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# Experiences in Dairy Recording with Smallholder Producers in the Ethiopian Highlands

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Ethiopia is one of the developing countries whose economies are almost entirely dependent on agriculture. Crop and livestock production are generally the mainstay of the people.

Livestock plays a major role in the Ethiopian agriculture as a direct source of food (meat, milk, eggs and blood), as a raw material for leather and carpet industries, as crop production inputs (draft power, manjure) and contributes heavily to the country's export earnings. Its contributions to the agriculture GDP is about 35% (Jahnke 1982).

Although the country is endowed with a huge resource of livestock population, the contribution that this resource makes to the national income and export earnings is proportionally very low. This is mainly due to the low productivity of the cattle caused by poor husbandry, management practices, prevalence of diseases and malnutrition.

Given its diversified to prographic and climatic condition, the huge livestock population size and the different types of animals which have evolved over time and adopted to the ecological conditions of their habitat to some extent having been influenced by production systems of their owners make Ethiopia a center of diversity for animal genetic resources. Ethiopia's livestock population is the largest of any country in Africa: cattle, sheep and goats ranks first, second and third, respectively, in the continent. That is 15%, 12% and 7%, 43% of the cattle, sheep, goats and equines, respectively, are found in Ethiopia.

Although this is true in general terms, the actual size of the statistics available is inconsistent and does not provide information for future planning for development work. Today the data quoted are estimates, obtained from various sources and therefore lack consistency (Table 1).

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## 1. Introduction

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## 2. Livestock population and distribution

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*Table 1. Estimate of Ethiopia's livestock population.*

Livestock type	Population ('0000)					
	FAO 1995	CSA 1995	World Bank 1984	IBRD 1976	Rank in Africa	% share in Africa
Cattle	29 825	29 825	27 000	29 000	1 <sup>st</sup>	15%
Sheep	21 700	11 615	24 000	6 400	2 <sup>nd</sup>	12%
Goats	16 700	9 611	18 000	7 000	3 <sup>rd</sup>	8%
Equine	8 580	3 938	-	-	-	44%
Camel	1 000	248	1 000	-	-	0.5%
Poultry	54 000	54 000	-	-	-	-

The distribution of livestock varies among different ecological zones of agricultural systems. In Ethiopia, livestock are important component in both the highland mixed farming system and lowland (pastoral) system of productions. About 79% of the cattle, 75% of the sheep flock, 30% of the goat population, and most of the equines and poultry are found in the highlands. In the lowland areas (pastoral zone) 12-15% of the human population, 70% of the goat population, 100% of the camel and 25% of the cattle are found. In the pastoral zone area livestock are the basis of the economy providing virtually all the food and the very means of their existence.

### **3. Livestock production system and productivity**

There are three major livestock production systems zones in Ethiopia, the crop-livestock mixed (highland) system, the pastoral (lowlands) system, and the perennial/livestock (humid) production system.

In the mixed cereal/livestock farming system farmers keep cattle for draft, meat and milk probably in the order of importance. Manure is an important by-product that is increasingly being used to substitute the fastly depleting fuelwood supply. In this production system sheep are perhaps the major source of meat supply. In the drier and semihumid pastoral areas cattle, including camel, are kept mainly for milk; goats increase both in number and importance as the major suppliers of meat and to a lesser extent of milk. In the more humid mixed perennial crop/livestock systems, livestock are more likely to be of much more importance in producing meat, milk and manure (for fertilization) than providing draft power. In this zone of the country (coffee, enset and chat growing area) hoe culture is the dominant form of cultivation.

Ethiopia's livestock productivity is very low compared to African standards (Table 2). Total herd offtake is estimated at 8% for cattle, and 26-28% for small ruminants. High mortality rate, estimated at 20%, occurs. Heifers do not reach maturity until 4 years of age, and they have long calving interval (24 months).

Table 2. Ethiopia's livestock productivity estimates for the year 1995.

	Ethiopia	Africa	% share of Ethiopia
1. Milk and milk by products			
Number of milking cows ('000)	-	-	-
Yield in kg/animal	209	450	46
Milk production ('000 MT)	738	15 779	4.7
Cheese (all kinds) ('000 MT)	4 600	509 964	0.9
Butter ('000 MT)	10 350	179 470	-
2. Meat Production			
a) Beef and veal production			
No. Slaughtered ('000)	2 200	260 894	0.8
Carcass wt. kg/animal	105	135	78
Total production	230	3445	6.7
b) Mutton and Lambs			
No. Slaughtered ('000)	7 912	70 674	11.2
Carcass wt. kg/animal	10	13	83.3
Total production ('000 MT)	78	945	8.3
c) Goat meat production			
No. Slaughtered ('000)	7 834	56 294	14
Carcasses wt. kg/animal	9	12	75
Total milk production ('000 MT)	62	662	9

It has long been recognized that the Ethiopian highlands, which cover about 40% of the total land area of the country, possess a high potential for dairy development. Amare (1978) has identified three major agro-ecological zones: the high potential cereal/livestock zone; the low potential cereal/livestock zone, and the high potential horticulture/livestock zone. In all these zones cattle play a significant role as source of draft power, milk, meat and manure.

The major source of milk production in Ethiopia is the cow, although small quantities of milk are also obtained from goats and camels in some areas, particularly the pastoral areas.

Until recently four major milk production systems existed (MOA, 1984) namely: traditional smallholder, dairy cooperatives, state dairy farms and private small and medium-sized dairy farms around towns and cities. But based on the current economic policy of the country, state dairy farms are being changed to private ownership. Presently only the three production systems are functional.

#### 4. Systems of milk production in Ethiopia

The traditional sector predominates and produces over 97% of milk from indigenous cattle breeds. In this system the milk is produced mainly for the household requirements of the farming community, although in many cases it can be an important source of cash income when sold either fresh or as processed products like butter and cheese. The other three production systems are concentrated in the central highland plateaus, and milk and milk products in these systems are produced on a commercial basis. This commercial sector is now growing. The cattle used in this sector are purebred exotic breeds or their crosses with indigenous breeds, the most common being Friesian crossed with indigenous breeds (Abay *et al.* 1989).

The potential for increasing milk production in the country lies within these commercial production systems that are found in the central highland plateaus in which crossbred and purebred exotic dairy breeds can be used. This is because of the low productivity of the indigenous breeds, owing to their inherent low genetic potential for milk production and the poor traditional management systems that lead to inadequate nutrition, particularly during the dry season (IAR 1976, Abay *et al.* 1989).

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### **5. Genetic improvement and dairy recording**

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In Ethiopia dairy development is mainly based on the use of purebreds (exotic) and crossbreds (*Bos Taurus* x *Bos indicus*) cattle. The purebred European dairy breed predominately used are the Friesian and Jersey in and around major urban centers. Under smallholder production system crossbreds (*Bos taurus* x *Bos indicus*) are mainly used. The conventional breed improvement scheme focuses on selection among the purebred and crossing between the indigenous and exotic breeds. The crossbred cattle are produced on big state farms using artificial insemination (AI), natural service or both.

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### **6. Breed improvement programme**

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At the research and higher learning institutions the breeding programme are aimed at upgrading the indigenous by crossing up to a 75% exotic blood level, or at 62.5%, or maintain at 50% level, or selection among the indigenous breeds. The regional extension service provides AI service to the smallholder periurban producers.

IAR, in its earlier breeding works, has evaluated three local breeds (Horro, Boran and Barka) for their dairy characteristics under improved management conditions. The results indicated that the milk yield of the indigenous breeds were very low for an economic level for a dairying activity (IAR 1976). Consequently, a cattle crossbreeding experiment was launched in 1974.

The overall objective of the study was to combine the high milk yield and good dairying trait of the exotic breeds with the tolerant and resistant characteristics to endemic diseases of the indigenous breeds, by means of which to find out what combination of these exotic and indigenous breeds

would best be adopted to the various environmental and climatic conditions of the country (Wiener, 1972). In this study, production performance (birth weight monthly weight and milk yields), reproductive performance (age at first calving, number of services, calving interval), as well as health data are recorded for all the animals. The institute has further developed a comprehensive recording scheme to record the data on individual cows production, growth rate, reproduction and health performance.

Over the last three to four decades there has been interest to initiate and develop a national dairy recording scheme at smallholder production level. However, this has not materialized, so far for various reasons, the primary ones being lack of a central institution to coordinate efforts at a national level and lack of dairy breeding policy. This does not mean that there is no dairy recording system in the country. Some dairy records are available in the country, but are limited to research institutions, university dairy farms, state dairy farm and to very few private dairy farms. The format and contents of the records kept at these institutions are not uniform and variable to allow comparison in a meaningful way and the information contained is in most cases either incorrect or incomplete and often not up-to-date.

The Ministry of Agriculture in 1988 commissioned consultants from FINNIDA to study and recommend milk recording requirements of the National Artificial Insemination Centre (NAIC). However, the implementation of the recording scheme at the national level and the utilization of the data for future bull selection need further consideration.

At present only a minor fraction of the whole dairy cow population in the country is included in any kind of organized milk recording scheme in Ethiopia. In all state dairy farms, and a few private dairy farms the types of dairy breeds recorded are pure Friesians, Jersey, or graded Friesians, numbering less than <5000 heads; while at the higher learning and research institutions a few indigenous breeds and their crosses with Friesians and Jerseys are recorded. The animal breeds are identified by ear tags and in some cases by ear notches.

There is no national milk recording scheme in the country to date. The various institutions involved in dairy improvement schemes use different recording formats (Alemu, 1992).

The Ethiopian dairy industry is lagging behind, because the industry did not get the necessary support in terms of policies and interventions to build it. Previous attempts to develop standardized national dairy recording have failed due to the following reasons.

- Lack of responsible body for dairy research and development.

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## **7. The status of dairy recording in Ethiopia**

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## **8. Constraints to dairy recording Ethiopia**

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- Lack of national dairy breeding and development policy.
- Inadequate resources like finance, trained manpower, equipment and facilities for the analysis.
- Limited data processing facilities and weak feedback mechanism to farmers.
- Weak linkages between extension staff recording schemes and the farmer.
- High illiteracy rate most of the smallholder farmers do not read and write.

Therefore, the aspect of dairy improvement has not received sufficient recording attention in terms of institutional setting for proper implementation of dairy recording under smallholder production system.

The constraints to sustainable increase in cattle genetic improvement in terms of milk yield have been identified and can be classified broadly into bio-technical, socio-economic and institutional factors. The biotechnical constraints include inadequate feed supplies, poor nutrition, unimproved genotypes, reproductive wastage, high morbidity and mortality rate. The socio-economic and institutional constraints are related to inadequate input arrangements, access to credit, poor marketing organization, poor infrastructure, absence of pricing policies, land tenure policies as well as inadequate health policies.

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## **9. Smallholder dairy recording pilot project**

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Objectives: to develop, test and validate standardized dairy recording scheme for improved milk production in smallholder system.

Target group: commercially oriented 120 smallholder dairy producers at three sites in the highland of Ethiopia.

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### **9.1 Project implementation**

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The project is coordinated by multi disciplinary team from 6 institutions. The major activities are:

- Develop standardized uniform dairy recording format.
- Recruit and train frontline extension staff about the importance of record keeping, characteristics of records, types of records and importance of feedback mechanisms.
- Train project farmers on importance of record keeping and how to fill out standardized format.
- Visit farmers regularly.
- Collect data.

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### **9.2 Project coordination**

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The project is being coordinated by a project leader at the coordination office where the following tasks are done:

- Keeping data bank.
- Data collection.
- Entry of data.

- Processing and summarizing the data.
- Providing feedback to farmers.

- Workshop/seminars, field visits.
- Joint research programmes development on milk recording.
- Feedback summary preparation.

- Frontline and extension staff are trained on importance of record keeping project.
- Farmers are sensitized, introduced to standardized dairy recording format.
- Strengthened and enhanced extension service and feedback to dairy farmers mechanism is in place.
- Dairy data from farmers available are for analysis.

In Ethiopia, with its growing human population, the food needs are rising. The country's population which is currently is estimated at about 55 million, is expected to reach 140 million by the year 2020. To meet at least the basic food requirement of the country, the animal agriculture (milk and meat) will have to grow at 4.3% per year.

In Ethiopia smallholder milk producers are increasingly becoming important. To be self-sufficient in milk, the dairy production system dictates that appropriate provision be made for high yielding genotypes, improved standard of dairy management, efficient disease control, better health care, increased accessibility to credit and more remunerative marketing arrangements for milk and milk production. There is no doubt that such incentives will raise the performance of smallholder producer substantially. However, this will greatly depend on efficient recording, analysing the recorded data and feedback mechanism.

According to the Ethiopian Government policy the following commodities have been give high priority, and the research is being undertaken at federal and regional research centres.

- Dairy cattle.
- Beef cattle.
- Small ruminants (sheep and goats).
- Camel.
- Poultry.

Each commodity research will be undertaken by a multi-disciplinary team, and the programme will be coordinated by a commodity leader based at a commodity centre. The research will be undertaken at federal and regional research centres.

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### 9.3 Institutional linkages

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### 9.4 Expected output

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## 10. Future programme

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### 10.1 Need for national recording and improvement

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### 10.2 Ethiopia's dairy research strategy

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## **11. Recommendations**

- In order for Ethiopia to utilize the recorded data for national genetic improvement, breeding programmes, training and policy purposes, there is a need for national data recording centre with regional and local recording centres working under it.
- Ethiopia should have an appropriate milk recording policy for the promotion and development of an efficient and sustainable dairy recording schemes.
- Dairy recording policy should focus on improvement of the feeding and management as well as the genetic improvement of the animal.
- Realistic, simple and standardized dairy recording format should be developed by all producers.
- Central data management systems should be in place to improve data analysis and feed back mechanism.

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