Report on ICARDA Project

"Community Action in Integrated and Market Oriented Feed-Livestock Production in Central and South Asia."

Activities # 11, 14 and 15

The basis for decentralized and participatory breeding plans for farmers to access improved animals in Kyrgyzstan and Tajikistan

Report Nr 2
Activities 2008

Submitted by

Joaquín Mueller
January 2009

Executive summary

In October 2007 three small ruminant community based breeding plans were developed and implemented: (1) meat sheep in Kyrgyzstan, (2) dairy sheep in Kyrgyzstan and (3) Mohair goats in Tajikistan. At present, end of 2008, the three breeding plans are active and produced the first progeny crop. In general all breeding plans are running as planned. Some useful adjustments were made. Data collection has also begun and some general production figures are available. The farms involved are also subject to improved management activities; furthermore some farmers are linked to processing and added value proposals (dairy and mohair). In what follows activities and recommendations for each plan are summarized.

(1) Meat Sheep Breeding Plan (Kyrgyzstan). A group of five members of the Akbeket community mated a total of 87 selected ewes to 4 purchased Aikol rams and, with help of scientists, recorded pedigree and performance of the progeny. These data will be used to select future male and female replacements and indicate parent's genetic merit. It is recommended to pay maximum attention in the data recording process to avoid mistakes. It is also recommended to progressively involve farmers more in the recording and selection process. Visual inspection of the Aikol progeny indicates superiority in conformation and weight when compared with local sheep progeny, it is recommended to objectively verify this impression.

(2) Dairy Sheep Breeding Plan (Kyrgyzstan). The breeding plan started with four farmers using one Awassi ram provided by an existing Awassi graded nucleus flock (near Tokmok) and the purchase of two new Awassi rams for this nucleus. This year a second mating cycle is in progress with 3 high Awassi graded rams from the nucleus. The first female progeny of the project to be milked by the four farmers will be after April 2010, thus the process is slow but allows gradual adjustment of management, milk collection, milk processing and marketing issues. Milk recording is already done in the nucleus. Dairy marketing and processing skills are crucial for the success of this breeding plan.

(3) Mohair Goat Breeding Plan (Tajikistan). Five farmers in the region north of Khojand started a breeding plan based on mating selected females to selected bucks. Comprehensive field records were taken to describe mohair quality. There are difficulties to agree on the importance of selection for fiber diameter. Increasing demand for fine Mohair will convince farmers to breed for fiber finesse. There are also difficulties in some farms to mate nucleus animals separated from base animals and so make maximum use of best bucks. Some management solutions are discussed.

The basis for a decentralized and participatory breeding plan for farmers to access improved animals in Kyrgyzstan and Tajikistan

Introduction

This report focuses on the results of the first year of implementation of 3 breeding plans including comments on problems encountered and solutions proposed. Problems and solutions were discussed and shared with the technical staff involved and to some extent also with participating farmers. A work plan with activities for the second year of implementation is provided. Some technical issues are discussed in more detail.

Kyrgyzstan

Akbeket Meat Sheep Breeding Plan (*Activity 11*)

Comments on Activities: October 2007 – October 2008

The design and implementation of a breeding plan for a group of farmers of the town of Akbeket, Chuy valley, raising meat sheep started in October 2007. Originally there were 10 candidates interested to participate but after farmers considered the risks involved by using a new breed and realizing the work involved some declined to participate and others were excluded due to insufficient quality of their ewes. There are now 5 farmers actively involved in the breeding plan (Photo 1).

Photo 1: Akbeket breeding plan participating farmers form left to right: Joldosh Mambetaliev, Shaken Rysbekov, Aman Omonov and Erkin Toktogonov. Not on Photo is participant Keldibek Toktogonov.

It was considered important to have a document signed by these farmers and researches stating the foundation steps and defining the responsibilities as part of the documentation process and as a reference for follow-up. Such a document was not signed but all parties expressed verbally their commitment with the plan.

The implementation of the plan commenced with the purchase of 4 Aikol rams and mating of selected ewes of each participant. Mating figures for sheep of each farmer are shown in Table 1. The total progeny obtained from the matings was 82, 49 females and 33 males.

Table 1: Akbeket. November 2007 Mating.

Farmer	Ewes mated (numbers by April 2008)	Id of ram used
Aman Omonov	18	4131
Erkin Toktogonov	21	4124
Joldosh Mambetaliev	6	6726
Keldibek Toktogonov	23	4144
Shaken Rysbekov	19	6726
Total	87	

Table 2 shows the working plan originally agreed on and the corresponding performed activities during the first year of implementation.

Table 2: Akbeket. Planned and performed activities.

Date	Planned Activity	Performed Activity
Oct 2007	*Sire selection:* Participants travel to Aikol and select foundation sires. Note: if there is a good sire in the community he could be used together with the Aikol sires allowing a comparison of the progeny from local and Aikol genotypes.	Two participants (Shaken Rysbekov and veterinarian Joldosh Mambetaliev) traveled with scientists to the Aikol farm in the Tonsk district and selected 4 foundation rams.
Oct 2007	*Ewe classing:* Upon return of ewes from summer grazing good ewes are identified and ear-tagged. Inferior ewes are culled if replacements are sufficient. Ewe classing will be based on criteria discussed between participants and technical team (an example of such criteria is given in Table 1 of an attached Excel spreadsheet).	A total of 87 ewes of 5 households were selected visually and on body weight for mating the Aikol rams. Some details of the classing were recorded. See Akbeket 2008 spreadsheet.
Nov 2007	*Mating:* All ewes are pen-mated to Aikol sires giving priority to best ewes. Sire-ewe mates and corresponding mating dates are recorded (Table 2) to enable	Mating started 17 November in individual household groups. There were 4 mating groups since the ewes of Joldosh Mambetaliev joined the ewes of Shaken Rysbekov for

	pedigree recording of progeny.	mating. The recording of mating dates was conducted by one of the farmers, Joldosh Mambetaliev, with visits by Kuban Abdykerimov to the farms.
Apr 2008	*Lambing:* Birth date, birth type and birth weight is recorded and lambs are ear-tagged (Table 3).	Done. See Akbeket 2008 spreadsheet.
May 2008	*Marking:* At marking all lambs are weighed (Table 4) and weights are analyzed (Table 5). About 20 male lambs with high growth rate born from superior ewes are not castrated and are candidates for future sire replacement. Decisions are made here on the basis of the data results.	All lambs were weighted at about one month of age. All lambs were retained. Inferior males will be castrated later.
May 2008	All animals go to summer pastures.	Done.
Aug 2008	*Weaning:* Weaning takes place in summer pastures. Weaning weights of ear-tagged lambs are taken (Table 4).	Effective separation of lambs from dams is not possible on summer pastures and lambs progressively wean naturally. Weaning weights were not taken.
Oct 2008	All animals return from summer pastures and ear-tagged lambs are weighed (Table 4).	All animals returned from summer pastures earlier than planned, on September 10, due to the intense drought. On September 28 all lambs were weighted.
Oct 2008	Weights are analyzed and about 10 male lambs are selected on growth rate and visual quality for final performance testing (as in Table 5).	All lambs were kept.
Oct 2008	*Performance testing:* Selected male lambs are managed together during the winter in a single flock (will get their final weight in May 2009).	Lambs were managed in respective households.
Oct 2008	*Ewe selection:* Select young replacement females and re-class adult ewes (Table 1 and 6). Put ear-tags on new ewes (using new numbers). Young replacement females will be selected and adult ewes will be reclassified. The first 2 years this will be done on the basis of the ewes' own performance.	All young females were retained due to the small number available and the intention to increase flock sizes.
Oct 2008	*Sire selection:* After one year, the adaptation of Aikol rams to the Akbeket production condition and	One ram died and another got lame. These two rams were replaced with two new rams (Numbers: 5890 and

	the performance of their progeny can be assessed. Results of this assessment may indicate the necessity of the replacement of one or both sires (Table 7).	5894). All rams performed very well in terms of quality of the progeny produced.

As can be seen in Table 2 the work done in the first year of implementation has been in acceptable correspondence to the original plan. Specific changes will be discussed in detail later but it is necessary to remember that the early years of most breeding plans are subject to adjustments as no general recipe can be applied. The Akbeket plan has started well, despite the fact that the winter 2007/2008 was particularly cold. In Bishkek during 2 months temperatures remained at about -30°C. In addition the summer 2008 was very dry, posing extra challenges to the breeding plan.

Lamb weighing (at marking time) was expected to be at an average age of 45 days. The exact weighing date was not recorded but scientists acknowledge it was about one month after lambing which, given a lambing spread of about 2 weeks, is not really exact enough. In addition there are doubts about the weights themselves since there are different weight records in different files and the average weight has an extremely low coefficient of variation. Nevertheless it was agreed with scientists to accept one set of weight records and it was agreed to take May 13 as weighing date, exactly one month after average birth date. The weighing date is necessary for adjusting weight for age. Weights were adjusted to 30 days of age instead of 45. These adjusted weights are important to evaluate mothering capacity of dams. The importance of accurate data recording was emphasized and it was clear to everybody that maximum effort will be put on accurate recording in the future.

Weaning in terms of forced separation of lambs from dams does not occur on summer pastures were all animals graze together till autumn. In addition access to the summer pastures in mountain rangelands is difficult therefore weaning weights were not taken. This possibility was expected in the original plan and is not an important problem. The two crucial weights are the previously mentioned 45 day weight and the weight at the return from summer pastures.

No lambs were culled or castrated because of the small numbers of lambs born in 2008. There is also interest in increasing flock sizes of participants. Therefore all lambs remain in the flocks and were performance tested. Castration will occur later once these lambs become sexually active. This change to the plan is justified.

However an important change is that all lambs returned from summer pastures to their respective households. The original plan was to keep all male lambs together for adequate performance testing (and progeny testing of sires). Now the performance test aimed at comparing all male lambs will assume no differences in sheep management during the winter in the 5 households. Scientists insist that management is similar in the different households and that adequate comparison of lambs is warranted. There are certainly reasons to support that assumption: households are within 1 km distance, housing facilities are similar and alfalfa bales to be used as main forage at all households are all from the same source (the production site was visited). An intermediate option for next year could be to exchange male lambs amongst flocks,

therefore randomizing housing conditions of lambs from different households (and sires), allowing a fair progeny test of sires.

In addition to the breeding plan calendar the technical team has also implemented an adequate health calendar. No sick animals were seen and comments of the scientists involved and the acting veterinarian farmer suggest adequate health conditions in all flocks. Body condition of the ewes at the time of the inspection (end of October 2008) is sufficient for effective mating.

At the planning stage of the breeding plan there was the assumption that Aikol rams are improvers of production for the Akbeket community flock. The progeny from each of the 5 households turned out to be very good in terms of size, frame and condition, suggesting that Aikol rams effectively improve the quality of the local flocks. Of course this cannot be easily proved yet and there also may be some heterosis inflating the phenotypic response in the present lamb crop. The important point is that farmers are very happy with the first progeny of the breeding plan.

Photo 2: Left, Joldosh Mambetaliev holds one of the Aikol sires. Right, Farmers explain merits of Aikol progeny.

The premise is to minimize recording needs given the restricted conditions of the farmers, but establishing a discipline that farmers could follow on a sustainable manner after the project. Without recording, genetic progress is still possible but at a much lower rate and independence from an external ram source becomes more difficult.

The present breeding plan requires weighing at about 1-2 months of age (previous to summer pasture grazing) allowing evaluation of milking ability of dams. However at this early age it is very important to have birth dates to adjust weight for age of lamb. In the usual management system October weighing (at about 6 months of age) becomes important because at that stage male candidates are retained for winter feeding. Minimum recording will also become important when the present “pilot breeding plan” is to be replicated without the extensive technical support provided to the Akbeket group.

An Excel spreadsheet template was provided in the first year for use and completion during the different recording and selection stages. Its use was only partial. The experience in the first year is that data adjustment procedures and breeding value

estimation is not evenly understood by all scientists involved. Some basic training on electronic data handling and statistical analyses would be useful. All data were compiled in a new spreadsheet (see Akbeket 2008.xls) which the technical team can fill with field records. The tables include some built-in functions for appropriate adjustment of data and estimation of breeding values. The built-in functions are meant for the researchers as they do not need at this stage to be explained to farmers.

Regarding pedigree recording it was explained that complete pedigree keeping is not obligatory but pedigree information tied to performance recording greatly improves selection accuracy and therefore genetic progress. Given the small numbers of animals involved, identification of the dam of a lamb is quite easy, and given the mating system (mating occurs in individual households) it is also easy to record the corresponding sire. The important point is to realize that if there are identification doubts it is preferable to consider a missing parent and not register a guessed parent. This is also valid for performance records. It is important to only record factual data and, if there are doubts, it is preferable to consider it missing. In line with data recording, special attention has to be paid to ear-tag replacements. If the lost tag number is unknown only new tag numbers should be used and the date of replacement should be clearly recorded.

As mentioned earlier, the project advances well and several adjustments are being made to simplify the work involved and to improve the results. In the following year or two intense technical support is still needed but, progressively the work has to be taken over by the participating farmers. For this to happen it is important that farmers can see the benefit of the breeding plan. This may happen in several ways, including a visual improvement of animal quality, an objective improvement in animal produce, the availability of home grown good rams, the income through sale of rams to other flocks, etc. It also will be important to progressively convey responsibilities to farmers and for this training is needed. Scientists will need to explain the rationale behind the required activities.

It must be mentioned that these 5 farmers are also subject to Project Activity 9 (improved management) which includes health, feeding, mating and culling techniques. All these activities are based on the development of extension brochures and on-field explanations. In order to estimate the improvement achieved by these 5 farmers there are also 5 control farmers (Dujsheev Tolai, Moldaiev Tolant, Ibraimov Tashtan, Jumabekov Mairanbeck and Aidaraliev Kochybek) where data, similar to the treated farms are collected.

Akbeket Work plan November 2008 – October 2009

After discussions amongst scientists involved and considering last year's experience a work plan for a new breeding cycle was developed and agreed on as follows.

1. Mating

The second mating season of the project started already on October 1 2008. This is one month earlier than expected in order to take advantage of the body condition of the ewes which later, in winter, will decline. Mating procedures are similar to the previous year. As mentioned two rams (one dead one lame) were replaced with two new ones (5890

5894). In December 2008, after mating, the 4 rams will be separated from ewes and will be fed elsewhere. Candidate young males (born 2008) will also be separated from ewes.

2. Identification of candidate lambs for selection

At lambing (March 2009), all female lambs born to superior and average ewes, and all male lambs born to superior ewes will be identified with ear-tags and their birth dates and birth weights recorded by farmers and these records will be checked by scientists in periodical visits. In order to keep track of data collection and visits a small "Visitors Book" was left in hands of Shaken Rysbekov.

3. Selection of male lambs

(i) First selection of lambs: At say May 30 2009, all male lambs born to superior ewes (that is, all male lambs with ear-tags) will be weighed and adjusted 45-day weight will be calculated. Based on this weight, about 20 male lambs will be pre-selected. Other male lambs will be castrated or sold (the numbers depend on reproduction rate).

(ii) Second selection of lambs: By October 15 2009, when the flocks return from the summer pasture grazing, lambs will be weighed again and adjusted 6-month weight will be calculated and used as selection criterion. The best 10 of these male lambs will be retained for winter feeding. Other males will be castrated or sold. During winter, selected males will be managed together in one flock agreed by the community in order to assess comparative growth rates under a single management environment. If this is not acceptable, an alternative is to exchange some of these young males and manage them as uniformly as possible.

(iii) Third and final selection of lambs: By April 15 2010, young rams will be weighed and the best of them selected on a final 12-month adjusted body weight.

4. Selection of female lambs

Female lambs born to superior or average ewes will follow the same weighing schedule as male lambs, that is: weighing on May 30 2009, October 15 2009 and April 15 2010. Weight adjustments will be similar to those for males and final selection will be based on adjusted 12-month weight.

5. Ram replacement in the nucleus

For the November 2009 mating, young males born in the system become ram replacement candidates. At that stage we will have progeny-tested the 4 rams used for mating in 2007. The progeny test of these rams will be based on their male and female progeny. Based on this progeny test results, a sire clearly outperformed by others should be replaced by a new one. This new ram can be a new selected Aikol ram purchased at the Aikol Pedigree Breeding Farm or can be an outstanding young performance tested ram born in the Akbeket nucleus. The decision should be based on careful analyses of data and visual inspection discussed amongst farmers and technical team.

6. Ewe replacement in the nucleus

With lambing records available for ewes, classing of ewes can be based on breeding values taking into account lifetime reproductive performance. This will become increasingly useful as lambing data accumulate.

Table 3 shows the Akbeket Work Calendar for Nov 2008-Oct 2009.

Table 3: Akbeket. Work Calendar November 2008 – October 2009.

Date	Activity
Nov 2008	*Mating:* Mating already started on October 1, 2008 and finished in November 2008 (see text).
Mar 2009	*Lambing:* At lambing lambs are ear-tagged. Use new numbers, different from already in use, for example: 4 digit numbers starting with "9" (9000, 9001, 9002, etc.) help also to indicate birth-year. Birth date, birth weight and dam ID are recorded.
Apr 2009	*Weighting of lambs and ewes:* Before leaving for summer grazing all lambs and ewes are weighed. If there are surplus male lambs: keep about 20 male lambs with high growth rate born from superior ewes. *Weighing of hoggets:* Male and females born in April 2008 should also be weighed. These are the final weights for hogget selection. Based on the analyses of the data, keep top females for replacement and also one or two young males for future mating if necessary (also for sale to other farmers).
May 2009	All animals go to summer pastures.
Oct 2009	All animals return from summer pastures and ewes and lambs are weighed.
Oct 2009	Weights are analyzed and about 10 male lambs are selected on growth rate and visual quality for final performance testing.
Oct 2009	*Performance testing:* Selected male lambs are managed together during the winter in a single flock (will get their final weight in May 2010). As discussed for the previous year: if separation is not possible, perhaps exchanging male lambs amongst farmers helps to randomize performance test environments.
Oct 2009	*Ewe selection:* Young replacement females will be selected and adult ewes will be reclassified. The first 2 years this will be done on the basis of the ewes' own performance.
Oct 2009	*Sire selection:* For the third mating cycle it will be necessary to rotate the males in order to avoid sire-daughter mating. Also an outstanding young ram (born 2008) may be used in a flock different from its own home-flock. This can be done to replace the worse of the 4 original Aikol sires, based on the analysis of its progeny growth rate.

Project monitoring

October 2009, upon return from summer pasture and previous to mating is a key project monitoring month. In October several key selection decisions take place including a new cycle of selection and mating, based on collected data. A secondary important monitoring month is in spring before summer pasture grazing. Monitoring could be linked to a short training of scientists on data analyses procedures.

Tokmok Dairy Sheep Breeding Plan (Activity 14)

Comments on Activities: October 2007 – October 2008

The breeding plan is based on further upgrading of the Awassi graded nucleus flock of Mr Nurjan Abdymajitov through the introduction of new Awassi rams. Four neighbor smallholders selected ewes on reproduction traits and received rams from the nucleus for producing Awassi graded females for milking. During the first year, two new Awassi rams were purchased for the nucleus and the 4 farmers mated a total of 55 ewes with one Old Awassi ram provided by the nucleus. Mating figures for sheep of each farmer are shown in Table 4.

Table 4: Tokmok. November 2007 Mating.

Farmer	Ewes mated	Rams used	Female progeny obtained	Male progeny obtained
Nurjan Abdymajitov (nucleus)	33 (Awassi x local)	1058 1983	23	
	26 (local)	1058 1983	20	
Altynbek Esenaliev	15	Old Awassi	8	7
Azimjan Tashbolotov	15	Old Awassi	8	7
Bakhtiyar Ashirov	10	Old Awassi	6	4
Tolobek Esenaliev	15	Old Awassi	7	8
Total	114		98	

Table 5 shows the working plan originally agreed on and the corresponding performed activities during the first year of implementation.

Table 5: Tokmok. Planned and performed activities.

Date	Planned Activity	Performed Activity
Oct 2007	New Awassi rams from Kazakhstan are introduced into the nucleus.	Two new Awassi rams were bought.
Oct 2007	Participants agree on Awassi rams to be used in their flocks.	Four farmers agreed on the use of one old purebred Awassi ram of the nucleus.
Oct 2007	Participants select appropriate ewes for mating with Awassi rams.	Farmers selected appropriate ewes for mating.
Nov 2007	Mating in nucleus and participating flocks	Mating started November 15, see Table 4.
Apr 2008	Lambing. F1 Awassi lambs are identified and ear tagged.	Progeny in nucleus flock and Awassi progeny in farmer flocks were identified and ear tagged.
May 2008	Milking starts in the nucleus.	Milking in the nucleus started June 15 and milk recording was performed every 10 days on 10 Awassi graded ewes and 10 control (F1) ewes.

May 2008	An initial training in milk processing is planned at this time to be held in Tokmok (Muhi El Dine, from ICARDA, in following already standard plans in this regard)	Training was done at the nucleus farm on June 14 2008 using regional expertise.
Oct 2008	A new cycle of mating with Awassi rams takes place with further ewes included in the plan by participants	A new cycle of mating with Awassi rams started on October 1 with the 2 new rams in the nucleus and 3 high Awassi graded rams from the nucleus in the flocks of the farmers.

It can be seen in Table 5 that all programmed work has been done. Upgrading the nucleus to Awassi continues and the flock progressively takes the characteristics of Awassis (Photo 3).

Photo 3: Awassi graded nucleus flock with nucleus breeder Mr Nurjan Abdymajitov. See ewes with typical Awassi features like yellow-white long stapled coat and light brown heads and extremities, "S" shaped tail, long ears, etc.

Recording of ewe body weights and reproduction performance as well as lamb growth is performed according to schedule (see Tokmok 2008.xls).

Milk recording in the nucleus continues on an experimental schedule: 10 Awassi and 10 coarse wool controls. This comparison is of interest in showing the high milk production potential of the Awassis and to convince other farmers of the opportunity to start a dairy sheep business with nucleus rams, but it is not very useful for genetic improvement of the nucleus flock. For selection purposes in the nucleus flock all ewes milked should be systematically recorded for milk production. Selection in the nucleus will become increasingly important as the plan proceeds and the nucleus takes the role of providing improved dairy rams to interested farmers.

In this respect the plan is very dependant from the nucleus, an aspect already discussed in the planning stage. Participants and technical team are very confident in that there are no risks as there is a mutual interest in a successful breeding plan. As mentioned last year the project design addresses the opportunities to capitalize on positive interactions among production systems but this certainly will depend on tangible benefits on both parts.

As planned the participating farmers have selected and mated ewes for crossing with the foundation Awassi ram of the nucleus, and obtained their first crossbred crop which will be mated in October 2009. Thus, the crucial period of the plan starts in 2010 when these crossbred ewe hoggets will be milked for the first time at the participant's households. Additional skills for these farmers will then be required. More importantly farmers lack not only milk processing experience but obviously they also lack dairy product marketing experience. Therefore the importance of training in milk processing and dairy marketing issues cannot be overlooked.

It is not clear if all these aspects are really internalized and fully considered by all participants and technical team.

Tokmok Work plan November 2008 – November 2009

The new breeding cycle started already in October 2008 with mating in all flocks as follows (Table 6).

Table 6: Tokmok. October 2008 Mating.

Farmer	Ewes mated	Rams used (Ear tag)
Nurjan Abdymajitov (nucleus)	Approx 40	1058 1983
Altynbek Esenaliev	15	Crossbred
Azimjan Tashbolotov	15	Crossbred
Bakhtiyar Ashirov	10	Crossbred
Tolobek Esenaliev	15	Crossbred

Note: three new crossbred rams are used in the base flocks

The new work-plan November 2008 – October 2009 is straightforward (Table 7).

Table 7: Tokmok Work Calendar November 2008 – October 2009.

Date	Planned Activity
Nov 2008	Mating. Mating already started October 1 in nucleus and participating flocks and finishes end of November.
Apr 2009	Lambing. Awassi progeny is identified and ear tagged in the nucleus and participant flocks.
May 2009	Milking starts in the nucleus.
Jun 2009	Milk recording in the nucleus.
Oct 2009	A new cycle of mating with Awassi rams takes place in the nucleus and with further ewes included in the plan by participants. Awassi crossbred ewe hoggets are mated in participant flocks.

Tajikistan

Khojand Angora Goat Breeding Plan (Activity 15)

Comments on Activities: October 2007 – October 2008

Participants

At the planning stage in September 2007, 8 farmers were identified as willing to participate in the development of an Angora breeding plan. However in the process of discussing details of the work, two farmers finally refused to participate. These farmers were replaced with two new farmers. In addition another farmer may be included this year. From the five active farmers two may not continue since they are facing different kinds of problems. It looks as if the final number of participants will be 5 or 6, which given the farm access difficulties and distances, is a reasonable number to work with. Table 8 summarizes the list of farmers with their present involvement in the breeding plan.

Table 8: Khojand. List of farmers and present involvement in breeding plan.

Farmer	**Details**
Abdufatov Khonaev	Abandoned. He sold his animals and also was afraid of animal identification
Abdumalik Khoji	Abandoned early
Abdunazar Matazimov	Active nucleus
Anarbai Kosimov	New nucleus
Mamarasulov Suyunboi	New black nucleus
Mamat Isomiddinov	New nucleus
Rajmon Ascarov	Nucleus, had many losses and moves a lot
Sherali Thilloev	Nucleus, coarse goats and not very interested
Sulaimon Umarov	Active nucleus
Turgunboi Madaliev	Active nucleus

Breeding structure

In terms of the breeding plan the five active participants are not an integrated group as such, since there are no breeding links between the flocks of the farms. Rather each farm has its own breeding plan based on a number of animals identified as nucleus animals. In addition each farm has its own bucks. This means that only the genetic variability within flocks is exploited and not the variability between flocks. Bucks which could be improvers in one farm but were born in another are not accessed.

This is a general situation in the region; most farmers are geographically isolated and largely not collectively organized. Therefore there is no community breeding structure, in fact in soviet times the cooperatives worked as a breeding structure, though other aspects made them inefficient. This is also the reason why proposing the establishment

of collective breeding structures is difficult. Therefore, at least initially, the proposed breeding organization is within farm.

In the actively participating farms all animals, nucleus and base, are kept together during mating, only one farmer (Sulaimon Umarov) separates nucleus and base allowing mating of the best with the best as proposed. Another farmer (Turgunboi Madaliev) mates nucleus females with best bucks during peak of oestrus joining all animals afterwards, therefore increasing the probability of having nucleus females mated to best males. Other farmers mate the whole flock only with selected bucks. This procedure means that only part of the potential selection intensity is used.

Breeding for color

Another important point is that from what could be seen, white and colored animals are run together, even during mating. All five flocks have mixed color flocks. This is actually not bad as there is a market for fleeces of different uniform solid color in the cottage industry (Brent 2008). However if mating across colors is allowed, non-solid color and non-uniform fleeces are produced. Mohair from such fleeces is difficult to process in high quality yarn and fabrics and is discarded by the industrial processors. In addition cross-color females maintained in the flock produce more variable offspring due to segregation.

Therefore it is suggested to use only solid color bucks in one mating flock, that is typically white or black. If complete separation is not possible farmers should try to separate colors at least during the peak of oestrus (eight days or so). This separation is of course even more important for nucleus females. If this is also not possible the option is to work on obtained progeny by culling non-solid colored animals. This needs reproduction to be high and for this to happen management must be optimum. Success of activity 13 (goat management) is therefore crucial in this aspect.

Culling policy would be to discard mixed colored animals. If bucks are known (for example when only one buck is used or phenotypes are associated to a particular buck) and most progeny are mixed in color then farmers should replace the buck as he might be segregating the problem. If isolated kids are of mixed color then farmers should cull the kid and the dam (if culling margin allows to do so) or separate the dam from the nucleus.

Clearly the recommendation for the farmer is to establish nucleus of solid colored animals. The choice of color would typically be the most frequent in the flock. The 2008 mating season is already on and we can see the distribution of colored animals among farmers. The number of nucleus does and bucks of white and colored females mated per farmer are shown in Table 10, as well as the progeny obtained from the 2007 mating. As can be seen, some farmers have much more does of a particular color in the nucleus (for example Sulaimon Umarov has 22 white and 4 black does). Of course if management allows, two nucleuses can be run (white and black).

In order to simplify the field work and to send a clear message to the farmer on what is expected we suggest concentrating on only one nucleus (color) per participating farmer. The technical team has identified at least two clear cases for excellent white and black Mohair nucleus amongst interested farmers (Photo 4).

Photo 4: Largely white does in the nucleus of Mr Sulaimon Umarov and Mr Turgunboi Madaliev (top row) and largely black does in the nucleus of Mr Mamarasulov Suyunboi (bottom left). Mr Abdunazar Matazimov and his wife proudly show two excellent solid black Tajik Angoras.

Breeding objective

Within a color, the original breeding objective for all farms was to improve fleece weights and to improve mohair quality without loosing body weight and fitness. Improvement of Mohair quality refers to increasing staple length, reducing contamination (medullated fibers and kemp) and improving style, character and luster.

Last year, reduction in fiber diameter was strongly suggested but farmer's decision was left open since the present Russia-orientated market prefers strong fibers whereas international markets clearly prefer fine Mohair. The point has been discussed in detail last year and this year again with farmers and within the technical team. It is clear that breeding objective changes will be driven by market signals, in particular Activity 16 is showing that fine Mohair is far more profitable than the present strong Mohair (see report of Dr Liba Brent). Farmer convincement to breed for finer Mohair will need various inputs: tangible market opportunities, farmer's women intervention, future market outlook information, objective data from the technical team, etc. In any case the process of reducing fiber diameter of Tajik Mohair will take time and in the meantime new markets and products are needed in order to improve income from all Mohair types produced.

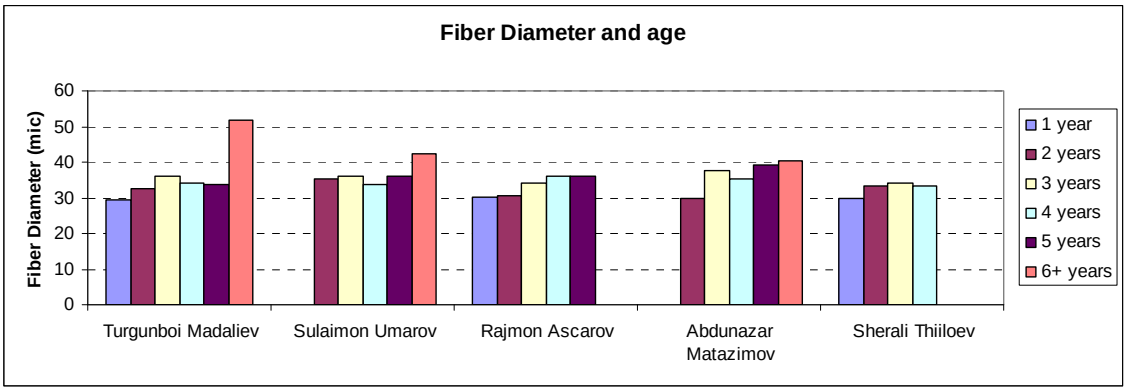
At present the variability in fiber diameter between fleeces is apparently very high (objective information is being processed) and very fine, kemp-free fleeces are available amongst kid fleeces, particularly if shorn early.

Fiber contamination with kemp is another issue not considered in traditional selection practices. Kemp is a problem at all fiber diameter categories and only of interest in some carpet products. High value Mohair should be free of kemp. This breeding objective has been more easily accepted by farmers. However improvement will take time since the amount of kemp observed is quite high in most animals. In Argentina this fault has been largely overcome by using imported Angora bucks or their semen. In about 10 years 90,000 Angoras of 900 farmers reduced kemp percentage from 6% to 1% using Australian Angora bucks in a large scale artificial insemination program. This improvement option needs appropriate skills and organization, not yet readily available in Tajikistan.

Recording

Field records were taken from all five farms. Field records included body weight in autumn, fleece weight, staple length (measured with a ruler) and visual fiber fineness (on the English Bradford scale). Averages for nucleus does per farm and color are shown in Table 9. In addition fleece samples were taken from all animals and sent to the Alrun Wool Laboratory in Almaty, Kazakhstan for analyses. Results are in Table 10 and Figure 1. A sub-sample is being analyzed also in an International Fiber Laboratory located in Bariloche Argentina for cross-checking.

Figure 1: Average Mohair fiber diameter per age and farmer. See increase in diameter with age and see between farmer fiber diameter variability.



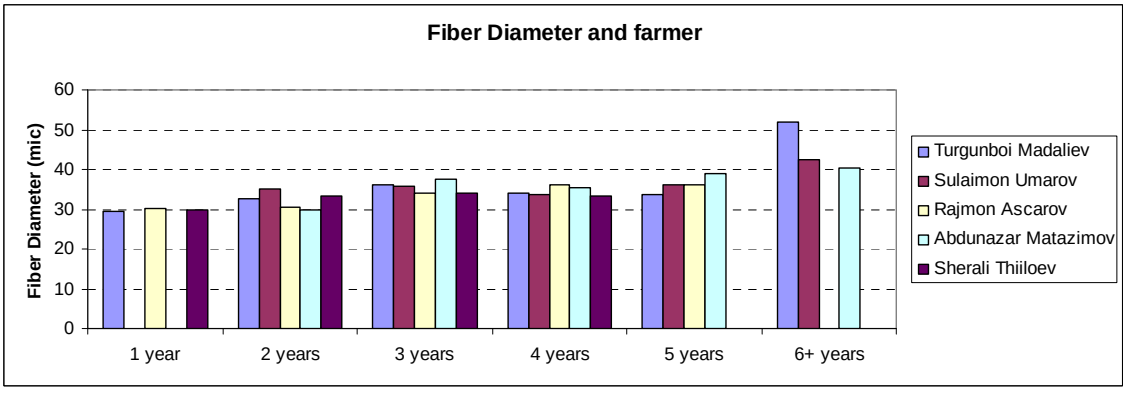


Table 9: Khojand. Animals and average field records per farmer.

Farmer	Goats		Nucleus		Color	Nucleus Progeny		Nucleus Does			
	Total	Does	Does	Bucks		Female	Male	Body Weight Sept 2008 (kg)	Fleece Weight Apr 2008 (kg)	Visual Finesse Apr 2008 (counts)	Staple Length Apr 2008 (cm)
Turgunboi Madaliev	146	90	27	2	white	13	10	31.6	1.90	49.5	21.5
			--	--	colored	--	--	--	--	--	--
Sulaimon Umarov	146	53	22	1	white	8	8	23.2	1.80	52.3	20.3
			4	0	colored	0	0	23.5	1.85	50.8	18.8
Rajmon Ascarov	121	52	11	1	white	4	2	27.7	1.80	49.8	18.1
			8	1	colored	2	1	26.6	1.71	52.0	17.3
Abdunazar Matazimov	314	120	15	1	white	0	2	23.6	1.64	48.6	17.1
			8	1	colored	0	2	21.3	1.26	50.0	17.1
Sherali Thilloev	94	50	8	1	white	1	0	17.9	1.82	49.5	15.9
			13	1	colored	0	0	20.8	1.74	49.0	17.5
Abdufatov Khonaev	80	30	18	1	white	--	--	--	--	--	--
			--	--	colored	--	--	--	--	--	--
Total	901	395	101	7	white	26	22	24.8	1.79	49.9	18.6
			33	3	colored	2	3	23.1	1.64	50.5	17.7

Table 10: Khojand Fiber sample analysis (Alrun Laboratory results). OFDA 4000 results.

Farmer	Sex	Age	n	Fleece sample analyses (OFDA 4000 - Almaty)					Staple lenght (mm)
				Average Fiber Diameter (mic)	SD of Fiber diameter (mic)	CV of Fiber diameter (%)	Confort Factor (%)	Fiber lenght (mm)	
Turgunboi Madaliev	Female	1 year	2	29.3	10.0	33.6	58.4	189.0	154.0
Turgunboi Madaliev	Female	2 years	2	32.6	8.8	25.2	38.5	131.5	158.0
Turgunboi Madaliev	Female	3 years	7	36.2	10.7	29.7	27.3	112.0	207.6
Turgunboi Madaliev	Female	4 years	9	34.0	9.3	28.4	36.0	115.0	191.0
Turgunboi Madaliev	Female	5 years	8	33.8	9.8	29.0	38.8	107.0	197.4
Turgunboi Madaliev	Male	Adult	1	51.8	14.9	28.7	9.6	93.0	178.6
Sulaimon Umarov	Both	6 month	10	23.0	6.8	29.4	86.5	184.6	96.5
Sulaimon Umarov	Female	2 years	6	35.1	9.5	26.9	35.7	109.0	192.1
Sulaimon Umarov	Female	3 years	5	35.9	9.8	25.4	27.0	96.6	199.0
Sulaimon Umarov	Female	4 years	4	33.7	10.5	31.1	39.3	118.0	205.3
Sulaimon Umarov	Female	5 years	2	36.0	10.9	30.1	33.3	117.0	213.4
Sulaimon Umarov	Female	6 years	2	42.4	9.9	23.2	11.9	94.5	229.5
Sulaimon Umarov	Male	Adult	1	43.4	10.8	24.9	9.0	101.0	173.5
Rajmon Ascarov	Female	1 year	2	30.2	9.6	31.9	52.7	116.0	200.3
Rajmon Ascarov	Female	2 years	4	30.6	10.8	35.2	55.9	135.0	170.0
Rajmon Ascarov	Female	3 years	3	34.1	9.3	27.3	35.9	104.0	192.7
Rajmon Ascarov	Female	4 years	5	36.1	9.5	26.5	29.6	102.0	192.7
Rajmon Ascarov	Female	5 years	4	36.2	11.3	31.6	35.5	111.0	203.1
Rajmon Ascarov	Male	Adult	1	50.5	10.4	20.7	4.3	69.0	190.2
Abdunazar Matazimov	Female	2 years	4	29.7	9.5	37.1	55.5	145.0	168.0
Abdunazar Matazimov	Female	3 years	3	37.7	9.8	26.1	24.3	115.0	175.9
Abdunazar Matazimov	Female	4 years	11	35.4	10.4	29.6	35.6	109.0	191.9
Abdunazar Matazimov	Female	5 years	4	39.1	9.9	25.2	20.3	107.0	198.1
Abdunazar Matazimov	Female	6 years	1	40.3	11.4	28.3	20.4	93.0	188.7
Sherali Thilloev	Female	1 year	8	29.8	8.5	28.5	56.0	134.0	169.0
Sherali Thilloev	Female	2 years	8	33.3	9.5	28.3	40.3	121.0	157.8
Sherali Thilloev	Female	3 years	2	34.0	8.4	24.9	34.8	104.0	194.3
Sherali Thilloev	Female	4 years	7	33.4	20.1	29.6	40.1	134.0	174.6
Sherali Thilloev	Male	Adult	1	51.1	8.6	16.9	1.6	68.0	197.3

Selection

Last year a detailed account on selection procedures was given, including visual selection criteria, measurements and final decision criteria. The actual use of these procedures is not clear and probably taken only partially. For example only very few progeny is left from the nucleus does. From 116 nucleus does only 53 kids are available. There are several reasons for this low figure including bad climatic conditions (cold winter and dry summer 2008) which limited reproduction and survival but also heavy culling has taken place before performance data became available. First shearing will be in April 2009 and selection pressure on measured performance will be very low.

This point has been discussed and needs further discussion. If selection takes place without consideration of objective performance then there is no point in measurement and fleece sampling. Genetic progress will be slower than actually possible (about 50% slower). Use of preset selection criteria (measurements and visual) is useful for systematic selection, analysis of progress and for uniform extension work.

Control flocks

This activity has also control flocks. Originally 13 flocks were selected, though data collection became very demanding. It was proposed to concentrate on only 7 control flocks (about the same number as "treated" flocks), those with good information. The control flocks belong to Abduvohid Mamatkulov, Abduvahod Uskanov, Abdurahmon Hayitmatov, Boir Parpiev, Abdumalik Khanaev, Komil Mamatkulov y Ravshan Dushaboev.

Training needs

Last year a formal training in mohair genetic improvement and selection was proposed, this year a short training in use of Excel spreadsheets and basic statistical analyses is also proposed.

Khojand Work plan November 2008 – November 2009

Mating and kidding:

Mating has already started in October and kidding is expected for March-April 2009. Promising male kids born from nucleus does (visually superior and born from best females) should be kept un-castrated. These males and the female kids will be ear tagged or tattooed. In fact as many male-kids as possible will be kept un-castrated in order to increase selection pressure.

Shearing:

At shearing in May 2009, fleece weights and fleece samples will be taken from nucleus females, bucks and 2008-born progeny. As in the previous year fleece weights will be recorded by weighing the whole fleece using scales with at least 0.05 kg accuracy. Sampling site is the region of the middle of third last rib. At least 20 grams from each

animal should be removed by shearing at skin level. The fleece sample will be sent to the Alrun Wool Lab in Almaty for analyses. Average fiber diameter, its Coefficient of Variation (CV) and Standard Deviation (SD), comfort factor (percent of fibers below 30 microns) and medullation will be determined.

Selection of replacement does and bucks:

Before mating in October 2009, young (2008-born) females and males as well as all adult does and bucks of the nucleus established in 2007 will be evaluated on measured and visual performance. Thus, four age-sex categories of animals will be evaluated independently: 2008-born males, 2008-born females, adult bucks and adult does.

By October 2009 the following measured performance records will be available for each category of animals:

- Body weight taken at the end of summer grazing in September-October 2009
- Fleece weight taken at shearing in May 2009
- Analysis of fleece sample taken at shearing in May 2009

Animals within each color group and age-sex category will be ranked and those with high body weight, high fleece weight and those with low average fiber diameter, CV, SD, Comfort Factor and Medullation will be identified as "superior" in overall measured traits. Conversely, bad performing animals in all these traits will be identified as "inferior" and others will be identified as "average". There is no pre-conceived weighing factor for each measured trait and the classer will have to apply his own criterion and knowledge to reach the overall measurement class. Typically 25% of animals should be classed as superior, 50% as average and 25% as inferior in overall measurement.

Similarly animals within each color group and age-sex category will be thoroughly inspected considering visual traits as described in last years report (Mueller 2007). Visual inspection ends with an overall visual class of each animal, based on weighted consideration of all visually assessed traits. Again three classes are possible: Superior animals, Average animals and Inferior animals. A similar 25:50:25 proportion of classes is also suggested.

Final selection will be based on both measured performance and visual performance, the decision depending on sex and number of candidates in each class.

The Work plan is summarized in Table 11.

Table 11: Khojand. Work calendar November 2008 – October 2009).

Date	Id	Activity
Oct 2008	1	*Grazing.* All animals returned from summer pastures
Oct 2008	2	*Selection.* Young and adult females are selected and ear-tagged for establishment of the nucleus.
Oct 2008	3	*Mating* starts October 20 and finishes after about 45 days. Wherever possible sire-dam mates are recorded.
Nov-Apr 2008	4	Winter feeding

March 2009	5	*Kidding* starts about 15th March. Kids are ear-tagged and dams of kids are identified
May 2009	6	At *marking* (and/or castration) promising male kids are kept un-castrated.
May 2009	7	*Shearing.* All adults and 2008 born kids are shorn. For all nucleus animals fleece weights are taken and fleece samples sent to Wool Lab.
May – Sep 2009	8	*Grazing* in summer pastures.
Oct 2009	8	Goats return from summer grazing.
Oct 2009	9	Results of Mohair sample analyses are returned from Wool Lab and are now available to substantiate selection of animals.
Oct 2009	10	A workshop on Mohair selection is recommended.
Oct 2009	11	*Visual assessment* of all animals in the nucleus including 2007 born male (un-castrated) and female kids. Staple length will be assessed with a ruler at the mid-side sampling site.
Oct 2009	12	*Selection.* Based on visual assessment and measured performance nucleus females and replacements are selected (or re-selected) and ear-tagged.
Oct 2009	13	*Mating.* Best bucks and selected females are mated in the two color groups.

Final Comments

An interesting finding is that farmers of the three breeding plans have very different background. The Akbeket farmers have no farming background and work with sheep only recently, therefore their knowledge is scarce but they are also very open to suggestions and have intention to work as a group. The Tokmok and Khojand farmers have more experience but are not used to work together, partly because of the distances between them. This poses some difficulties. For example it is difficult to organize a functional breeding structure and share genetic material if farmers have not developed confidence to each other. Several measures can be put in place to overcome this problem: for example taking farmers to visit other farmers during data collection, organizing small technical discussions for all participants, exchanging information to wake interest for mutual visits, etc.

After the first year of data collection, valuable information is already accumulating as can be seen in the attached 3 Excel files which show an extract of more comprehensive information already available and processed by the local scientists. Clearly there is a need for more careful data recording and analyses and several steps have been taken to achieve this. Documentation of the experience is very important because the information and experience gathered in the three breeding plans are unique in the region and will be extremely useful in the design and implementation of future breeding plans.

References

Brent L. 2008. Report on ICARDA Project "Community Action in Integrated and Market Oriented Feed-Livestock Production in Central and South Asia". Activity 16: "Value added local processing of goat fibers by women and assessing the characteristics of naturally colored mohair and the potentials for its marketing", June 23, 33 pp.

Mueller JP. 2007. Report on ICARDA Project "Community Action in Integrated and Market Oriented Feed-Livestock Production in Central and South Asia". Activities 11, 14 and 15: "The basis for decentralized and participatory breeding plans for farmers to access improved animals in Kyrgyzstan and Tajikistan", October 7, 19 pp.

Acknowledgements

Many thanks to the ICARDA project teams in Kyrgyzstan and Tajikistan and staff of the ICARDA CAC Regional Office in Tashkent. In particular I like to thank Kudaibergen Abdykerimov and Asambek Ajibekov in Kyrgyzstan and Matazim Kosimov in Tajikistan for their substantial work and ideas for the improvement of the ongoing breeding plans. Thanks also go to Dr. Rysbek Nurgaziev Director of the Kyrgyz Veterinary Research Institute for his support and interest in the project. Collaboration and inputs of Liba Brent are also sincerely thanked for. I want to express my gratitude to Habib Hamdamov for logistics, translation and assistance. I appreciate very much the work and enthusiasm of the new generation of researchers: Kubanychbek and Nasambek Kudaibergen and Farhod and Alisher Kosimov. As happened last year the hospitality of the Kyrgyz and Tajik farmers has been great. It is a pleasure to work with such enthusiastic farmers and research people. Finally I would like to thank Barbara Rischkowsky and Luis Iñiguez for the opportunity given to me to contribute to the project.

Terms of Reference

- Based on visits to the communities of participant farmers along with scientists involved, supervise the implementation of activities during the year 2008/2009 in accordance to the agreed plans, assessing problems presented and changes made to the action plan.
- Discuss and agree with the communities of farmers and scientists involved a plan of action for the year to come, identifying gaps and measures to be taken.
- Agree with the scientists involved on a realistic timetable to be followed to secure the implementation of the plan.
- Prepare a report and present it in Aleppo in your way back to the Project Coordinator and finalize the report in discussion with Luis Iñiguez.

ANNEX: General Itinerary Field work 28/10/08 - 14/11/08

1. At the Kyrgyz Veterinary Research Institute in Bishkek the program was discussed. General development of Activities 11 and 14 were discussed with senior staff of the Institute including its director Nurgaziev Zaryldykovich, deputy director Kudaibergen Abdykerimov and the director of the Kyrgyz Livestock Research Institute Asambek Ajibekov and Livestock PO of the Tashkent ICARDA Office Habibulo Hamdamov (who was also translator throughout the field work).

2. A meeting was held with the Akbeket community farmers in the village of Kyzyl-Oktybar in order to discuss the progress of the breeding plan. Animals of the 5 involved farmers were inspected. In particular the Aikol rams and its progeny. Fodder reserves were observed in each case.

3. The nucleus flock of the Tokmok dairy breeding group located some 50 km from Tokmok was visited together with its owner Mr Nurgan. Animals were inspected and activities discussed. In Alymseyt the site of Activity 9 was also visited and animals inspected.

4. In Bishkek further discussions with scientists (Kudaibergen, Nasambek and Kubanychbek Abdykerimov) were held in order to improve data quality and assess reasons for changes in original workplan and a final discussion on general issues of the project activities in Kyrgyzstan were held with Nurgaziev Zaryldykovich, Kudaibergen Abdykerimov and Asambek Ajibekov.

5. In Khujand Activity 15 was discussed with Dr Liba Brent and Matazim Kosimov from the Sughd Branch of the Tajik Livestock Research Institute assisted by Farhod and Alisher Kosimov. Genetic and statistical principles as well as some software tools useful for analysis of collected data were explained to the young researchers.

6. About 7 farmers in two distinct regions were visited, flocks inspected and breeding plan discussed.

7. In Tashkent all collected information was processed, additional information was requested and a draft report was prepared.

8. In Aleppo the draft report was discussed with the PI of the project and a presentation on “Participatory Small Ruminant Breeding Schemes” was held.

9. Discussions in relation to the report contents were followed up with Luis Iñiguez after leaving Central Asia.

ANNEX: Excel files Akbeket 2008 and Tokmok 2008