
Milk recording under different production systems in Egypt

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The paper shortly presents data of the cattle and buffalo population in Egypt, where the dairy sector contributes for about 1/3 of the national agricultural production; no milk records are kept for small farm or medium herds. The head number together with distribution and herd sizes are outlined. Production data for milk in cattle and buffalo are also reported

A programme for animal recording data started in 1989 in order to establish a cattle information system (CISE) is then described; the results reported that include herd summary, information on individual animals and priority lists. Such reports are published on a monthly basis.

Milk production in Egypt is based either on the traditional crop/livestock system or on the (intensive) industrial production system. Within CISE activities, personnel have been trained and statistical facilities have been developed. The recording scheme is based on visits on a monthly base (ICAR A4-method) and data are recorded on a single input-sheet for every animal. Data are then analysed with the Canadian Record of Performance (ROP) and DHIS, IDEAS and LIMS from ILCA.

Constraints can be distinguished in structural, cultural and educational, technical and financial origin. Recommendations to overcome such limits are briefly described.

In Egypt the dairy sector contributes about 30% of the total value of agricultural production. The population of dairy animals is about 6.7 million heads of cattle and buffaloes. The total milk production is about 3.6 million tons (Ministry of Agriculture and Land Reclamation, MALR, 2000).

Summary

Introduction

Table 1. Cattle and buffalo population (in million).

	Number (million)	%
Cattle		
Native	2.373	35.0
Foreign purebred	0.133	2.0
Crossbred	0.912	13.5
Total cattle	3.418	50.5
Buffaloes	3.330	49.5
Total	6.748	100.0

Source: Animal Production Sector, MALR, 2000.

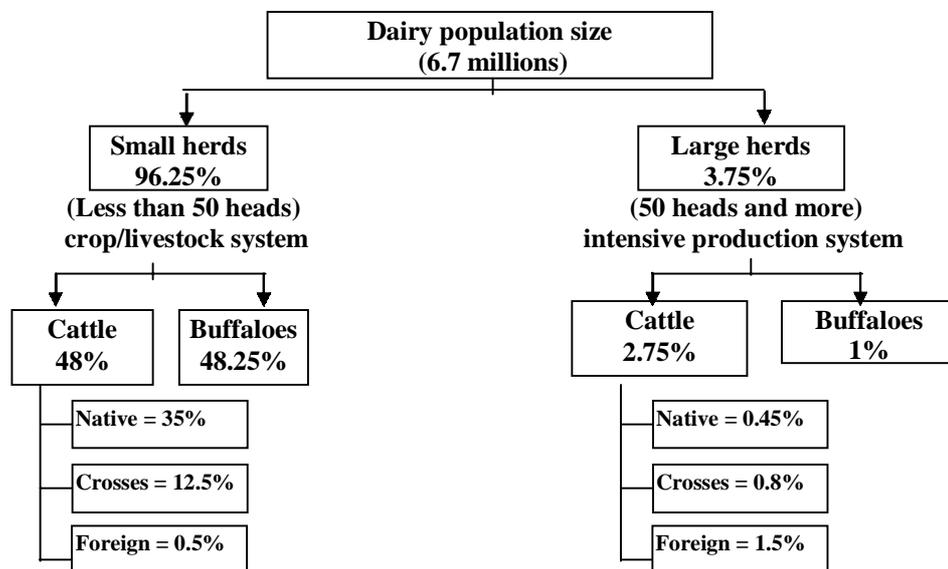


Figure. 1. Distribution of cattle and buffalo populations over the two major production systems.

The two major milk production systems in Egypt are the traditional crop/livestock which holds about 96% of the cattle and buffalo population and the “industrial” intensive production system which contains large commercial farms of more than 50 heads each, mainly of high yielding foreign breeds of cattle. Another system includes medium-size buffalo flying herds at the outskirts of large cities for milk production.

Table 2. Distribution of cattle and buffaloes by herd size.

Herd size (head)	No. of buffaloes	No. of cattle	Total
Less than 10 heads (No. of holders = 1 687 986)	2 899 809 (43%)	2 830 881 (42%)	5 730 690 (85%)
10 – 24 heads No. of holders = 45 021	279 339 (4.1%)	319 749 (4.7%)	0 599 088 (8.8%)
25 – 49 heads No. of holders = 7 194	84486 (1.25%)	81275 (1.20%)	165761 (2.45%)
50 heads and more No. of holders = 1166	66 066 (1%)	185 672 (2.75%)	251 738 (3.75%)
Total	3 329 700 (49.35)	3 417 577 (50.65%)	6 747 277 (100.0%)

Source: Animal Production Sector, MALR, 2000.

No milk records are kept in small farms or medium and flying herds. Most experimental farms keep records for management and research purposes. Large commercial farms apply computerized dairy management programs for controlling farm activities and decision making.

The objective of this presentation is to discuss the on-going milk recording activities under different milk production systems in Egypt, with a especial attention to the constraints facing the establishment of a national milk recording system.

Table 3. Milk production from cattle and buffaloes.

	Milk production (Million tons)	% of the total production
<i>Cattle</i>		
Native	0.544	15.0
Foreign purbreds	0.274	7.5
Crossbreds	0.778	21.5
Total cattle production	1.596	44.0
Buffaloes production	2.018	56.0
Total production	3.614	100.0

Source: Animal Production Sector, MALR, 2000.

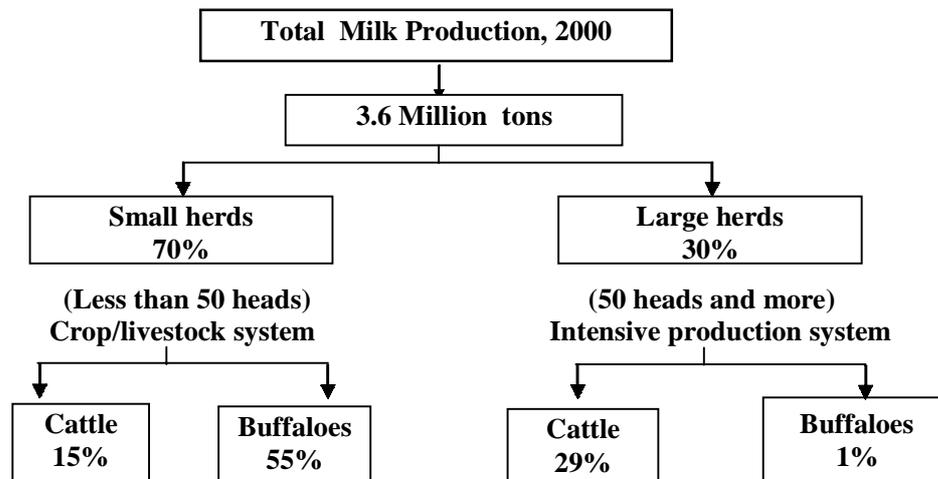


Figure 2. Milk production by the two major systems.

Background information

From the published data of MALR 2000, cattle and buffalo populations for all Egypt are summarized in Table 1. The distribution of cattle and buffaloes over the two major dairy production systems is shown in figure 1. Table 2 explains the distribution of cattle and buffaloes by herd size.

The population of dairy animals is divided almost equally between cattle and buffaloes. The importance of the small proportion of foreign breeds comes from their significant contribution to the regular milk market and dairy processing plants.

Concerning age structure, the mature females of cattle and buffalo (> 2 yrs.) represent 45% and 50% of the total cattle and buffalo populations, respectively. The higher percentage of mature female buffaloes confirms the recognition of the buffalo by the farmer as the major dairy animal in Egypt.

According to the 2000 MALR published statistics, the total milk production from cattle and buffaloes is about 3.6 million tons (Table 3). About 55% of the total milk output comes from buffaloes. Buffalo milk is preferred by Egyptian consumers because of its white color, high fat content (about 7%) and flavor. The contribution of foreign breeds and crosses to the domestic milk production is about 30% which is produced mainly by commercial farms. Figure 2 shows the contribution of buffaloes and cattle to total milk production.

In 1989, the Animal Production Department, Faculty of Agriculture, Cairo University started a pilot project financed by the International Development Research Center (IDRC), Canada to establish a "Cattle

Information System in Egypt (CISE)". Village Extension workers (VEW's) from the MALR were trained as field recorders, and the university staff and postgraduate students as supervisors. Data were collected based on once-a-month visit, and monthly reports were issued by CISE and sent regularly to each enrolled farm. To encourage farmers to join the programme, a package of technical services, on cost recovery basis, were offered to farmers by CISE (concentrates, veterinary services, pregnancy diagnosis, treatment of infertility cases ... etc.).

In 1996, the project was transferred into a special self financed non-profit community service center. The center has well trained personell and owns well equipped network for data collection, analysis and evaluation. CISE produces monthly reports for farmers which include:

- 1) herd summary;
- 2) information on individual animals; and
- 3) an attention list to help in farm management.

A Technical Cooperation Program (TCP) between MALR and FAO was designed in 1996 to expand CISE program to a National Dairy Herd Improvement System in Egypt (DHIS). The document of the National DHIS nominated CISE as the National Central Data Processing Laboratory in Egypt.

CISE succeeded in gathering the facilities of relevant institutions to implement a national milk recording program in nine governorates. CISE is currently a member of ICAR and follows its guidelines in milk recording.

There are two major milk production systems in Egypt:

- 1) The first system is the traditional crop/livestock system which is traditionally integrated with the dominating agricultural system. It contains about 96% of the cattle and buffalo population and produces about 70% of the total domestic milk output. This system is characterized by:
 - Small holdings and herds (1-5 heads/farm) of low producing native animals.
 - Labor intensive operations using simple techniques and practices.
 - No recording for milk or for any other activities.
 - Low values of inputs and outputs.
 - Surplus milk is sold at farm gate to middlemen at low price, and live animals are sold alive in village markets.
 - Most services have been provided to the farmer by the MALR free of charge, but recently a cost recovery basis has been applied to some services.
 - The farmers families are the primary consumers of the milk, and, therefore, the contribution of this system to the regular milk market does not match its large population size.

Dairy production systems

- 2) The second system is the (intensive) industrial production system which contains large commercial farms of more than 50 heads each, mainly of high-yielding foreign breeds of cattle. Commercial farms contain about 4% of the total cattle and buffalo population but produce about 30% of the marketable milk. Milk recording in most of these farms are conducted through computerized dairy management programs used mainly for controlling and operating farm activities and supporting decision making. Large scale farms belong either to specialized companies, cooperatives or privately owned. Some large companies have their dairy processing plants and feed mills. Most large dairy farmers are members of the General Cooperative for the Development of Animal Wealth located in Cairo, or/and other associations such as those of the Egyptian Buffalo Producers' Association (EBPA) or Egyptian Milk Producers' Association (EMPA).
- 3) A minor type of farms is operated under a strictly commercial milk production system contains relatively smaller buffalo farms located at the outskirts of large cities. In this system, buffaloes are put under very intensive feeding regimes to produce high-fat milk which is delivered directly to consumers. Buffaloes are bought in milk and are sold for slaughter immediately after drying off. Through this system, much of the best animals are lost. Recently, attention has been focused on identifying and selecting high yielding buffaloes to purchase them and formulate nucleus herd(s) for the purpose of genetic improvement of milk in buffalo herds.
- 4) There is no specialized beef breeds in Egypt, meat is produced either by native cattle or buffaloes, or by imported feeders and ready to slaughter steers.

In the traditional system, native calves are sold alive either when cash is needed or when they are culled. Buffalo calves are sold for slaughter at a very young age to save their dams' milk for family consumption. Farmers and feedlot operators were encouraged by soft loans provided through the National Veal Project, to keep buffalo males for a longer period to attain higher body weights.

Current situation of milk recording

Organizations

Variable activities are undertaken for milk recording in Egypt. Almost all experimental farms have milk records to control its operations and help decision making. Some of these farms own computerized farm management programs. The large commercial dairy farms operates varied types of farm management programs. Animal Production Research Institute (APRI), MALR provides service package (complete milk analysis, somatic cell counting and feed treatments to enrich roughage nutritional value) to the dairy farms. In the meantime, APRI measures daily milk production during a once-a-month visit to the enrolled farms.

In general, the outputs of the abovementioned recording activities are not uniform enough to be exploited in effective breeding program. CISE is currently operating a national milk recording program in nine governorates. CISE was established in 1989 as a pilot project financed by the IDRC of Canada to act as the cattle information system of Egypt. It was transferred in 1996 into a self financed non profit community service center. CISE is the member of ICAR and follows its recording guidelines both in cattle and buffaloes.

Scattering facilities needed to establish a national milk recording exist in Egypt. For example, APRI has an effective service package as mentioned above. Animal Production Sector has a network of VEW's spread almost at all villages in the country. There are major associations for animal breeders. The General Cooperative for Development of Animal Wealth (GCDAW), the Egyptian Buffalo Producers Association (EBPA) and the Egyptian Milk Producers Association (EMPA). Most of the dairy farmers are members in one of these associations.

CISE has well trained specialists and well equipped statistical laboratory (hard –and software) capable to analysis up to 100 thousand records of enrolled animals. Also, the center has equipment for fat test, mastitis detection and early pregnancy diagnosis.

Despite the presence of all elements needed for milk recording, the links and coordination among relevant institutions is not strong enough. CISE is working on institutionalizing the relationships among organizations interested in animal recording.

The CISE milk recording scheme depends on once-a-month visit (official 24-hour milk recording system, ICAR A4-method). An official recorder collects the data on farm at a specific day “centering date” identified by CISE. Due to the lack of a national identification program, animals on small or medium scale farms are identified by plastic eartags provided by CISE. Animals on the large scale farms are identified by the owner identification marks (plastic or metal eartags, ear tattooing and sometimes by liquid nitrogen branding). The data processing system is working with the Input-Sheet number as the animal identification key.

The VEW's visit farms and measures milk yield during the normal milking times on the testing date. Simple balances are used on the small farms but electronic milk meters or milk jars are available on large farms. Data

Facilities

Methodology

Data collection

are recorded on a single Input-Sheet specific for every animal. The following information is recorded: milk yield, animal status, insemination information, pregnancy diagnosis and calving information. The input-sheets are transported by the recorders to the data processing lab (CISE).

Data entry and analysis

Based on the Canadian Record of Performance (ROP) and DHIS programmes, IDEAS and LIMS from ILCA, and German experience in milk recording, CISE has developed its own software in Arabic for data entry and analysis for both cattle and buffaloes. The CISE software takes care of the specific conditions of the small herds and the characteristics of local breeds, especially buffaloes. An Arabic monthly technical report is issued directly to farmers which contains three parts: herd summary, individual information and attention list. The herd summary contain: averages of daily milk yield for both recorded and lactating animals. The individual cow information contains: reproductive information, total milk yield, days in milk and expected 305 day milk yield. The attention list shows the cows which are still non-pregnant, animals due for service, due for palpation, and due for drying off...etc.

Recently, the technical report includes the results of milk fat test, pregnancy diagnosis and mastitis detection. For small farmers, small village farms are treated as one herd. The report is supported by extension work at the village level.

Services

Two different service packages are offered –on cost recovery basis- to both of small holders and commercial medium farms.

- a) The following services are provided by CISE to the small farmers:
- Milk processing using separators and churns.
 - Chopping crop residues for utilization as animal feedstuff.
 - Machine milking by small portable machines.
 - Provision of good quality concentrates.
 - Veterinary services.
- b) Recently, for medium-sized commercial farms, CISE provides fat test, pregnancy diagnosis using sonography, and mastitis detection during the monthly visit.

Constraints

The constraints for establishing the national milk recording system in Egypt can be summarized as follows:

- a) Structural constraints:
- Scattering of animals (small herds of less than 10 heads represent about 85% of population).
 - Inefficiency of the existing Breed Associations.
 - Absence of coordination among relevant institutions.
 - Absence of a national identification and registration program.

- b) Cultural and educational constraints
- High illiteracy rates.
 - Adverse traditions, and beliefs.
 - Small farmers keep animals mainly for food and/ or financial security.
- c) Technical constraints
- Absence of breeding programs.
 - Inefficiency of extension services.
- d) Financial constraints
- Small farmers are not able and are not willing to pay fees for milk recording.
 - Few commercial farmers only pay the actual cost.
 - Recording cost is high due to the limited enrolled herds.

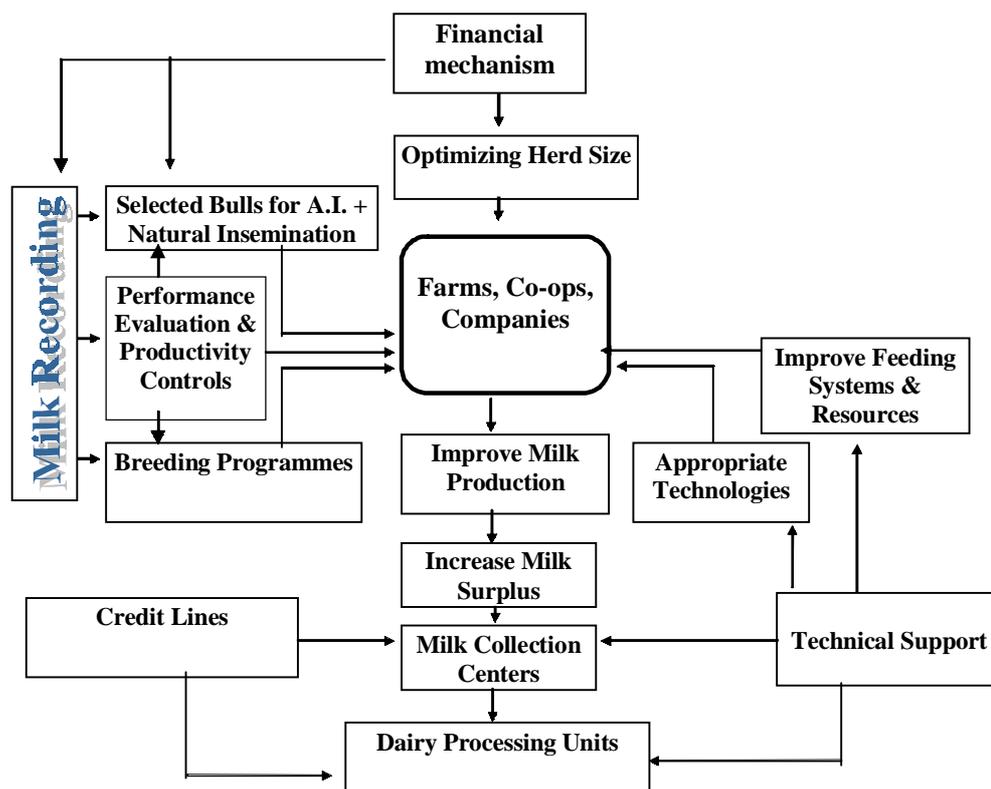


Figure. 3. The role of milk recording in improving the efficiency of the dairy sector.

**Recommendations
for the
development of
the dairy sector**

- a) Resources development:
 - Optimizing herd size.
 - Setting breeding objectives and programs.
 - Attaining international standards of production.
- b) Organization:
 - Expanding the activities of the animal dairy specialized farms & co-operatives.
 - Strengthening existing service schemes.
 - Strengthening links and relations among institutions responsible for milk recording.
- c) Systems:
 - Developing identification and registration program.
 - Encouraging the concept of milk recording.
 - Encouraging market-oriented milk production.
- d) Finance:
 - Establishing financial policies for sustainable milk recording.
 - Establishing criteria for collateral and loan systems for large dairy operations.

Figure 3 shows the role of milk recording in increasing the efficiency of the dairy sector.

**Recent research
in milk recording
under Egyptian
conditions**

In order to overcome the constraints to improving milk recording in Egypt, many recording schemes were developed to decrease cost, time and efforts of recording. In this direction, once-a-month, bimonthly and trimonthly recording schemes have been studied, especially to fit the small farmers' conditions, who reject receiving foreigners (milk samplers and data collectors), frequently at their homes.

Sadek *et al.* (1994) and Abou-Bakr (1996) and Abdel-Aziz (1996) concluded that once-a-month milk recording system could be applied for estimating total milk yield, genetic parameters and breeding values of Egyptian buffaloes with a high accuracy ($r^2 = 0.98$).

Hamed (1995) and Abou-Bakr (1996) tested the use of bimonthly and trimonthly milk recording systems in estimating total milk yield in Holstein and buffaloes. They found that the accuracy of estimation ranged between 0.79 and 0.95.

Abd El-Lattef (2002) studied the use of different milk recording schemes (AM-milking, PM-milking, alternative AM/PM and alternative PM/Am) under monthly, bimonthly and trimonthly recording systems in estimating milk yield in buffaloes. The conclusion was that, the AM-milking, alternative AM/PM and alternative PM/AM schemes under monthly, bimonthly and trimonthly recording schemes could be utilized in estimating total milk yield, heritabilities and breeding values for Egyptian buffaloes with reasonable accuracies.

Table 4. Enrolled animals.

Governorates	No. of herds	No. of animals	No. of records
Giza	28	2 195	4 858
Ismailia	5	622	1 244
Gharbia	3	98	196
Beni-Suif	18	220	399
Fayoum	1	580	1 221
Behaira	9 (villages)	477	1 271
Sharkia	2	194	390
Kalyobia	2	254	466
Alexandria	1	930	1 808
Total	70	5 570	11 553

Table 5. Milk production characteristics.

Production system	No. of records	TMY (kg)	LP (day)	DMY (kg)	Actual 305 d (kg)	Fat (%)	CI (day)
<i>Cattle</i>							
Commercial:							
Holstein (H)	3 037	8 280	360	23.0	7 650	NA	450
Friesian (F)	183	6 805	317	21.5	6 600	3.5	380
(H x F)	3 537	7 040	337	20.9	7 005	3.3	425
Experimental:							
(H x F)	50	6 830	340	20.1	6 780	3.3	429
(F x B)	614	2 445	325	7.5	2 340	3.8	413
Traditional:							
Baladi	210	1 005	230	4.4	1 005	NA	395
<i>Buffaloes</i>							
Commercial:	2 334	2 105	305	6.9	2 105	6.9	415
Experimental:	340	1 560	270	5.8	1 560	8.0	420
Flying herds:	842	2 750	370	7.4	2 390	NA	495
Traditional:	664	1 865	330	5.7	1 815	NA	435

TMY= Total milk yield; LP= Lactation period; DMY= Daily milk yield;
 CI= Calving interval, B= Baladi cattle and NA= not available.

On-going activities of CISE

- 1) *Enrolled animals.* A total number of 5570 animals (cattle and buffaloes) distributed over 70 herds in nine governorates under different production systems are enrolled (Table 4).
- 2) *Provision information on local and foreign dairy animals* under different production systems. Milk Production and calving interval (CI) for cattle and buffaloes under different production systems are shown in Table 5.
- 3) *Buffalo improvement program.* Special attention has been given to buffaloes, as the major dairy animal in Egypt. A milk recording program was initiated since September 2000 by CISE for buffalo herds under different production systems in eight governorates. The objectives of this program were:
 - Recording milk production of large number of buffalo farms.
 - Identifying elite buffaloes.
 - Establishing a nucleus herd.
 - Building a database to benefit farmers in:
 - purchasing and establishing new herds.
 - providing pedigreed bulls and potential breeding heifers.
- 4) *Establishing buffalo nucleus herd(s).* Preliminary analysis of milk records of 2065 buffaloes in 58 herds under different milk production systems in eight governorates enabled the specialists at CISE to identify the elite milking buffaloes. About 20% of the enrolled buffaloes produce over 2000 Kg of milk in an average lactation period of 314 days, which is significantly higher than the national buffalo average. Nucleus herd(s) of selected buffaloes will be formulated, where buffaloes are kept for further genetic evaluation. The nucleus herd(s) are expected to produce good heifers for replacement at buffalo dairy farms, and pedigreed young bulls for breeding purposes.

References

- Abdel-Aziz, A.S., Sadek, R.R., Nigm, A.A. & Abou-Bakr, S.** 1994. Estimation of breeding values of buffalo bulls from daily and monthly test-date milk records. *Buffalo J.*, 3: 201.
- Abou-Bakr, S.** 1996. The use of different milk recording schemes for sire evaluation of dairy cattle and buffaloes under field conditions. Ph.D. Thesis, Fac. Agric., Cairo Uni., Egypt.
- Abd El-Lattef & Hoda M.A.,** 2002. Studies on milk recording systems in buffaloes. Ph. D Thesis, Fac. Agric., Cairo Uni., Egypt.
- Hamed, M.K.** 1995. Accuracy of bimonthly and trimonthly milk recording systems for dairy cattle in Egypt. *Annals of Agric. Sci., Moshtohor*, 33: 659.
- Sadek, R.R., Kawther, M. Mourad, Ibrahim, M.A.M., Abou-Bakr, S. & Abdel-Aziz, A.S.** 1994. Genetic parameters of milk yield of Egyptian buffaloes calculated from daily and monthly test date records. *buffalo J.* 3: 197.

MALR. 2000. Annual Statistics, Animal Production Sector. Ministry of Agriculture and Land Reclamation, Giza, Egypt.