consumed.

2.4.2 Calf Rearing

Fertility affects the number of calves born and total milk production during the lifespan of a cow (MAAIF, 1988). A good measure of fertility is the calving intervals. In the ideal situation the cow gives birth every year. It is reported that reproductive failure is more often a result of human error rather than reproductive distinction of the cow (Mbabazi, 1989). According to the author, many human errors leading to reduced fertility include: underfeeding, poor heat detection, poor housing and sanitation, unhygienic measures taken at calving, and

lack of proper health care.

Nsubuga (1989) stated that the most economic type of breeding in a small commercial herd is by artificial insemination, as it eliminates the cost of buying a bull and maintain it, and the farmer can easily plan the seasons and dates of calving of cows with a view to maintain optimum milk production throughout the year.

Non-lactating cows do not require as much fodder as lactating ones, but they must nevertheless be given enough food to enable them give birth to well developed calves. Calf-rearing is a very important aspect of dairy farming because today's calf will be tomorrow's cow. Therefore, the calf should be fed on colostrum, milk, early wean pellets and should be regularly dewormed and vaccinated accordingly (DDP, 1989).

2.4.3 Milk Yield

Musangi (1971) observed that milk production is affected by several factors such as animal breed, stage of lactation, health of animal, feeding management and climate . Level of feeding during rearing has the greatest influence on subsequent milk production. The higher the quality of feed given to the animal the higher the milk yield and quality. The milk production peak is determined by feeding rate and quality between calving and peak production. The milk yield has also been found to

increase with stage of lactation. Milk yield also increases with age of animal and reaches the peak at maximum maturity (Approximately 7 years) and then starts to decline.

Nsubuga (1989), stated that in an ordinary commercial herd, a good average milk yield per cow for a year should at least range between 2900 to 3600 liters. He further went on to say that, **Friesian** cows which are well fed and managed should give an average milk yield of 3,825 liters per year with an average lactating period of 305 days.

Van de Val (1985), also concluded that the zero grazing system has a good potential for the small scale farmer. In Kenya, for example, an annual milk production of 2255 liters per lactation, that is, 7.4 liters per day per cow in DPP farms was observed. According to Stots (1983), **Friesian** cattle in Central Province, Kenya on zero grazing produced about 2,800 liters per lactation, that is, 9.2 liters per day.

2.4.4 Milking and Milk hygiene

Mahadvan (1962) also noted that the techniques of milking such as washing the udder with warm water, feeding the cow with concentrates, and, gently squeezing and stripping the teats while milking as well as seasonal variation affect milk yield. During cold seasons, milk yield is generally low due to low water intake.

According to Axles (1985) milking should be done in small mouthed pails to prevent contamination of the milk with dirt from the animal's body and surroundings. A hygienic and clean environment is also required because milk tends to absorb odours from the environment quite easily.

2.4.5 Milk Marketing

Kohls (1990) noted that price of milk is influenced by several factors including costs of production, government pricing support programs, domestic supply and consumer demand, dairy farmer's cooperatives and dairy product import policies. All these contribute to the complex milk price process and none dominates the other.

Chamberlain (1983) reported that there is always some ultimate government responsibility in setting prices for milk. Controlling prices to make milk available to all people gives uneconomic returns to farmers leads to decreased interest in dairying and an unfair advantage to private raw milk sellers.

2.4.6 Disease Control

According to Musangi (1971) disease control could be reduced by maintaining good hygiene at the farm, good fencing to prevent foreign animals from entering the farm, and have regular regional vaccination of threatening disease and regular tick control. Further, although tick control is expensive, it is cheaper than treatment of tick born disease because it costs approximately 20%

of total treatment cost.

Tick-borne diseases (particularly East Coast Fever - ECF), anaplasmosis, babesiosis (Red water fever) and heart water disease, are great killers of cows especially exotic ones. Other common diseases associated with poor management are mastitis and helminthiasis, caused by heavy worm infestation (Luutu-Kisegerwa, 1990). Further it is important to regularly spray and deworm for good health and effective milk production.

CHAPTER THREE

BACKGROUND INFORMATION TO THE STUDY AREA

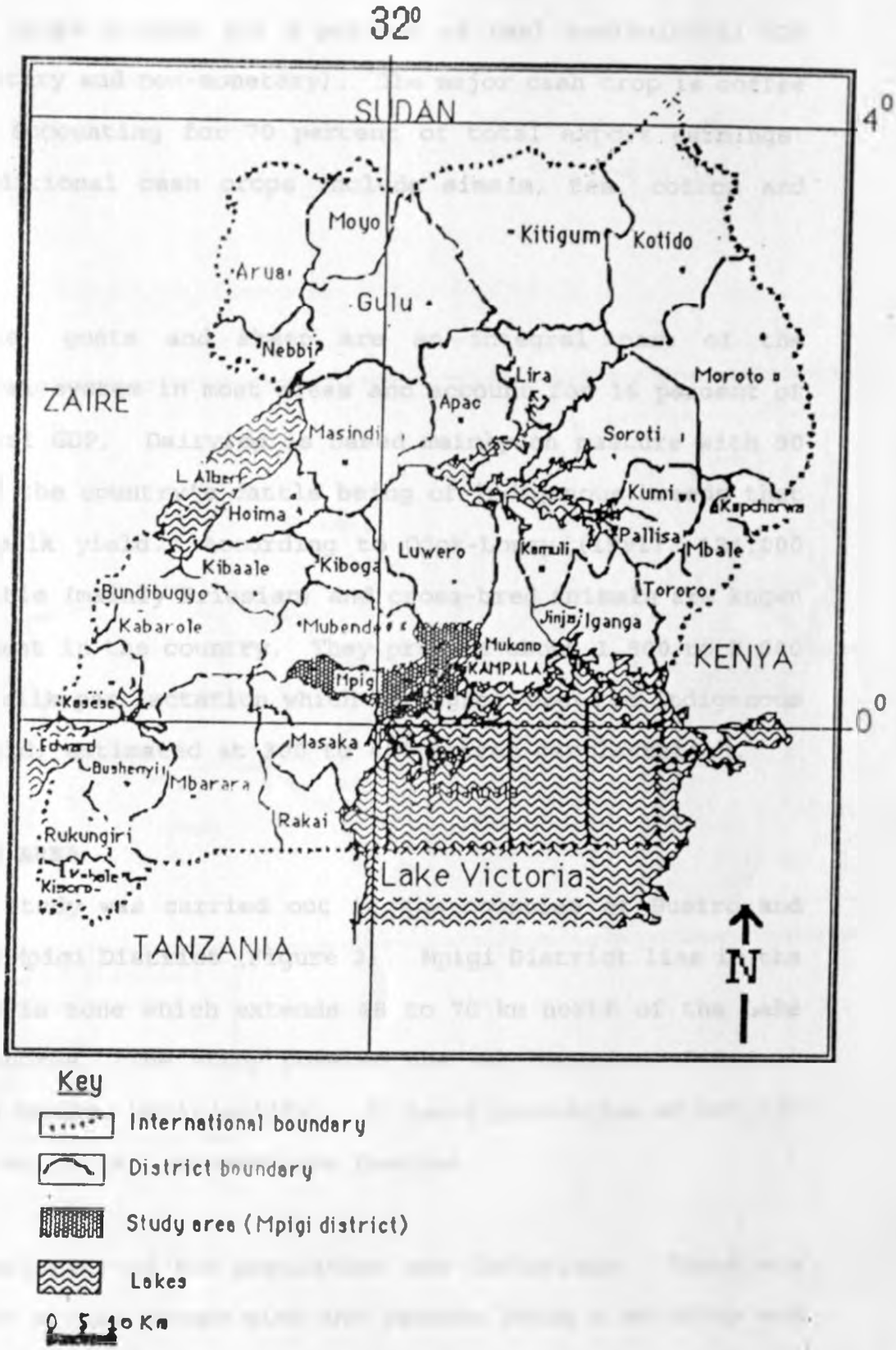
3.1. GENERAL COUNTRY CHARACTERISTICS

The study was carried out in Mpigi District in Uganda. Uganda is a landlocked country lying astride the equator in East Africa (Figure 1). It covers an area of 241,000 km^2 of which about 197,000 km^2 is land. About 84 percent of the land is suitable for agriculture, eight percent forests and the rest (8%) is under National Parks, and game reserves. The country is divided into 39 districts and has a population of 16.5 million growing at a rate of about three percent per year (MAAIF, 1992). Most of the Uganda Government's political and administrative powers have been decentralized to the Districts. The Districts are divided into counties/municipalities, sub-counties, parishes, and villages which are ran by Resistance Council Committees (RCs): RC1 (Village level), RC2 (parish), RC3 (sub-county), RC4 (County or municipality) and RC5 (district).

Uganda can be divided into five climatic zones on the basis of rainfall distribution. Plenty of rain and varying altitudes allow for a wide range of food and cash crops cultivation.

Agriculture is the dominant sector contributing about 68 percent of Gross Domestic Product (GDP) and about 95 percent of total export earnings. With the exception of sugar cane and tea, agricultural production is dominated by 2.2 million small rural holdings of about 2 hectares each. Food production accounts for 75 percent of agricultural GDP and for 90 percent of cultivated area (MFEP,1992)

Figure 1: Map of Uganda Showing Mpigi District



Cash crops account for 4 percent of real agricultural GDP (both monetary and non-monetary). The major cash crop is coffee currently accounting for 70 percent of total export earnings. Other traditional cash crops include simsim, tea, cotton and tobacco.

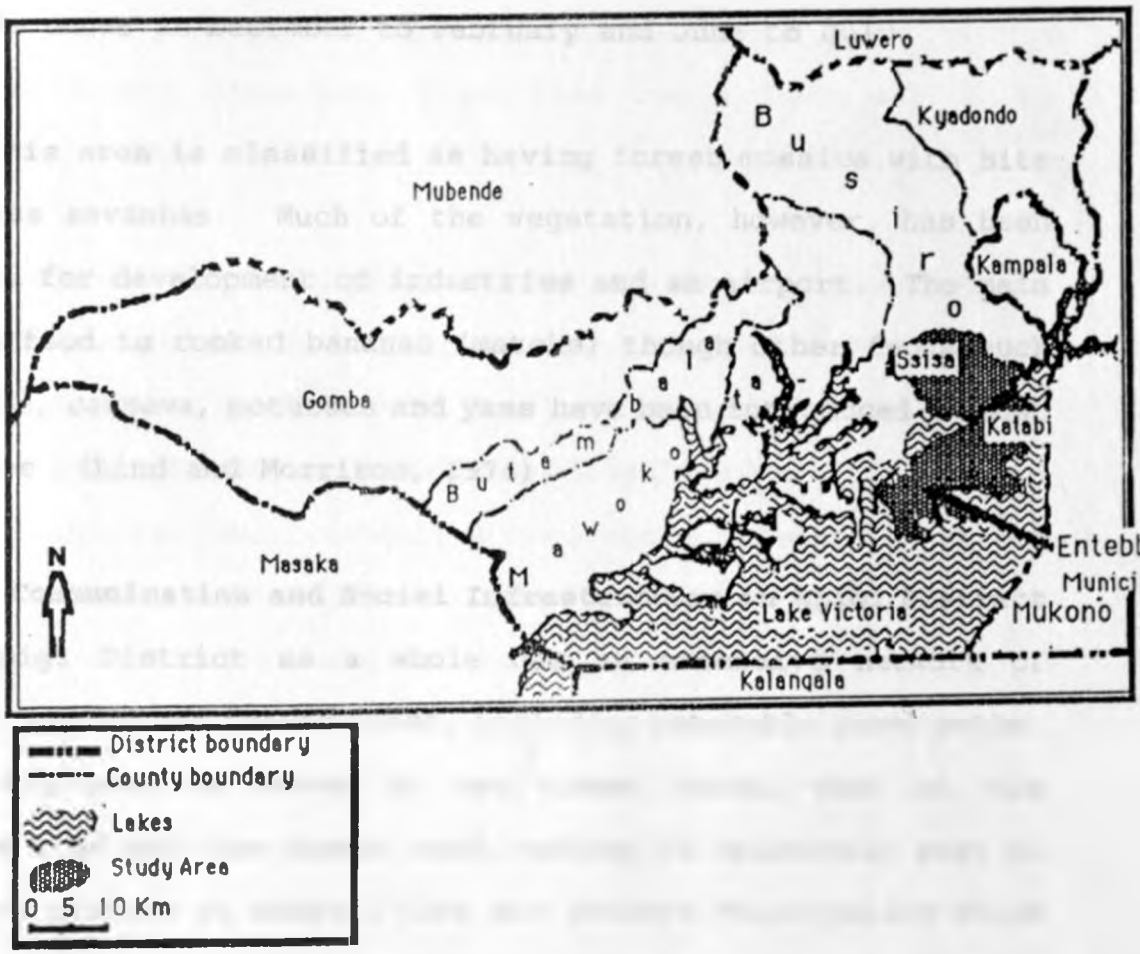
Cattle, goats and sheep are an integral part of the agricultural system in most areas and account for 16 percent of agricultural GDP. Dairying is based mainly on pasture with 90 percent of the country's cattle being of indigenous breeds that give low milk yield. According to Ojok-Lonzy (1991), 124,000 exotic cattle (mainly Friesian) and cross-bred animals are known to be present in the country. They provide about 1,800 to 2,000 litres of milk per lactation which is higher than the indigenous cattle yield, estimated at 300 to 400 litres per lactation.

3.2 STUDY AREA

This study was carried out in the counties of Busiro and Entebbe in Mpigi District (Figure 2). Mpigi District lies in the Lake Victoria zone which extends 48 to 78 km north of the Lake Victoria shores. The study covered the sub-counties of Ssisa, Katabi and Entebbe Municipality. It has a population of 249,100 people of which 59.1 percent are females.

The majority of the population are Christians. There are a number of ethnic groups with the Baganda being a majority and the main language is Luganda.

Figure 2: Map of Mpigi District Showing the Study Area



In this zone, the climate is influenced by Lake Victoria, and is characterised by more or less uniform temperature throughout the year of over 21°C with a temperature range of about 2°C. The zone receives very heavy rainfall with two rainfall seasons. The principle peak occurs in March to May, with April being the wettest. The second peak is in September to November . The annual rainfall on average is 1,230 mm. Drier periods occur in December to February and June to July.

This area is classified as having forest mosaics with bits of grass savannas. Much of the vegetation, however, has been cleared for development of industries and an airport. The main staple food is cooked bananas (matoke) though other foods such as maize, cassava, potatoes and yams have been introduced in most families (Lind and Morrison, 1974).

3.2.1 Communication and Social Infrastructure in Mpigi District

Mpigi District as a whole has an extensive network of tarmac, murram and feeder roads, including motorable rural paths. The study area is served by two tarmac roads, that is, the Entebbe road and the Masaka road, making it relatively easy to get farm produce to Kampala City and Entebbe Municipality which are the major trading centres.

There is a significant variation in economic activities between the rural and urban sectors. Most of the activities

are concentrated in the urban areas, and hence there is a high rate of rural-urban migration. This has depleted the rural areas of active labour force and consequently most of the work in the rural households is done by women.

Generally, apart from Entebbe Municipality, the distribution of electricity and telephone services is poor in the study area. In the Municipality, the distribution of these services, is associated with Government ministries and a few well-to-do individuals (Wood and Barber 1979).

The area has sufficient schools and training institutions both government and privately owned. However, education is expensive making it difficult for most parents to send their children to good schools. Entebbe Municipality has an Artificial Breeding Centre (ABC), a Dairy School and a Livestock Research Centre. Apart from coffee hulling and brick making, little industrial activity is seen in the study area.

3.3 INFORMATION ON HPWF

3.3.1 Project Conceptualization and Administration

The original idea of the project was conceived by MAAIF after realising that Mpigi District was declining in soil fertility and that there was urgent need for the supply of milk to improve the nutritional status of the community.

After identifying the project need, funds were solicited from various donors. WFP was willing to fund the project. The women in Mpigi District like most of their counterparts in Uganda undertake most of the agricultural work. These constitute 66 - 80 percent of the agricultural labour force. Despite this, they do not benefit much from monetary farm output because most of them are not household heads (Nalwanga and Natukenda, 1988). They therefore have no say in the outlay of the receipts from their farm produce. This implies that, while women earn the income from agriculture, they have no decision in its disposal.

This HPWF was intended to put farm income under the control of the women by involving them in carrying out several activities including training participants in dairy management, record keeping and farm management, establishing pasture initially amounting to one acre, constructing cow sheds, and, purchase of equipment and materials needed. The selection of farmers for inclusion in the project was done by the agriculture and veterinary staff, chiefs and resistance committees (RC's). The criteria for selection were based on: availability of land, source of water and family stability.

The participating women organised themselves into an association and selected committee members to run their affairs relating to the co-ordination of activities. There are committees of two types; the central committee and

sub-committees both based on the zones. The idea behind the formation of the association is to prepare the farmers to manage the project when project administration staff from MAAIF finally pull out; and to ensure sustainability of the project.

The central committee consists of a chairperson, vice-chairperson, secretary, treasurer and six members representing each zone. The major function of the central committee is to plan for the women's activities and try to solve their problems. This involves gathering relevant information from the zones, processing it and passing it to the project administration for major decision making.

The sub-committees govern the zones and are represented at the central committee by the chairpersons. The sub-committees plan for their respective zones and consult the central committee for major decision making.

The general agreement was that WFP supplies the major inputs (in-calf heifers) and the MAAIF provides the management and implementation of the project by incorporating it in its Extension Service. It was also agreed that the first female calf should be returned to the project and would be given to new beneficiaries for expansion of the project.

Although the project is mainly sponsored by the WFP and executed by the Dairy Development Committee (DDC), it is implemented and administered by the staff of MAAIF. In the administration structure, there is an overall co-ordinator and an assistant who monitor the project activities closely. The project utilizes services of one part-time veterinary doctor and six extension staff. Each of the extension officers is in charge of a zone while the veterinary doctor offers services to all the zones.

CHAPTER FOUR

METHODOLOGY

4.1 Study Design and Sampling.

A cross-sectional survey of descriptive nature was carried out in five purposively selected zones in Mpigi District namely; Nakawuka, Kitende and Nkumba/Kitala of Busiro county and Nakiwogo and Katabi of Entebbe county (Figure 3). The number of farmers with project cows who were surveyed was 40 .

4.1.1 Sampling

A random sample of 40 households was selected as follows:

(a) Listing of all beneficiaries who have received the in- calf heifers since the inception of the project. These were 130.

(b) Excluding from the list all those farmers who had lost a project cow and therefore had dropped out of the project. These were 34.

(c) Grouping of the remaining beneficiaries into their respective zones was done alphabetically for the purpose of identification (Appendix C2).

(d) Identifying participants from those who received project cows between 1988 and 1991 from five zones,

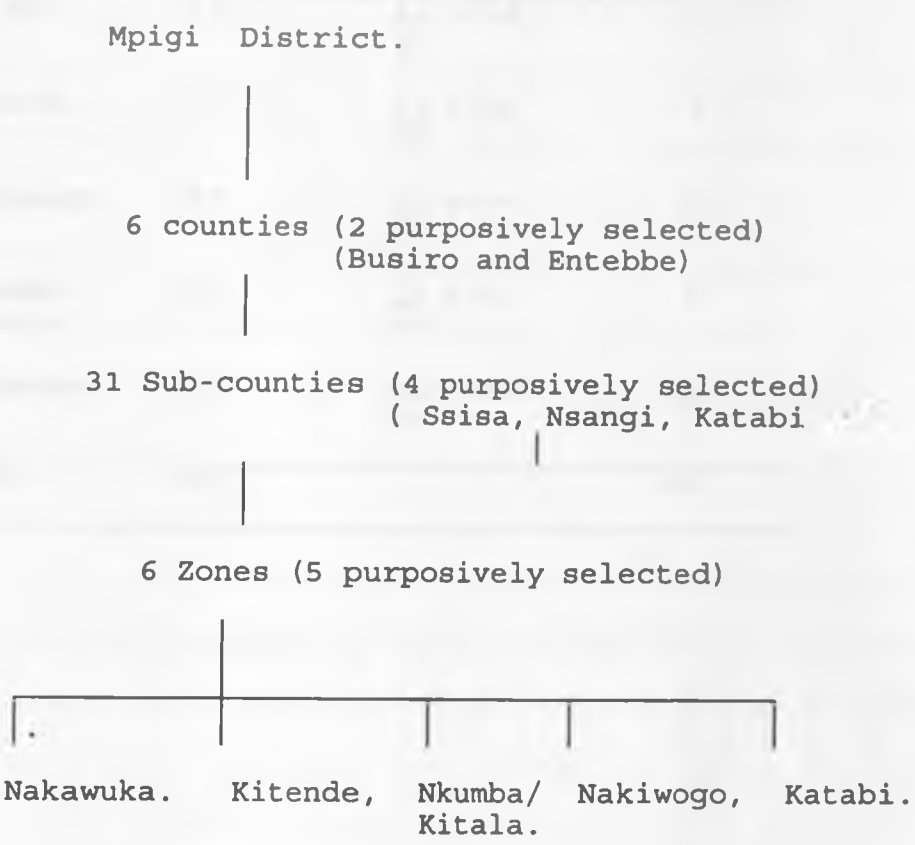
namely: Katabi(01), Kitende (code 02), Nakiwogo (code 03), Nkumba/Kitala (code 04) and Nakawuka (code 05). These were 89

(e) Taking of samples from each of the zones mentioned. The size of these samples was proportional to the size of the zones.

(f) Randomly selecting from the five zones the farmers to be included in the study. The sample size determination (i.e. 40 farmers) took into account constraints especially financial of resorces,time and volume of work involved as well as convenience and plausibility of results

Sample size determination appears in Table 1.

Figure 3: Sampling Method



Notes: (1) A total of 40 farmers were selected for the study using proportionate sampling method.(Table 1)

(2) 2 Farmers were randomly selected from the 40 farmers for case study to support data collected through the survey.

Table I: Sample Size Determination

Zone Code	Zone	Eligible farmers	Method	Number Selected
01	Katabi	12	$\frac{12}{89} \times 40$	5
02	Kitende	15	$\frac{15}{89} \times 40$	7
03	Nakiwogo	17	$\frac{17}{89} \times 40$	8
04	Nkumba/ Kitala	19	$\frac{19}{89} \times 40$	9
05	Nakawuka	26	$\frac{26}{89} \times 40$	11
	TOTAL	89		40

4.2. RESEARCH ACTIVITIES

4.2.1 Pilot study and Training of Enumerators

The questionnaire was pre-tested on eight farmers from Buloba who were considered to be similar in all respects to the farmers in the study area. The results were analysed and relevant changes were made especially on the length and ambiguity of the questions in the questionnaire. Every questionnaire was checked for accuracy and completeness immediately after the pilot study. The enumerators in (section 4.2.2) were used in the collection of data in the pilot study.

Two enumerators, both holders of a Diploma in Agriculture, were recruited and trained for a week on the administration of the questionnaire. The enumerators were fluent in both English and Luganda, the languages used in the administration of the questionnaires. The questionnaire was designed in English, translated into Luganda and re-translated into English.

The procedure in training involved study of the questionnaire, administration and filling in of the questionnaire using two of the selected farmers, with the assistance of the Researcher. Thereafter, the enumerators were asked to administer one questionnaire each to the farmers in the presence of the researcher.

Any bias, suggestive questions or inconsistencies noticed were discussedand eliminated immediately.

Further training included explaining to the farmers the purpose of administering the questionnaire in order to pave way for support and to make farmers have confidence. This took place in the annual general meeting of the farmers' association. It was also agreed that the enumerators visit farmers to make appointment. The purpose of the survey was communicated to the local RC's, relevant ministries, departments and women farmers' groups through the HPWF staff.

4.2.2 Data collection

The whole field survey took three months. The work involved gathering data from farmers as well as discussing all the information obtained with the enumerators. The other part of field survey involved measurement of the land under fodder.

Actual study was carried out from November 1992 to January 1993, which was a dry season. Interviews were normally undertaken in the afternoon hours because in the mornings farmers were busy carrying out their routine work. Each respondent was interviewed at her (project) premises.

The researcher closely supervised the enumerators throughout the entire survey to ensure data were correctly obtained and

recorded. Apart from the supervision of enumerators the researcher was also involved in the administration of questionnaires. Supervision involved cross-examination of the enumerators on every questionnaire completed, at the end of each day. Where there were mistakes in entering and coding, the concerned farmers were revisited by the researcher to clear any ambiguity.

4.3 Study Instruments and Standardization

4.3.1 Questionnaire

The Questionnaire was developed and desgned to collect primary data. As noted earlier, the questionnaire was structured and translated into Luganda and re-translated into English.

4.3.2 Key Informant Interviews

Additional information on the project related to administrative and institutional aspects as well as project background was obtained from the project office, chiefs, local committees and relevant Government departments.

4.3.3 Secondary Sources of Data

Secondary data was obtained on process implementation of HPWF with regard to policy, project revision, funding, logistical support and distribution of inputs. The major sources included books, files, articles, reports and records from HPWF, and UNDP/FAO project.

4.3.4. Observations of Farmers Management Practices

Observations were undertaken to establish the following:-

(a) The standard techniques applied in milking.

(b) The degree of cleanliness in handling milk containers, cowfeed, cows and cow-sheds.

(c) Condition of building materials used, type of roof, or floor and exercise yard.

(d) Method of disposal of cow dung as well as its application and effect on the existing crops.

4.3.5 Standardization

Questionnaires were collected from the enumerators everyday for cross-examination. The PI surveyed 15 farmers while both enumerators surveyed 25 farmers. The choice of the 15 farmers surveyed by PI was purely random. This further facilitated comparison of records with those of the enumerators to ensure correctness in the collection of data. This gave the PI ample time of supervision on data collection. All anomalies in the collection of data were also corrected by the PI during her observation exercise on all the 40 farmers. Generally, the PI records on the questionnaire tallied with those of the enumerators. The researcher on her arrival, explained to the farmers that she was on her routine work for the betterment of the project and strongly believes she was given sincere and correct information.

4.4. Type of data

(a) Household Information

The information collected was on sex, age, marital status, religious affiliation, education level and occupation of the members of the household. Ages for the members of the household were obtained from the birth certificates, where applicable. In absence of the birth certificates, ages were estimated by respondents.

(b) Inputs to the Project.

Data on inputs to the project (manpower, logistical support and staff training) was obtained from the records maintained at the project office though their actual disbursement was obtained from the farmers themselves.

Data on in-calf heifers distributed, credit, and farmers' training were also collected.

Information on total land available was obtained from records on land title deeds, where applicable. In case of farmers who had not leased their land, total land available were estimated by the respondents with the help of the interviewers. Land under other crops and unutilized land were estimated by the respondents.

(c) Land under Fodder

A perimeter survey (using chain and a compass) was carried out to determined the area under fodder (in hectares), for all farmers surveyed in the main study.

The method involved fixing the shape of the land and its bearing, using poles and carrying out clockwise measurement of the whole land. All measurements were then put on a rough sketch on paper. The information so recorded was transferred to a scaled graph paper from which the correct area was determined by counting the number of squares per scale (Table 2).

Data on cow-shed, water availability, and various zero-grazing equipments (spray pumps, milking cans, buckets, feed and water troughs plus exercise yard) were collected using the structured interviews and observation.

Table 2: METHOD OF LAND MEASUREMENT

SIDES	AB	BC	CD	DA
LENGTH	70	70	72	50
FB	225°	336°	94°	59
BB	75°	156°	274°	279°
DIFFERENCE	180°	180°	180°	180°
SCALE	1 cm = 1 m			

Note FB = Forward bearing
BB = Backward bearing

There are 40 small squares
1 sq = 1cm
1 small sq. = $1cm^2$ + 10m
$1 cm^2$ = 100m
Area 40 small sq. = 4000
1ha = 10,000m

$$\text{Area} = \frac{4000}{10000} = 0.4\text{ha}$$

Area = 0.4ha.

(d) Farmers' Management Practices.

Farmers' management practices (feeding, record keeping, and disease control); productivity of the cows with regards to milk production and reproduction were obtained by interview and scrutiny of records maintained by individual farmers.

(e) Benefits Derived From the Project.

Information on benefits of the project to the farmers (income, other projects initiated and benefits farmers thought they had benefited from the project) was obtained through interviews, farm records and direct observation.

(f) Constraints.

Information on project implementation constraints was collected through informal interviews and the structured questionnaire.

(g) Disposal of cowdung

Method of disposal of cowdung as well as its application and effect on the existing crops was obtained by interviews and direct observation.

4.5. DATA ANALYSIS

4.5.1. Data Entry and Cleaning

Data were entered and cleaned on a computer using SPSS/PC package under two files. The first file contained information on the demographic features of the study population, while the second file contained information on all other study variables. Frequencies were run to ensure consistency in data entry. None of the 40 farmers surveyed was dropped during analysis

4.5.2. Methods of Analyses

Descriptive analyses were undertaken on the data to obtain descriptive statistics such as frequencies, percentages, mean, standard deviation and correlations.

The following sub-group analyses were undertaken.

(a) The characteristics of female-headed households against male-headed households with respect to average milk sales, average time spent on cow management, average labour cost and land under fodder.

(b) The performance of farmers whose husbands are employed outside the farm against those whose husbands are employed on the farm in terms labour costs, monthly milk income, farm time, and land under fodder.

(c) The performance of farmers using only family labour; against those farmers who use both family and hired labour; in terms of milk sales, time spent on cow management, land under fodder and labour cost.

(d) The correlation of total milk production (TMP) with following variables :=

(i) Land under fodder
(ii) Water intake
(iii) Age of animal
(iv) Credit availability
(v) Supplimentary feeding
(vii) Cow deworming.

In all cases above, tests of significance were undertaken to determine the relevance of the relationships. The student's t-test was used.

4.6. Limitations of the Study

(a) This study has not incorporated directly nutritional aspects and yet one of the major original objectives of HPWF was to increase milk production for purposes of better nutrition. This was however, beyond the scope of this study. Another study is envisaged

(b) It does not seek the impact of the project on the beneficiaries. It is a process evaluation and therefore, the impact should be followed up in another study.

(c) It has not incorporated the economics of zero-grazing.

(d) It does not evaluate the effect of introducing zero grazing on other important traditional activities.

(e) Net income from milk sales is just an estimate because information on expenditure was not investigated in the study.

(f) For purposes of this study, only the born calves were considered when evaluating reproductivity of the project cow. Normally both born and unborn calves are considered in this aspect.

CHAPTER FIVE

RESULTS

This chapter includes the results as derived from the analysis of data collected from 40 farmers during the survey, and other observations. It includes general demographic characteristics of the households; timeliness and adequacy of both project and farmers' inputs, the productivity of the project cows in terms of milk production and reproduction; farmers' management practices and constraints to the project. In support of the general results presented and in order to investigate factors that could have led to the success of some farmers case studies on two individual farmers were done. References are made to relevant literature in the text.

5.1 Characteristics of Project Participants

Tables 3a and 3b, show that average household size was 10. Almost half of the family members of the study population (47%) fell below the age of 14 years. The dependency ratio was therefore high (>1). The female population (51%) was slightly higher than that of males which was 49 percent.

Table 3a: General Household Characteristics

Variable	Household Members from 40 WPWF Households (N=388)	
	Frequency	%
Average household size	10	
Dependency ratio	1.1:1	
Male-headed households	32	80
Female-headed households	8	20
Household members employed outside the farm	42	11
Full time members on the farm	53	14
Household members not employed*	293	75
EDUCATION:		
Illiterate	54	14
Primary/junior	188	49
Technical/T.T.C	32	8
Secondary and above	114	29

NOTE: * - This included children who were too young to work, school-going children and the elderly people.

Table 3b: The Population Structure

Age in Years	Sex (N = 388)					
	Male		Female		Total	
	F	c%	F	c%	F	%
0-14	90	57	91	58	181	57
15-44	75	86	86	90	161	88
45-54	12	92	12	96	24	94
55+	14	100	8	100	22	100
	191		197		388	

NOTES: F = Frequency
C% = Cumulative percentage.

The proportion of the household members employed full time on the farm (14%) was not much different from that employed outside the farm which was 11%. The rest were not employed.

About three quarters of the farmers (Table 3c) had attained secondary level education while 25% had received technical and/ or University education. A small percentage of the population (14%) was illiterate. The rest of the population attained formal education from primary level and above. This revealed a highly educated study sample, as is expected in peri-urban communities.

The average age of the participants was 43 years. About 80 percent were married which proportion represented male-headed households. The average age of the household heads was 58 years.

Table 3c: Characteristics of Farmers.
(N= 40)

Variable	Number	%
age		
25-34	11	28
35-44	12	30
45+	17	42
Education level		
Primary/Junior	21	52
Technical/T.T.C.	8	20
Secondary +	11	28
Marital Status		
Married	32	80
Single	3	8
Widowed	5	12

5.2 INPUTS

The project document upon which implementation was based gives guidelines for among other things, project inputs to be provided by project administration and farmer inputs to be provided by beneficiaries. The evaluation of the inputs was therefore based on the project document.

5.2.1 Project Inputs

The project falls under the Home Economics section of the Department of Production and Marketing in the MAAIF. Initial financial support for the project was provided by WFP through UNDP/FAO/UG Project (UGA/84/023), though data regarding this funding were not available at the time of the survey.

(a) Logistical support

Transport was provided to the project staff as follows:- one vehicle in 1988, two motorcycles in 1989, and, 12 bicycles (six in 1988 and six in 1990) to ensure the smooth running and close supervision of the project activities. The transport facilities were adequate, since each level of staff had some mode of transport provided to them in time of need. The running and maintenance of the above transport was done by MAAIF.

All the vehicles, motorcycles and bicycles were all in good condition by the time of survey. In addition, a fully equipped veterinary kit was provided to be used by all the project veterinary staff. It contained most of the essential equipment.

(b) Project human resources

The project is run by seven well qualified staff-members of the MAAIF who were recruited at the beginning of the project. The selected staff were trained in order to be equipped with hands on skills on zero grazing management, farmers' training programmes and demonstrations. A full-time overall project coordinator and an extension officer per zone of about 30 farmers were considered adequate for the project implementation. Besides, there is a part-time veterinary doctor to assist the extension staff and farmers.

(c) Farmers' training

This involved the introduction and/or upgrading of farmers' knowledge on dairy management and zero-grazing. The training was given by project personnel. Specific areas included dairy husbandry, breeding, forage preservation, credit management, milk hygiene, fodder establishment and management, record keeping and formation of co-operative societies.

Of the farmers surveyed, 95 percent had attended all the courses planned on zero-grazing management, while the remaining 2 farmers had not received any training at all, because they had inherited the project cows after the death of their mothers who were initially in-charge and had been trained. However, 42 percent of the trained farmers indicated that they needed more training on the topics that had been taught to them already.

These were silage and hay making (10%), calf rearing (13%), cow management after parturition (9%), and first aid treatment (10%). Slightly more than a half of the farmers (58%) indicated that they were satisfied with the training they had been given. It is noted, however, that while all courses were arranged adhoc it was compulsory for all farmers to attend them.

(d) Credit

Credit was disbursed to farmers in kind and not in cash. The valuation, however, was in cash. This was done by attaching prices to all categories of inputs provided. There were two lines of credit; one from Uganda Commercial Bank (UCB), and the other from the Canadian Government.

(i) Credit from UCB

A credit arrangement between the project and the Rural Farmers Scheme (RFS) of UCB was instituted to enable farmers to obtain materials and equipment to use on the project at an interest rate of 42 percent per annum and loan repayment period of one year. These included iron sheets, barbed wires, wheelbarrows, cement and acaricide (**Delnav**).

All the farmers who had received the project cow were advised to apply for the UCB credit which they did in 1989. Of the surveyed farmers, 23 (57.5%) received the UCB credit with disbursements beginning 1991. However, only half of what each applied for was approved.

The UCB used the following criteria to select eligible farmers:-

1. The farmer must have received project cow.
2. Ability of the farmer to repay the loan.
3. Experience of the farmer regarding dairy farming.
4. Character of the farmer as recommended by the local chiefs.
5. Farmers' ability to estimate the appropriate funding she required.

(ii) Credit from Canadian Government.

The funds which came from the Canadian Government, was meant to avail farmers with water storage facilities by setting up a water catchment service. The project administration used the money to buy water storage tanks, and passed them to the project association officials. These were then supplied to the farmers who were expected to repay to the project association to loan to other farmers later.

This scheme started in 1990 and all farmers were entitled to this facility. By the time of the survey 15 farmers had benefited. The expansion of this service is determined by the rate of repayment by farmers and the project association which draws the priority list. By the time of the survey no farmer had repaid the loan.

Table 4 shows the beneficiaries of the credit scheme from the two sources of funding.

Table 4: Distribution of Credit by Different Institutions
(N = 40)

Source of credit	Amount (U.Shs)	Frequency	Year of receipt	% of farmers
Uganda Commercial Bank	<200,000	12	1989	30
Uganda Commercial Bank	200,000-600,000	16	-	70
Canadian Government	280,000-300,000	11	1991	48
UCB and Canadian Government	-	6	1991	26

NOTE: * = The numbers of farmers totalled over 23, and the percentage totalled over 100 because some farmers received credit from both sources.

Chamberlain (1983) and Mukasa (1991) underscore the importance of credit in small scale dairy production particularly if it is of long-term nature (see section 2.3). The findings indicated that the UCB loan was inadequate, had long procedures and was short-lived.

(e) In-calf heifers

All the in-calf heifers mostly imported were received by the farmers at different times. A majority of them (85.5%) received pure Friesian breed while the rest received cross-breeds. Almost three -quarters (72.5%) preferred the breed they received while the rest did not. The majority of the farmers (90%) preferred the Friesian breed because it is high yielding, while the rest preferred crosses because of their resistance to diseases. Only about a third (32%) received the cows at the time they expected them. Those who had not received the cows two months from the time they were promised, waited for eight months on the average, with the waiting period ranging from 6 to 24 months.

The delay in arrival of the imported in-calf heifers resulted in giving out of crossbreeds bought locally to some of the farmers. The distribution of in-calf heifers in the whole project appears in Appendix C1.

5.2.2 Farmers' Inputs

The minimum inputs required from the farmers were in regard to :-

(i) Adequate land for planting fodder.

(ii) Establishment of at least 0.4 hectares of fodder.

iii) Availability of water.

(iv) Attendance of all planned courses.

(v) Construction of a cow-shed.

(vi) Purchasing of all recommended equipment and materials

vii) Provision of labour time.

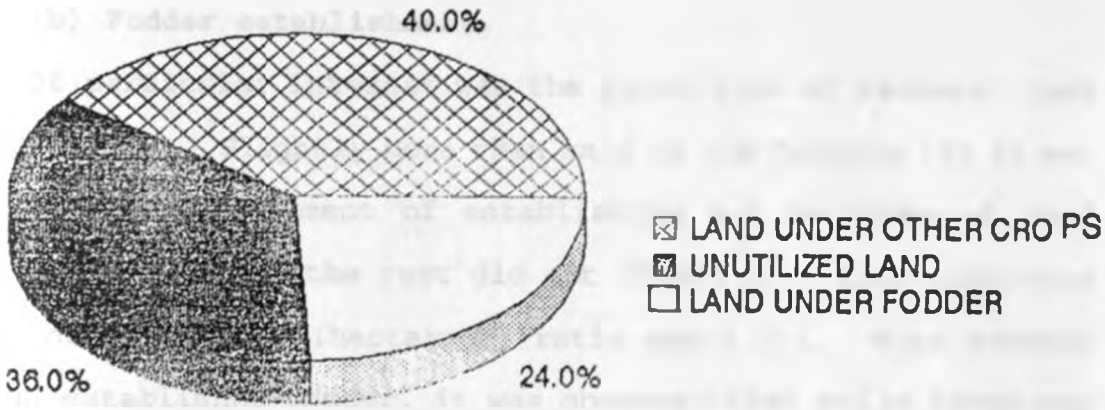
The situation as found out during the survey is presented below:-

(a) Land

Average total land was about 2 hectares with the exception of two farmers who owned 19.3 and 26 hectares respectively. Land utilization is shown in figure 4 below.

Figure 4: AVERAGE LAND UTILIZATION BY HOUSEHOLDS

(N=40)



Footnotes:

(1) Unutilised Land does not include the residence

(2) Land under other crops includes both cash and food crops

Land utilisation also varied among zones. Kitende zone had the highest average land under fodder (0.68 hectares), Katabi had the lowest (0.36 hectares). Similarly, Kitende zone leads in land under other crops, that is, 1.4 hectares compared with the average of 0.87 hectares in the study area (Appendix D).

(b) Fodder establishment.

Of particular interest was the proportion of farmers' land under fodder. Slightly more than half of the farmers (52.%) met the project requirement of establishing 0.4 hectares of land under fodder, while the rest did not (Table 5). This indicated that the cow-fodder (hectarage) ratio was 4.2:1. With respect to the established fodder, it was observed that while those who followed the recommended spacing of 3:1 foot (75%) had well established pastures while those who did not follow the proper planting methods had poor pastures as observed (Appendices E1 and E2)

The cow fodder (hectarage) ratio of (4.2:1) instead of the recommended cow fodder (hectarage) ratio of 2.1:1 implied that there was overstocking which could have resulted in underfeeding thereby contributing to the reduction in both production and reproduction. This came about because originally, only one cow was catered for, but with time the number increased which has resulted into inadequate fodder.

Table 5: Average Land Under Fodder

(N = 40)

Area Hectares	Frequency	Land under fodder (%)	Cow fodder ratio	Adequacy
≥ 0.4	21	52.5	4.2:1	NO
< 0.4	19	47.5	4.2:1	NO

Important issues considered in fodder were the type and acreage. Results tally with past studies of Mpairwe (1991) and Froemert (1969) on the type of fodder. Nappier grass, and legumes (lablab) grown and recommended elsewhere are also grown in HPWF. The stocking rate of 2.5 animals per hectare (Tilee 1969) recommended contrasts with our findings of 4.2 animals per hectare which indicates overstocking in HPWF.

(c) Water

The farmers secured water in various ways. Some obtained water from one or more sources. About two thirds (67%) of the farmers obtained water from wells, slightly more than a third, collected rain water from the roofs, 5 percent from mountain streams and valley bottoms and 3 percent from Lake Victoria. Distance from water source to the farm, ranged from about 0.5 km to about 1.5 km.

More than a quarter (32.5%) of the farmers did not have water storage facilities. A water storage facility was taken to refer to any container of not less than 200 litres. Fourty percent of the surveyed farmers owned tanks (more than 800 litres), 27.5 percent owned drums (200 litres) Table 6.

Table 6: Distribution of Farmers by Water Source*, Distance to Source and Storage Facility

(N = 40)

Variable	Frequency	% of Farmers
Source of Water		
Piped	9	22.5
well	15	42.6
Tank	13	37.4
River	2	5.0
Lakes	1	2.5
Distance to Water source (Km)		
< 0.5	28	70
> 0.5	11	30
Water storage facilities		
Tanks	16	40
Drums	11	2.5
No water storage facilities	13	32.5

NOTE: * = Percentage of water source total over 100% because some had more than one source of water

(d) Cow-shed

All the farmers under survey except two, were practising zero-grazing. The two practised semi-intensive system of dairy farming, fenced 0.1 of a hectare of the land, and for a half of the day, the cow was grazing. Feeding troughs with extra fodder were filled and placed in the paddocks. This system is not recommended by HPWF because it is difficult to measure the cows' feed when feeding independently. However, no problem was mentioned and the farmers practising it were contented.

In the construction of the cow-shed, each farmer was expected to provide all materials required, and by the time of the survey, each of them had one.

Slightly more than half (53%) of the sheds were covered with iron sheets, while 45 percent were either grass or papyrus thatched. The remaining two percent utilized old tins for their shed-roofs. More than fifty percent of the cow-sheds were in good condition, while 27 percent required major repairs and 18 percent needed only minor repairs (Appendix F1).

The cost of constructing a permanent shade (Appendix F2) was approximately 1.4 times that of building a temporaly one (Appendix F1) which was US $166.

(e) Labour

The mean time spent on routine activities on the project cow was 5.2 hours, that is, 37 percent of fourteen working hours per day. The most labour-intensive activity was cutting fodder which took 21% of the time (Appendix G). This was followed by cleaning cow-shed and utensils and fetching water which took 17% and 12% respectively. The least labour intensive activities were feeding calves and record keeping (3%) each (Table 7)

About one third (28%) of the farmers utilised only family labour while the rest utilised both family and hired labour (Appendix H).

A sub-analysis comparing characteristics of farmers using family labour alone with those combining family labour with hired labour was undertaken. Time spent on the project activities, land under fodder and milk sales per month were considered. Farmers utilising both family and hired labour showed better performance than those with family labour in all aspects though the difference was not statistically significant (Table 8).

Table 7: Mean Time Taken to Perform Different Tasks on the Project Cows (N=40)

Activity	Mean time spent (minutes)	SD	% of Total Time
Cleaning shed and utentils	51.78	9.63	17.0
Milking	14.10	4.41	4.5
Cutting fodder	65.40	17.23	21.0
Chopping fodder	64.25	15.17	20.0
Feeding the cow	19.40	7.25	6.0
Feeding calves	9.08	4.0	3.0
Fetching water	40.78	12.0	13.0
Marketing milk	36.71	15.8	12.5
Keeping records	10.5	2.5	3.0

Table 8: Characteristics of Farmers Who Use Family Labour and Those Using Both Family and Hired Labour
(N=40)

Variable	Family and hired labour (n=29)		Family labour only (n=11)		P-Value
	$\bar{X}$	SD	$\bar{X}$	SD	
Herd size	3.1	1.6	2.4	1.4	0.2
Time spent on project cow/day (hrs) by hh	5.1	1.2	4.9	1.2	0.7
Land under fodder (ha)	0.5	0.4	0.4	0.1	0.2
Income per month (U.Shs)	108,206	6,541	72,062	9,578	0.143

NOTE: $p \leq 0.05$
SD = Standard Deviation
hh = Households.

Information about routine activities involved in the management of the zero-grazing cow was obtained purposely to understand division of labour among household members and hired labour (where applicable). The results showed that farmers were heavily involved in the project activities. They contributed about 42 percent (2 hours) of the total labour time (5.2 hours) required. The husbands contributed only six percent while children and hired labour contributed 23 and 29 percent respectively (Figure 5a). On the other hand, results on households which utilised only family labour in the management of the zero-grazing cow show that the farmer contributed 61 percent (3 hours) of the total labour time required while the husband and children contributed 9 percent and 30 percent respectively (Figure 5b).

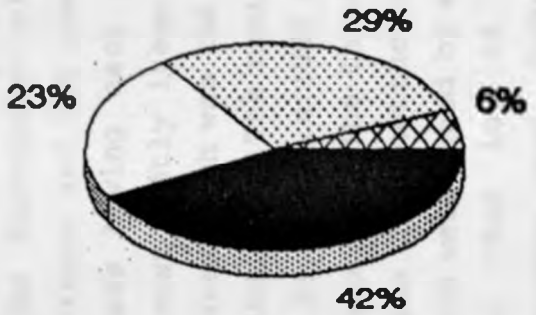


Figure 5a: Average project Labour Distribution in the house hold

(Using both family and hired labour)

(N=29)

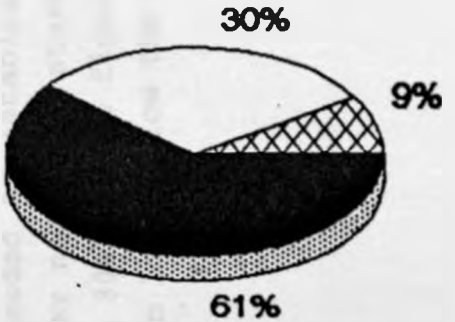


Figure 5b: Average project Labour Distribution in the house hold

(using only family labour)

(N=11)

husband | hired labour | children | famer

(f) **Ownership of Farm Equipment, Facilities and their cost**

Farm equipment and other facilities included other inputs provided by the farmer. The possession of the items were determined more by its importance and not cost as was evident from the proportion of farmers having each item (Table 9). Considering the first three most costly items for example, all the farmers had a common cow-shed which was the most costly item, costing Ushs 199,400/= i.e (US$166). The next most costly item was the Bucket pump which was 55,000/=i.e (US$ 46). The majority of farmers 85.5% had this equipment. The third most costly item [Ushs 30,000/= i.e (US$ 25)] was the construction of the exercise yard, and the wheelbarrow which were owned by slightly more than two thirds of the farmers, that is, 66 and 62 percent, respectively. Aluminium buckets cost Ushs 5000/= and were owned by 95 percent of the farmers, while the stainless steel milk cans costing Ushs 15,000/ i.e (US $ 13) were owned by 27.5 percent of the farmers. Feeding and drinking troughs which cost Ushs 10,000 i.e(US $ 8) in each case were owned by 87.5% of farmers respectively.

Excluding the amount needed to establish a pasture, the initial total amount a farmer needed to start the project was therefore Ush 364,400/= (US$ 304). This figure is high for the target group i.e the poor who leave below the estimated poverty line of US $110 per year.

Table 9: Proportion of Farmers with Different Farm Equipments and Facilities.

	Farmers with		Expenditure* (U.Shs)
	Frequency	%	
Common cow-shed	40	100	199,400b
Bucket pumps (20 litres capacity)	33	82.5	55,000
Wheel barrows	25	62.5	30,000
Exercise yard	26	66.0	30,000
Milking cans	11	27.5	15,000
Buckets	38	95.0	15,000[a]
Feeding troughs	35	87.5	10,000
Drinking troughs	38	95.0	10,000
Total			364,400 (US$ 304)

NOTES: * = Cost of equipment/facility

a = Stainless steel bucket considered

b = The price of the cow-shed construction refers to the shed constructed by the farmers who had just joined the project. They used local materials.

5.3 FARMERS' MANAGEMENT

5.3.1. Feeding

Feeding the cows entailed giving fodder, supplements and water.

Fodder

Only a small proportion of farmers (10%) used **nappier** grass alone while 90 percent used both **nappier** grass and legumes. Farmers who fed both nappier grass and legumes did so without any set proportion as recommended. According to Mukasa (1991) (section 2.2.1a) nappier grass and legumes should be regularly combined and fed to the cows in the ratio of 7:3 in order to obtain 4.5 litres of milk per day and any other additional quantity of milk to be brought in by supplementary feeds.

In addition to fodder, 92.5 percent fed their cows on crop residues, which included banana peelings, and/ or potato vines. Both types of crop residues were used by 85 percent of the farmers, while 15 percent used banana peelings or potato vines singly. Crop residues were given two to seven times a week.

Crop residues were collected from home gardens or bought from hotels or restaurants. Crop residues from gardens were fed to animals when they were mature, fibrous and low in nutrients. Those from hotels or restaurants required sorting out dangerous articles such as nails, polythene papers and broken bottles. Crop residues supplemented the fodder although the project (MAAIF 1988) did not recommend use of these low nutritive feeds. However, Wouter (1988) suggests that their energy content is acceptable especially when used green and grown on fertile soil. Since the HPWF area is fertile and can be extensively used to grow fodder, the use of crop residues was not encouraged.

Supplements

In addition to fodder, nearly all (92.5%) of the farmers gave supplements to their cows. Supplements consisted of manufactured feeds which included dairy meal, mineral blocks and maize grain. Nearly three quarters (73%) gave both dairy meal and mineral blocks, while 27 percent administered maize grains in addition. The feeding rates varied with the type of feed. The average amount of dairy meal given to the cow was about five kg per day. The recommendation according to MAAIF (1988) is that for each extra 1.5 litres of milk produced above seven litres of milk, the farmer should give one kg. of supplements.

With the average milk production of 13 litres per cow per day produced by the project cow, they had to give an average of 4 kg. per cow per day. Considering that some cows produced more than 13 litres of milk per day, the 5 kg. given was within the recommended range and therefore, considered adequate.

Most farmers (77%) gave supplements during both lactation and dry periods. The rest gave supplements only during the lactation period. This was an issue which needed emphasis during training that cows should also be given supplements during dry periods although in lesser quantities to prepare the cow for future production.

Water

Water is given to cows *ad libitum*. Milking cows consume, on average, 90 litres of water per day. Etgen (1987) observed that each litre of milk produced requires a cow to drink 5 litres of water and also 3-4 litres of water are consumed for each unit of dry feed consumed . So for a cow producing 13 litres and feeding on about 5 kg of dry feeds, needs about 95 litres of water. Since the average on HPWF is about 90 litres, water intake was considered adequate.

5.3.2 Disease Control

Disease control entailed the control of diseases and vectors such as ticks on both the cows and calves as well as deworming them.

(a) Tick control

All farmers practised tick control. About two thirds of the farmers (65%) used the system of spraying and the rest a pour-on system. There were several acaricides used to spray the cows. The commonest one was **Baytical** which was used by 32.5 percent of the farmers. **Steladone, Delnav,** and **Supona** were used by 20, 17.5 and 15 percent of the farmers, respectively. The other five percent used either **Spoton** or **Buckdip. Superdip** was used by very few farmers (2.5%). Only one farmer did not have an acaricide at the time of the survey. The frequency of spraying/pouring-on the acaricide was once per week on average. The actual frequency was determined by the type of animal, acaricide used and season.

Tick control on calves

Ten percent used a pour-on system while 27.5 percent sprayed. Surprisingly 15 percent of farmers did not control ticks on calves. This might have contributed to calf mortality shown in section 5.4.1.1.

Use of pygrease, pour-on were effective but spraying with **steladon, delnave,**and **supona** on calves predispose them to poisoning since they can be easily licked by calves.

Storage of Acaricide

The majority of farmers (87.5%) stored acaricide in separate stores, while 12.5 percent of the farmers stored it together with other household things which was very dangerous since food could be easily contaminated.

(b). Deworming

Practically all the farmers (97.5%) dewormed their cattle. More than half (60%) dewormed both cows and calves. About three quarters dewormed their animals at least two times per year. This is considered inadequate as cows and calves should be dewormed quarterly. This irregularity of deworming might have contributed to fertility and production problems which were expressed by the farmers.

Also, there were more farmers who did not deworm their calves (37%) than those who did not deworm their cows (20 percent). This is very critical as deworming of calves is very important for proper growth and breeding.

5.3.3 Record keeping

As a condition, all farmers had to keep records for better management and evaluation of the project. Farmers were required to keep records on milk production, cow fertility, income and expenditure, treatment and visits made to their farm.

The DDC provided farmers with printed formats for record keeping, written in English, a language not understood by some farmers. All farmers kept records in the language they understood best and on each item.

Compliance to essential record keeping was high except for spraying, for which the proportion of farmers keeping the record was only five percent. There was total compliance for treatment records though these were completed by the visiting veterinary doctors. Similarly, nearly all (97.5%) of the farmers kept milk records.

Cow fertility records was also kept by most of the farmers (90%), while about three quarters kept records on income. A smaller number (20%) kept records on project expenditure.

Visitor's books were kept by more than half of the farmers (60%) (Table 10).

Table 10 : Distribution of Farmers by Types of Records Kept (N = 40)

Type of records	Farmers keeping records	
	Frequency	%
Milk production	39	97.5
Cow fertility	36	90
Income	30	75
Expenditure	32	80
Treatment	40	100
Spraying	2	5
Visitors book	24	60

The total compliance on treatment records and the high fertility records could be due to the fact that these were recorded by the veterinary staff as they carried out their routine activities. Most farmers, however, kept records on milk production and income, since these enabled them to assess how beneficial the project was to them. The records also helped farmers to keep track of their performance especially in finding out why there would be a fall in milk production for a given period. The low record keeping of spraying was because most farmers assumed that since spraying was done on particular days, for example Tuesdays, there was no need to keep records. Generally, however, farmers surveyed tended not to understand the keeping and use of records apart from those records on milk production and sales. They have to keep records because it is a project policy

It is very important that farmers take record keeping very serious as this can facilitate acquisition of loans and also monitor progress in the project management and evaluation.

5.3.4 Performance of Male-headed versus Female-headed households

A comparison was made between male and female headed households in the HPWF with the aim of ascertaining the extent to which the HPWF has influenced the women farmers. A female headed household was taken to refer to one in which there was no husband.

Variables considered for comparison were milk sales, labour cost, land under fodder and time spent on the project cow per day (Table 11). The results show that the average milk sales and average labour cost in the female headed households were higher than their male headed counterparts. But the difference between their means in the two cases was not statistically significant at the 95% level. However, the average fodder acreage and average time spent on the farm were higher for the male headed households than their female counterparts (Table 11).

It was expected that because of the extra input by the husband on the farm and other requirements in the home, the male headed households would perform better in all cases. This result was not supported by the data. As only 8 female-headed households (out of 40 households surveyed) entered the analysis, so it was not reasonable to draw conclusions from this small sample.

Table 11 : Performance of Female-headed Households versus Male-headed ones. (N=40)

	Male-headed (n = 32)		Female-headed (n = 8)		P-Value
	$\bar{x}$	SD	$\bar{x}$	SD	
Milk sales /month	92609.8	54408.8	122704.5	29246.1	0.3
Fodder acreage (ha)	0.5	0.4	0.4	0.09	0.5
Labour costs (U.Shs)	16416.7	12813.6	16600.0	1020.2	0.5
Time spent on project cow/day (hrs)	5.1	1.1	4.1	1.1	0.1

NOTE: $p \leq 0.05$ level

5.3.5 Management Practices: Husbands employed on the farm versus husbands employed outside the farm

A comparison on management practices was made between farmers whose husbands where employed on the farm and those whose husbands were employed outside the farm. Variables considered were: milk sales, time spent on the project, labour cost and land under fodder (Table 12). Results show that the average time spent on the farm, labour cost and land under fodder were higher for farmers whose husbands were employed on the farm. However, the differences between their respective means were not statistically significant (95% level). Similarly, the average milk sales for farmers whose husbands were employed outside the farm was higher than that of the farmers whose husbands were employed on the farm, though statistically insignificant (95% level)

It was expected that because of the extra income to the households of farmers whose husbands were employed outside the farms would display significantly better management practices. However, this being not the case we can conclude that women farmers can manage the project cows with or without their husbands or without their additional income.

Table 12: Performance of Husbands Employed on the Farm versus Husbands Employed outside the Farm

(N = 32)

Variable	Husbands Employed Outside the farm (n=20)	Husbands Employed On the farm (n=12)	P-Value
Milk sale / month (U.shs)	103282.04	86152.50	0.538
Total time spent on project cow by households(Hrs)	4.9	5.24	0.409
Labour cost (U.sh)	16142.86	17250.00	0.964
Land under fodder	0.48	0.57	0.478

$P \leq 0.05$

5.4: PRODUCTIVITY OF THE PROJECT COW.

The assessment of performance of the cow was based on volume of milk produced per lactation, and number of live calves reproduced by the project cow. Before this assessment, however, the composition of the herd on the farm was noted (Appendix I).

Generally, the project herd was much larger (80%) than the non-project herd. The project herd included only exotic and cross breed animals while the non-project herd included exotic and local breeds. Only the project herd was on zero-grazing while the non-project herd was on free range. The non-project herd is defined as all the cows owned by the households but not originating from HPWF.

5.4.1 Reproduction

It should be noted that economic productivity of the project with regard to return on labour and man hour was not included in the study. This is because collection did not monetize all the project benefits especially milk consumed in the family milk not sold, hides and skins and cowdung used to improve the productivity of crops. As such milk sales as a proxy for project income is insufficient to give a true picture of the economic performance of the project.

Theoretically, a cow can produce one calf per year. On average, each farmer has kept a cow for 3.6 years and in that period each cow had produced on average 2.9 calves, making a total of 129 calves born within that period, however, 15 of the calves (11.6%) died (Table 13). For that period all the cows surveyed under normal circumstances were expected to produce 144 calves, instead of 129. This reproduction performance (90%) is considered good.

Table 13: Offspring Production between 1988-1993

(N = 40)

Category of calves	Sum	Mean	SD
Bulls produced	67	1.67	1.0
Females produced	47	1.17	0.9
Dead offspring	15	0.38	0.67
Abortions	7	0.18	0.01
Still birth	3	-	-
Offspring per year	32.8	0.82	0.26
Mortality of offspring	4.32	0.11	0.20

The proportion of cows which had one calf per year was 73 percent. This is a good performance. The implication is that the performance could have been higher if the unborn calves were considered during the survey.

The 27 percent of the cows which did not produce a calf per year had a long calving interval which was possibly due to management problems such as failure on the part of farmers to detect heat. Of the surviving calves, 60 percent were bull calves and the rest were heifer calves. In addition there were seven abortions (5%) and three still-births (2%).

As per project policy, the first heifer calf was withdrawn from the farmer at 8 months and given to a new beneficiary when in calf after maintaining it on the government farm (Namulonge research station). By the time of the survey 24 of such heifer calves have been redistributed, implying that 16 more farmers are yet to bring back their heifer calves.

The time lag between giving the heifer and its return for redistribution was difficult to estimate, since most of the calves were bulls. Most farmers have had to wait long periods before receiving heifer calves. New beneficiaries are not told in advance as to when they will receive the heifer. This is certainly a hinderance to the project expansion.

5.4.1.1 Calf Mortality.

Calf mortality was 11%. This was slightly high as a herd in normal circumstances should experience approximately 5% (MAAIF 1983). There was little mortality of the female calves (9%), compared with the bull-calves which represented 91% of all calf deaths. The most common cause of death was ECF causing 75% of the deaths. Other causes included worms and poison and accidents representing 15% and 10% of the deaths respectively. The management of tick control and deworming might have contributed to this high mortality. According to information from the project office, farmers gave more care to female calves than to bull calves and hence the high mortality rate among the bull calves.

5.4.2 Milk Production.

As expected, the milk production increased with successive lactations for both exotic and cross breeds.

Standardizing the milk production for 305 days of lactation, the mean milk production per cow per lactation for exotic and cross breeds increased with subsequent lactations, that is 3261, 4649, 5082, (litres), and 1694, 1975 and 2664 respectively (Appendix J).

The general trend of average milk production per cow per day in all lactations across breeds was considered for all the farmers who had milk records (Table 14). The overall average milk production was 13 litres per day per cow. The average milk

production for Friesian was 14 litres while that of cross breeds was 7 litres per day per cow i.e. only 50%. This wide variation in milk production between breeds was largely due to the fact that local cattle are normally low yielders leading to cross breeds beeing poor milkers. However, according to Nsubuga (1984) and Dtots (1983), on milk production (section 2.2.5), the performance experienced in the HPWF project cows was good. They stipulate in separate studies, that average milk production range from 8 to 14 litres per cow per day for zero grazing cows.

Table 14: Mean daily milk yield per cow per day

(N=39)

Yield (litres)*	n	%
3 - 6	4	10
6 - 13	17	44
13 - 20	15	38
20 +	3	8

* Intervals take into account:

(i) Minimum production for household comsumption.

(ii) Minimum subsistence income.

5.4.2.1 Statistical Analysis

Correlation was done to determine the level of relationship between milk and other variables as depicted by the correlation coeficient (r^2) in Table 15. Regression analysis was done to determine the direction of the relationship and the extent of the variables in explaining milk production. The variables considered are: Land under fodder, water intake, age of animal, credit availability, supplementary feeding and deworming.

From the analysis, 5 variables i.e. land under fodder, water intake, age of animal, credit availability and supplementary feeding were correlated with milk production. For all these variables, the relationship was positive and statistically significant ($P \leq 0.05$) explanations for milk production. The frequency of deworming was found to be correlated with milk production. The relationship was positive but represented a statistically insignificant ($P \geq 0.05$) explanation for milk production.

Table 15 : Pearson correlation Coefficient (r2)for total milk production(TMP) against other variables.

Independent variable	dependant variable (TMP)	correlation coefficient (r2)	P-Value
Land under	(TMP)		
Fodder	(TMP)	0.3128	0.25*
Water intake	(TMP)	0.5104	0.00*
Age of animal	(TMP)	0.3103	0.00*
Credit availability	(TMP)	0.51718	0.01*
Supplementary feeding	(TMP)	0.4041	0.013*
Frequency of deworming	(TMP)	0.31498	0.05

Note:

* Significant at ($p \leq 0.05$)

5.5 PROJECT BENEFITS

One of the principal objectives of the HPWF project was to raise the farmers' standard of living through increased income. Results given in this section relate to average income received by the farmer through sales of milk and bulls, milk consumed by the family and other benefits.

5.5.1 Milk Consumption

The existence of the milking cow on the farm permitted the consumption of milk in the family and sale of the surplus. Of the 40 families surveyed, only one did not consume milk. On average, farmers consumed four litres per household per day, that is, 146 litres per capita per year for the average household size of 10. That is 0.4 litres of milk per person per day which is higher than the FAO (1989) recommended daily milk intake of 0.33 (MAAIF) per person per day . Therefore milk intake was considered, on average, to be adequate according to this recommendation.

5.5.2 Milk sales

The mean milk yield per day per cow for each cow's last lactation was 10.62 litres. Taking the then current price of individual farmers' milk price per litre, the estimated gross income per month per farmer was U.Shs 136,515.90 (U.S.114). Assuming 30% of gross income as the farmer's total costs, the average net milk sales per farmer per month was found

to be U.Shs 95,561.1 (US 80) (Appendix K).

The majority of farmers (33%) earned between Ush 50,000/= and 100,000/= (US$ 42 and 83 respectively) per month per farmer (Table 16). Compared to the salary structure of the Uganda civil service, this income far exceeds a graduate's basic salary (Ush 15,000/=) i.e (US $ 13), implying that the project has boosted the farmer's income and helped them to realise improved socio-economic status.

Table 16 : Average project milk income per farmer per month * (N=39)

Income (U-SHS)	Frequency	%
10,000 - 50,000	9	23
50,000 - 100,000	13	33
100,000 - 150,000	10	26
150,000 - 200,000	4	8
200,000 +	3	8
Total	39	100

*Each of the 40 surveyed farmers had one milking project cow. One farmer had no milk records.

5.5.3 Sales from bulls

As per project policy, all bulls produced were supposed to be disposed off either through sale or consumption, depending on the farmers' discretion. The total number of bulls produced and survived were 67 (85%). Twenty six (39%) of them were still on the farm unsold, due to unavailability of market. This is a problem for the farmers since these bulls are sharing the facilities available with the milking cows. The rest were sold at an average price of U.shs 228,000/=(US$ 190), at the average age of 11 months. The smallest bull calf fetched Ushs 40,000/= (US$ 33) at the age of three weeks, while the largest (seventeen months) fetched UShs 700,000/= (US 583). Income from the sale of bulls was diverted to other income generating activities on the farm such as poultry farming.

5.5.4) Other Benefits

Farmers were asked to indicate benefits they thought they had got from the project in order of priority and the following results were obtained.

(a) Improved Income

A good number of farmers (75%) reported that their income had generally been improved and they were able to start some other businesses such as poultry farming and pig rearing (Appendix L). The rest had not been able to offset their initial cost as well as adequately providing for project operation expenses due to poor milk yield (10% in Table 14)

and poor milk market (22.5%). In addition, others improved their residential premises and some built new ones (Appendix M1 and M2). With increased income, it was noted, they could feed their families better and send their children to school.

(b) Supply of Manure

All farmers reported that they had gainfully utilised the manure obtained from the cow to improve on the fertility of the soil which resulted in better yield of existing food and cash crops

5.6 CONSTRAINTS

Farmers were found to experience the following problems in the rearing of their animals.

5.6.1 General Problems

General maintenance (cost of feeding, treatment and pasture production) of the project cow was the major problem reported by 50 percent of the farmers. Other problems were reported by smaller numbers of the farmers. Problems in marketing were reported by 12.5 percent, shortage of veterinary services and low milk price by 10 percent in each case, fertility and security by five percent in each case and pasture shortage during dry season by 7.5 percent (Appendix N).

5.7 CASE STUDIES OF TWO WOMEN FARMERS FROM THE HPWF.

To support data from the surveys two individual farmers were randomly selected from those who had one cow for case studies. The random selection produced Mrs Ruth Wamala and Mrs Margaret Lubowa all of Nakiwogo zone.

5.8.1 Case Study I:

Mrs Ruth Wamala's Farm

Ruth Wamala is 32 years old and was widowed 2.1/2 years ago. She has six children of ages between 8 and 18 years, and are all at school. Her husband was a secondary school teacher. When he died, Ruth depended on her cow as a source of income. Ruth has secondary school education. Her farm is located in Nakiwogo zone, 1.5 km from Entebbe town.

At the time of the survey Ruth had a total land area of one hectare, 23 percent of which was under fodder. She was given a crossbreed cow in 1988 which she named "KISAKYE" meaning god's mercy. She was one of the first farmers to receive the project heifer. She received credit amounting to U.Shs 200,000 from UCB. This she used to improve her cow-shed and also to purchase other farm equipment. She also obtained UShs. 270,000 from the Canadian Government which she used to extend water to her home.

Ruth carried out the following routine management practices on the cow. She fed both nappier and legumes, banana peelings

and potato vines. She supplemented this with dairy meal at the rate of two kilograms/day, and gave mineral blocks as well. She gave water at the rate of 50-60 litres per day.

As regards disease control, she used the spraying method with **Supona** acaricide. She dewormed the cow twice a year and four times a year for the calves.

She used only family labour and the duties were divided up among the children. She spent an average of three hours per day on the project activities. Besides the project, Ruth used income from milk sales to start a retail shop at her house. After feeding the cow she worked on the shop. She started the retail shop about one and a half years after the acquisition of the project animal.

So far Kisakye has produced four calves, three bulls and one female. One bull died of ECF and the female was returned to the project. She sold one bull at U.Shs 60,000 when it was four months old.

Milk production per lactation was 13 litres on average. However, the milk production has been increasing steadily since first lactation; that is, 8, 10.4, 12.6, and 14 litres for the first, second, third and fourth lactations, respectively. She consumed four litres of milk daily and sold the rest of the milk at U.Shs 500 (approx. US $ 0.5) per litre. Besides the sales of

the bull she realised an average monthly income of U.Shs 99,750 (approx. US $ 83) from the milk sales. Inspite of the above progress made by Ruth, she faced one problem of pasture availability during the dry season.

5.8.2 Case Study II:

Mrs. Margaret Lubowa's Farm

Margaret Lubowa is 38 years old married with seven children aged between 5 and 20 years. The husband is 48 years old and is involved in petty trading for a living. Both Margaret and her husband have secondary school education, and all her children are at school (four in primary and the rest in secondary schools). Her farm is located in Nakiwogo zone, 1.5 Km from Entebbe town.

She had 1.5 hectares of land, 50% of which was under fodder. She was given a **Friesian** cow in 1988. She obtained credit from UCB amounting to Ushs 290,000 (approx U S $ 242). She used most of it to improve her cow-shed. She utilised both family and hired labour, and spent about Ushs 6,000 (approx.US $ 5) on the latter per month. All her children were involved in project activities. The family spent 4.8 hours per day on average on project activities.

Margaret fed both fodder and supplements to her cow. This included two kilograms of dairy meal per day and maize bran. She gave water at the rate of 75 litres per day. She controlled ticks by spraying using **Delnav** acaricide. She was one of the best farmers who observed good record keeping and other management

practices.

So far her cow had calved three times, two bulls and one heifer. It also had one abortion. Her cow had one of the highest milk production per lactation, that is, 15, 16, 22 and 25 litres per day, for the first, second, third and fourth lactations, respectively. She consumed about three litres of milk per day, while the calf consumed two litres. The rest of the milk was sold for cash, and this was the most important source of income in the home. It fetched about Ushs. 141,750 (approx.US $ 118) per month. Besides, Margaret obtained Ushs 70,000 (approx.US $ 58) from the sale of a bull. Income from the project cow was the most important source of income that sustained her children in school.

The uniqueness of this farmer was in the constraints the farmer faced, and how she solved them. In 1991, Margaret's cow contracted ECF and died when it was almost calving down. She lost the most important source of income. As a result the children lacked school fees and stayed home for one year. However, due to her excellent management practices, the Women Trust Fund (WTF) of which she was a member, offered her credit of another cow. When she received the cow of WTF, HPWF incorporated her into its administration. She exchanged one of her bulls for 2 female calves, sold one of the calves and remained with one. The cow which was loaned to her had already calved down and Margaret was receiving her regular income from the milk once again.

Though Margaret lost her initial cow, she maintained her membership of the project, since she exchanged her bull (offspring of the cow given to her) for another female calve, which was doing well at the time of the study.

CHAPTER SIX

DISCUSSION

This chapter discusses the results as presented in the previous chapter. The basis of the discussion therefore is the observations and findings of the survey. However, comparisons with findings from similar studies are also included.

6.1 DEMOGRAPHY

The community to which this group belongs is a typical African one, where the woman takes the responsibility of feeding the household. This is why the project cow was given to women farmers, despite the fact that 80% of the households are male-headed.

Section 5.1 shows a big family size of 10, with a high dependency ratio of 1.1:1. The ratio is relatively high due to the age structure, whereby the greatest proportion of the population falls below the age of 14. This group includes those whomost need milk and on whom a substantial fund for welfare is spent.

The relatively high rate of literacy and high levels of education was possibly due to the fact that the project was in the peri-urban areas. However, it facilitated the general acceptance of the project, and made implementation of the project easier.

Though the high educational level of the project participants

seem to suggest that the project did not target the needy, these people were unemployed, and had virtually no source of income. They, therefore, qualified for the project.

6.2 INPUTS

The major point of interest here was the timeliness and adequacy of inputs to the project.

6.2.1 Project Inputs

(a) Logistical Support

In Section 5.2.1 (a), gives information on the availability and distribution of logistical support. Figure 2 displays the geographical spread of HPWF project participants. This information suggests that logistical support was adequate and timely. This is because each project staff was given a maintained form of transport and had access to a common veterinary kit. Besides, the project participants were close enough to get similar services from the project administration without stretching the facilities.

(b) Project manpower and Farmers' Training

In Uganda, about 2000 farmers are served by one extension worker (MAAIF 1988) but in the HPWF one extension worker serves about 30 farmers. It is thus considered that the HPWF manpower was adequate and qualified. With the expansion of the project, this staff need to be expanded. The proportion of farmers (58%) who

expressed satisfaction with the training they received was an indication that the training was relatively adequate. Only a small proportion (5%) had not received any training at all (Section 5.2.d) because they joined the project later, after their mothers who were initially in it died. The implication for these two farmers is that the survival of project cows is in question. They must be trained. On the other hand project staff received adequate training.

The training on the various aspects of dairy management resulted from the fact that the training was in phases and had not followed conventional methods. Nevertheless, the training of new entrants was timely and adequate, because it was conducted before the cows were delivered to the farmers. However, as indicated in section 5.2.1 (e), many farmers (42%), considered the training as inadequate in some areas.(biogas, silage and hay making, calf rearing and first-aid). This is a positive indicator of interest with which farmers have assimilated the aims and goals of the project. Farmers should be encouraged to express desire for more knowledge as this will foster improvement in performance of the animals and the farmer. This lack of knowledge and technical know how could have contributed to the lower production levels. While it is the aim of the project to strengthen training, farmers should be consulted to assess their training needs and institute training programmes accordingly.

(c) **Credit**

Credit from both sources (Canadian government and UCB) was disbursed in kind to avoid the possibility of mis-appropriation of money by the farmers. A higher credit coverage of the farmers would be desirable since approximately 42.5 percent obtained none. The amount of credit received however, was adequate as indicated by the relatively high proportion of farmers (78%) who expressed satisfaction.

The timeliness was very poor. The time lag between application for credit and its receipt was long. This adversely affected implementation since farmers did not have funds to rehabilitate their cow-sheds and purchase the necessary equipment and acaricides, hence resulting in poor set off of the project. By the time credit was received by farmers, the cows had been under difficult conditions such as experiencing a high rate of ECF. Credit from the Canadian Government was indeed very handy. It saved those farmers who had benefited from it a lot of time and labour spent on fetching water. Arrangements should be made to give credit in advance to the prospective beneficiaries.

(d) **In-Calf heifers**

The distribution of the heifers can be described as adequate because every farmer who was selected, trained and prepared received one, although a small percentage did not receive the

breeds of their choice.

The major setback was the long time lag between the time farmers were ready to receive the heifers and the time they were actually given. This problem is best viewed in terms of psychological and material losses that the farmer may have incurred as a result. By waiting too long, the farmers became worried. Furthermore, by the time the farmer was ready to receive the cow, she had invested alot in the project. Losses were incurred through maintenance of pasture without the cow. The cause of the time lag in distribution was reported to be partly bureaucratic and partly due to excessive demand for imported in-calf heifers at that time. This could have led to the procurement of crossbreeds which were available locally. Currently, however, in-calf heifers distribution depends primarily on female calf production.

6.2.2 Farmer's Inputs And Management.

(a) Land

The farmers' major problem was not availability of land but its utilization, shown by the high percentage of unutilized land (36%). The major problem was lack of capital and underestimation of the area for planting fodder by project staff. On land utilization per zone, the highest proportion of unutilized land in Kitende zone (1.53 hectares) indicated the greatest potential for the expansion of the project in that zone. However, there was room

for expansion in all the other zones.

(b) Fodder Production.

An appreciable proportion (47.5%) of the farmers did not establish the minimum acreage for fodder. This possibly explains why the fodder was not adequate for the project herd, as reflected by the high stocking ratio of 4.2:1 instead of 2.1:1 as recommended by MAAIF.

(c) Cow-shed

The recommended cow-shed constructed from local materials in the longrun proved more expensive than the permanent shed considering the fact that it required frequent repairs and replacement with time. The construction of permanent cow-sheds by a good percentage of the farmers who obtained credit was therefore commendable, since it could save them some funds which could be used for other purposes. In light of this the project administration should insist on permanent cow-sheds for new entrants.

(d) Labour time

Considering the high labour intensity of zero-grazing, and the fact that the women are also the caretakers of the family, the project was seen to add more burden to the women. Routine activities on the project cow took about 5.2 hours per day. This

necessitates hiring labour , since the farmers alone could not maintain the project to run smoothly . Furthermore, since the farmer obtained income from the project cow, they could hire labour without adversely affecting the overall income from the project because the opportunity cost of labour in Uganda generally is low compared to international rates (MAAIF, 1988).

Activity sharing among family members facilitated progress of the project. It is important to note that the women contributed the greatest share (42%), children (23%), while the men contributed least (only 6%). The limited role played by men was not surprising given the status of men in African families, and the fact that the woman is the manager of the project. The limited involvement of men in the farm activities could be due to the fact that they would be busy elsewhere earning extra income since they are traditionally the breadwinners. However, leaving the children to do most of the milking which requires special care and hygiene may have serious implication for marketing milk and its safety.

(e) Farm equipment and other facilities

The farmers who obtained credit received the recommended equipment for handling milk (Appendix 01). The rest bought poor quality equipment such as plastic containers for handling milk and aluminium saucepans to work as feeding and drinking troughs (Appendix 02).

Milk cans

The percentage of farmers without milk cans was high (29%). This is unhygienic and costly in the longrun. It is a fact that some farmers are selling the milk at the farm, nevertheless, every farmer needs milk cans for milk storage before selling and marketing of milk. Unfortunately, farmers without milk cans use plastic containers for marketing and storage of milk. Such containers are difficult to clean and therefore harbour germs especially in the handles.

Drinking and feeding troughs

Although the percentage of farmers who used aluminium saucepans for drinking and feeding troughs was low (18%) it has some implications such as:

(i) They are small and sometimes very tiresome to clean whenever you put in water and feeds.

(ii) The farmers have to fill in water and feeds whenever they were empty which is very demanding in labour time on the side of the farmer. Usually, cows end up underfed. Furthermore, it is difficult to maintain such containers and this can lead to an outbreak of various diseases.

Exercise Yard

The relatively high number of farmers (35%) without exercise yard is of great concern. This can result in **footrot** which intern interferes with feeding and production. Also lack of an exercise

yard can lead to poor performance. Such cows could be deficient of vitamin D since they are constantly in the shade without direct sunlight.

(f) Feeding

Although most of the farmers gave supplements to the cows, the high proportion of the farmers who did not have enough fodder (42.5%) implies that an appreciable number of the cows did not get adequate dry matter of the recommended 80 kg (MAAIF). The cows nevertheless increased milk production.

(i) Fodder

The high stocking rate of cow fodder ratio of 4.2:1 (hectares), could result in underfeeding which result in reduction in both production and reproduction. Ninety percent of farmers feed both Nappier and legumes unpropotionally. The recommended mixture ratio of 7:3 (carbohydrates and proteins MAAIF 1988) is not being adhered to. According to the observation, the farmers were not aware of this recommended ratio. This might have contributed to reduced milk production of the animals. Information dissemination should be improved and made as much accessible and free to the farmers.

(ii) Crop Residues

The farmers surveyed have not learnt how to utilise crop residues efficiently. They use it when it is fibrous and with very low nutritive value. But due to lack of pasture especially in dry

season, the crop residues should be used. To solve the problems farmers should be taught to utilise the crop residues when they are still young, tender, green and nutritious.

(iii) Supplements

The farmers give on average 5 kg of supplement per milking cow per day. To get the maximum milk yield each farmer must learn to give supplements according to the cows production, giving 1.5 kg for each litre produced above seven litres. The 22% of the farmers who gave supplements during lactation periods only, should give supplements at the dry period for steaming up. This is important for both cow and calf. The practice might have contributed to low milk production in their case.

(iv) Water

Although credit from Canadian Government alleviated the water shortage problem, there was still lack of water storage facilities for some farmers. This meant more work for the farmer besides domestic work which could affect dairy management.

As the milking cow need more than 80 litres of water per day for both production and maintenance, it is doubtful that the 32.5 per cent farmers without water storage could meet the demand. The Canadian Government loan should be reinforced from other sources to ensure better water availability.

(g) Disease Control

The farmers' efforts together with the project management performed reasonably well towards the control of diseases.

Spraying/Pour-on

A majority of farmers (58%) controlled ticks on calves by applying **pygrease.** In the actual fact, pygrease is not very effective in controlling ticks (MAAIF 1988) and possibly that is why there was a high mortality of calves due to **ECF (75%).** Pour-on should be the most appropriate because it is very infective and eliminates chances of poisoning as it may be with spraying/dipping. Furthermore, some of the farmers seemed not to have grasped correct mixing of the acaricides. This may have been due to less emphasis during training. This is an important areas and should be handled vigorously.

Deworming

It is very alming to note that 37% of the farmers did not deworm calves at all. This might result into:

(i) Poor growth

(ii) Long time to attain breeding weight.

(iii) Long time to conceive and when it conceives, it may experience problems.

(h) **Record Keeping**

The record format imposed by the project, looked difficult to manage since it was in English. The variations reported in the record keeping could be attributed to this fact.

6.3. Productivity of the Project Cow

The greater number of the exotic breeds in the project herd compared to non-project herd (section 5.3) is in line with one of the major objectives of the project of improving the living standard of the farmer through increased milk production. Exotic breeds are known to be higher milk producers than the crosses and local breeds. However, the existence of both herds on the farms introduces competition for the existing resources, between the two herds.

(a) **Reproduction**

A good proportion (73%) of the project cow had at least one calf per year. This was an impressive performance, though this figure would have been higher if the unborn calves (in gestation) were also considered during the survey. On the other hand 27% which did not get a calf every year, had a very long calving intervals. This may be due to a number of factors including, poor nutrition, uterine infections, cystic ovaries and poor detection of heat.

(b) **Calf Mortality**

The calf mortality of about 11% was relatively high. Under good management of zero-grazing one should aim at calf mortality less than 5% (MAAIF 1983). The mortality in the bull calves (90% of the total calf deaths) was more than the heifer calves. Possibly, since the farmers were more interested in the heifers, they took more care over them than the bulls.

6.3.1 Milk Production

The high milk production observed in the project (section 5.3) is commendable, although long lactation period should be avoided because these imply low future productivity. This could also have been caused by failure of AI and other infertility problems such as silent heat . The high productivity of the project cow was indicated by increasing milk production with subsequent lactations and was desirable. The 20 percent of the cows which gave less than nine litres per day, may most probably be partially explained by individual variation such as poor milking characteristics.

The mean yield of 4331 litres per cow per lactation ranging from 2135 to 8540 litres is an indication that the project cows were productive. The cows which gave 1830 litres (10%) per cow per lactation were uneconomical to be kept on zero-grazing (MAAIF 1988). Currently the HPWF is not financially able to replace

uneconomical cows and there is no mechanism to assist farmers to do this. Farmers should be advised to sell the uneconomic cows and mobilise savings to top up and replace them with economically viable ones.

6.4 Project Benefit

The increased milk production in the families, besides fulfilling a very important objective of the project, also caters for the vulnerable age group 0-5 years, which was 10.8 percent. The family also earned a substantial amount of money (U.Shs. 60,000 per month). This is based on the assumption that the farmer would have spent this amount either on milk or an equally nutritive item (Section 5.5.1), considering the amount of milk consumed per family (4 litres/day).

Besides consumption of milk at home, the farmer sold most of the milk, thus improving household income which could cater for her family needs. The most important aspect of this benefit is that the farmer earned the money at home while taking care of her domestic duties. Bulls sold at an early age (about two weeks) were a good source of income. Unfortunately the farmers lacked market, and most were not aware of the small market available, i.e, hotels. Some of the farmers however, out of ignorance, preferred to keep the bulls for as long as a year in order to get more money. This was certainly not economical considering the competition for

fodder, feed and facilities between the bulls and cows. The project administration and association should work hand in hand to dispose of the bulls for their members.

Other benefits like manure were important. These helped the farmers to increase crop yields through improved soil fertility. Some of them expressed interest in biogas production from manure. All these ventures would help the farmer to save some money.

6.5 Constraints

The major constraints reported , namely high cost of acaricides, inadequate and expensive veterinary services, fertility of the cows, low price and lack of market for the milk affected the farmers. Apart from the fertility of the cows which can be improved through further research on the part of the project administrators, the other problems were beyond their control. Government intervention in form of providing infrastracture and subsdising veterinary services will be helpful.

CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSION

Throughout the study, it was revealed that while the project was adequately and timely staffed, the disbursement of project inputs to farmers was untimely, bureaucratic and inadequate particularly credit facilities, farmers training and in-calf heifers leading to mobilized but idle resources on the part of the farmers. The result was the sluggish progress of the project implementation. The farmers' component of the project inputs, particularly cow-shed, pasture establishment and water source was satisfactory. Proper farm equipment was not adequately provided by the farmers due to lack of capital and absence of reliable and affordable credit facilities. The overall impression created on the project inputs is that while farmers are eager and prepared for active involvement in the project's implementation, the project administration must augment the farmers' effort by providing inputs and advice in time and in sufficient quantities.

Despite delays in the acquisition of relevant inputs, the productivity of the project cows, as assessed through milk yield and reproduction, was good. The average of 13 litres per day per cow and 90 percent of offspring production of HPWF is good.

The excellent performance in the productivity of HPWF cows indicated above could be mainly attributed to the farmers' good

management practices particularly feeding, deworming and spraying. Being the major source of income, the farmers developed a particular liking for their animals (evidenced by the names given to them) and in process cared for them intimately. Hence the good management practices. Wherever the management was poor, it was due to ignorance on the part of the farmers regarding what should be done e.g. milk hygiene, expenditure and record keeping.

There were several benefits and constraints associated with the HPWF. On average, households of project beneficiaries consume 0.4 litres of milk per person per day. Milk sales boosted the families' income which was used to send children to school, improve homesteads, increase the variety of food in the diet, start other income generating activities and, in general, to upgrade the participants' social status. On the other hand, the project implementation faced some constraints particularly the maintenance of the project cow was both costly and time consuming. The others included low price milk, marketing of milk shortage of pasture during dry season, security of the animal and shortage of veterinary services.

7.2 RECOMMENDATIONS

Generally, the project implementation is feasible and will be more successful if the following recommendations are strictly adhered to:-

1) The bureaucracy in the disbursement of project inputs be eliminated and streamlined.

2) Credit and preliminary training be made available to new entrants before the project cow is given to enable them prepare effectively for the animal. The training should emphasize milk hygiene, feeding of the animal and disease control. Besides, training should be standardized and made regular to make retraining possible and effective.

3) Land under fodder be expanded under strict supervision of the project staff to ensure that the recommended stocking rate is adhered to.

4) The project cows with low productivity be culled and replaced with high quality ones at the cost of the project.

5) Encourage farmers' cooperatives to mobilize savings within the farmers so as to provide services for themselves for sustainability.

6) The project administration liaise closely with the HPWF Farmers' Association officials to identify and review constraints as they arise from time to time and attempt solutions to them.

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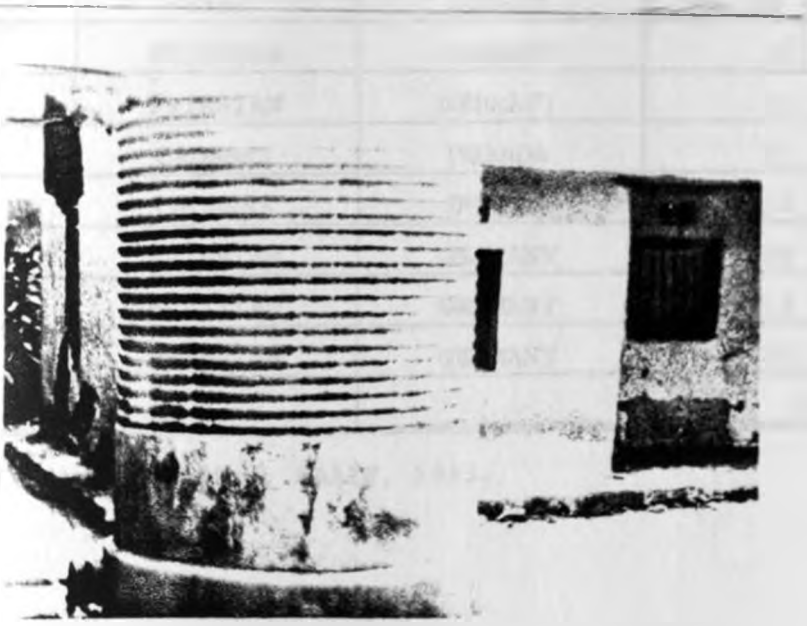
Appendix A: Project Manpower

Title	Year	Qualification
1. Project Co-ordinator	1989	1. B.SC. Agriculture 2. Certificate Nutrition
2. Project Doctor	1991	1. B.Sc. Vet. Medicine 2. MSC. Trop. Medicine
3. Deputy Coordinator	1987	1. Diploma in Agriculture] 2. Diploma in Integrated Rural Development
4. AAO	1987	1. Diploma in Agriculture
5. Animal Husbandry Officer	1987	1. Diploma in Animal Husbandry 2. Diploma in Dairy Farming
6. AAO	1987	1. Diploma in Agriculture 2. Certificate in Agriculture.

Appendix B1: Typical Water Tank (Constructed with assistance from the Canadian Loan)



Appendix B2: Water Storage Facilities (used by those who have not benefited from the Loan)

Appendix C1: In Calf-Heifer Distribution

Date	TYPE	SOURCE	NO. OF COWS
27.2.88	FRIESIAN	GERMANY	10
30.6.88	FRIESIAN	GERMANY	30
22.10.88	CROSSES	UGANDA	11
8.11.88	CROSSES	UGANDA	17
9.12.89	FRIESIAN	GERMANY	30
20.3.90	FRIESIAN	GERMANY	12
4.11.90	FRIESIAN	GERMANY	20
TOTAL			130

SOURCE: HPWF Project Office, MAAIF, 1993.

Appendix C2: **Names of Farmers Utilised in Study Sample Determination:**

KATABI ZONE

1. Buchanagandi Edith
2. Curtino Sheila
3. Kizito Pauline
4. Kyewalyanga Sauda
5. Mukasa Robina
6. Mulindwa Peregia
7. Musime Mary
8. Muyonga Ramulatu
9. Nannyonga Rose
10. Nazziwa Magdalena
11. Sebagala Hadja
12. Twinamasiko Emily

KITENDE ZONE

13. Gombe Dimetria
14. Higenyi
15. Kasirye Jowelia
16. Katongole Margret
17. Kikule Gladys
18. Kimbowa Jane
19. Kingongo Ester
20. Kisubi St. Mary's
21. Lwasa Irene
22. Mayanja Doroth
23. Semmanda Florence
24. Serunjogi Rose
25. Seruma Anne
26. Serwanga Christine
27. Ongodia Victo

NAKIWOGO ZONE

28. Bbuye Rebecca
29. Byaleero Margret
30. Kalule Sewali
31. Kasangaki Diana
32. Kawoya Norah
33. Kinobe Cernelia
34. Kiryampawo Loi
35. Kiyingi Sarah
36. Kyewola Alice
37. Lubowa Margret
38. Musoke Debora
39. Musoke Jane
40. Nakiwala Doroth
41. Waigumbulizi Petua
42. Wamala Ruth
43. Wamuti Vlaria

NKUMBA/KITALA ZONE

45. Drania Angella
46. Kagwa Alice
47. Kayondo Betty
48. Kayondo Cissy
49. Kiggundu Catherine
50. Kironde Susan
51. Kityo Florence
52. Lutalo Teo
53. Mukasa Elizabeth
54. Musoke Gladys
55. Najjemba Susana
56. Nakame Sarah
57. Nalubega Zeuster
58. Namusisi Annet
59. Nankya Florence
60. Nyanzi Mary
61. Sebugwawo Catherine
62. Sempiira Nalongo

SISA ZONE

64. Bulya Christine
65. Galiwango Anna
66. Kabenga Ruth
67. Kalanzi Beatrace
68. Kalenge Fausta
69. Kazooba Gatrude
70. Kigongo Margret
71. Kyamulabi Anne
72. Kyewalabye Sarah
73. Mulindwa Edisa
74. Musoke Damali
75. Mwanje Joyce
76. Nakibirige Sarah
77. Nsamba Florence
78. Ntege Joyce
79. Sebba Catherine
80. Sebijano Dezilata
81. Sebunya Pross
82. Segujja Lydia
83. Sekabanja Perusi

84. Sekikongo Samali
85. Serwanga Joyce
86. Ssali Florence
87. Walakira Catherine
88. Walakira Mary
89. Yiga Beatrice

84. Sekikongo Samali
85. Serwanga Joyce
86. Ssali Florence
87. Walakira Catherine
88. Walakira Mary
89. Yiga Beatrice

Appendix D. Mean Land Utilisation by Zones

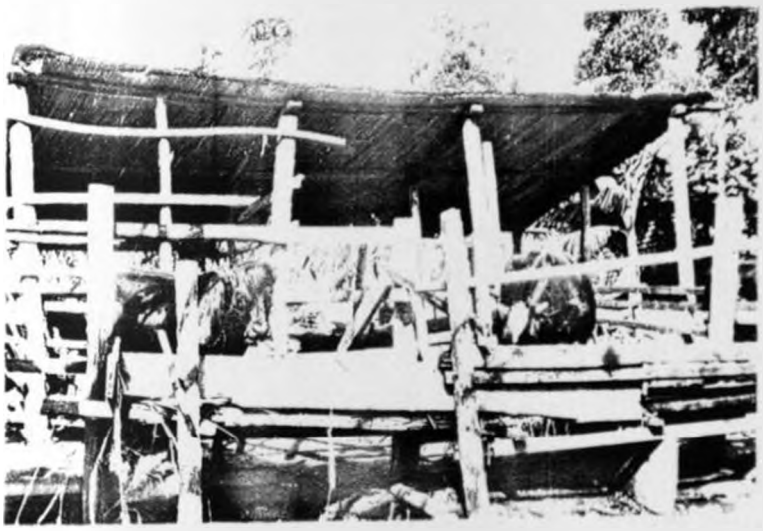
Zone	Land under fodder (ha) *		Land under other crops (ha)		Unutilized total land (ha)	
	$\bar{x}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Katabi (N = 5)	0.36	0.42	0.65	0.39	0.17	0.09
Kitende (N = 7)	0.68	0.66	1.4	1.11	1.53	1.42
Nakiwogo (N = 7)	0.51	0.33	0.52	0.53	0.67	0.46
Nakawuka (N = 11)	0.45	0.20	1.24	0.75	0.73	0.39
Nkumba (N = 9)	0.54	0.09	0.41	0.18	0.56	0.09

Appendix E1: Well established Napier grass (spaced at 3ft by 1ft)

Appendix E2: Badly established pasture (wide and uneven spacing)

Appendix F1: Temporary cow-shed (with grass roof and mud flow)

Appendix F2: Improved cow-shed (iron roofed, concrete flow with treated poles)



Appendix G: Cutting and chopping fodder

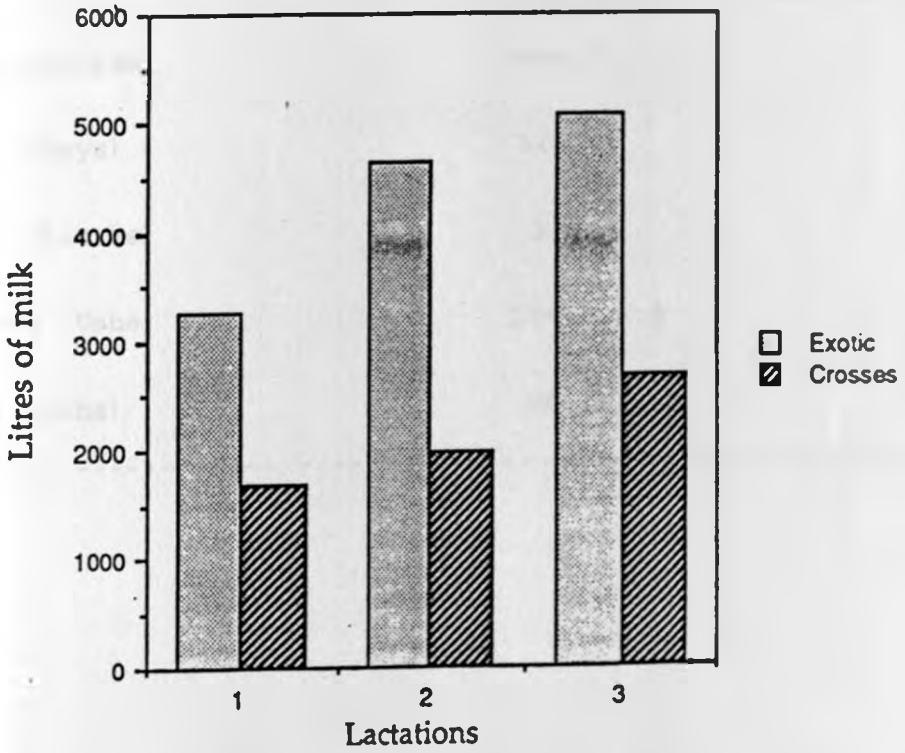
Appendix H: Labour Employment on the Project Activities.

Variable	Frequency	% of farmers
Farmers using only Family labour.	11	28
Farmer using both family and hired labour	29	72

Appendix I: Composition of the Herd on the Farms (N = 40)

Category	Project Herd (80%)			Non-Project Herd (20%)			
	Exotic	Cross	Total	Exotic	Cross	Local	Total
Cows	44	2	46	4	-	5	9
Bulls	2	-	2	-	-	2	2
Heifers	4	-	4	2	1	7	10
Heifer calves	13	2	15	2	2	21	25
Bull calves	24	3	27	4	-	32	36
Total	87	7	94	12	3	67	82

Appendix J: Mean Production per Lactation by Breed of Cattle (305 days)

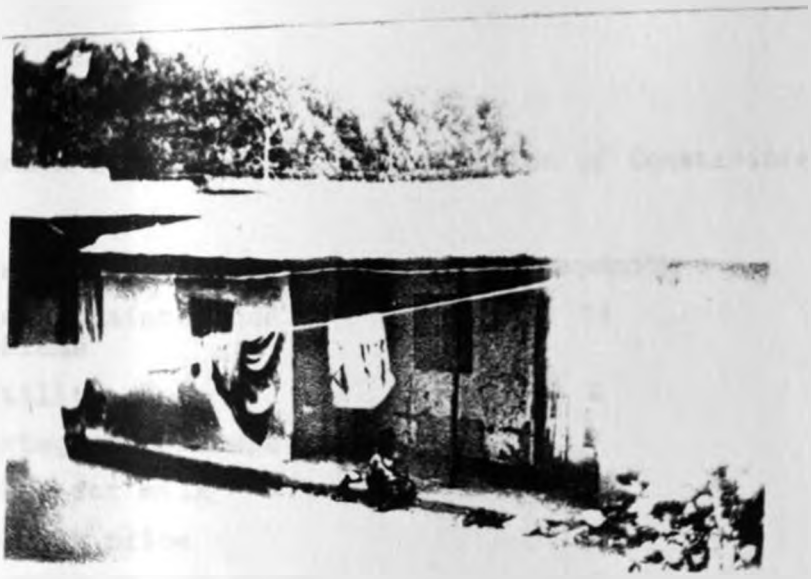


Appendix K: Milk Sales/Farmer/Month

Variable	Mean	SD
Last lactation (Litres)	4546.75	2303.82
Last lactation (days)	316.20	70.07
Milk yield/day (litres)	10.62	5.87
Gross Milk sales (Ushs)	136,515.9	88858.1
Net Milk sales (Ushs)	95,561.13	62200.61

Appendix L: Poultry Project from the project sales.

Appendix M1: Miss Florence Nankya's house before the Project (1988)



Appendix M2: Miss Florence Nankya s house build from the Project Sales (1993)

Appendix N: Percentage distribution of Constraints (N = 40)

Constraints	Frequency	%
General maintenance problems	20	50
Fertility	2	5
Shortage of pasture	3	7.5
Market for milk	5	12.5
Low milk price	4	10
Security of the animal	2	5
Shortage of Veterinary Services	4	10

Appendix 01: Recommended equipment for Handling Milk.

Appendix 02: Prohibited Equipment not recommended for Handling Milk

Appendix 01: **Recommended equipment for Handling Milk.**

Appendix 02: **Prohibited Equipment not recommended for Handling Milk**

APPENDIX P: QUESTIONNAIRE

HEIFER PROJECT FOR WOMEN FARMERS

(HPWF) SURVEY FORMS

PART I

INSTRUCTION: CIRCLE WHERE APPROPRIATE

FARMER'S HOUSEHOLD CHARACTERISTICS

ID NO.....

LOCATION.....VILLAGE.....DATE.....

FARMER'S NAME.....

NAME OF HEAD OF HOUSEHOLD.....

NAME OF PERSON INTERVIEWED.....

RELATIONSHIP OF THE INTERVIEW TO THE FARMER.....

1 - Farmer herself
2 - Husband
3 - Co-wife
4 - Daughter
5 - Son
6 - Sister/Brother
7 - Parent

(List the Number of people in the farmer's household and other details mentioned in the table below)

Table 1: Household Particulars

Serial No (1)	Name (2)	Age (3)	Sex (4)	Religion (5)	Relationship To Farmers (6)	Marital Status (7)	Residence Status (8)	Level of Education (9)

Sex

Male -1
Female -2
Primary/Junior -2

3

4

5

Religion

Christian -1
Moslem -2

Marital Status

Single -1
Married -2
Other -2
Divorced -3
Separated -4
Widowed -5

Level of Education

Formal
Illiterate -1

Secondary -

TTC/Technical

University

Informal

Adult Education -6
Artisan Train -7
Agric. Training -8
Other (specify) -9

Occupation

Farmer -1
Houseworker -2
Public Servant -3
Trader -4
Artisan -5
Student -6
Other (specify) -7

Relationship to farmer

Farmer herself -1
Sone -2
Daughter -3
Grand daughter -4
Worker -5

Residence Status

Permanent -1
Temporary -2

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PART II

INPUTS SUPPLIED TO THE FARMERS

Instructions: Circle right code where appropriate

2. How many cows do you have now?.....

3. How many milking cows do you have?.....

4. What breed were you given?

   1- Pure Fresian, 2- Cross breed

   3- Local bred, 4- Other (specify)

   .....

5. Was that the breed you preferred?

   1- Yes 2- No

   3- I didn't know the types of breeds that time

6. (If no). Tell me which breed you prefer to get.

   1- Pure Fresian 2- Cross breed

   3- Local breed 4- Others (specify)

   .....

7. Why did you want to get this breed?

   .....

   .....

   .....

   .....

8. Was incalf heifer given to you in the time you expected?

   1- Yes 2-No

9. (If no) How long did it take you to get the incalf.

heifer after preparing for it?..... months.

10. Have you received any training on the zero grazing management?

1-Yes 2- No.

11. What other information or training do you require to assist you in zero-grazing management? Do you feel that you received the training that you need to assist you in the zero-grazing management?

.....

.....

.....

12. Have you ever received any credit facility?

1- Yes 2- No

13. (If yes), (Record in table below) Please let me know the source of credit. When you got it, the amount and purpose for it.

Table 2: CREDIT SOURCES

Source	Check ( )	When	Amount UG.Shs	Purpose Check ( )	Other Purpose (Not on the Project
(1)	(2)	3	4	5	6
1. Rural Credit Scheme					
2. Women Trust Fund					
3. Other Agency (Specify)					

14. Was the Credit adequate to secure all you needed for the project?

1- Yes 2- No

15. How often are you visited by Veterinary extension workers?

1- Once a week 2- fortnightly 3- rarely

4- When called 5- have never been visited.

16. Does the artificial inseminator respond to your call in time?

17. How often do other extension workers on the Project visit you?

1- Once a week 2- have been visited once since training.

3- Once a month 5- have never been visited at all.

4- Once in six months

ID

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PART III

FARMERS CONTRIBUTION TO THE PROJECT

18. Kindly allow me to measure your land covered by fodder, and also tell me the estimate of your land under other crops and unutilized land.

Table 3: LAND AND LAND USE

	Land Use	ACREAGE
1.	Total land	.....
2.	Land under fodder	.....
3.	Land under other crops	.....
4.	Un-utilised land (under natural pasture)	.....

19. Is your land
1- Registered freehold (Mile)?
2- Unregistered freehold (Mile)
3- Leasehold
4- Customary (Freehold)
5- Squatters

20. What is your main source of water? (Circle)

1- Piped
2- Water-well
3- Tank
4- River
5- Lake
6- Other (specify)

21. What is the distance to water source?

1- under 0.5 km
2- 0.5-1.0 km

3- 1.0-1.5 km 4- >1.5 km

22. Do you have water storage facilities?

1- Yes 2- No

23. (If yes), Tell me what type and capacity.
(Complete the table below)

STORAGE FACILITIES	TOTAL CAPACITY IN LITRES
1- Construction tank	.....
2- Galvanised tank	.....
3- Drums	.....
4- Posts/jerrican	.....
5- Other (specify)	.....

24. (Observe and record material used for building cow-shed and circle code).

1- Iron sheets 2- Grass/Papyrus

3- Asbestos 4- Others (specify).....

25. (Observe the condition of the shed and circle)

1- Good and firm

2- The floor need repair

3- Only the roof needs repair

4- The whole shed is poor and needs repair.

26. How long did you take yesterday to perform the following activities?

Table 4: COW RELATED ACTIVITIES

Activity	Minute per day	Person performing (use code below)
1. Cleaning the shade and cow utensils		
2. Milking		
3. Cutting of fodder and carrying it home		
4. Chopping of fodder		
5. Feeding of cow(s)		
6. Feeding of calves		
7. Fetching water		
8. Marketing of milk		
9. Record Keeping		
10. Other (specify)		

1- Farmer herself 4- Hired farm-worker

2- Children 5- Relatives

3- Husband 6- Others (specify)

27. (If yes), What type of labour do ;you use?

1- Permanent labour only 2- Casual labour only

3- Both 1 & 2 4- Family labour only

28. What is the total average cost of labour/month?.....UG.Shs.

29. Please show me the equipment you have on your farm for the project and tell me how they cost you. (Check prices with the records and enter below)

ID NO.....

Table 5: CAPITAL EQUIPMENTS

Equipments/Facilities	Number	Current price on market (Ug. Shs)
1- Spray pump		
2- Buckets		
3- Milk cans		
4- Wheelbarrows		
5- Cow-shed construction		
6- Fencing exercise area		
7- Fodder establishment		
8- Feeding-troughs		
9- Drinking-troughs		
10- Others (specify)		

PART IV

PRACTICES/MANAGEMENT

31. What feeding system do you use?

1- Zero-grazing only 2- Grazing only

3- Both 1 & 2

32. What leys do you use to feed your cow(s)?

1- Nappier alone 2- Legumes alone 3- Both 1 & 2

4- Others (specify).....

33. Do you use crop residues to feed your cow?

34. **(If yes) which of the following do you use?**

1- Maize stover

2- Banana peelings and stems

3- Potato vines

4- Both 2 and 3

5- Others (specify).....

35. How many times do you give per week?.....

36. Do you give supplements to your cow(s)? 1- Yes 2- No

37. (If yes), tell me which of the following supplement you give, the amounts and costs

Table 6: SUPPLEMENTARY ANIMAL FEEDS

Supplements	No. of times per day	Amount per day	Cost/day Ug.Shs.
1- Molasses			
2- Dairy meal			
3- Grains			
4- Maize bran			
5- Cotton seed cake			
6- Mineral blocks			
7- Commercial Salt.			

38. When do you give supplements?

1- Every day including during the cow's dry period

2- During Lactation only

3- Only when the cow is sick

39. How much water do you give to the milking cow per day?.....lts.

40. What system of tick control do you use?

1- Spraying 2- Dipping

3- Pouron 4- Others (specify).....

41. What is the name of acaricides do you use?.....

42. How much did you pay for your current stock? Amount bought.....(litres).....Costs.....Ug.Shs.

43. How often do you spray/dip/pouron?

1- Once a week 2- Twice a week 3- Fortnightly

4- Others (specify).....

44. What method of tick control do you use ;on calves?

1- Spray with acaricides 2- use pygrease

3- Pouron 4- Do nothing

5- Others (specify).....

45. Show me where you store acaricides and other pesticides?

1- Separate (not in general store)

2- General store

3- Just in the house

4- Others (specify).....

46. Do you keep records on (milk production)?

1- Yes 2- No

(Yes) Show me the records.

Table 7: FARM RECORDS

Type of record	Check ( ) Yes	No
1. (Milk Production)		
2. Fertility		
3. Income		
4. Expenditure		
5. Treatment		
6. Spraying		
7. Vaccination		
8. Visitors		

47. Do you vaccinate both cows and calves?

1- I don't vaccinate any of them

2- Vaccinate only cows

3- Vaccinate only Calves

4- Both 2 and 3

48. (If yes), What do you vaccinate against for each of them? [Check ( )]

Table 8: Animal Diseases

Disease	Cow	Calf
1- Foot Mouth		
2- Rinderpest		
3- Rabies		
4- Lumpy skin		
5- Anthrax		
6- Blackquarter		
7- Cowpox		
8- Others (specify)		
.....		
.....		
.....		

49. Do you deworm your:

1- Cow(s)

2- Calves

3- 1 and 2

4- Do not deworm

5- Deworm when the Doctor tells me.

50. How often do you deworm your:

Table 9: Frequency of De-worming

	Once every 3 months	Once in 6 months	Once per year	Other (specify)
	----------	----------	----------	----------
(i) Cow (s)				
(ii) Calves				

51. What are your major problems on the project? (Give most three pressing ones).

1. .....

2. .....

3. .....

PART V

PRODUCTIVITY

52. Can you tell the number of (calves) produced, dead, sold, stolen or given away from the project cow?

Table 14: Animal Productivity

Type of Calf	Produced	Died	Given away	Stolen	Return to the project	Left to expand the herd	Sold	Amount in Ug. Shs
Bulls (1)								
Female (2)								
Total (3)								

53. (If there are any calves which died, proble the cause of cause of death, sex of animal and age of death)

Table 15: Calf Mortality

Calves	Check Sex F	Check Sex M	Age	Cause of Death
(1)	(2)	(3)	(4)	(5)
Calf 1				
Calf 2				
Calf 3				
Calf 4				
Calf 5				
Calf 6				

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PART VI

MARKETING

55. Do you have problems in selling your milk?

1- Yes 2- No

56. If (Yes) mention major problems you have in marketing the milk

.....

.....

.....

.....

57. If you do not sell your milk, how do you preserve it?

1- Cooling 2- Boiling 3- Others (specify).....

58. Where do you sell your milk?

1. People come to my farm to buy it.
2. At the dairy.
3. To hotels.
4. Others (Specify)

.....

59. By what means do you distribute your milk?

1. Use bicycle 2. On foot
3. My car 4. Public means
5. I just sell it at home
6. Others (specify).....

60. What is the furthest distance do you distribute the milk?

Name of the place.....distance.....km.

61. What was your price yesterday per litre? .....Ug. Shs.

60. What is the furthest distance do you distribute the milk?

Name of the place.....distance.....km.

61. What was your price yesterday per litre? .....Ug. Shs.

PART VII

OPPORTUNITY COST

62. Where were you getting your income from before the Project?

1. I was employed outside the home.
2. I had no income of my own.
3. I had some income from my farm.
4. I was getting my income from trading.

63. How much where you earning per month? Ug.Shs.....

64. Are you satisfied with the income you get from your project cow(s)?

1- Yes 2- No

65. If (No) why not? .....

.....

.....

66. Any two major benefits you have obtained in this project?