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# Dairy Herd Improvement Services in Zimbabwe: Past Present and Future

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More than 200 million litres of milk are produced per year in Zimbabwe (Central Statistical Office, 1996). The dairy industry is dominated by large scale producers who own over 95% of the commercial dairy herd and supply close to 100% of the intake of processors. There are, however, only about 340 large scale producers, compared to several thousands of small holders.

Government renders support services to the dairy industry, most of which fall within the Ministry of Lands and Agriculture. Dairy Services, a branch of the Department of Research and Specialist Services, is responsible for statutory, advisory and management services, while research institutions within the same department carry out production research. The Department of Agriculture, Technical and Extension Services provides on-farm advice to farmers, mainly the smallholders, while the Department of Veterinary Services is responsible for monitoring and controlling diseases such as contagious abortion.

The Dairy Development Programme (DDP) was set up by the government in 1983 and charged with the responsibility of spearheading smallholder milk production. The programme pays special emphasis and attention to communal, resettled and small scale dairy producers. This is in pursuit of government's goal of increasing income and contributing towards an improved standard of living for rural communities. A DDP project consists of a group of participating farmers from the communal areas and small scale farming sector. Each project has a resident officer, who co-ordinates dairy development activities and provides dairy extension services in his area.

The Zimbabwe Herd Book (ZHB) is a statutory body established in 1981 as the sole registering authority of all pedigree livestock (excluding thoroughbred horses). It is an association of 25 breed societies who constitute its members, and the main objectives are to encourage and improve the breeding of purebred farm livestock through, among other means, the promotion of performance recording.

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## 1. Introduction

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### 1.1 Current status of the zimbabwe dairy sector

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### 1.2 Government support services to the dairy industry

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### 1.3 Information support systems

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#### **1.4. Current status of milk recording**

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About 28% of Zimbabwe's dairy producers are members of the milk recording scheme. In addition, three DDP projects are also performance recorded under the group recording option. Milk recording services in Zimbabwe have come a long way and the herd improvement services currently available to Zimbabwean dairy farmers are among the best in the world.

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#### **2. Historical background**

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Official milk recording in Zimbabwe started in 1932, but attempts to organise recording had been started as early as 1929. At that time, only a handful of herds participated in the milk recording scheme, which only involved collection and manual compilation of basic production records. As the Zimbabwe dairy industry became larger and more sophisticated with time, the milk recording scheme also grew gradually in size and became more refined. In 1992, Zimbabwe was granted full membership of the International Committee for Animal Recording (ICAR) to become the second Sub-Saharan African country, after South Africa, belonging to the organisation. The register system of milk recording which was used at that time, is described below.

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#### **3. Registered milk recording system**

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For more than half a century, the milk recording scheme was run by Dairy Services. Participating herd owners were charged a nominal fee and virtually all costs of delivering the milk recording service were borne by the government. Each member of the milk recording scheme was required to keep daily and cumulative lactation milk yield records of individual cows. Milk recorders employed by Dairy Services would visit each participating herd at bi-monthly intervals. During their twenty-four hour stay on the farm, the milk recorders would carry out the following testing procedures:

1. Check farmer's milk yield records and measuring devices.
2. Record milk yield and collect a proportionate milk sample for each milking cow at every milking.
3. Determine butterfat content of each cow's composite milk sample using the Gerber method.
4. Summarise completed lactation records and dispatch them to the Central Milk Records Office.
5. Staff at the Central Milk Records Office would process incoming records as follows:
  - Verify information recorded by the farmer.
  - Calculate weighted average lactation butterfat content and other parameters e.g. calving interval, age at calving.
  - Prepare records for electronic processing.

All the records would then be entered into a computer and at the end of the year, herd averages would be computed for milk yield, butterfat yield and per cent, calving age, days dry, and calving interval.

The register system involves analysing individual cow and herd performance records retrospectively and as such is of limited value as a herd management tool. Consequently, participation of Zimbabwean herds in the register scheme remained consistently low ( Table 1), despite the low cost of the service.

#### 4. Constraints

Table 1. Details of herds participated in the register scheme.

Year	Total no. of dairy herds	No. of herds under recording	Participation %
1983	516	104	20.2
1984	524	105	20.0
1985	531	95	17.9
1986	552	101	18.3
1987	556	104	18.7
1988	511	103	20.2
1989	521	102	19.6
1990	508	99	19.5
1991	479	92	19.2
1992	442	86	19.5
1993	412	84	20.4
1994	410	98	23.9

Besides failing to rise to the expectations of herd owners, the milk recording service deteriorated badly in the mid-80s to early 90s, mainly due to inadequate capital and financial support by the government. The scheme could also not cater for smallholder producers, who had now become a force to reckon with in the national dairy industry.

The year 1993 saw the implementation of the Canadian International Development Agency (CIDA) funded Zimbabwe Dairy Cattle Improvement Project (ZDCIP), which was a milestone in the history of milk recording in Zimbabwe. A major component of the ZDCIP was the upgrading of the antiquated register system of milk recording to a state-of-the-art statement method. The Zimbabwe Dairy Herd Improvement Association (ZDHIA) was set up in the same year to run the new herd improvement services.

A ZDHIA council, consisting of representatives of all stakeholders in the dairy industry such as the government, producers, processors, ZHB etc. was formally constituted to direct the management of ZDHIA.

#### 5. Recent developments

ZDHIA and government (Dairy Services) made an undertaking to operate in a 'joint' venture in administering the new milk recording services. Members of the milk recording scheme began paying substantial fees which were, however, subsidised by dairy industry levies and government's contribution. The proportion of user fees to total costs has been increasing gradually, in a bid to eventually phase out levies and operate on a purely commercial basis. Government's financial provision is also dwindling markedly and is likely to be phased out in the near future. ZDHIA changed its name on 1 July 1997 to the Zimbabwe Dairy Services Association (ZDSA), to reflect the wide range of services that it was now rendering.

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## **6. Main features of the new milk recording scheme**

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The new milk recording programme was adapted from the Canadian system and was set up by the then British Columbia Dairy Herd Improvement Services. Essentially, the statement system provides a valuable management tool in the form of regular reports containing comprehensive and progressive profiles of each cow's performance. In addition, information on overall herd performance is provided.

Participating members have two options to choose from, namely fully supervised and owner sampler. Fully supervised herds receive ten visits per year from ZDSA milk recorders who carry out all the on-farm testing procedures and dispatch milk samples and accompanying information to the ZDSA central offices. Owner sampler herd owners, on the other hand, do their own testing and transportation of samples to ZDSA central offices.

Small holder farmers participate in group recording, which is a modified form of the owner sampler option. Owner sampler herds are tested every month, with milk recorders visiting them four times a year to check the accuracy of recording devices and do positive identification of animals.

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## **7. On-farm testing procedures**

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### **7.1 Fully supervised and owner sampler option**

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Each participating member is required to keep the following basic records on the farm:

1. Animal identification and pedigree details
2. Event dates (births, calvings, disposals etc.)
3. Breeding details
4. Auxilliary trait information e.g milking speed, calving ease.

On test day, before the first milking, the milk recorder or herd owner extracts from the farm records, all events occurring, and, identification and pedigree details of all cows joining the herd, since the last test. This information is recorded on specially designed input forms.

During each milking, proportionate milk samples are collected and milk yield recorded for each cow. The milk samples are preserved in bronopol pills. After testing, the milk samples and input forms are dispatched to ZDSA central Office by courier.

Each member participating in group recording is required to own a hang scale. Members are encouraged to keep basic on-farm information such as parentage details, event dates etc. On test day, each member in the group weighs and records the milk yield of each cow at every milking. Samples are collected from each cow's milk after physical agitation. All the relevant information and milk samples are delivered to the resident DDP officer, who will check and record all the test day details onto the group's input forms and dispatch them and the samples to the ZDSA central office.

Currently there are three small holder groups (DDP projects) participating in this option, with a total of 129 cows.

At the central laboratory, milk samples are tested for butterfat, lactose and total solids using a Bentley 2000 infra red milk analyser. Somatic cell counts are determined by a Bentley Somacounter.

Information on the input forms is entered into the computer as soon as it reaches the data processing centre. Lab results are transferred electronically from the lab to the data processing centre. Electronic processing of the records then ensues, leading to the production of herd management reports.

The reports are sent to the herd owner within ten days after test day. Farmers thus get timely feedback on their herd and individual cow performance, enabling them to make accurate management decisions.

Genetic evaluation of dairy cattle in Zimbabwe started in 1986. The National Association of Dairy Farmers (NADF) funded the establishment of the genetic evaluation programme, with technical assistance being provided by the Netherlands Royal Cattle Syndicate (NRS). The genetic evaluation programme was handed over to Dairy Services in 1988, who were responsible for the running of the scheme until the setting up of ZDHIA.

Data collected under the register milk recording scheme were used to compute sire predicated differences (PDs) and Cow Genetic Indices (CGIs) using the BLUP sire model methodology.

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## **7.2 Group recording**

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## **7.3 Laboratory testing**

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## **7.4 Data processing**

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## **7.5 Genetic evaluation**

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The change in the system of milk recording in 1994 saw the introduction of the animal model procedure of genetic evaluation, as part of the ZDCIP. The first animal model genetic evaluations were undertaken by Agriculture and Agrifood Canada in 1996. The future of the new genetic evaluation programme however, hangs in the balance as ZDSA do not have the software, appropriate computer hardware nor technical expertise to run the programme. On the other hand, they cannot afford to pay external organisations to carry out the genetic evaluations for them.

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## **8. Conclusion**

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### **8.1 Looking into the future**

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Dairy herd improvement programmes in Zimbabwe are now well established and poised for growth to great heights. The country has gone through the most critical phase of setting up a self-sustaining system.

All the basic requirements for a valuable and efficient service are in place, however, the following issues need to be addressed in order to achieve the main goal of improving efficiency of production at national level.

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### **8.2 Level of participation**

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At 28%, the level of participation of Zimbabwean herds in milk recording remains low, compared to most other ICAR members (Table 2). From herd owners who have been dropping the service, it appears that lack of knowledge on the value of milk recording is the main reason for this low level of participation. ZDSA therefore has to strengthen its extension services to farmers in order to promote the use of milk recording.

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### **8.3 Participation of small holder sector**

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Although Zimbabwe is one of the very few countries operating an organised milk recording service in the small holder sector, there is a room for increasing the participation of these farmers. It is government's express objective to expand and increase the efficiency of milk production in the

*Table 2. Details of participation of farmers in milk recording in different countries.*

Country	% of recorded herds
Australia	35.0
Canada	62.7
Denmark	80.0
Israel	49.7
Japan	34.1
Portugal	2.8
Slovenia	18.3
Switzerland	67.0
Zimbabwe	27.6
USA	31.0

small holder sector (Ministry of Agriculture, 1997) where more than 70% of the country's cattle population is found (Central Statistical Office, 1994). Besides the dire need to evaluate and preserve the diverse genetic resources in these marginal developing country areas (Cunningham, 1992), animal recording can be used as key technology to increase productivity and sustainability in these production systems (Hammond, 1994). Government is expected to play a leading role in pursuance of this goal, mainly by creating an enabling environment.

There is also a need to modify the recording service rendered to small holder farmers so that it provides information that is simpler and easier to use.

Genetic evaluation is one of the most valuable outputs of a milk recording programme. Zimbabwe therefore has to come up with a well thought out strategy for running a sustainable genetic evaluation scheme. There is a need to invest resources into setting up the country's own genetic evaluation system.

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#### 8.4 Genetic evaluation

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### 9. References

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