
Animal performance recording in Kyrgyzstan: an essential tool for cattle improvement efforts

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The recent economic crisis has hit large collective farms, which resulted in an emergency at the new private farms. At present all available cattle are distributed among three types of farms: domestic households, small farms and large cooperative farms.

Currently in the rearing system of domestic households and small farms strong breeding occurs seasonally. The peak of calving seasons in the villages is in April. The reason for this is associated with herd management practised in villages. Cows are mainly bred naturally, which occurs in common herds mostly in summer when cows graze on a summer pasture. Additionally, there is a preference by farmers for their cows to calve mostly in spring. This tendency results in a smaller quantity of milk produced in winter in Kyrgyzstan.

The Central Asian Breeding Services Ltd., a company based on the principles of private enterprise and market economy was established in 2000. The objective of the company is to offer services to farmers to improve the performance of their livestock. Among other services, there is a supply of semen for artificial insemination and maintaining animal performance recording.

Today the Central Asian Breeding Services Ltd. renders its services for animal performance recording to both large cooperative and small private farms. Since the beginning of the animal performance recording, nearly 7 000 cows have been registered from 16 farms. The recorded data are entered into the database in the central computer. Farmers receive analysed information that enables them to identify the best cows and facilitate herd management (splitting the herd into groups of dried, calving and milking cows, etc.). The pedigree of cows is closely watched to avoid inbreeding in the herds.

Summary

Based on the data analysis results provided to farmers, animals' genetic merit can be better evaluated by means of calculated performance correction for various factors. By applying these average differences to an animal's phenotype, a more precise estimation of performance is obtained to select an animal with a better genotype.

There are other institutions which also supply semen for artificial insemination in Kyrgyzstan. The one that functions best is Emgek, a small bull station based on a large cooperative farm, which keeps Alatoo bull mothers' nucleus in Kyrgyzstan.

A few cooperative farms run animal recording on their own. Such farms managed to keep the recording system the way it was before the Soviet Union collapsed in the early 1990s. The system includes recording a number of traits to give so-called complex evaluation (type of selection index). Based on the complex evaluation, a cow forms one of the following groups: breeding nucleus, normal milking cows and culled cows. One farm, Emgek, estimates the bulls' breeding value. The farm evaluates the progeny of the bulls whose semen it uses. The estimation involves a simple comparison of bulls' progeny with the rest of the herd.

Due to the recent drastic changes in the political and market environment the animal recording system faces a problem, namely the lack of an acting breeding policy at national level, which hampers the development of animal recording. The herd book, which Central Asian Breeding Services Ltd. maintains, is financed by grants from Helvetas, a Swiss organization for development and cooperation. Thus, the development of services in animal breeding and particularly animal performance recording depends largely on foreign aid.

Introduction

The case study of Kyrgyzstan, a Central Asian republic is based on a very recent programme to reintroduce systematic breeding in cattle after the transformation from large collective farms to private ones. Some of

Table 1. Agricultural land (total area of Kyrgyzstan: 200 000 km²). (Ibragimova, 1996).

Type of land	Area, km ²	Percent of total area
Summer pastures (1 500 to 3 500m above the sea level)	62 520	31.2
Winter pastures	22 590	11.3
Total pastures area	85 110	42.5
Cultivation land	16 000	8.0
Forest	12 000	6.0

the former collective farms have been transformed into private cooperatives, privately owned large farms and these farms have managed to maintain valuable breeding stock. The importance of the livestock sector in agriculture is determined by the availability of large pasture areas (Table 1).

The cattle in Kyrgyzstan are mainly of the Alatau breed. The breed has been developed over a long period by the complex crossbreeding of local Kyrgyz cattle with Brown Swiss and Kostromskaya. Alatau cattle are of a dual-purpose breed, milk and beef, which corresponds to the current market situation whereby the milk-to-beef price ratio is 1:10. The genetic production potential (4 000 to 5 000 kg of milk) is higher than the current average milk yield (2 000 to 3 000 kg of milk), which calls for a lot of management improvement efforts. Animals of this type are very similar to Brown Swiss, they have a shorter body, deeper chest and a lower implantation of the legs. The udder is well developed and the milk yield is 10 to 15 kg per day. Thanks to productivity and adaptation to the hot dry summers and severe winters of Central Asia, the breed is widely used in the country as well as in other countries. During the period of breed perfection Kyrgyzstan has exported 59 500 heads of young animals to other republics of Central Asia, Caucasus, Mongolia, Korea, China, and Afghanistan. The level of improved (American) Brown Swiss blood has probably decreased over the past seven years, as Brown Swiss semen was used less in this period. The estimated population of Alatau cattle in 1997 was 680 000 heads (Wageningen *et al.*, 1998).

The Kyrgyz Black & White cattle consist of three subpopulations: original Aulieatinska, "holsteinized" Alatau and "holsteinized" Aulieatinska. The highest density is in peri-urban areas. Kyrgyz Black & White cattle, though not officially recognized yet, can be defined as a new breed group of dairy animals. Its genetic improvement can be found in a breeding programme similar to that of Alatau. The Aulieatinska breed was created in 1974 by crossbreeding local Kyrgyz cows with Friesian bulls. The average milk yield of the cows was about 4 000 kg of milk per lactation. From 1980 onwards "holsteinization" of Alatau started in 26 collective farms with the aim of increasing milk production. The estimated population of Kyrgyz Black & White in 1997 was 170 000 heads (Wageningen *et al.*, 1998).

The recent economic crisis has hit large collective farms, which resulted in an emergency at the new private farms. At present all available cattle are distributed among three types of farms as shown in Table 2.

Characterising the animal production system

Breeds

Herd structure

Rear systems

There are two types of cattle rearing systems in Kyrgyzstan:

- the system where animals are housed year round; this system is more intensive and normally used in large cooperatives located around industrial and urban centres;
- mixed system with stall-feeding and grazing in summer or only grazing in summer on pastures and stall-feeding in winter; domestic households and small farms use this system more widely.

Currently in the rearing system of domestic households and small farms, strong breeding is seen seasonally. The peak of calving seasons in the villages is in April. The reason for this is associated with herd management practised in villages. Cows are mostly bred naturally, which in common herds occurs mostly in summer when cows graze on a summer pasture. Additionally, there is a preference by farmers for their cows to calve mostly in spring. This tendency results in a smaller quantity of milk produced in winter in Kyrgyzstan.

Table 2. Private farms in Kyrgyzstan (total cattle population: 850 000). (Wageningen et al., 1998).

Type of farm	Per cent of total population	Number of cows per farm
Domestic households	67	1 to 5
Small farms	25	10 to 30
Large co-operative farms	8	200 to 1000

Improvement efforts

Kyrgyz-Swiss initiatives

A Kyrgyz-Swiss project constructed a cheese factory in a rural region of Kyrgyzstan in 1996. The factory began to purchase milk from eight villages and later extended the procurement area to 20 villages. Next some centres for artificial insemination were established in the villages and collective farms around the factory. The project supplied bulls for natural service in village herds and launched a pilot programme for animal performance recording in the villages.

The Central Asian Breeding Services Ltd., a company based on the principles of private enterprise and market economy was established in 2000. The objective of the company is to offer services to farmers to improve the performance of their livestock. Among other services, there is a supply of semen for artificial insemination and maintaining animal performance recording, the activities taken over from the Kyrgyz-Swiss project. Today there are 40 centres for artificial insemination in villages and 16 on cooperative farms. They are supplied with semen, liquid nitrogen and equipment.

There are other institutions, which also supply semen for artificial insemination in Kyrgyzstan. The one that functions best is Emgek, a small bull station based on a large cooperative farm, which keeps Alatau bull mothers' nucleus in Kyrgyzstan. The farm has 700 cows, purchases progeny tested semen and uses it to produce its own semen. Emgek imported 200 pure-bred Brown Swiss heifers from Austria and Germany in 1998-1990. Now the male calves of the imported animals are the breeding bulls that the bull station uses for semen production and natural service.

A secondary channel for flow of genetics, namely in villages, used to go through culled bulls from collective farms in the past. After the collective farms were either transformed into cooperatives or shut down, very few villages appear to have good quality bulls for natural service on the newly private farms. It is rare that a domestic household makes use of a good quality, commonly owned breeding bull. Instead, indiscriminate mating is widespread.

The initial objective of the pilot animal performance recording programme in the villages around the cheese factory was to test the feasibility of such a recording scheme in domestic households, closely contacting a large number of farmers and identifying potential bull mothers through systematic production comparison. Four hundred cows were recorded in four villages from 1997 to 2000.

**Animal
performance
recording**

Now the Central Asian Breeding Services Ltd. renders its services for animal performance recording to both large cooperative and small private farms. Since 1997, when recording began, nearly 7 000 cows have been registered from 16 farms. The recorded data are entered into the database in the central computer. The farmers receive analysed information that enables them to identify the best cows and facilitate herd management (splitting the herd into groups of dried, calving and milking cows, etc.). The pedigree of cows is closely watched to avoid inbreeding in the herds.

In 1999, the first cattle show was organized in Kyrgyzstan with the participation of almost all farms enrolled into the cattle herd book. Since then it has become the cattle breeders' annual event. The judgement at a cattle show is based mostly on external evaluation according to Brown and Holstein breeds applied to Alatau and Black & White ones, respectively. The cattle allowed to enter the show are registered in the herd book and their evaluation marks are then updated at the next show.

Some results are summarized in Table 3 and Figures 1 and 2. Table 3 gives an overview of the scheme size. The data collected in the domestic households are considered versus small and large cooperative farms.

Based on the data analysis results provided to farmers, animals' genetic merit can be better evaluated by means of calculated performance correction for various factors. Figures 1 shows the relations observed between lactation yields and lactation numbers, lactation yields and seasons of calving. Applying these average differences to an animal's phenotype, a more precise estimation of performance is obtained to select an animal with a better genotype.

Figure 2 presents the seasonal influence on milk production level and breeding that is typical for animal husbandry in Kyrgyzstan today. The left graph shows that the highest daily yield is in summer. This happens for two basic reasons; firstly one is the seasonal feeding difference caused by grazing on pastures in summer and somewhat scarce stable fodder in

Table 3. Average 305-day lactation yields of the domestic households, small private and large co-operative farms.

No	Village	Breed	Domestic households	Cows	Average 305-day lactation yield, kg
1	Toktoyan	Alatoo	71	100	1 521
2	Sary Tologoi	Alatoo	79	101	1 711
3	Ken Suu	Alatoo	80	97	2 091
4	Santash	Alatoo	72	102	2 130
	Average		76	100	1 897
	Total		302	400	
<i>Small & large co-operative farms</i>					
1	KOSS	Alatoo		300	1 367
2	Kelechek	Alatoo		115	1 477
3	Jaiyl	Alatoo		343	1 543
4	Panfilov	Alatoo		58	1 660
5	1st May	Alatoo		42	1 688
6	Niva	Alatoo		162	1 781
7	Jenish	Alatoo		204	1 934
8	Zarya	Alatoo		849	1 935
9	Pahar	Alatoo		387	2 019
10	Engels	Alatoo		250	2 321
11	Drujba	Alatoo		290	2 532
12	Kirovets	Alatoo		779	2 779
13	Emgek	Alatoo		700	3 054
14	Bakyt	Alatoo		28	3 736
15	Vetka	Black & White		940	3 276
16	MIS	Black & White		1 467	4 733
	Average			432	2 826
	Total			6 914	

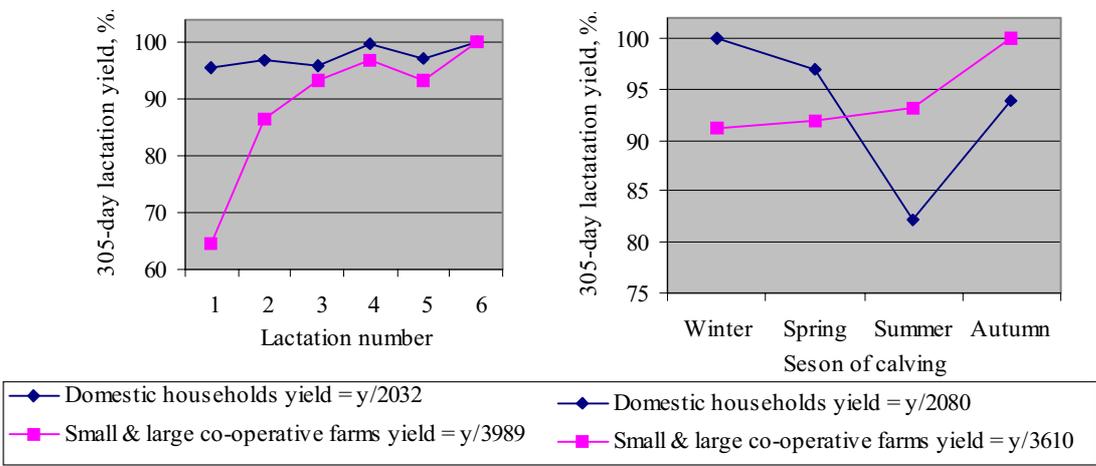


Figure 1. Relations between 305-day lactation yields and lactation numbers, 305-day lactation yields and seasons of calving.

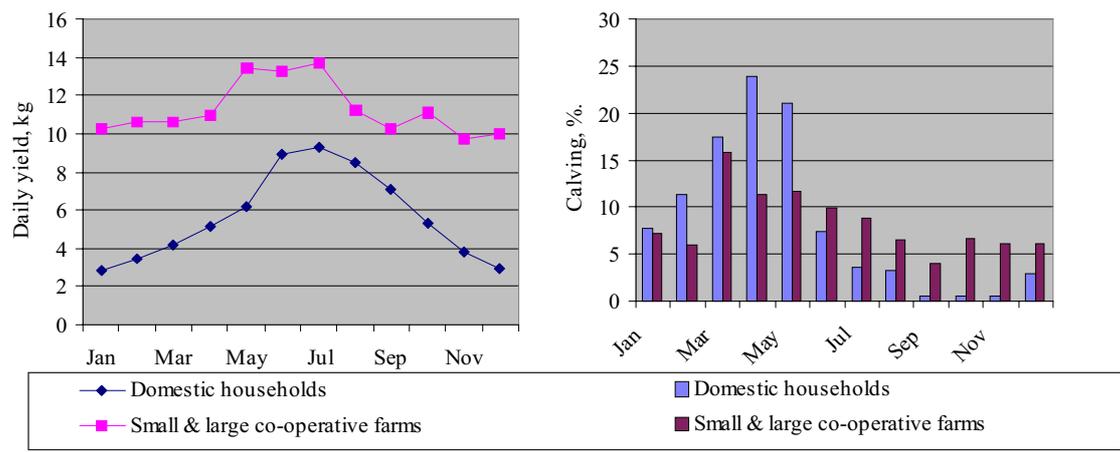


Figure 2. Seasonal influence on milk production level and breeding.

winter. The other reason is breeding seasonality that results from most cows calving in spring and being dry in winter thus producing very little milk in that period.

A few cooperative farms run animal recording on their own. Such farms managed to keep the recording system the way it had existed before the Soviet Union collapsed in the early 1990s. The system includes recording a number of traits (Table 3) to give so-called complex evaluation (type of

selection index). Data processing is maintained manually, on a special cow card. Based on the complex evaluation, a cow forms one of the following groups:

- breeding nucleus – mothers of the next generation that reproduce the herd;
- normal milking cows;
- culled cows.

The best cows are selected from the breeding nucleus to rear young bulls. The complex evaluation results help to design an individual mating programme. It also enables the design of a plan to complete the herd with young animals, increase cows' milk performance, sell and purchase animals.

Table 4. The traits included into cows' complex evaluation and the weights in points.

No	Trait	Maximum point
1	Milk yield and fat content	70
2	Conformation	10
3	Growth (weight)	5
4	Milking speed of the udder	5
5	Sire's and dam's complex evaluations	10
	Total	100

Only one farm, Emgek, estimates bulls' breeding value. The farm evaluates the progeny of the bulls whose semen it uses. The estimation involves a simple comparison of bulls' progeny with the rest of the herd. However, a large-scale breeding value estimation scheme outside a single farm does not currently exist.

Policy environment

The state system of dairy production, in which farms kept cattle highly concentrated in collective farms, has collapsed and Governmental support is no longer available. The Government issued a resolution on subsidizing farms but in reality no action has taken place. The lack of a reliable marketing unit that would trade surplus milk does not allow a milk producer to generate a stable income. Therefore, the milk producer has no guarantee on getting returns on investments. Thus, the newly emerging farms and organizations try to respond to the current changes.

Their aim is to improve efficiency of production by improving:

- genetic quality of the animals,
- feed and herd management,
- developing the processing and marketing infrastructures for milk and meat,
- veterinary service.

The objective of cattle breeding is countrywide availability of good quality cattle, which have genetic potential to efficiently transform available resources into milk and meat. This main objective has two components:

- superior cattle that can serve as pedigree stock for the next generations;
- centres for artificial insemination and good quality bulls for natural service.

Due to the recent drastic changes in the political and market environment the animal recording system faces a problem, namely, the lack of an acting breeding policy at national level. This circumstance hampers the development of animal recording. Despite the lack of a legal basis no finance for animal recording from either the Government or the public is available. Now, the herd book is financed by grants from Helvetas, a Swiss organization for development and cooperation. Thus, the development of services in animal breeding and particularly animal performance recording depends much on foreign aid. In the long run it cannot be sustained without local initiatives both from the Government and farmers of Kyrgyzstan.

Nevertheless the organizations, which currently render breeding services, are in turn responsible for the rate of development. By supplying high quality services, it is in their power to attract more farmers and necessary resources into the sector to promote sustainable development. A core factor of development is professional personnel engaged in the breeding sector, which needs education and communication with international animal recording organizations.

A prerequisite of animal recording development is readiness of farmers to accept new approaches and to use data for selection. To achieve this objective, generation changes are needed. Thus, animal performance recording is part of the whole development packet for cattle improvement.

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Conclusions

References

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