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

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I Introduction

This report covers the period from 1 July-31 December 2007 and relates to the first six months in the second annual workplan (1 July 2007 to December 2008).

The second annual workplan specified detailed activities for each region, each research theme and country/project site. The section on project implementation and achievements (II) in this progress report is organized accordingly by region, themes and countries. Regional activities are reported separately. The report is based on progress reports by the national teams that included some preliminary descriptive results. A technical report summarizing the results from the socioeconomic surveys undertaken in the first 18 months is in preparation by Aden Aw-Hassan and Nariman Nishanov. In addition an updated report on activity 16 "Value added local processing of goat fibres by women and assessing the characteristics of naturally coloured mohair and the potentials for its marketing" was prepared by Liba Brent (University of Madison, Wisconsin), including her mission to Khojand from 7 September to 16 October and her work with the knitter societies in the USA.

In brief the major activities in the six months included:

- First annual national workshops in four countries in August and September 2007
- Regional workshop and first SCM on project planning and implementation in Central Asia and Pakistan in Kyrgyzstan on 11-13 September 2007
- Employment of the third PO, Dr. Habibulo Hamdamov, for Theme 3
- Selection of Master and PhD students in CA and Pakistan contributing to project activities
- Selection of candidates and initiation of English training in Tashkent and Dushanbe
- Development of a project webpage in English
- Continuation of market studies of sheep and goat products and value chain analysis
- Planning workshop on socioeconomic methodology and evaluation of interventions in livestock productivity for Central Asia from 26-30 November 2007 in Tashkent with participation of socioeconomic supervisor from Pakistan
- Development of the sampling frame and the questionnaires for the baseline study in CA and Pakistan
- Preparation and start of field experiments under Themes 2 and 3 in CA
- Second cultivation cycle of winter crops (improved varieties and agronomic measures) in Pakistan
- Feeding experiments with cattle and buffalos in Pakistan

II Project Implementation and Achievements

1 Central Asia

1.1 Theme 1: Socioeconomics

The activities under this theme were carried out as planned. There was a small delay in finalizing the sampling frame and the questionnaires for the multi-theme surveys to be conducted in 2008. The approach taken was to discuss the methodology intensively with all partners during a regional workshop in November 2008 (see under regional activities). In this workshop the sampling frames were clarified and a first draft of questionnaires produced.

Kazakhstan

1.1.1 Analysis of rural livelihoods

- Analysis of household income obtained from selling of the weaned lambs and fattening of animals and rural livelihoods analyzed for one year cycle were prepared for different types of producers based on their access to natural grazing lands.
- The cost of animal feeding was evaluated in the fall period during the mating period.
- The dynamics of Karakul lambs and fat-tailed lamb prices reported by households were monitored from July to December 2007.

1.1.2 Analysis of lamb markets and farmers market access

- Prices of mature animals and lambs of karakul and fat-tailed sheep breeds at different markets (local, Arys and Shymkent) were recorded from January to December in 2007.
- The retail values of fattened lambs were decomposed value along the marketing chain.

Kyrgyzstan

1.1.3 Analysis of lamb markets and farmers market access

Completion of the market description:

- Average prices of mutton and 2-year old coarse wool lamb prices at different markets (Kemin, Tokmok, Bishkek 1, and Bishkek 2) during January-December 2007 were obtained and analyzed.
- The structure of lamb market value chain has been clarified and described.
- The gross margins (and prices) of different market agents along the value chain were computed.

Tajikistan-Khojand

1.1.4 Analysis of rural livelihoods

Developing the sampling frame for producers and traders formal survey:

- Factors including geographical territory, farm household typologies, farm organization type, mountain ecology, and distance were used to determination the list of villages for stratified sampling for the formal socioeconomic survey. Lists of households in these villages were listed for sampling. Small ruminant populations were obtained.

1.1.5 Analysis of mohair markets and farmers market access

Completion of the market description:

- The shares of mohair fiber trade (local and export) are decomposed by destined markets, with Russia being the dominant market with 40% of the trade and the domestic market being the second largest with 30% of the traded volume.

Tajikistan-Dushanbe

1.1.6 Analysis of lamb markets and farmers market access

Completion of the market description:

- The market agents along the value chain including individual wholesale buyers, wholesale agents, dealers at the regional level and their procurement practices and margins are described.
- The structure of the sheep market value chain is described and mapped.

Analysis of the market prices for agricultural animals over the past 10 years:

- Livestock market prices from 1996 to 2007 for lambs and calves in Dushanbe market are collected and presented.

Multi-market livestock price data analysis:

- Prices of different markets ate compared and significant prices differences between rural and urban markets are estimated. Whether these differences are due to transaction and transportation costs or market inefficiency due to segmentation will be clarified.

1.2 Theme 2: Range and Forage Productivity

1.2.1 Assessment of current status of fodder crop production and Assessment of feed resources and feeding calendar (first annual workplan)

These two activities were listed in the first annual workplan as part of the methodology to be used for Activity 4 “Participatory evaluation and dissemination of improved fodder crops and agronomic packages to increase the feed resource base” and of Activity 5 “Promoting efficient use of fodder crops, crop residues and agro-industrial by-products for increased meat and milk”. The assessment was originally planned for the first project year but had been postponed to the second year.

A questionnaire for a comprehensive survey on feeding strategies and forage production was developed and translated into Russian and distributed to the partners in the three countries by the end September 2007. The survey was initiated in Kazakhstan in mid October 2007, in Kyrgyzstan in the beginning of November and in Tajikistan at the end of November in each country. The objectives of the feed survey were to document current feeding strategies, to assess the current status of forage production and to identify the major constraints limiting forage production in the households. Three villages were selected in each country, these are namely: Akdala, Dermene and Akbulak in Kazakhstan, Ak-beket, Progress, Komsomolskiy in Kyrgyzstan, Buzbit, Nematabad, and Obi Sangbur in Dushanbe/Tajikistan, Uyas, Karajingil and Ispisor in Khujand/Tajikistan.

The aim is to interview about thirty farms and households in each village including those participating in the project and neighboring households. Till December 2007 about 60 households were interviewed in each country. We plan to finalize data collection at the end of May.

Kazakhstan

1.2.2 Activity 4: Participatory evaluation and dissemination of improved fodder crops and agronomic packages to increase the feed resource base

The outputs from this activity are expected for 2008 or 2009.

Activity 4.1: Community action for improving the carrying capacity of degraded rangelands around settlements

Activity 4.1.1 Effect of oversowing on productivity of degraded rangeland

In Kazakhstan sites in the ephemeral and wormwood-ephemeral types of the pastures of two medium scale farms were selected and data on the status of the vegetation, yield were collected in monthly interval. The data showed that the productivity of the pastures was quite low.

In September and October, a mission was organized to the central part of Kazakhstan to collect seeds from indigenous range species. About 10 kg seeds were collected from Eurotia, Haloxylon, saltwort

and Kochia. As planned the pasture plots at Kasymbay and Duysen farm were oversown with Haloxylon, Kochia, Eurotia, and saltwort using the appropriate seed rates. However, there was a severe cold in winter and flooding in spring. The agricultural land at the project site in Akdala was completely flooded. Thus, the hayfields need to be replanted by the end of March; a revised experimental design will be applied.

Activity 4.1.2: Effect of continuous and rotational grazing on productivity of natural pastures

The activity is carried out as planned. At the private farms, Kasymbay and Duysen, two 300-ha plots were selected and divided into four plots of 75 ha. The four plots are rotationally grazed by sheep in spring, summer, autumn and winter. In the continuous grazing treatment, 120 sheep graze the entire 75 ha plot during the respective season, while in the rotational grazing system each of the four plots are divided into three subplots, and the sheep rotated among the subplots. The grazing trial was started in May 2007

Before starting the experiment the biomass and botanical composition was measured at the two experimental sites. Biomass was recorded each month from May-December 2007 comparing continuous and rotational grazing scheme. Under rotational grazing the biomass yield on the plots was nearly always higher compared to the continuous grazing system. As expected the yield greatly differed by season. The summer period and beginning of the autumn are critical periods for ephemerous-wormwood pastures of “Duysen” farm; in this period wormwood has large quantity of essential oil and is not very palatable. It is planned to continue the experiment for two years. A first technical report will be produced by end of July after one year.

Activity 4.2: On-farm demonstration of improved fodder production options

To measure the production potential of maize and alfalfa on irrigated land, agronomic practices and yields were recorded on one large farm (Kasymbay) and two small farms (Kojanov Yusup, Ibragimov Oraz). While Kasymbay and Oraz used recommended agronomic practices with regard to planting date, seeding, fertilization rates and harvesting methods, Yusup used local practices (Table 1). The results for maize showed no advantage of the improved agronomic measures used by the household Oraz over Yusup.

Table 1. Seed rate, plant density and yield of alfalfa and corn in the households

Name of farms and households	Area (ha)	Seed rate (kg ha^{-1})	Plant density (unit m^{-2})	Yield (t ha^{-1})		
				3rd cut	4th cut	5th cut
Alfalfa						
Kasymbay farm	10,0	11,0	180,1	100,0	80,0	-
Household Oraz	0,3	10,0	190,0	95,0	93,9	71,5
Corn						
Kasymbay farm	10,0	25,0	5,0	50,0 - 55,0		
Household Oraz	0,3	20,0	4,0	12,0 - 15,0		
Household Yusup	0,3	18,0	3,0	40,0 - 45,0		

To test the effect of different seed rates on wheat production, an experiment was set up on a 0.30 ha field on Erkin Akhmedov’s farm in November 2007. However, so far no evaluation could be done because the field was flooded.

Kyrgyzstan

1.2.3 Activity 4: Participatory evaluation and dissemination of improved fodder crops and agronomic packages to increase the feed resource base

Outputs from this activity are expected at the end of 2008.

Assessment of botanical composition and biomass

The assessment of feed availability from pastures and forage production was continued at the middle sized farms “Alymseyit” and “Kenesh”. Over the period from July to September for Kenesh and till October 2007 for Alymseit, biomass and botanical composition of the natural hayfields were

monitored. At Alymseit the winter pastures were also evaluated. All feed resources from forage/crop production were recorded and compared with the demand of the flocks.

Activity 4.1: Effect of over-sowing on productivity of hay fields and Activity 4.2: Effect of ammonium nitrate fertilization on productivity of hayfields.

The experiments on the effect of oversowing and fertilization on the productivity of hayfields are planned for spring 2008. Land preparation was originally planned for December but was postponed to spring as the conditions were unfavorable in December. The experimental site at Alymseit farm had been already selected in summer and biomass production was measured during harvest in June. In Kyrgyzstan's medium mountain area (1200-2000 m) hayfields are cut only once per vegetation period. The sun-dried biomass yield of the hayfield was 1.2 t ha^{-1}, which was lower than the yield of 1.5 t ha^{-1} measured in previous years due to a relatively low annual precipitation in 2007.

Activity 4.3: Integration of food/feed legumes into cereal cropping systems

The experiments with summer crops (mung bean and pearl millet) will be started after harvest of winter wheat on the farm of Rysbekov Shaken. Winter wheat planting was monitored. Two winter wheat varieties, namely "Kazakhstanskaya-10" and the local winter variety "Qnejs" were planted each on 2 ha. Seeding rate was 280 kg ha^{-1}. First pre-sowing irrigation was provided, then the field was ploughed, leveled, and planted with a seeder (STZ-3.6 Russian made model).
Seeds for 1 ha from the maize variety "Manas" were prepared in October 2007 to be used in comparison with pearl millet from ICRISAT.
To demonstrate the potential of intercropping, alfalfa was planted as intercrop in a 4 ha barley field belonging to Rysbekov Shaken end spring 2007. The grain yield of barley was 2.5 t ha^{-1}. After barley harvest the field was watered two times and alfalfa was cut once, dry biomass was 3.5 t ha^{-1}.

1.2.4 Activity 5: Promoting efficient use of fodder crops, crop residues and agro-industrial by-products for increased meat and milk

One expected output was a training course on balanced feeding rations for participating households in November 2007 that was conducted as planned (see Theme 4). The other expected output on the development of feeding systems is planned for October 2008.

Types and volume of forages for the winter period (incl. nontraditional forages and agro-industrial by-products) were recorded on two medium scale farms and in some selected households in Akbeket villages. The main crop by-products used are cereals' straw and maize stems. In addition hay is produced from perennial and natural grasses. To improve the efficiency of using these forages, chopping of straw, coarse-stalked hay, and maize stems is being recommended to the households. For this purpose a multi-propose chopper was installed in one household to be used by the community. The chopper has three different screens (6 mm, 7 mm, 18 mm) to chop hay, straw and maize stems for sheep and for cattle. 5 to 12 bales of hay and straw (about 75-180 kg), 100 kg maize stem or 350 kg grain can be chopped per hour.

10 households in the village Akbeket will jointly use the chopper:

1. Mambetaliev Joldosh: 3 ha land (alfalfa), 3 cows, 3 calves, 6 sheep.
2. Moldaliev Talant: 4 ha land, 2 cows, 2 calves, 10 sheep.
3. Ryspekov Shaken: 5.1 ha land (alfalfa and esparsette), 4 cows, 2 calves, 2 bulls, 28 sheep.
4. Moldoshev Askar: 0.85 ha land (alfalfa), 1 cow, 1 calf, 10 sheep.
5. Jamakeev Beyshembek: 1 ha barley and 1.5 ha alfalfa.
6. Abdraliev Choro: 3.4 ha land (1 ha sugar beet, 1.5 ha barley, 1.0 ha alfalfa).
7. Toktomambetov Bekin: 6.0 ha of land (4 ha alfalfa, 1 ha wheat, 1 ha barley), 30 sheep, 10 goats.
8. Moldoshev Sashka: 10 ha land (barley, 1 ha sugar beet, 2.5 ha alfalfa) 7 heads of cattle.
9. Borgoev Tobokel: 6 ha land (alfalfa), 28 sheep, 2 heads of cattle.
10. Omorov Aman: 5 ha land (alfalfa), 4 heads of cattle, 32 heads of sheep.

Households were selected to test the effect of chopping on animal performance. The feeding experiment was postponed to January 2008. As there was no snow cover, the sheep continued to graze on the pastures to save the prepared forages.

On the medium scale farms alfalfa, natural hay, barley and wheat straw, maize stems, concentrates (mainly barley) are available to feed the sheep during the winter period 2007/2008. A fattening experiment is planned at the farm Alimseyit in January-February to market them in March.

Tajikistan, Sogd province, Khujand site

1.2.4 Activity 4: Participatory evaluation and dissemination of improved fodder crops and agronomic packages to increase the feed resource base

It was expected to develop a more detailed workplan during Aziz Nurbekov's visit at ICARDA under the guidance of Asamoah Larbi. This revised workplan is currently finalized.

Activity 4.1: Integration of fodder crops into plant production systems and crop rotations

The biomass yields of alfalfa planted in the previous year (2006) were recorded on the households' fields. The alfalfa variety Vakhsh-300 (the only registered alfalfa variety in Khojand province) was planted in a number of farms in Karajingil and Uyas (Haitmatova Tolibdzon - 0.05 ha, Haitmatov Abdurakhman – 0.04 ha, Akramov Usmonali – 0.07 ha, Kholmirzaev Abdukholik – 0.06 ha from village Karajingil, Mamadkulov Komil – 0.03 ha, Parpiev Boir – 0.03 ha and Khudayberdiev Burkhon – 0.02 ha from village Uyas). Compared to the annual precipitation in the last ten years it is important to note that there was a severe drought in 2007 throughout the country. No drop of rain fell from the end of spring till end of autumn. This influenced pasture productivity and crop yields not only under rainfed but also under irrigated conditions, where water is sourced from spring and medium size canals. Thus, the alfalfa yield was not very good, some farmers did not even harvest anything. However, the households obtained some knowledge about improved agronomic practices.

Because of the drought there was no chance to experiment with winter cereals and intercropped forage crops. The forage crops to be considered for planting in spring 2008 were identified and will include corn, sorghum, pearl millet, soybean and sainfoin. Seeds have been already prepared

Activity 4.2: Community action on improving productivity of degraded pastures close to the villages

First the pastures around the project village Takli were studied. The relief, plant composition of the pastures, and climatic conditions of the locality are typical for breeding mohair goats in Sogdian province. Lower Takli pasture is located nearby settlements and used by many goat flocks. Upper Takli pasture is located in the heart of the valley and is surrounded by mountains. Both sites have approximately equal size of autumn-winter pasture area (80-110 ha). The yield of palatable dry biomass of the pastures ranges from 0.05-0.3 t ha^{-1} depending on the distance to the goat farms and altitude. Plant cover was very low (20-30%) in the upper Takli village's pasture. It was composed of wormwood bushels, namely *Aellenia subaphylla* and *Girgensohnia oppositiflora*.

The upper Takli site was selected to rehabilitate the degraded rangeland. Four hectares of pasture belonging to five households were selected and divided into two equal sites (each 2 ha), to test improvement and control. It was planned to plant mid of December when the rainfall starts. However, due to the very cold winter planting had to be postponed to end February 2008. Persian clover, saltwort and a mix of Persian clover and saltwort will be planted and compared to natural pastures. The experiment was designed according to the method which was published during the former Soviet Union period. The pastures will be grazed in fall when the goats will return from summer pasture.

A second experiment to test the effect of nitrogen application will be conducted when the vegetation period starts.

Tajikistan, Vahdat district, Dushanbe site

1.2.6 Activity 4: Participatory evaluation and distribution of improved fodder crops and agronomic packages to increase fodder resource base.

Outputs from this activity are expected at the end of 2008.

Activity 4.1: Improving carrying capacity of degraded rangelands and hay pastures.

A trial was conducted to demonstrate options for pasture rehabilitation near the settlements Nematabad and Karsang in Majid Makhmudov's pasture land. The pasture land is located on high arid zone of western part of mountain Surkho. The rangeland is sloped to the western direction. The demonstration trial is conducted on North-Eastern (North-Eastern) descending slopes with 12 degree. Vegetation is grassland semi-savannah, *Hordeum bulbosum* plant association with ephemeral vegetation. The monitoring of the pasture showed that the pasture is highly degraded and its productivity 5-10 times lower than normal vegetation grass.

Sainfoin (*Onobrychis sativa*) was chosen to improve the pasture condition. Experimental trials with sainfoin started on rainfed areas of sub-mountains and medium-mountains zones in 1961. Sainfoin is a drought and frost resistant crop and produces a higher biomass than alfalfa (*Medicago sativa*) under the local conditions.

Sainfoin was planted on 4 April 2007 on a 50 m^2 demonstration plot (5x10 m) by hand at the seed rate of 70 kg ha^{-1}. The sainfoin seedlings started to germinate on 16 April 2007. At the 1-2 leave-stage the plant height ranged from 2.5-3.0 cm. In the first year sainfoin produces comparatively low yield as it is developing its powerful root system. The dry biomass yield of the hayfield was 1820 kg, out of which 1296 kg ha^{-1} was sainfoin (Table 2). Average plant height was 19.3 cm, while the leave number was 6.6, the lower leaves were dry.

Table 2. Sainfoin yield in the first year life cycle, Nematbad, 8.07.2007

Botanical composition	Dry mass yield, kg ha^{-1}				%
	1	2	3	Average	
Sainfoin	1232	1256	1400	1296	71,2
Other pasture species (*Avena fatua, Centaurea squarosa, Convolvulus arvensis and others*)	624	540	408	524	28,8
Total	1856	1796	1808	1820	100

Activity 4.2: Effect of nitrogen fertilization on productivity of hay fields

At the same pasture site the effect of nitrogen application on the harvest from hayfields was tested. Nitrogen was applied at the rate 60 kg ha^{-1} by hand during spring (4 April 2007). The yields from the improved and control hayfield were also compared to open grazing pasture. The biomass on open rangeland yield is 3-6.5 times lower than on protected hayfields (Table 3). On 6 June 2007 the dry biomass on open rangelands was 400 kg ha^{-1} while on untreated hayfields it was 2558 kg ha^{-1}. With application of 60 kg N ha^{-1} the yield of the *Hordeum bulbosum* plant association increased to 5578 kg dry biomass ha^{-1}. Nitrogen application improved plant cover, and the plant height of the main hayfield species increased 1.5-2 times.

Table 3. Seasonal yield dynamics *Hordeum bulbosum* – ephemeral vegetation community

Pasture type	Date	Dry mass yield (kg ha^{-1})		
		Open pasture	Hayfield	
			Control	N_{60}
Hordeum bulbosum with ephemeral vegetation (*Hordeum bulbosum, Avena fatua, Cynodon dactylon, Vicia hyrcanica, Alhagi kirghisorum, Origanum tyttanthum*)	4/04	*	228	(228)
	16/04	103	364	625
	5/05	288	943	2038
	9/06	400	2558	5578
	8/07	505	*	*
	15/08	365	*	*
	12/10	450	*	*
	16/11	365	*	*

*no data

The botanical composition changed in favor of *Hordeum bulbosium* L. which increased from 56 to 72% in the dry biomass (Table 4). The share of oat (*Avena fatua*) decreased from 26.8 (control) to 11.9% (with nitrogen application). Nitrogen application increased the dry biomass yield of *Hordeum*

bulbosium from 1439 kg in the control to 4008 kg ha^{-1} (2.8 times). The nutritional quality of the hay was not affected by the nitrogen application. The demonstration trials with nitrogen fertilizer will be continued in 2008.

Table 4. Effect of nitrogen application on biomass and botanical composition of a *Hordeum bulbosium* hayfield

Plant species	Control		$N\ application_{60}$	
	kg ha^{-1}	%	kg ha^{-1}	%
Hordeum bulbosum	1439	56,4	4008	71,9
Avena fatua	686	26,8	664	11,9
Cynodon dactylon	276	10,8	425	7,6
Vicia hyrcanica	22	0,9	0	0
Alhagi kirghisorum	82	3,2	184	3,3
Galium pamiroalaicum	23	0,9	254	4,6
Turgenia latifolia	15	0,6	0	0
Origanum tyttanthum	10	0,4	18	0,3
Plantago lanceolata	05	0,2	0	0
Crupina vulgaris	0	0	25	0,4
Total	2558	100	5578	100

Activity 4.3: Integration of legumes into cereal cropping systems

The area of village rangelands is limited, the plant cover is highly degraded and yield is low due to overgrazing. A considerable part of forage has to be produced on the irrigated croplands. The farmers in Vakhdat district cultivate vegetable and cereal crops (wheat and rice). They grow alfalfa for hay, maize for grain and fodder. Presently farmers increase the area of forage crops, especially alfalfa. After continuous cultivation of the cereal crops (wheat) the soil fertility has decreased and farmers are searching for option to increase soil fertility in the irrigated land, and forages have a good market potential. However, the yield of fodder crops on irrigated and rainfed fields is low due to lack of knowledge of best agronomic practices for growing fodder.

Some farmers in Dusti jamoat plant Asian bean or mung bean (*Phaseolus aureus)* as a stubble crop after harvesting winter wheat or barley. Mung bean is an excellent stubble crop due to its short vegetation period of 70-100 days and heat tolerance. In 2007 a pilot experiment was conducted on a 1 ha irrigated field of the farmer M. Makhmudov in the village Karsang. Mung bean, an improved variety from the Tajik Research Institute of Farming, was planted on 0.5 ha after winter wheat, while the other half of the field was left fallow. The winter wheat harvest was 3700 kg grain and 3000 kg straw ha^{-1} on both plots. On the 0.5 ha planted with Mung beans 600 kg beans and 1100 kg straw were harvested. The farmers consider Mung bean straw as an excellent fodder for the Gissar sheep. A systematic experiment will be conducted in summer 2008 to test sowing Mung beans at different seed rates in farmers' fields after winter wheat. The farmers' fields have been selected and are currently cultivated with wheat.

Three farmers (R. Azizov, M. Makhmudov, K. Nematov) in Nematbat village planted alfalfa on 0.35-0.5 ha in September 2007. These fields will be used to evaluate the yield response to ammophos fertilizers. Ammophos fertilizer can play an important role to increase the yield of alfalfa when N-fixation is inadequate. Ammophos fertilizers generally are applied by broadcasting method. Ammophos was applied to the alfalfa fields by hand at a rate of 40 and 60 kg ha^{-1} in February or March 2008. It should be noted that alfalfa field performance was good at the three selected households.

1.3 Theme 3: Improvement livestock productivity

Kazakhstan

1.3.1 Activity 6: Early lambing for targeting lamb sale during Navruz (March) involving a genotype comparison in household flocks

The expected output for 2007 was the training of farmers in managing ewes and lambs (feeding, housing) in October 2007. This was not done as a formal training but as an on the job training of participating farmers.

The activity was carried out according to the workplan. The main activities included:

- Preparation of rams to mating (Table 1)
- Preparation of ewes for the insemination
- carried out traditional insemination
- Monitoring of the physiological state of ewes
- Feeding rations for ewes in the gestation period
- Feeding rations of ewes in the lactation period
- Development of technology of winter lambing
- Development of technology of care of ewes and lambs after lambing
- Development of technology of the raising of lambs in winter.

All ewes were ear-tagged before mating; additionally the early mating ewes were marked by paint on the head and the ewes in the control group on the withers. All data are collected for individual ewes. Before mating ewes were weighed, and control weighing of early lambed ewes will be started within two weeks after lambing and then continued at monthly intervals. The dates of mating were recorded (Table 5). The early lambing takes place in January and the control group is expected to lamb in March.

Table 5. Information on the mating/artificial insemination of the ewes in 2007

Households	Karakul sheep		Fat-tailed sheep	
	early	traditional	early	traditional
Farm “Kasimbay”	43	57	48	52
Household “Abdukarim K.”			17	23
Household “Ergesh”	4	6	8	12
Household “Andas”	9	11	6	4

Preparation of rams for mating

The rams, utilized for the mating and the artificial insemination were kept in a separate group. The same rams were used for early and traditional mating. In summer rams were kept on good pastures and grazed early in the morning, during the second-half of day and late in the evening about 3.5-5.5 hours a day consuming about 0.5-1.0 kg fodder from the pasture.

Supplemental feeding of rams started 40 days before mating and lasted 25 days during mating period. Each ram was fed with 1.0 kg fresh cut grass, 300-400 g carrots –, 0.5-1.0 kg fodder beets and 0.5-0.6 kg concentrates per day. The concentrate mixture consisted of 78% grains, 8% stern hydrolytic yeast and meat-bone flour, 4% cotton cake, 1% defluorinated Karatau phosphate and common salt. The condition of rams utilized during the mating/AI should be above average. Only rams with a sperm density above 8.0 at the beginning of the artificial insemination period were used.

Preparation of ewes for the insemination

The preparation of ewes for mating began 4-5 weeks prior to mating. It was estimated that the pasture supplied about 2.1 kg air dried feed per ewe. In addition 0.5-0.6 kg chopped barley was provided to ewes in the improved and control groups in the households “Abdukarim”, “Ergesh”, “Andas”. The feed was bought by the project (in total 400 USD). The farmer Kasymbay fed his ewes independently with pasture fodder and chopped barley (0.5 kg for ewes and 1.0 kg for rams). All prices of feeds were recorded.

Feeding of ewes in the gestation period

In the first half of the gestation the ewes received about 3.0-3.3 kg air dried pasture fodder and 0.5-0.6 kg concentrates consisting of 47.5% barley, 50% ear of corn, 0.4% carbamide, 1.9% defluorinated phosphate, and 1.2% common salt.

Monitoring of the physiological state of the ewes

A continuous monitoring of animal health of the animals is being carried out and sick animals are treated.

An additional study examines the physiological state of ewes: at an external temperature of 18.5ºC (at noon) the body temperature of Karakul sheep was 39.1ºC, the frequency of pulse per minute 60.7, respiratory rate 30 per minute, while the coarse wool fat tail sheep showed values of 39.0ºC, 68.0 per min, and 28.0 per min, respectively. Also the quantity of erythrocytes in the blood in Karakul and fat-tailed ewes was monitored over the four seasons of the year (Table 6). In the winter period the highest quantity of erythrocytes was observed in the ewes of fat-tailed species (12.5 mln/mkl) and the smallest quantity in the ewes of Bukhara sur type (11.1 mln/mkl). The content of erythrocytes in blood of the ewes of other colors was within the normal range (11.5-11.8 mln/mkl).

Table 6. Quantity of erythrocytes in the blood of the Karakul and fat-tailed sheep

Bree and color of sheep	Quantity of erythrocytes (mln/mkl)			
	Winter	Spring	Summer	Autumn
Karakul black color	11.5±0.18	16.9±0.76	17.8±0.56	14.3±0.43
Karakul grey color	11.8±0.35	16.2±0.63	17.4±0.61	13.7±0.39
Bukhara sur	11.1±0.42	14.8±0.62	15.6±0.76	13.5±0.64
Fat-tailed	12.5±0.43	16.7±1.01	17.7±0.56	14.0±1.32

1.3.2 Activity 7: Early weaning and fattening (Nagul) of lambs for lamb marketing and milking of early weaned ewes for value addition in household flocks

The expected output for 2007 was the training of farmers in creep feeding of lambs for early weaning in December 2007. This training was conducted on 16 October 2007 (see Theme 4).

This activity is not directly linked to early lambing as the lambs from Activity 6 will be sold during Navruz. Thus, for the early weaning experiment additional groups of lambs were needed (improved and control). These lambs will be obtained from artificial insemination carried out on the farms Kasymbay and Abdukarim in October 2007 (Table 7). For the purpose of increased fertility artificial insemination was continued during two sexual cycles. At the end of the season of artificial insemination the ewes were released to ram for 20 days for covering ewe that did not conceive. Liveweights and pedigree of the individual ewes were recorded.

At the same time the farmers were informed about some major advantages of artificial insemination, which include:

- artificial insemination makes it possible to obtain more offspring from good rams and/or fewer rams are needed;
- it allows to dilute, preserve and to transport sperm;
- it allows more efficient organization of mating and breeding;
- it prevents the spread of the diseases transmitted during mating of animals.

Table 7. Artificial insemination of ewes in October 2007

Households	Karakul sheep		Fat-tailed sheep	
	early	traditional	early	traditional
Kasymbay	50	63	54	50
Abdukarim	-	-	24	20

The main implementation of the activity will start in March 2008.

1.3.3 Activity 8: Community-based household cow and sheep milk processing improvement and sausage making for value addition and income increasing.

Expected outputs for the reporting period were:

- Participatory planning workshop with communities in October/November 2007
- Training workshops for milk processing with interested households in December 2007
- Training workshops for sausage production with interested households in December 2007

The participatory planning workshop was done jointly with theoretical training on milk processing and home made sausage production on 12 December 2007 in Akdala village (see Theme 4). 20 households and 4 farmers participated. Farmers and households were interested in milk processing, as the suggested technologies will diversify milk products and increase income. The households "Elan" (G. Kuleeva) and farm "Akdala KZ" are interested for processing chechil, brynza, cheese and homemade sausage. It was agreed with farmers and households that the practical training will be done in May 2008 during main milking period. The processing methods for Brynza, Kurut with dried fruits, Chechil and homemade sausage are well documented.

Kyrgyzstan

1.3.4 Activity 9: Household improvement of livestock management for improved productivity: integrating management of lambing period, animal health, feeding system, lamb management

The expected output for the reporting period was to start comparative experiments with households in the two districts in August 2007.

This activity has not been carried out as planned in the workplan. No comparative experiments were started at the households. Instead improved veterinary care is being introduced to households in the two districts.

A study of the status of animal health at "Alymseit" farm and 10 households of Akbeket village, at "Kenesh" farm and at the 5 households involved in Awassi breeding in Chuy district showed that preventive vaccinations and diagnostics against five infectious diseases, foot-and-mouth disease, brucellosis, tuberculosis, smallpox and rabies are conducted free of charge according to the plan of district veterinary administration. However, there are other infectious diseases for which no preventive measures are carried out. The scientists also tested sheep for brucellosis. A calendar of the required veterinary measures for prevention of infectious and parasitic diseases over the 12 months of the year has been developed and explained to the farmers and households.

Furthermore, improved management practices and monitoring of animal performance on the medium scale farm "Alimseit" in Kemin district was continued. At August lambs were weaned at "Alymseit" (Table 8). The weaned lambs were then allocated to pastures with good herbage.

Table 8. Mortality and lamb weights at weaning at "Alymseit"

Breed of sheep	No of ewes	Ewes lambed	Lambs born	Mortality before weaning		Lamb weaned		Average liveweight at weaning (kg)
				no	%	no	%	
Coarse wool	91	79	93	7	7.5	84	94.5	31.5
Merino	160	144	184	18	9.7	166	105.3	28.5

In autumn, after the return of the sheep from the summer pastures, the animals were weighed (Table. 9 and 10). The young ewes of both breeds gained 4 kg weight on the summer pastures. The adult coarse wool ewes gained 4.3 kg, while the adult Merinos only gained 1.5 kg.

Table 9. Liveweight of coarse wool sheep

Group by age and sex	n	Liveweight (kg)	
		Spring	Autumn
Ewes	91	54.4	58.7
Young ewes	59	39.8	44.2
Wethers (castrates)	37	58.2	55.9

Table 10. Liveweight of Merino sheep

Groups by age and sex	n	Living weight, kg	
		Spring	Autumn
Ewes	160	52.4	53.9
Young ewes	70	37.1	41.1
Wethers	52	56.4	50.5

Culling of ewes and wethers was performed in September. 29 heads of wethers and 37 heads of old ewes were culled from the coarse wool sheep flock. 45 heads of wethers, 53 heads of old ewes were culled from the fine-wool sheep.

For genetic improvement of the fine-wool ewes 8 heads of rams at the age from 1.5 to 2 years with an average liveweight of 57.5 kg were purchased by the farmer with the help of the scientist from the pedigree farm of “Orgochor” (Issykul region). The rams were used for mating in November 2007.

1.3.5 Activity 10: Production diversification: Improvement of milk productivity in sheep (with the potential to include a multi breed comparison by a regional activity)

Expected outputs for the reporting period were:

- First analysis of comparative productivity of Awassi crossbred (different genotypes) versus local sheep December 2007
- Training course for participating households and pilot farms in Kemin and Chuy district in December 2007

Nurjan Abdymajitov (supervised by Ajibekov A., Abdyrasulov) has finalized his PhD thesis on “Effectiveness of the crossing local coarse wool sheep with Awassi and the characteristic of their cross-breeds”. The examination of thesis by the academic council will take place on 6 February 2008. Then the main results can be translated and used for the first evaluation (analysis of productivity) of this activity.

The training course was conducted on 13 December as planned (see 1.4 Theme 4).

In September 2007 the breeding plan for “Awassi” dairy sheep on Kenesh farm was jointly discussed by Joaquin Mueller, Luis Iniguez and Asanbek Ajibekov. A new feature of the plan is that it will involve five surrounding households from Progress village. The households will mate some selected local coarse wool ewes with Awassi rams.

As planned two Awassi rams (no. 1983 and no. 1058) of 1.5 years age were acquired from Kazakhstan in October 2007 (with an average liveweight of 63 kg before mating). In November all animals were weighed (Table 11). The liveweight of local coarse wool fat tail ewes exceeded the weights of 50% Awassi crossbreds by 3.9 kg or 6.6%. From the male lambs born in 2007 six were kept for breeding.

During the mating season of 2007 26 ewes of the local coarse wool population were mated with the new Awassi rams for obtaining 50% Awassi x local crossbred lambs; for obtaining 75% Awassi crossbred 37 50% crossbred ewes were mated with Awassi rams; some half-bred ewes were mated with a local coarse wool ram (no. 5204, liveweight of 74.5 kg). The mating of the ewes began on 17 November began and was recorded.

Table 11. Liveweight of the sheep of different genotype at "Kenesh" (November 2007)

Group of animals	Genotype	n	Mean ± se
Rams	Awassi	2	63.0
Rams	Local*	1	74.5
Ewes	50% Awassi x local	38	58.8±1.38
Ewes	Local	30	62.7±1.55
Young rams, born in 2007**	50% Awassi x local	6	47.3±2.17
Young ewes, born in 2007	50% Awassi x local	2	38.3
Young ewes, born in 2007	local	28	38.1±0.92

* local = coarse wool fat tail sheep; **age of 7 months

1.3.6 Activity 11: Set the basis for a decentralized and participatory breeding plan for farmers to access improved animals

The expected output was the development of a detailed breeding plan under the guidance of Joaquin Mueller and Luis Iniguez to be implemented in the mating season in 2007 in Akbeket village.

The community based breeding plan for improving the genetic potential of sheep for meat production in the households of "Akbeket" village in Kemin district was developed as planned in September 2007 under the lead of Joaquin Mueller and Luis Iniguez (detailed report of Dr. Mueller's mission and plan is available).

Four "Aykol rams were purchased from the "Aykol" pedigree farm (Tonsk district) by the project. The Aykol breed is derived on the basis of the crossing of Gissar rams with Kyrgyz fine-wooled ewes. The rams were selected on the basis of high liveweight, big size, and excellent body structure. After the return of sheep from the summer pastures 1.5 year old and older local coarse wool fat tail ewes were selected in the participating households. The selection was jointly done by scientists and farmers through weighing, visual inspection of the ewes according to the agreed breeding plan; the characteristics of the ewes were recorded. 87 heads were selected and weighed in November. Their average living weight was 60.1 kg. The mating of ewes began on 17 November by admitting oestrous ewes to the Aikol rams. The recording of mating was conducted by one of the farmers, veterinarian Joldosh Mambetaliev, with weekly visits by Kuban Abdykerimov to the farms.

1.3.7 Activity 12: Community-based household cow and sheep milk processing improvement for value addition and income increasing

Expected outputs for the reporting period were:

- Participatory planning workshop with communities to define organizational structures for milk processing and interest in mini processing units in September/October 2007
- Training workshops for milk processing with interested households in October-December 2007

A group of farmers and households interested in milk processing that have 2-3 dairy cows, including the farms Alymseit and Kenesh with 10-15 dairy cows was formed. At present they sell raw milk for a low price and would like to sell kefir, sour cream, cottage cheese, yogurt, and butter.

Then the responsible scientists K.K. Abdykerimov, A. Karybekov and M. Mederbekova searched the internet for mini-units for processing cow's and sheep milk suitable for domestic and small scale farm conditions and accessible with regard to the price. No appropriate technical equipment was found in Kyrgyzstan as the existing plants for milk processing are designed for processing large volumes of milk located in the large cities. No training was conducted.

Tajikistan, Sogd Province, Khujand site

1.3.8 Activity 13: Household improvement of goat management for improved productivity [management of the flock, feeding, selection and culling]

Expected outputs for the reporting period were:

- Comparative experiment started in September 2007
- Description and time schedule of improved husbandry practices developed in December 2007

The management elements to be introduced in the improved flocks were defined as strategic culling, improved feeding and animal health measures, recording of flock dynamics, tattooing and performance measurements of animal for their evaluation.

There are difficulties related to tattooing and recording in the improved and control flocks. This will render a detailed performance comparison very difficult. Improved feeding could not be carried out due to the weather conditions (see details below).

Selection/culling

Visual estimation of goats in the integrated group was done in autumn when the majority of animals were in good (well-fed) condition. The aim was to select "best" animals and cull those that do not meet the standards. The goats were selected by visual appearance of wool quality (wool density, length, thickness, luster, winding of plaits) and size by age and sex. The best goats were marked with cutting of the hair of tail.

For culling of goats were used following criteria:

- animal age; usually bucks and does using as reproductive part of flock up to 6-8 years, castrates up to 5 years for wool and meat. degree of the erasure of cutter teeth
- bad quality of wool: the large proportion of kemp in the wool, heterogeneous length on different parts of the body (for example, the difference between the length of wool on the thighs and the sides composes 3 cm or more)
- too small (size relative to their contemporaries in the herd).
- explicit defects (sick, blind and others).
- opinions of farmers (also the number of to be culled animals has to be adjusted to the flock size)

A simplified evaluation sheet for classifying (grading) was developed to facilitate the selection process by the farmers taking into account meat and fiber production (Table 12).
Wool productivity through the letter "W":
"**-W**" – unproductive;
"**W**" - normal;
"**+W**" - good wool productivity.

Liveweight associated to the size of animal (individual weighing carried out at two farms was used for developing the scale and train for the visual estimation. The liveweights of the female adult goats ranged from a minimum 24 kg to a maximum 33 kg, accordingly females with 28 kg were classified as "average").
"**-S**" - small animal;
"**S**" - average;
"**+S**" - large.

Condition ("fatness") designated by letter "F":
"**-F**" - getting emaciated fatness;
"**F**" - average fatness;
"**+F**" - good fatness.

Summing up the individual estimates, the animal is then classified as:
"**N**" - pedigree (for nucleus);
"**U**" - for user purposes;
"**C**" - cull.

Table 12. Recording sheet for individual estimation (grading, classification) of goats (example)

Individual number	Age	Sex	Liveweight	Fatness	Wool productivity	General estimation
7	1-1.5	f	+S	-F	W	U
98	4	m	+S	+F	+W	N

Special attention was given on the selection of the replacement animals (2.5 years age and also 1.5 years old goats) with a good size (were selected larger). The rejected goats were assigned to sales,

fattening, more well-fat to the slaughter (their own use or for sale meat on the market). Until December many farmers had not completely removed the rejected goats from the herd. The framers tend to preserve the number of animals in their flock and cull as little animals as possible. Systematic culling as an important management practice is new to the farmers and requires convincing. In addition to the improved group, also two farmers (Abdurahmon Khayitmatov, Boir Parpiev) in the control group carried out culling of goats in theirs flocks.

Tatooing
Many households refused to tattoo their goats. During the soviet system 100% of the state animals were ear-tagged or tattooed. Private owners did not have marked animals. Therefore there were many cases, where the government confiscated animal with individual labeling (ear-tag, tattoo, etc) from households. Since there are still labeled public goats in the region, the farmers are afraid to mark their animals. Thus, tattooing had to be limited to the best does selected for the nucleus at two farms (see activity 15). Some other farmers agreed on tattooing their goats in spring before shearing.

Recording
During the interaction with the farmers it became apparent that the owners of goats do not keep any records on their goats and do not calculate their benefits. This is even the case for larger-scale farms, with 200-300 of goats. Many only know the number of heads. Therefore, a monitoring form on herd dynamics (entries and offtake from the flocks per age category for a specific period) was developed to initiate performance recording at the farms.

Animal Health measures
In September 2007 all farmers bathed their goats in the water solution of Neocidol against the parasites. In September-October all farmers in the integrated group and some farmers in the control group gave albendazolum (suspension or tablets) to their goats against helminthiasis. Sometimes in the winter period some goats (especially young animals) suffer from lice. Because of the cold they cannot be bathed, so farmers sprinkle in the abdominal and inguinal region, where lice are most accumulated, with a solution of Neocidol. This method is not very effective and the lice pass on to non-infected animals. Therefore, it is recommended to the farmers use injection of ivermectinum instead. A training session for farmers is being prepared including a brief description of widespread diseases in Tajikistan, preventive measures and treatment.

Efficient feeding (improved rations matching the needs)
The winter in Tajikistan and in whole Central Asia was prolonged (beginning from the middle of December it continued till February) with temperatures up to -27ºC - according to the meteorologists the coldest winter for the last 40 years. The animals could not graze on the pastures. The feeds for the goats stored by farmers for the winter period were consumed much quicker than foreseen and the plans for rational feeding had to be abandoned.

1.3.9 Activity 14: Improvement of shearing and classing of fiber, standardizing on the basis of international standards in accordance to quality, contamination and age

The expected output was a first analysis of variability of fiber quality and prices in December 2007.

Preliminary results of the fiber quality are shown below but the number of samples was too small to give a full picture of the variability and factors affecting it (Table 13). The evaluation of the quality of the analysis at Almaty could not be done at the certified lab at INTA as planned. 62 duplicates were sent to the INTA laboratory in Argentina. Despite the provision of the necessary documentation and the efforts of Joaquin Mueller the samples got stuck in customs and finally had to be abandoned.

A price analysis is provided in the report by Liba Brent and in the technical report currently drafted by the socioeconomic team.

67 fiber samples (9 colored, the rest white behind the shoulder) that had been collected at 8 farms from different age and sex groups of animals, were analyzed in a specialized fiber laboratory at Almaty.

Table 13. Results of examples white mohair of Tajik breed of angora type (Almaty laboratory)

Age group	Sex	Average length, (mm)	Fiber diameter (μm)	Coefficient of variation (%)	Comfort factor (% fiber, thinness not less than 30 μm)	Average crimp (mm)
One year kid	f	186.31	26.37	28.37	73.33	15.97
	m	180.75	26.17	28.17	73.65	14.87
Young animals second year	f	199.90	27.80	28.25	66.10	16.25
	m	165.00	35.80	26.60	28.30	12.10
Adult 3-5 years	f	195.10	30.98	32.75	53.6	14.48
	m	213.00	38.80	30.05	25.2	14.4
Old, 6 years & beyond*	f & m	192.50	42.10	33.06	-	-

*Data from laboratory of Tajik Research Institute Livestock

Based on these results, the sampling plan for fibers for March 2008 was developed. Samples will be collected by the four age group separated by male and female animals. Also the sampling will be stratified by best, average and worst animals in wool quality by visual estimation.
An important part of the project activity is to train farmers for separating wool by fiber diameter. At the international market, the price per unit weight for fibers with smaller diameter can be 3-5 times higher than for coarser fibers.
Furthermore, the current selection standards for Angora goats do not include fiber diameter and need to be changed to reach an improved Mohair quality that can compete on the international market. Thus, the researchers aim at the development of a new standard on “Classification of the unwashed sheared wool of Angora goats” taking into account thinness.

1.3.10 Activity 15: Set the basis for a decentralized and participatory breeding plan for farmers to access improved animals

The expected output was the development of a detailed breeding plan under the guidance of Joaquin Mueller and Luis Iniguez to be implemented in the mating season in 2007.

The expected detailed breeding plan including data collection sheets was elaborated by Dr. Joaquin Mueller in consultation with Luis Iniguez (detailed report of Dr. Mueller’s mission and plan is available).

At the beginning October 2007 four farmers - Turgunboy Kilichev, Abdunazar Matazimov, Rakhmon Askarov, Abdufattokh Khonaev - were selected to start the nucleus flock based on their experience, a strong willingness to introduce new technologies and a sufficient flock size. These farmers are also members of the improved group of activity 13. The aim is to mate the best female goats with the best bucks for obtaining offspring for their own replacements and in a later stage to distribute better males to the community. The best goats of the flocks of the 4 selected farmers were kept separately as a “nucleus” during the mating season (Table 14).

Table 14. Structure of nucleus flock

Farmers name	Total number, (heads)		Number of nucleus (heads)		Colour
	Total	Incl. female	female	Bucks	
T. Kilichev	180	85	18	1	white
			14	1	coloured
A. Matazimov	556	261	16	1	white
			7	1	coloured
R. Askarov	126	56	11	1	white
			9	1	coloured
A. Kanaev	68	30	18	1	white

Breeding objectives and economically important traits to be monitored were discussed with the farmers. During these discussions it became apparent that the farmers were most interested in the following traits (listed by importance according to opinions of farmers):

- wool yield (this includes growth of woolen cover on the goats body, the density of fibers with sufficient grease (suint), more than quantity).
- softness (by touch, fiber must not be rough), style (the degree to which the fiber twists or spirals) and character (the degree to which the fiber crimps or waves, the twisting should not be small, but wavy or like a corkscrew)
- luster (fibers must shine, no luster is not desirable).

In addition to the traits considered by the farmers, other traits (thinness of fiber, length, presence of kemp fibers) have to be considered with a view to international markets.

Selection and tattooing of the selected animals were carried out in October before beginning of mating. Attention has to given to the presence of colored animals in the flocks. In general, the farmers used to breed white goats; however, in recent years there is a specific market demand for colored fibers. In response to this demand, the goat owners began to also breed colored goats. However, the white fiber is most desirable for international markets, thus, white and colored goats should not be mixed during mating which is presently the case.

The nucleus group was tattooed in two farms, and the others two farms described the marks of the selected does and promised to be able to recognize the goats during the lambing in spring and then mark their offspring. 15 heads of white does (tattoo no. 01-15) were selected and tattooed at one (Abdunuzar Matazimov) and 12 heads (tattoo no. 16-27) of best does at the second farm (Rahmonali Askarov). During another day 14 heads of the best does with the colored wool were selected at the two farmers (8 and 6 does). It was agreed that during mating (35-40 days) the white does will be separated and mated by the best selected white buck (tattoo no. 00). None of the three available bucks with colored fleece met the required standards. Therefore, during mating a desirable buck was leased from another farmer. It has to be noted that this required additional labor force.

The tattooed animals selected for the nucleus were weighed (October, 2007) at the farms of Rahmonali Askarov and Abdunazar Matazimov. In the spring of 2008 before shearing of goats the characteristics of wool productivity and quality will be recorded for each individual doe in “nucleus” in special simplified formats.

More farmers are interested in creating nucleus flocks even outside the project villages (Table 15).

Table 15. List of additional farmers interested in creating a nucleus flock

№	Name	Goat	Site
1	Kushmurod Abdurahmonov	90	Katorbulok
2	Uktam Usarov	130	Korajingil
3	Anorboy Kosimov	210	Olchali
4	Abdushukur Fozilov	160	Dulona
5	A.Kholboev, coloured	180	Dulona

1.3.11 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

Expected outputs for the reporting period were:

- Working with women’s groups in Tajikistan to develop the production of competitive yarns and establishing reliable sources of equipment and other supplies in September 2007, January & April 2008
- Conducting sample testing and test marketing with yarn storeowners and knitters in the United States and developing a reliable marketing network in October 2007, February & May 2008
- Feedback on the yarn samples entered into the existing database and distributed to the Tajik spinners in November 2007, March & June 2008

This activity is implemented under the guidance of Dr. Liba Brent (University of Madison, Wisconsin) and was carried out as planned. A detailed updated report was prepared by Liba Brent in March 2008.

The objective of this activity is to increase the incomes of Tajik women spinners and Angora goat producers by developing a new value chain centered on the production of luxury mohair yarn and knitted products for the American market to complement the Russian market for coarse yarn and utilitarian mohair knitware. The project has focused on the following activities up to date:

1. Research on the American market for luxury handspun yarns (March 2007).
2. Survey of skills, resources, supplies and capacities of Tajik women to produce high quality yarn for the American market (April-May 2007).
3. Work with groups of women spinners on producing yarn samples for the American market (April-October 2007).
4. Development of a registry system for artisans and their samples (May-October 2007).
5. Testing of yarn samples by American knitters and storeowners (June 2007-March 2008).
6. Delivery of test results to spinners and discussions about improvements needed (September-October 2007).
7. Development of other components of the production and marketing chain including:
   a. Working with the women's groups to introduce quality control and training new spinners who wish to join the current groups.
   b. Working with angora producers on shearing 6-moths old kids for "superkid" mohair for spinning.
   c. Working with producers on breeding and selection to improve fiber quality.
   d. Working with local craftsmen on producing quality spinning wheels for artisans.
   e. Working with suppliers of dye, silk and other raw materials to establish reliable supply linkages for the spinners.
   f. Working to resolve trade logistics such as transport and customs.
   g. Developing a website and a documentary video about the project.

The activity is conducted with groups of women in the villages Takli, Karajingil, Katarbulak, the settlements Taboshar and Adrasman, and new settlements Shurkul, Karamazar and Appon, the total number being more than 21 women (selected women with good knowledge on spinning). At the beginning of December all women obtained thin colored wool for producing new examples of yarn to be sent to the USA. Wool of the required quality (thin "Kyd" and appropriate natural and dyed colors) has been distributed. Some groups have been provided with inventories (mechanical spinning machines, carding combs), for example Matluba Khanaeva and the group of women from Takli received the spinning tools from New Zealand brought by Dr. Liba Brent.

The knitters in Madison tested a number of samples and knitted a variety of beautiful items out of the Tajik yarn. It seems that the Tajik spinners are well positioned to market their yarn in the US. For example yarns (samples 7,8,9,10) of the women of the Takli village from the 2nd testing obtained very good evaluations. All results from the yarn evaluations by the stores, specialists and spinners in the USA are entered into a database "sample test results".

An issue of concern will be finding enough fine quality kid mohair for the luxury yarns. Unfortunately the Tajik farmers have not been breeding for fine fiber in the past and many of the fleeces of even the yearling and kid goats are too coarse for our purposes. We learnt that yarn made of the coarser fleeces cannot be spun into wearable clothing because of the prickle. Thus, the market assessment underlines the importance of improving breeding of goats for the long-term success of the project.

Tajikistan, Vahdat district, Dushanbe site

1.3.12 Activity 17: Evaluation and improvement of sheep breeding in households flocks, aspects of feeding, reproduction and selection of sheep

Outputs of this activity were expected in 2008. However, the comparison of flocks with improved management versus control flocks is not carried out as planned. Improved management practices are systematically tested only at a very small subsample.

Instead a PhD study evaluates the effect of the three main management systems on flock productivity. Data are collected in ten households from each group with a total of about 80-100 ewes per group to compare flock performance throughout the year.

In a small subsample improved management interventions are being tested. In September two groups of Gissar ewes were formed with 30 heads each. The improved group of ewes is kept by farmer Bobishoev M. (Karsang village). In the period of preparation for mating the ewes grazed natural pastures at the boundary of Sultonobod, at a distance 7-10 km from the village and received concentrates of 0.3 kg per day (chopped barley and corn) for 30 days. The concentrate was provided by the project (250 kg in total). The control group kept by the farmer M. Niezov in Nematobod was grazing and did not receive any supplements. Both flocks were vaccinated against sheep smallpox and were treated against helminthes.

While the liveweight of the ewes receiving concentrates increased by 3.7 kg (daily weight gain of 123 g), the control ewes lost 3 kg (Table 16). In the improved group one ewe died, while in the control group 2 ewes died. T

Table 16. Liveweight and survival of ewes in the experimental and the control group

Criteria	Experimental group	Control group
Liveweight of ewes at the start of the experiment (kg)	58.6 ± 0.782	59.3 ± 0.569
Liveweight of ewes after 20 days (kg)	61.4 ± 0.546	58.6 ± 0.443
Liveweight of ewes at the end of experiment (kg)	62.3 ± 0.387	56.4 ± 0.412
Survival of ewes (heads/%)	29/ 96.7	28/93.4

Natural mating was used of sheep and two rams plus one reserve ram were used in each groups. The improved condition of the ewes led to earlier mating and a higher conception rate at first service (Table 17). However, also all ewes in the control group conceived at the end of October.

Table 17. Reproduction parameters observed in the experimental and the control group

Criteria	Experimental group	Control group
Number of ewes arrived in oestrus at first decade of October (heads/%)	19 / 63.3	4 / 13.4
Number of ewes arrived in oestrus at second decade of October (heads/%)	9 / 30.0	6 / 20.0
Number of ewes arrived in rut at third decade of October (heads/%)	2 / 6.7	20 / 66.6
Number of ewes repeatedly arrived in oestrus at third decade of October (heads/%)	5 / 16.7	13 / 43.4

1.4 Theme 4: Knowledge exchange and capacity building

1.4.1 Activity 18: Enhancing knowledge exchange for increased feed and livestock production

Participation of students in project activities

Great efforts were made to encourage graduate students to use some of the project activities for their field research. This was especially difficult for Themes 1 and 2, as there are not many young professionals working on these themes. In general, young people do not consider agriculture as an attractive field for their future career because of the very low salaries compared to other sectors in the economy. Eleven students are now actively participating in the project (Table 18).

Table 18. List of students in the Livestock project

Name of persons	Institute or university	Project supervisor	Official supervisor	Act.	Title
Kazakhstan					
1. Ms. Alima Aymyrzaeva	Kazakh-Turkish University in Turkistan town	Dr. N. Alibaev	Dr. Borash Myrzaliev	1	Analysis of households' livelihoods in Southern Kazakhstan
2. Ms. Khalida Mamanova	Kazakh-Turkish University in Turkistan town	Dr. N. Alibaev	Dr. Borash Myrzaliev	3	Mutton markets in arid and semi-arid regions of Southern Kazakhstan

3. Abay Sartaev	Master of agricultural science	Seyfulla Abdiraimov	Talgat Ibragimov	4	Increasing forage crops production through planting of maize and alfalfa in South Kazakhstan province
4. Shilimbet Saltanat	PhD in Agriculture	Talgat Ibragimov	Talgat Ibragimov	4	Increasing productivity of Karakul sheep in rational use of natural pasture of South Kazakhstan province
Kyrgyzstan					
5. Katosheva Tulganoy	Kyrgyz Agrarian University	Razzakov Imatbek	Razzakov Imatbek	9-12	Improvement in the quality indicators of the merino wool
6. Nazarbekov Daniyar	Kyrgyz Agrarian University	Razzakov Imatbek	Razzakov Imatbek	9-12	Comparative characteristic of the management of the coarse wool and fine-wooled sheep
Khujand/Tajikistan					
7. Makhmud Kasymov	Khujand Branch of Tajik Tajik Research Institute of Livestock	Abdullo Madaminov	Abdullo Madaminov	4	Pasture degradation and its potential to rehabilitation
8. Botir Hamzaev	Khujand Branch of Tajik Tajik Research Institute of Livestock	M.Kosimov	M.Kosimov	13-15	Comparative estimation of the quality of the wool of different lines of the Tadzhik species goats of Angora type
9. Farkhod Kosimov	Khujand Branch of Tajik Tajik Research Institute of Livestock	M. Kosimov	M.Kosimov	13-16	Productive and some biological special features of the many-coloured types of the woolen goats
Dushanbe/Tajikistan					
10. Abdurasul Mirzoev	Tajik Research Institute of Livestock	F. Ikromov	F.Ikromov	17	Productivity of sheep with the different methods of management and feeding in households conditions
11. Hurshed Davlatov	Tajik Research Institute of Livestock			17	Raising of merinos under the conditions of mountain house management

Training workshops

Nine farmers' training workshops were organized in Central Asia to bring together participating and neighboring farmers and researchers.

In **Kazakhstan** a training workshop took place on 25 November 2007 with farmers and households from Akdala village. The principal investigator on range and forage productivity, Seyfulla Abdraimov, presented improved fodder production systems in South Kazakhstan province.

In **Kazakhstan** a second training of farmers on creep feeding lambs for early weaning took place with 7 households and 2 farmers in Akdala village on 16 October 2007. A. Ombaev gave the opening speech and J. Parzhanov reported on early weaning and fattening". Then the farmers K. Abdukalykov ("Kasymbay"), S. Permanov ("Ergesh"), and A. Musabaev ("Andas") gave their opinion. Farmers and households showed an interest for early lambing and lamb fattening. They were also interested in ICARDA's assistance in buying feed, as carrying out the experiment has additional costs.

In **Kazakhstan** a third training was conducted with 20 representatives of households and 4 farmers on milk processing and preparation of homemade sausages in Akdala village. Again A. Ombaev gave the opening speech. Then E. Kunanbaeva reported on "Processing of milk" and .A. Saniyazova explained "the preparation of domestic sausage". After hearing the presentations of Kunanbaeva and Saniyazova, the farmers, namely K. Abdukalykov ("Kasymbay"), S. Permanov ("Ergesh"), and A. Musabaev ("Andas") Kuleeva G. ("Elan"), commented the training.

In **Kyrgyzstan** one field day was conducted on 10 December on “Importance of preparing balanced rations including crop residues for increasing livestock productivity". Farmers and households of the Kemin and Chuy districts participated in the field day.

In **Kyrgyzstan** a second training course was carried out with participation of the farm Alymseit, 10 households of “Akbeket” village, the farm „Kenesh and six households from Progress village on 5 December, 2007. The course was chaired by Asanbek Ajibekov assisted by I. Razzakov, D. Nazarbekov, K.K. Abdykerimov, and M. Mederbekova, N. Abdykerimov, and T. Mamyrkulov. The training was on the theme “The timetable of the preventive measures of infectious and invasive diseases, including brucellosis”. In the training questions on importance of taking anti-epizootic measures for preventing the spread of the infectious diseases of animals. Participants were trained on new strategies of vaccination of animal and other veterinary-sanitary measures in connection with access to markets. “The calendar of the health of animals for 12 months” was distributed to the community members.

In **Kyrgyzstan** a third training course was held at the farm “Kenesh” on “The importance of sheep milk production for income diversification” with participation of the farm „Kenesh and six households of “Progress” village on 13 December 2007. The course was chaired by R.Z. Nurgaziev assisted by K. Abdykerimov, A.S. Ajibekov, A. Karybekov, E. Akmatova, K.K. Abdykerimov, N. Abdykerimov, T. Mamyrkulov. The characteristics of the “Awassi” dairy sheep breed were presented. It was explained that through the initiative of Nurjan Abdymajitov the first Awassi ram was imported from the Kazakh republic and crossed with the local coarse wool fat tail sheep. Cross-breed ewes give on average a daily milk yield of 1.5-2.0 liters of milk. Maintenance, feeding and milk production were discussed by the participants in the workshop. The members of communities were convinced that breeding the “Awassi” could be advantageous for their households.

In **Khojand/Tajikistan** training was carried out on “Classification of Angora goat wool by thinness (fiber diameter)” on 21 April 2007 in Karajingil village (school) with 11 farmers. The trainer was M. Kosimov assisted by R. Mamatkulov and F. Kosimov. The training included a theoretical part on

a. fiber diameter – as one of the most important factors determining the technological merit of woolen raw material
b. the interrelation of the fiber diameter with age and sex of goats.
c. other factors influencing the thinness of wool. Feeding and , maintenance

and a practical part demonstrating sheared fleeces of the goats of different age and sex groups at a farmer’s home (Adumalik Tojiev). The training showed that the farmers can distinguish differences in the thinness of the wool of goats depending on age and sex of goats and by style (homogeneous and heterogeneous). However, the farmers consider wool from adult animals with large diameter of fibers as high quality because of the high demand at the local market. They were informed about the quality requirement of international markets and the prices that can be obtained for thin wool from the young animals.

In **Dushanbe/Tajikistan** training was provided to 20 farmers of the villages Buzbit, Karsang and Nematabat on the themes “Rehabilitating the productivity of pastures and hayfields through oversowing and fertilizer application (nitrogen and phosphorus) and appropriate pasture management” and on “cultivation of forage crops in the irrigated lands”.

In **Dushanbe/Tajikistan** regular meetings were held with the representatives of households. Inter alia farmers were informed about methods of selecting the best males and females during the mating season, the preparation of ewes for mating and lambing by additional feeding, storage of fodders for the winter, improvements in the quality of fodders, organization of management and fattening of sheep, protection from the diseases.
In general the farmers and households were happy to participate in the field days and to interact with the principal investigators. They considered the field days as useful for their farming practices.

National workshops
National workshops were organized at the end of August and in the beginning of September 2007 in the three countries. The progress in project implementation was discussed and the workplans for the next year presented by the principal investigators for each theme (see separate Annex with Programmes and list of participants of the national workshops). Some farmers participated in the meetings. In Kazakhstan and Kyrgyzstan representatives of the Ministry of Agriculture were present.

2 South Asia – Pakistan

2.1 Theme 1: Socioeconomics

2.1.1 Activity 1.1: Baseline study in rainfed and irrigated sites

The expected output for the reporting period was the completion of data collection by December 2008.

The activity started with a small delay but the first draft report will be ready as planned. The work on baseline survey was initiated through conducting a meeting with the supervisor and the two students from the University of Agriculture Faisalabad involved in this activity during October 2007. The draft questionnaire was developed during November 2007. The questionnaire was finalized after pretesting and through consultation with the collaborating scientists during January 2008. Data collection was started during the last week of January 2008 and was completed by end February.

Data was collected from 30 participating, 40-non-participating and 40 control farmers from 2 project and 2 control villages at the irrigated site and from 20 participating, 20 non-participating and 20 control farmers from 2 villages at the rainfed site. Data editing and entry scheme was finalized and data entry will be completed by end March 2008. Data analysis and preliminary reports will be ready by end April 2008.

2.1.2 Activity 1.2: Economic evaluation

In the reporting period evaluations were planned for Kharif fodder crops in 2007, for fattening calves and village based seed enterprises.

These targets have not been achieved. However, on-going monitoring and evaluation formats are ready and will be implemented during the first week of April 2008. A draft report on evaluations will be ready by end May 2008.

2.2 Theme 2: Forage production

Rainfed research site, Lodhay village

2.2.1 Activity 2.1: Participatory on-farm evaluation and dissemination of winter and summer cereal legume mixtures and agronomic practices.

Outputs from this activity are planned for 2008.

Activities undertaken:

The activity was carried out as foreseen in the second annual workplan. Two MSc students were involved in the activities for the summer crop season and one will be working on the winter crops (see Theme 4).

Summer fodder crops:

Twenty farmers planted improved varieties of summer fodder crops (Annextable 1). Low yielding varieties of sorghum, millet and maize were compared with improved fodder varieties of these cereals grown alone or in mixture with cowpeas and guar. The treatments were:

T1: Farmer variety and traditional farming practice (control).

T2: Improved Variety of summer cereals and improved farming practice.

T3: Improved variety summer cereals grown in mixtures with improved variety of Guar.

T4: Improved variety of summer cereals grown in mixtures with improved variety of cowpea.

Preliminary findings are shown in figures 1 to 3 and Table 19.

Millet (*Typodium ameracanum*)

The highest green fodder yield (47.8 t ha^{-1}) was recorded for the improved variety of millet grown alone (T2). T2 and T4 (mix with cowpeas) showed significantly higher green fodder than the control (T1), while T3 (mix with guar) was not significantly different.

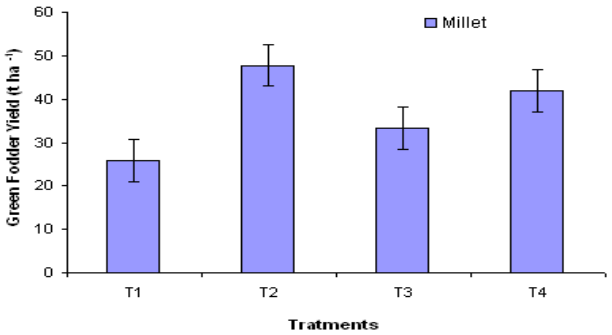

Figure1. Green fodder yields (t ha^{-1}) of millet and millet-legume mixture by treatment

Sorghum (*Sorghum bicolour*)

The highest green fodder yield (33.6 t ha^{-1}) was recorded for the improved variety of sorghum grown alone (T2). However the yield was not significantly different from the mix with legumes (T3 and T4). T4 did not differ significantly from the control (T1).

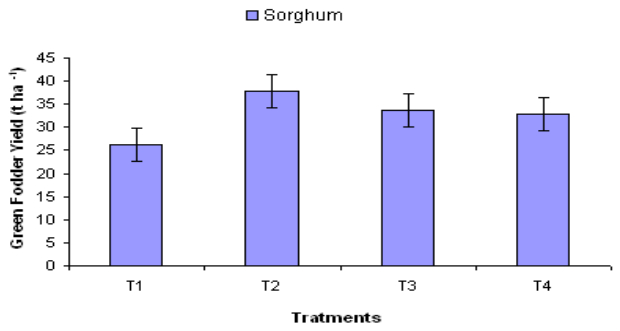

Figure 2. Green fodder yields (t ha^{-1}) of sorghum and sorghum-legume by treatment

Maize (*Zea mays*)

There was no significant difference in green fodder yield between plots grown with improved variety of maize alone or in mixtures with guar and cowpeas. All three improved treatments produced significantly higher green fodder yield than the farmers' practice (T1).

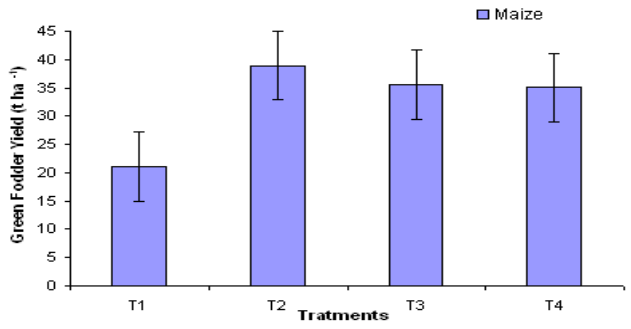

Figure 3. Green fodder yields (t ha^{-1}) of maize and maize-legume by treatment

Table 19. Dry matter yield (t ha^{-1}) of cereals and cereal-legume mixtures by treatment

Treatment	Millet/M-legume mix	Sorghum/S-legume mix	Maize/M-legume mix
T1	8.30 c	8.60 b	6.10 b
T2	15.53 a	12.10 a	11.50 a
T3	10.27 bc	10.73 ab	10.23 a
T4	12.40 ab	10.70 ab	10.33 a
LSD	3.16	2.29	3.5

Samples for analysis of the fodder quality were sent to the University of Agriculture in Faisalabad. The results will be available in a technical report end April 2008.

A disadvantage of harvesting the guar mixtures according to the farmers was that harvesting guar caused body itching.

Winter fodder crops:
Improved varieties of oats and vetch were planted by 19 farmers in November 2007 for further evaluation (Annextable 2), use in feeding trials and dissemination in the project area. Data collection on these plots is in progress and the documentation of results will be finalized end May 2008.

Promote village-based fodder seed enterprises:
One farmer planted 2 canals and three farmers 4 canals of their land with improved variety of oats (PD2-LV65) for harvesting seeds (Annextable 3).

Feed resources calendar
A feed calendar showing the feed availability for livestock on a monthly basis is being developed. The calendar will also show changes introduced by the project.

2.2.2 Activity 2.2: Preservation/conservation of fodders as hay for feeding during scarcity periods

The main outputs from this activity were scheduled for July 2008.

Activities undertaken:

Hay was made from summer crops as planned while the feeding trails were slightly delayed (see Theme 3 below). The twenty farmers that planted summer cereals (maize, sorghum & millet) and winter legumes (cowpeas & guar) produced 50 tons of hay (Annextable 1). About 60-70% of the feed requirements of the livestock owned by the farmers were met in December-January through feeding cereal-legume hay. The hay yields from mixtures of summer cereals and legumes per farmer varied from 0.63 to 13.75 tons.

2.2.3 Activity 2.3: Development of green forage selling enterprise using dug-well irrigation

Activities undertaken:

As planned oats and berseem for selling green fodder were planted on six farms on 2 or 4 canals (20 canals=one hectare) and in one case on 40 canals (Annextable 4). The farmers have already sold berseem for Rs. 48000 $acre^{-1}$ (800 $US). The activity is still ongoing and customers are recorded. An economic evaluation of the activity will be done after completion.

Irrigated research site, Sarghoda, Chak No. 74 SB & Chak No. 105 SB villages

2.2.4 Activity 2: Comparison of yield and nutritional value of improved fodder crops varieties with local fodder crops. Seed production and preservation/ conservation of fodder crops through hay and silage making and cultivation of multi-cut hybrids, Mott grass and multiple planting of maize crops for lean period.

Outputs for this activity were scheduled for 2008 and 2009.

Summer fodder crops:
The activity was carried out testing more combinations than originally planned. In each village 15 farmers were provided with seeds of improved fodder crop varieties for planting 15 acres in each village for fodder trials. Each farmer tested two of the six improved treatments sowing 0.5 acres (0.2 ha) per treatment. The remaining farmers (15 in each village) were kept as control and planted sorghum (T7) and the sorghum-millet mix (T8) on half an acre per treatment according to traditional practices.

The summer cereals, i.e. sorghum, millet and maize and cowpeas were sown in the following combinations:

T1: Sorghum + millet + cowpeas + maize

T2: Sorghum +millet + maize
T3: Sorghum + millet
T4: Sorghum + millet + cowpeas
T5: Sorghum alone
T6: Maize alone
T7: Sorghum (farmers' variety and practice)
T8: Sorghum + Millet (farmers' varieties and practice)

The first sowing of improved varieties and mixtures took place in July and the forages were harvested in September 2007. The crops were damaged by heavy rains. In Chak No 105/SB the highest green fodder yield (60 t ha^{-1}) was obtained with the mixture of sorghum, millet, cowpeas and maize and the mixture of sorghum, millet and cowpeas (T1 and T4), while in Chak 74/SB the highest yield (58.3 t ha^{-1}) was produced with the mixture of sorghum, millet and maize (T2, Table 20 & Figure 4). The lowest yield in both locations (25 and 32 t ha^{-1}) was obtained with sorghum alone – farmer's practice (T7). All improved varieties of fodder crops grown alone or in mixtures except sorghum alone in Chak74/SB produced higher green fodder yields than both controls (T7 and T8).

Table 20. Green fodder yields (t ha^{-1}) of improved varieties of summer cereals sown alone or in mixtures in July 2007 in Chak No. 74/SB and 105/SB

Treatment	Crops	Chak 74/SB	Chak 105/SB
T1	Sorghum + millet + cowpeas + maize	51.67	60.00
T2	Sorghum + millet + maize	58.33	46.70
T3	Sorghum + Millet	56.67	56.67
T4	Sorghum + millet + cowpeas	53.33	60.00
T5	Sorghum alone	31.67	56.67
T6	Maize alone	43.33	50.00
T7	Sorghum (Farmers variety & practice)	25.00	32.00
T8	Sorghum + Millet (Farmers varieties & practice)	31.00	37.00

The second planting time was in August/September and the forages were harvested in November 2007. In both villages the highest green fodder yields were obtained with the mixture of sorghum, millet, cowpeas and maize (T1, 82.7 t ha^{-1} in Chak No 74/SB and 72.2 t ha^{-1} in Chak No 105/SB, Table 21 & Figure 5). Improved varieties of fodder crops grown alone or in mixtures produced higher green fodder yields than the controls (T7 and T8).

Table 21. Green fodder yields (t ha^{-1}) of improved varieties of summer cereals sown alone and in mixtures harvested in August/September 2007 in Chak No. 74/SB and 105/SB

Treatment	Crops	Chak 74/SB	Chak 105/SB
T1	Sorghum + millet + cowpeas + maize	82.67	72.20
T2	Sorghum + millet + maize	63.33	66.10
T3	Sorghum + Millet	66.67	60.67
T4	Sorghum + millet + cowpeas	75.33	70.25
T5	Sorghum alone	55.67	59.15
T6	Maize alone	45.33	52.35
T7	Sorghum (Farmers variety & practice)	34.00	28.00
T8	Sorghum + Millet (Farmers varieties & farming practice)	27.00	35.00

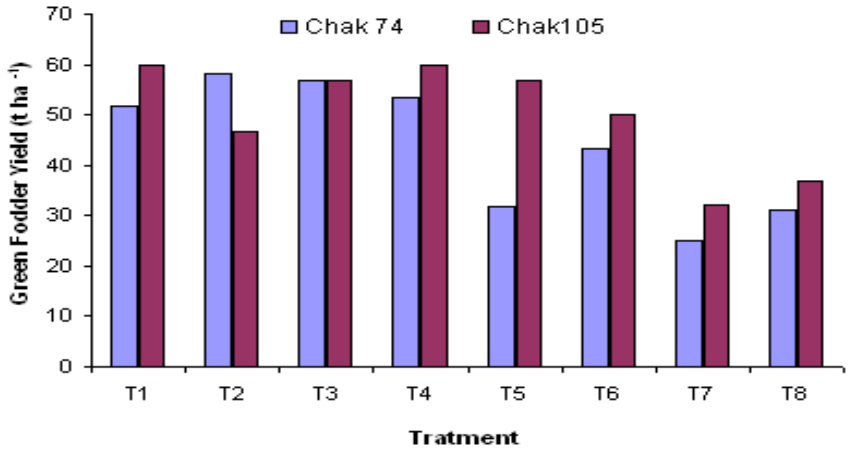

Figure 4. Green fodder yield (t ha^{-1}) of summer crops harvested in September 2007.

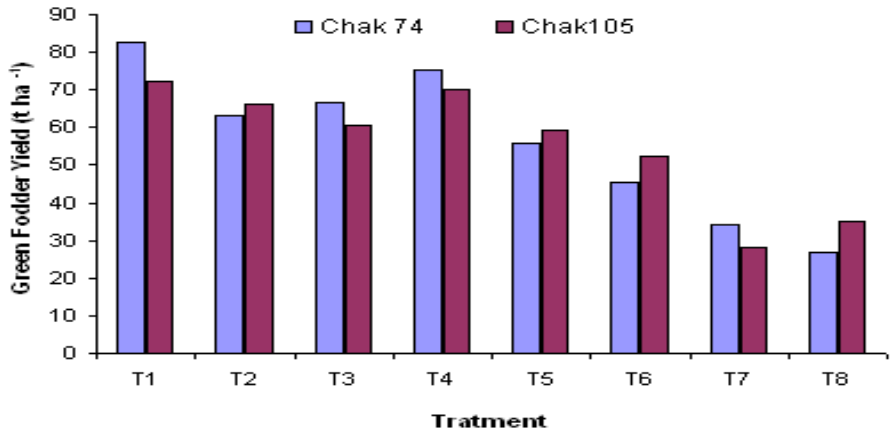

Figure 5. Green fodder yields (t ha^{-1}) summer crops harvested in November 2007.

Winter fodder crops:
Improved varieties of oats, berseem and alfalfa were planted in November 2007. 15 farmers planted each one acre per improved forage variety (5 farmers for each forage species). The15 remaining farmers planted local fodder crops using their traditional production technology. Data collection on these plots is in progress and will be finalized for documentation by May 2008.

Seed production:
It was planned to test seed production with 6 farmers in both villages. However, due to heavy rains during the cropping season the fields were water logged and the crops could not be harvested for seed.

Hay making for lean periods:
Due to standing water in the fields the crops had to be harvested early and could not be conserved.

Multi-cut fodder crops for lean periods
Mott grass was sown with one farmer in Chak No. 105/SB. The other multicut forages will be sown during February-March 2008.

2.3 Theme 3: Livestock Productivity

Rainfed research site, Lodhay village

2.3.1 Activity 3.1: Feedlot fattening of calves (cattle)

A first assessment of the activity was planned for March 2008.

The feeding trial planned for January-February was postponed to start by the second week of March 2008 and the assessment will be done in May 2008. The farmers willing to participate in the activity were selected. Hay from improved fodder of summer cereals and cereal/legume mixtures will be used for fattening cattle calves and the performance of calves will be compared to feeding traditional rations.

2.3.2 Activity 3.2: Feeding trial on buffalos for milk production

A first assessment of the activity was planned for end March 2008.

Hay from summer cereals and cereal-legume mixes will be fed for a period of 60 days to buffaloes for milk production in the winter (January-February 2008) and in the summer (June-July 2008) scarcity periods. The performance will be compared to traditional feeding of low quality roughages. 15 dairy buffalo farmers planted improved varieties of fodder crops and are willing to participate in the feeding trials.

Irrigated research site, Sarghoda, Chak No. 74 SB & Chak No. 105 SB villages

2.3.2 Activity 3: Evaluation of effect of different fodder crop varieties (green fodder and hay/ silage) and concentrates on milk yield and quality in buffalos & cows and on meat production in buffalo and cow calves

First assessments of the effect of feeding lactating animals and fatten buffalo and cattle calves with balanced rations including improved summer crops were planned for end December 2007.

During September-October 2007 a feeding trial with lactating animals was carried out with 15 farmers testing three diets and 5 farmers feeding according to their local practice in each village. The three test diets were fodder from improved forages fed alone or combined with 2 kg concentrate or 2 kg cotton seed cake per animal. In Chak No. 74/SB 28 buffalos and 16 cows (in Chak No. 105/SB 29 buffalos and 13 cows) were fed the test diets while 8 buffalos and 5 cows in both villages were fed according to local practice.

A fattening trial with calves was conducted from July to October 2007. The rations were improved forages plus 200 g concentrate per calf, improved forages and local forages fed alone. In Chak 74/SB 12 buffalo calves and 7 cow calves (in Chak 105/SB 15 buffalo calves and 9 cow calves were fattened with the two test diets, while 6 buffalo calves and 4 cow calves (in Chak 105/SB 7 buffalo and 4 cow calves) received local forage. The data collection could not be carried out as planned as the scale was bought too late. However the other fattening data are being processed and a first assessment will be ready by end March.

2.3.4 Activity 4: Adding value to livestock products through preservation and processing of milk

The expected outputs for this activity were:

- to establish farmers' interest groups for quality milk production and processing by September 2007
- to induce raw milk preservation technology starting in October 2007

Activities were planned for both sites but took only place in Lodhay village. In Sarghoda the activities were supposed to be carried out under the lead of Dr. Nurzhat, a female dairy technologist from the

University of Faisalabad. As she was out of the country, there was no progress in Sarghoda. However, two female MSc students are now working on the subject and activities have started.

Clean milk production practices

The purpose and benefits of clean milk production technology were explained to the community in August 2007. An interest group of about 25 persons with a collective herd size of 75 to 100 animals were willing to participate in this activity was formed. A training workshop was organized with the milk hygiene interest group to explain clean milk production practices such as introduction of teat dips, standard hygiene protocols and utensils etc. In the presence of Veterinary Officer of the area the participants were informed about the use of teat dip cups and its role in prevention of mastitis. They were also briefed about sub-clinical and clinical mastitis and its effect on hygienic milk production and ultimate effect on dairy products and shelf-life of raw milk. Suppliers were contacted to collect information as regards field kits / material for hygienic milking and other testing equipments such as antiseptics, California mastitis test (CMT) kits, dip cups, spray bottle, spray guns, etc. To detect sub-clinical mastitis a CMT kit was obtained and the kit was validated in comparison with standard/reference test. A trial on teat dip cup was also carried out. An order to procure the material for project area has been placed with the supplier. Material for clean milk production has been received and is being distributed to the community members.

Value addition/ milk processing

The project site was visited in July 2007 to assess needs/expectation of the community on milk processing. Information regarding milk production potential and its availability for value addition was collected. Three farmers were interested to collaborate for value addition. Their daily milk availability is 250 to 350 liters. They agreed on a joint facility for milk chilling and processing aiming at the following products of chilled milk, yoghurt and white cheese. The group was also briefed about the milk preservation and processing technology for which the interested persons will be trained. Infrastructure requirement of milk processing and handling, were explained to the group so that necessary arrangement can be made before actual launching of the activity.

For establishment of small scale processing facility to prepare quality yoghurt and/or cottage cheese the interest group was asked to provide basic premise or make arrangements for provision of power (gas) and clean water supply etc. Unfortunately so far they have not succeeded, either in their village or nearby town, in locating such a facility. Furthermore, a nearby market survey revealed that no retail outlets or consumer market exist for cheese. There is only a demand for raw milk and for the conventional style yoghurt, called *DAHI*. The price of milk was Rs. 20 to 22 per liter in August 2007 and Rs. 25 to 27 in November 2007. The price of yoghurt was between Rs. 30 and 35 per kg.

Although efforts are still being made to get a rented place to create a processing facility, as an alternate a small cottage business group, that has successful business links with the Capital, was invited to start a joint venture with the farmers. A meeting was organized between the interest group of the community organization and the processor of value added dairy products. They are working on this idea including a simple alternate to sell / hand over the milk at *premium price* if it is found worth. Taking into consideration the local market price structure the two stakeholders decided to hold another round of meeting after having tested the quality of their produce and the price structure in the Capital market. Another option is to establish a small cottage level set up at NARC to train the interested persons so that they can start their own business according to their convenience.

Qualitative evaluation of milk

In order to assess the quality of milk three samples were collected from the farmers in August 2007 and analyzed. The milk contained about 15.0 to 16.5 % total solids content with fat ranging from 4.5 to 6.2 %. This preliminary evaluation was done with respect to potential for product preparation. In relation to the effect of feeding on milk quality, it was proposed to do on the spot analysis of milk from all experimental animals in feeding trials. The purchase request for a milkoscan is being processed at ICARDA HQ.

2.4 Theme 4: Knowledge exchange

Most of the outputs for this theme are planned for 2008 and 2009 except for a course on scientific writing reporting and data presentation that was foreseen in 2007 but has not yet been conducted.

The following activities were planned for the reporting period:

- Training of stakeholders in fodder crops production, preservation and feeding in September 2007
- Field days, and workshops for stakeholders to exchange knowledge in October 2007
- Quarterly meeting of teams to discuss progress on implementation in November 2007

The training of farmers has been carried out through meetings and on the job training. No field days and stakeholder workshops have been so far conducted as the first assessments of interventions have not yet been completed. Instead of quarterly project meetings, monthly planning meetings are held.

Training of farmers conducted in Lodhay village:

- Making hay from summer cereals and cereal-legume mixtures
- Improved agronomic practices for fodder production.
- Improved feeding practices of livestock
- Clean milk production practices for the milk hygiene interest group of the community in the presence of Veterinary Officer

Planning and coordination meetings:
The annual planning meeting was held from 22-23 August 2007 in Islamabad. The participants were scientists representing the various institutions involved in the project activities and the national and provincial coordinators from the Women Livelihood and Goat Project (see separate Annex).
Monthly meetings of the coordinators and participating scientists are held with the ICARDA country coordinator in Islamabad.

Networks of collaboration created in each country:
Efforts are being made to collaborate with various agricultural institutions/organizations working in the rainfed areas of Pakistan. Also the experience and know how of private enterprises working on feed improvement will be utilized for the respective project activities

Involvement of students:
Graduate students were encouraged to participate in the field experiments of project and to use the results for their master theses. In total seven graduate students are now involved in the project activities (Table 22).

Table 22. List of students involved in the project activities

No	Name of student	University	Name of supervisor	Title of thesis	Discipline	Duration of field work
1	Abdul Rehman	Uni. of Agri., Faisalabad	Muhammad Siddique	Profitability of subsistence verses commercial dairy farming in Punjab, a case study of Sargodha district	Socio-economics	January to June 2008
2	Muhammad Irfan	Uni. of Agri., Faisalabad	Muhammad Siddique	Comparative economics of different dairy production systems in Sargodha district of the Punjab	Socio-economics	January to June 2008
3	Sana Ramzan	Uni. of Agri., Faisalabad	Nuzhat Huma	Effect of drainage pH and calcium contents on the functionality of mozzarella cheese	Dairy Technology	January to June 2008
4	Saliha Ahmad	Uni. of Agri., Faisalabad	Nuzhat Huma	Effect of exopoly-secharides culture on the quality of mozzarella cheese	Dairy Technology	January to June 2008
5	Yasir Mehmood M.Sc (Hons)	Univ. Arid Agric.Rawal pindi	Dr. Ansar	Evaluation of Kharif cereal legume mixture for fodder yield and quality under rainfed condition.	Agronomy	July-December 2008
6	M.Nadeem M.Sc (Hons)	Univ. Arid Agric. Rawalpindi	Dr. Ansar	Evaluation of winter cereal vetch mixtures for fodder yield quality under rainfed condition.	Agronomy	October, 2007 to May, 2008
7	Adeel Anwar M.Sc (Hons)	Univ. Arid Agric.Rawal pindi	Dr. Ansar	Mixed cropping of non traditional winter legumes and oats for sustainable forage productivity	Agronomy	October, 2007 to May, 2008

3 Regional Activities

3.1 Activity 1: Regional (across site) analysis for Theme 1 "Socioeconomics" in Central Asia

The following milestones were foreseen for the reporting period:

- MSc thesis proposal of three students approved by 30 October 2007
- PO for Theme 1, Nariman Nishanov, to visit ICARDA for completing the research design (draft research methods and questionnaires) from 1-15 November 2007
- Regional training from 17-23 November 2007 on designing and testing survey instruments, training material circulated and translated in Russian, questionnaires finalized

Two master students from Kazakhstan are conducting their research in the project (see Theme 4).

As planned Nariman Nishanov visited ICARDA in November 2007 in order to prepare the regional methodology workshop and to conduct a literature search on market studies (presented during the regional workshop). The training socioeconomic workshop on methodology for livelihoods and market analysis and assessment of the biophysical technologies was conducted from 26-30 November 2007 in Tashkent under the lead of Aden Aw-Hassan assisted by Nariman Nishanov. The training workshop was divided into two parts: in the first part the methods required for the socioeconomic activities foreseen in 2008 were developed and discussed by the ICARDA principal investigator (PI), the PO Tashkent and the PIs for socioeconomics from the three Central Asian countries and from Pakistan. In the second part the national coordinators from Kazakhstan and Tajikistan (Dushanbe site) and the PIs for Theme 3 from Central Asia participated (see separate Annex).

Workshop Part 1 - Socioeconomic studies

Three major outputs were achieved:

- Description of project sites in order to develop an appropriate sampling frame
- Key research questions to be answered by surveys
- Start of developing the questionnaires to address these research questions

Workshop Part 2 - Socioeconomic evaluation of biophysical interventions:

Theme 3 "Livestock productivity" was chosen as the example for the workshop. The PIs presented the main interventions in Theme 3 for each country. Then the data requirements were listed and discussed taking the example of one intervention from each country.

3.2 Activity 2: Capacity building: Training scientists in the area of integrated feed resources and livestock production at ICARDA and in the countries

Expected outputs were:

- 1 month GIS training for three Tajik researchers at ICARDA in November 2007
- NPOs for Theme 2 and 3 trained in research methods and analysis for 15 days end 2007 or beginning 2008
- Liba Brent (University of Wisconsin) will work with the Tajik team on value addition to fibre production through improved local processing and Joaquín Mueller from INTA, Argentina, will work with the Kyrgyz and Tajik teams on community based breeding schemes.

The training on GIS had to be postponed because funding by IAEA for two of the three Tajik researchers was not obtained in 2007.

The NPOs for Theme 2 and 3 received individual training at ICARDA from 13-24 January 2008 including field visits at the research sites in Al Bab and Salamieh in Syria. Their visit was used to review the progress reports and the workplans with ICARDA's principal scientists. In particular the workplan for Theme 2 was reviewed and the experimental designs improved. These changes were discussed with the national teams (the revised version of the workplan has been nearly finalized). Furthermore, detailed travel plan in relation to the project activities was developed by Habib Hamdamov.

Liba Brent worked on activity 16 with the Tajik scientists at the Khojand project site from 15 September-16 October 2007. Joaquín Muller visited the project sites in Kyrgyzstan and in Khojand

Tajikistan from 17 September to 7 October 2007 and developed detailed community based breeding plans for activity 15 and data collection schemes for each site.

3.3 Activity 3: Capacity building: English training of scientists to improve the international scientific exchange

The expected outputs was the training of 10-12 scientists from three participating countries in English in Tashkent from December 2007 to February 2008

The English training course for Tajik scientists was conducted in Dushanbe. Eight Tajik participants (4 from Dushanbe and 4 from Khojand) were trained for three months in Dushanbe from 1 November 2007 to 1 February 2008 (Table 23). Four Kyrgyz and three Kazakh participants are currently participating in the English training course conducted from 5 January to 5 April 2008 in Tashkent. Thus, in total 15 researchers will be trained in English. The candidates were carefully selected by the national coordinators in agreement with our project staff. One important selection criteria were age - young or middle aged scientists - and a high probability that the trainees would stay for a longer time in the partner institutes to support their linkage to international organizations and to international publications. The PO for Theme 3, Habib Hamdamov, will receive individual English training lessons in Tashkent.

Table 23. List of participants of the English training course in Dushanbe

#	Name	Place of work	Position	Date of Birth
Training in Dushanbe				
1	Kasymov Alisher	Khujand Branch of Tajik University of Technology	Student, part time in Khujand Branch of Tajik Research Institute of Livestock	10/08/86
2	Makhmudov Khasanboy	Khujand Branch of Tajik University of Technology	Student, part time in Khujand Branch of Tajik Research Institute of Livestock	21/05/86
3	Samatov Jamshid	Khujand Branch of Tajik University of Technology	Scientific worker	17/08/83
4	Kasymov Makhmoud	Khujand Branch of Tajik University of Technology	Scientific worker	18/12/81
5	Ulugov Odiljon	Tajik Research Institute of Livestock	Scientific worker	17/11/82
6	Daminova Karomat	Tajik Research Institute of Livestock	Scientific worker	12/05/83
7	Madjidov Sherzod	Tajik Research Institute of Livestock	Scientific worker	12/05/82
8	Soliev Kobiljon	Tajik Research Institute of Livestock	Laboratory Assistant	27/04/84
Tashkent				
1	Roza Shimelkova	South-West Scientific Center for Agriculture	Scientific worker	23/09/83
2	Abay Sartaev	South-West Scientific Center for Agriculture	Scientific worker	01/08/75
3	Maryam Kalginbaeva	South-West Scientific Center for Agriculture	Scientific worker	26/08/77
4	Kubanchbek Abdukerimov	Institute of Livestock, Veterinary, and Rangelands	Livestock specialist	25/03/81
5	Elmira Akmatova	Institute of Livestock, Veterinary, and Rangelands	Livestock specialist	26/03/70
6	Aliman Kachaganova	Institute of Livestock, Veterinary, and Rangelands	Socioeconomist	16/05/88
7	Altynbek Karybekov	Institute of Livestock, Veterinary, and Rangelands	Range specialist	26/11/79

3.4 Activity 4: Project supervision and interregional knowledge exchange: regional workshops and SCM

The Professional Officers, one for each disciplinary theme, being based at the ICARDA Tashkent office, play an active part in the planning and implementation of the project activities and link the national researchers to the principal Investigators at ICARDA. Their frequent travels to the partner countries and trip reports assure a close monitoring and evaluation of the progress in project implementation.

The regional workshop followed by the first project steering committee (PSC) meeting was held at lake Issyk Kul in Kyrgyzstan from 12-13 September 2007. For the first time the regional workshop brought together scientists from CA and Pakistan. In total 23 participants attended the regional workshop (the national focal points from Tajikistan, Kyrgyzstan and Pakistan, 3 scientists from Pakistan, 2 from Kazakhstan, 3 from Tajikistan, 5 from Kyrgyzstan, the grant's manager from IFAD, the Assistant Director General-International Cooperation and project coordinator from ICARDA HQ, the two POs from Tashkent office, Liba Brent from the University of Wisconsin and Dr. Yusupov, a guest speaker from Uzbekistan, see separate Annex). The scientists from the partner institutes in Central Asia and Pakistan presented preliminary results from the socioeconomic studies, on forage and range production, on livestock productivity and on value addition. Dr. Yusupov presented the results from early weaning and milking Karakul sheep from the first phase of the IFAD project.

During the Steering Committee Meeting (SCM) the progress was briefly summarized by the project coordinator and a preliminary state of expenditures for the first project year was presented. Then the national coordinators of Central Asia and Pakistan presented the work plans and detailed budgets for 2007/2008. The SCM approved the second annual workplan and budget. The minutes of PSC meeting were shared with all participants.

3.5 Activity 5: Web based knowledge exchange (Virtual information Center)

It is expected that the design of the webpage and the training of resource persons in the partner institutes will be completed end 2008.

A first version of the project webpage has been set up in English by Sherzod Kosimov, our web designer in Tashkent office. The website needs to be further improved and translated into Russian. Liba Brent is working on a special webpage for the activities related to value addition (adventureyarns.com) where she plans to include videos and other information. It is planned that she will work with Sherzod on her webpage during her next stay (April/May 2008) to improve and integrate it into the project website.

II Problems during the reporting period and steps taken to remedy these problems

Report writing for Central Asia still demands a lot of time. Although the quality of the annual progress reports has improved, there are still delays and complications related to the translation from Russian to English. To clarify unclear report sections requires a series of exchange of messages and subsequent reiterations of reports. Our POs are also still in a learning process and their knowledge of English is not always sufficient with the exception of Nariman Nishanov.

A major difficulty in the project implementation for range and forage productivity in Central Asia is the lack of forage specialists and a lack of young scientists on range and forage in general. Thus, guidance and support from the ICARDA's PI to reorientate the scientists from range to forage related research is very important.

Experimental designs still require considerable improvements although they were clearly described in the agreed workplans. In particular, the comparison between flocks with improved management and control flocks has not been implemented as planned (Activity 9, 11, 17).

There is also still a bias towards working with larger farmers in some activities in Theme 2 and Theme 3 in Kyrgyzstan and for Theme 2 in Kazakhstan.

Furthermore some unusual weather conditions in Central Asia jeopardized some of the project activities (long extremely cold winter in Tajikistan and flooding in Akdala village in Kazakhstan). In Sarghoda/Pakistan heavy monsoon rains have had negative effects on forage trials and the planned forage conservation activities. Some communication problems with Lodhay village occurred due to telephone network disturbances and made the planning of training workshops and meetings sometimes difficult.

III Progress expected during the following reporting period

Year 2008 is the key period for successful implementation of the project. As the research teams are complete in both regions and administrative problems and uncertainties have been solved or clarified, smooth implementation is expected. The success of the project depends on the support and personal engagement of all involved scientists and support staff at ICARDA and the national partner institutes. Fortunately, we are working in all countries with highly motivated partners that are trying hard to make the project a success.

Some issues deserve special attention in 2008 and 2009:

- Ensuring data collection and quality, in particular data necessary for economic evaluation of interventions
- Strengthening activities on forage production
- Linking farmers to improved forage seed supply
- Organization of field days with a range of stakeholders
- Producing training material for successful interventions
- Training of students working in the project
- Improving webpage and ensure training of responsible “webmasters” at the partner institutes in CA and Pakistan.

Annextable 1. Farmers' profiles selected for fodder interventions in Lodhay Village/Pakistan and area planted with improved summer forages in 2007

No	Farmer's Name	Farm size (canals)	No of animals		Area (canals*) planted with					Dry matter yield of mixture (tons)
			Buffalo	Cows	Maize	Millet	Sorghum	Guar	Cow-pea	
1	M. Javed	140	5	2	-	10	10	4	6	6.25
2	M. Hanif	12	4	-	-	2	-	-	2	1.25
3	Abdul Rauf	12	3	1	2	2	3	2	2	2.25
4	M. Saqib	80	3	1	4	4	4	2	4	3.75
5	Wasim Razzaque	60	4	-	-	3	3	-	2	1.25
6	Qammer Zaman	16	2	-	-	2	-	-	2	1.25
7	Lal Hussain	40	1	2	10	12	8	18	4	13.75
8	Nizakat	12	3	1	2	4	4	4	-	2.50
9	Khurram Manzoor	100	-	4	-	2	6	2	-	1.25
10	Sikander Hayat	32	2	1	-	4	1	-	1	0.63
11	M Nawaz	80	6	-	4	4	4	-	4	2.50
12	M Ghouse	200	2	-	2	3	-	2	2	2.50
13.	Khuram Pewrveez				-	8	1	1	-	0.63
14.	Shah Zaman				-	3	-	1	-	0.63
15.	Abdul Hussain				-	3	-	1	-	0.63
16.	Jehangir				-	3	-	1	-	0.63
17.	Shahid Mehmood				-	3	-	-	1	0.63
18.	Qaisar				-	3	3	4	-	2.50
19.	Tauqeer				-	3	-	2	-	1.25
20.	Anwar Sadat				-	3	3	5	1	3.75

*20 canals= 1 ha

Annextable 2. Farmers planting improved winter forages in Lodhay Village/Pakistan

	Name of Farmer	Area planted (Kanal)	Quantity of Seed provided	
			Oats (kg)	Vetch (kg)
1	M. Javed	8	30	8
2	M. Javeed	48	-	48
3	M. Hanif	4	15	4
4	Shamrooz	8	30	8
5	Amjad	6	25	6
6	Shahid Mehmood	8	30	8
7	Jehangir	4	15	4
8	Touqir	4	15	4
9	Khurram Manzoor	10	40	10
10	Anwar Saadat	8	30	none
11	Abdul Rauf	6	20	6
12	M. Saqib	8	30	8
13	Wasim Razzaq	4	15	4
14	Qammer Zaman	4	15	4
15	Lal Hussain	12	45	12
16	Nazakat	10	40	10
17	Khurram Perveez	8	30	8
18	Sikander Hayat	40	150	40
19	M Ghouse	8	30	8

Annextable 3. Farmers planting improved varieties of oats for seed production

No	Name of Farmer	Area Planted by Project (Kanal)	Oats (kg)
1	Lal Hussain	2	10
2	M. Javeed	4	20
3	Anwar Saadat	4	10
4	Waseem	4	10

Annextable 4. Farmers planting improved varieties of oats and berseem for selling green forages

No	Name of Farmer	Area planted by Project (Kanal)	Quantity of Seed provided	
			Oats (kg)	Berseem (kg)
1	Lal Hussain	40 (32 + 8)	140	12
2	Jehangir	4	12	6
3	Saqib	4	12	6
4	Waseem	2	6	3
5	Anwar Saadat	4	12	6
6	Nazakat	2	6	3