The Development and Maintenance of Animal Recording Schemes for Low to Medium Input Production Environments - A Case Study on Animal Recording Systems in Greece

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1. Characterisation of the animal recording system in Greece

Animal species involved: cattle, sheep and goats

Breeds of the species involved:

Cattle: Holstein Friesian, Brown Swiss, Simmental
Sheep: Mountain breeds: Boutsiko, Sfakia.
Plain breeds: Karagouniko, Serres, Arta (Friesarta)
Island breeds: Chios, Lesvos (Mytilini)
Goats: Skopelos breed

2. Overall input level of the production environment

Dairy cattle in Greece is kept in environments which range from the upper medium to high level of inputs and for that reason in the present case study more consideration will be given to the recording systems of sheep and goats. Nevertheless, in Greece the general purposes, procedures and conditions for recording are the same for all species and breeds.

There are three main systems of sheep production:

1. The extensive system with transhumance. Breeds involved are: The Mountain breeds, Vlachico, Sarakatsaniko, Sitia, Sfakia and Boutsiko.
2. The extensive or semi-intensive system without transhumance: Breeds involved are: Occasionally the Mountain breeds (Vlachico, Sarakatsaniko, Sitia, Sfakia and Boutsiko), the Plain breeds (Karagouniko, Serres, Frisarta upgraded sheep, etc.) and occasionally the Island breeds (Chios, Kymi, Lesvos, Skopelos and Zakynthos).
3. The Intensive system: Breeds involved are: the Island breeds (Chios, Kymi, Lesvos, Skopelos and Zakynthos) and occasionally the Plain breeds (Karagouniko, Serres and Frisarta).

There are four main systems of goat production:

1. Extensive system with and without transhumance. Breeds involved are the different populations of local goats.

2. Semi-intensive system and
3. Intensive system. In both these two systems the breeds involved are: the local Skopelos and the imported Malta and Saanen breed or crossbreds of local goats with Malta, Saanen and the Skopelos breed.
4. Home-fed system. Breeds involved are: The Malta and Saanen breeds or crossbreds of local goats with Saanen.

3. Number of herds/flocks and animal recorded

Table 1. Dairy, sheep and goats milk recording in Greece: populations, number of recorded animals and herds.

Species and breeds	Total population	Recorded animals (% recorded)	Total herds per flocks	Recorded herds (% recorded)
Dairy cow breeds (data from 1996)	216 000	61 867 (28.6%)	n.a.	1 425
Holstein Friesian	203 000	61 508 (30.3%)	n.a.	1 411
Brown Swiss	13 000	225 (1.7%)	n.a.	9
Simmental	n.a.	134	n.a.	n.a.
Sheep breeds (data from 1994)	561 800	31 611 (5.6%)	8 645	429 (5.0%)
Mountains of Epirus (Boutsiko)	28 700	2 450 (8,5%)	300	24 (8.0%)
Sfakion	75 000	1 650 (2.2%)	1050	20 (1.9%)
Karagouniko	208 000	14 800 (7.1%)	3210	210 (6.5%)
Serres	38 000	2 200 (5.8%)	670	32 (4.8%)
Frisarta	27 800	5 011 (18.0%)	835	73 (8.7%)
Chios (purebred)	7 300	1 000 (13.7%)	350	10 (2.9%)
Lesvos	177 000	4 500 (2.5%)	2230	60 (2.7%)
*Goat breed**	8 000	3 296	n.a.	n.a.
Skopelos (data from 1994)	8 000	3 296 (41.2%)	n.a.	36

*local goats populations are not controlled
n.a.=not available

Table 2. Number of livestock species in Greece ('000).

	Years						
	1965	1970	1975	1980	1985	1990	1993
Cattle	1 131	971	1 184	900	776	687	608
Sheep	8 338	7 355	8 340	8 397	9 939	10 149	10 069
Goats	4 007	4 003	4 549	4 637	5 696	5 904	5 821

Source: National Statistical Service of Greece.

4. Animal categories involved in the recording process

In each controlled farm/flock, all females (cows/ewes/goats) and subsequently all their female progenies (calves/lambs/kids) which are maintained as replacements, are involved in the recording process. Performance recording on the Agricultural Research Stations involves all the animals in the flock (sheep, goats only), which act as breeding nucleus for the genetic improvement of the relevant breed.

4.1 Purpose(s) of the scheme

In general, cattle, sheep and goats performance recording aims at improving through mass selection milk production and estimating the necessary genetic parameters for milk yield, needed for the operation of the genetic improvement scheme.

We recognise in Greece two types of recording schemes. On-farm and on-station performance recording

On farm performance recording for dairy cattle, sheep and goats was conceived to provide firstly data for the genetic improvement of the animals and secondary to supply management and technical information for the farmers. Is carried out, until recently, exclusively by the Ministry of Agriculture and nowadays, the trend is going towards the farmers organisations.

Performance recording on the Agricultural Research Stations aims at collecting data for studying the various native sheep and goat breeds of the country and is carried on without the involvement of the livestock keepers. Furthermore, some of these flocks (the Chios breed at Chalkidiki Agricultural Research Station) are considered as nucleus breeding units for the genetic improvement of the breeds. These institutions are supervised by the National Foundation for Agricultural Research.

4.2 Animal identification

Identification is made by plastic eartags. This unique official number consists actually of two numbers, namely the herd number and an animal number made up by the year of birth and an in-herd running animal number. Identification for milk recording and A.I. applied for genetic

improvement in cattle, are identical. Furthermore, the Greek Veterinary service is using for all species a second plastic eartag aiming at the identification of the animals for health purposes.

4.3 Traits measured

The traits considered and the collected information are:
1. Individual identification of all animals
2. Mating and lambing/kidding dates and consecutive number
3. Type of birth, sex of the lambs or kids and litter size
4. Monthly controls of milk yield (a.m. and p.m.) after the suckling period
5. Fat, protein and lactose content of milk.
6. Live weight records of lambs at regular intervals (birth, before and after weaning).
7. Live weight records of ewes at mating and lambing

Actually, not all these traits are measured. Well working is the recording of the traits 1, 2, 3 and 4.

The method of milk recording is the official A one, once a month two milkings per day. The controller records for each ewe in his first visit after lambing/kidding, the identification number, the age in years, the data and the consecutive number of the lambing/kidding, the number and the sex of the lambs/kids born alive (after the first 24 hours). The visits are repeated once a month and the milk yield is measured in the first visit after the suckling period. Measure is taken place by a volumetric tube with markings of 1/100 lt. This is done until the end of the lactation period of each ewe/goat, which is considered when daily milk drops under 0.05 lt. (~ 50 gr). The collected data with a sample for measuring the milk contents is delivered immediately after the visit, to the responsible Animal Genetic Improvement Centre.

4.4 Other information collected

Information regarding feeding or health traits is not collected. Pedigree information derives, when properly registered, from the individual identification and lambing data.

4.5 Types of analysis of data

No analysis of data is undertaken on the farm/flock. Milk samples are analysed at the Animal Genetic Improvement Centres (Drama, Thessaloniki, Karditsa, Ioannina, Athina) by two in each Centre MILKOSCAN apparatus (type 104 without printing and 133 with printing device), capable to measure fat, protein, lactose, Solids without and with fat, in a rate of 700 samples per hour. After milk content is determined, the results are matched with milk recording data and finally sent for processing to the central computer. The trend is going towards storing and processing the collected data at local PC's (in one Genetic Improvement Centre is already done).

4.6 Computerisation and storing of the data

The processing of the data is accomplished centrally. At the beginning of the application of animal recording a small scale computing centre was established in co-operation between the Ministry of Agriculture and the Department of Animal Husbandry - Laboratory of Animal Genetics and Breeding of the Aristotle University of Thessaloniki, in the University Farm. This computing centre provides facilities for processing milk and reproduction control data collected in northern and central Greece (where the major part of the dairy cattle population is kept) while the southern and western regions of the country are using the computing facilities of the Ministry of Agriculture in Athens. In the mean time a part of the processing work is accomplished by personal computers in an Animal Genetic Improvement Centres using home made software.

Processing for the cattle recording data is taken place every month and the results are sent back to the farmers. At the present time processing for sheep and goats is accomplished once, at the end of the production period and the advice to the farmers is based on the results of the total lactation of each ewe/goat and the average production and the standard deviation of the flock in relation to the average and standard deviation of the whole region for which the Animal Genetic Improvement Centre is responsible.

4.7 Government and farmer involvement

Responsible for the proper application of the on farm performance recording is the Greek Ministry of Agriculture and the financial support comes from the Greek government.

At this point, it should be remembered that in Greece the basic adverse factor for the promotion and improvement of the animal recording and the livestock structure in general, has been the absence of organised initiative from the part of our livestock breeders. As a consequence, in our country there are no genealogical books belonging to farmers organisations, fact that is also implemented in other Mediterranean regions with similar conditions.

The constraints of the recording are not balanced by the individual and collective interest of the results provided and there is also a degree of breeder resistance to recording because of the tedium of the milk sampling and weighing and the slowness of response time, apparently for the optionally cost of recording. The current trend is to simplify the recording and to accelerate data turnaround.

4.8 Who pays for the recording

The responsibility for the on farm performance recording has been undertaken exclusively by the Ministry of Agriculture and the financial support comes from the Greek government. Performance recording on the Agricultural Research Stations is supervised by the National Foundation for Agricultural Research, which indirectly takes financial support from the Ministry of Agriculture.

Furthermore, during the previous periods (since 1993) the Ministry of Agriculture granted the farmers considerable premiums to join the recording and genetic improvement scheme.

4.9 Type and nature of technical support

The recording and genetic improvement scheme gets scientific and technical support from the Ministry of Agriculture and the Agricultural Universities.

The Direction for Inputs to Animal Production which is responsible for Animal Genetic Improvement in the Greek Ministry of Agriculture, operates five regional Animal Genetic Improvement Centres (Drama, Thessaloniki, Karditsa, Ioannina, Athina). These Centres monitor the milk recording and genetic improvement scheme, process and evaluate the collected data in collaboration with the Animal Production Department of the University of Thessaloniki , informed the producers on the relevant results and give them properly technical advise on feeding, breeding and selection. Further technical advice to the farmers is also given by the Regional Agricultural Development offices of the Ministry of Agriculture.

4.10 Principal people involved in the development and maintenance of the scheme

The Ministry of Agriculture, Direction for Inputs to Animal Production with five regional Animal Genetic Improvement Centres (Drama, Thessaloniki, Karditsa, Ioannina, Athena).

The Agricultural Universities (Thessaloniki and Athena) support the scheme with computer facilities, software for processing the collected data and scientific methodology for the genetic evaluation of the recorded populations.

4.11 Main reasons for introducing and maintaining the scheme

The official animal performance and especially milk recording is applied in Greece for about 50 years and it can be divided in four periods.

The first period, which could be characterised as an introductory one, covers the years between 1952 and 1962, when milk recording was planned by the regional services of the Ministry of Agriculture and intended to identify only the variability of milk yield of sheep raised in farms, without being an integral part in the frame of a genetic improvement programme of the known breeds.

The second period covers the years from 1963 to 1977 and is characterised from the issuing by the Ministry of Agriculture of the relevant decisions and regulations for the organisation and operation of the herd book and milk recording of the common bovine, sheep and goat dairy breeds. Milk recorders were employed by the regional services of the Ministry of

Agriculture in order to carry out milk and fat content recording, body conformation measurements, collection of feed intake information and processing of the data.

The third period covers the years from 1978 to 1992 and is characterised by the establishment in the Ministry of Agriculture of the Direction of Animal Genetic Improvement (later renamed to Direction for Inputs to Animal Production) and of five regional Animal Genetic Improvement Centres (Drama, Thessaloniki, Karditsa, Ioannina, Athena). These Centres monitored the milk recording and genetic improvement scheme, processed and evaluated the collected data in collaboration with the Animal Production Department of the University of Thessaloniki and informed the producers on the relevant results. In 1978 and 1982 the regulation of animal milk recording of 1963 was amended, as well as the relevant decision concerning the organisation and operation of herd book.

The fourth period, which is a continuation of the previous , has started in 1993 and lasts until now (1997). In this period, also, the Ministry of Agriculture is still in charge of the organisation and operation of milk recording and herd book keeping, but there is the intention to totally involve the co-operative organisations, under the supervision of the Ministry.

4.12 Most significant activities and design peculiarities that have enable the Scheme Initiated

The genetic improvement scheme, which has been introduced since 1978 and with minor modification is carried out until today, is characterised by the establishment in the Ministry of Agriculture of the Direction of Animal Genetic Improvement (later renamed to Direction for Inputs to Animal Production) and of five regional Animal Genetic Improvement Centres (Drama, Thessaloniki, Karditsa, Ioannina, Athina). These Centres monitored the milk recording and genetic improvement scheme, processed and evaluated the collected data in collaboration with the Animal Production Department of the University of Thessaloniki and informed the producers on the relevant results. Now (1997). The Ministry of Agriculture is still in charge of the organisation and operation of milk recording and herd book keeping, but there is the intention to totally involve the co-operative organisations, under the supervision of the Ministry,

4.13 Maintained

During the last period milk recording was carried out more systematically, on a larger scale and in the frame of a more specific genetic improvement programme per animal species and breed. A number of milk recorders has been employed, but it was not enough to cover the needs of the milk recording programme. Furthermore, a close co-operation has been established between the competent services of the Ministry of Agriculture and the Animal Production Department of the University of Thessaloniki. The use of computers has been started and as a result, the whole

programme has been improved, as far as the collection, evaluation and use of all the relevant data by the farmers and the responsible scientists are concerned. In addition to the milk yield, data of milk composition and data related to artificial insemination and parturition were collected.

5. Changes to the design and operation of the scheme

The farmers' organisations will be responsible for the identification of the new-born calves/lambs/kids, the application of milk recording and analysis of the milk samples for fat and protein content, the collection of reproduction data and the keeping of a data base for production and pedigree certificates. For these activities, separate organisations for bovine, sheep and goats re under way to be established. Especially, sheep and goat breeding will be carried out in collaboration with several research institutions, which will act as breeding nucleus. Progeny testing, calculation of genetic merit and evaluation of secondary traits, will be carried out by the regional Genetic Improvement Centres, in collaboration with the University of Thessaloniki.

In the mean time a part of the processing work is accomplished by personal computers in the Animal Genetic Improvement Centres using home made software.

Decentralising of the production records by region (input and output) would give more flexibility to the recording programme and allow the farmers to have the relevant records sooner. Furthermore, the development of communications with the use of modems between the computing centre and the on farm personal computers of the co-operative members will allow them to interact directly with the data bases

6. Future directions

Motivation of the foundation of independent co-operatives or non-profit organisations, in an attempt to spread out the animal performance recording and apply specific genetic improvement projects more systematically.

The farmers will be motivated to contribute economically to the milk recording programme.

Application of simplified methods of recording, appropriate for low to medium input production systems.

Managing by computers. One of the most important factors for the farmer who produces milk, especially under the milk quota restrictions, is the economy of the milk production. It is planned to collect all the necessary data related to the economically important factors of the milk production in the frame of the official milk recording system, in order to establish a good basis for planning the production and managing the whole farm.