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

IFAD Technical Assistance Grant (TAG): ICARDA-816

Third Annual Workplan
1 January – 31 December 2009

ICARDA and NARS of Kazakhstan, Kyrgyzstan, Tajikistan and Pakistan

Introduction

The first annual workplan described the research sites and outlined the project activities for each research theme in Central and South Asia, which were revised and further specified in the second annual workplan. The third workplan covers the period from 1 January to 31 December 2009 in the expectation that the project will be extended for six months. The presented workplan is a continuation of the previous workplans. Most activities are continued but were evaluated and modified based on discussions with village communities, individual farmers and decisions made in the national annual meetings. The activities are being presented below by region, themes and country.

Central Asia

In theme 1 "Socioeconomics" the three activities foreseen in the previous annual workplans will be continued and completed:

- Activity 1. Analysis of rural livelihoods
- Activity 2. Socioeconomic evaluation of technological options
- Activity 3. Analysis of market chains and farmers' market access in Kazakhstan (lambs), Kyrgyzstan (lambs, sheep milk), and Tajikistan (Mohair goat fiber)

To facilitate Activity 2 an interdisciplinary training workshop (biophysical and socioeconomic scientists) is planned for mid 2009 when most data are available.

In theme 2 "Range and Forage Productivity" activities in Central Asia are grouped under two general activities (4 and 5).

Under Activity 4 "Participatory evaluation and dissemination of improved fodder crops and agronomic packages to increase the feed resource base", the following research activities are carried out:

- Monitoring of rangeland productivity in Kyrgyzstan
- Testing of interventions to increase productivity of hayfields in Kyrgyzstan and Dushanbe/Tajikistan (fertilization, oversowing with sainfoin)
- Testing of interventions to increase productivity of degraded rangelands in Kazakhstan and Khujand/Tajikistan
- Integration of food/feed legumes and non-traditional summer cereals into the winter cereal cropping systems in Kyrgyzstan and at both sites in Tajikistan
- Testing of improved agronomic practices for forage crops in Kazakhstan and at both sites in Tajikistan.

Under Activity 5 "Promoting efficient use of fodder crops, crop residues and agro-industrial by-products for increased meat and milk", improved feed rations are being tested in Kyrgyzstan and Khujand/Tajikistan.

In Theme 3 "Livestock productivity" the testing/implementation of 16 different activities will be continued (Activity 12 in Kyrgyzstan will not be continued). These interventions target sheep or goats and different livestock products. Four major types of interventions are being undertaken:

- Introducing improved management packages including more cost effective flock structures, supplemental feeding, improved animal health care in Kyrgyzstan and in Tajikistan
- Early lambing and early weaning in Kazakhstan
- Product diversification in sheep production through milk production in Kazakhstan and Kyrgyzstan
- Community-based breeding schemes in Kyrgyzstan and Khujand/Tajikistan
- Value addition through processing in Kazakhstan and Khujand/Tajikistan.

South Asia (Pakistan)

In 2009 the main focus in the rainfed and irrigated research sites of Pakistan will be on confirming results for interventions that proved successful in the previous project years and on their socioeconomic evaluation. In Theme 2 these are the interventions increasing forage production (improved varieties of winter and summer crops with agronomic practices) and conserving feed for periods of scarcity (making of Guar hay). For Theme 3 feeding trials with buffalo and cattle for milk production and fattening will be repeated with promising feeding rations of which the components are readily available. Improved milking techniques and hygiene will be further outscaled at the rainfed site through training and introducing adequate equipment; at the irrigated sites main emphasis will be on finding markets for the dairy products produced by the women groups.

The supporting interventions that are being undertaken in the communities – the established small scale feed mills, breeding buffalo bulls and the delivery of animal health services – have to made

independent of the project. The required support needs to be organized and maintained through the communities and local scientists.

Theme 4: Knowledge exchange and capacity building in the countries
Training of farmers is an important component of most project activities, for example in fodder crop production, forage preservation, strategic feeding, milking techniques and processing of yogurt and cheese. Emphasis in 2009 will be given to field days and workshops inviting relevant stakeholders to share successes and failures and discuss options for outscaling.

Regional activities
The webpage in Russian and English will be further developed as a tool to enhance exchange of information between the regions although timely translation of documents will not be easy with the available human resources at Tashkent office. The language barrier is a major hindrance to direct exchange between the scientists participating in the project.
The final regional workshop planned for October 2009 aims at exchanging well documented research results from all countries and discussing lessons learnt.

Country Activities

1 Central Asia

Theme 1: Socioeconomics

The principal investigator to lead in this theme on behalf of ICARDA is Dr. Aden Aw-Hassan.

Kazakhstan

Sites: 3 villages and 3 livestock markets in the 3 districts and 1 livestock market in Shymkent, center of the South-Kazakhstan province.

Location of villages:
Akdala village in Arys district, Akbulak village in Ordabas district, Juynek village in Turkistan district.

Livestock markets are located in Shymkent, at Badam station, in Arys town, and in Turkistan town.

Activity 1. Analysis of rural livelihoods

Staff involved: Dr. N. Alibaev, Dr. M. Uskenov, Dr. Myrzaliev

Master student: Ms. A. Aymyrzaeva, “Analysis of the effects of changes in sheep production systems, due to market and weather changes, on rural livelihoods in South-Kazakhstan region”

Other staff: S. Abulgaziev, R. Kanseitov, G. Toyshibekova, G. Lakhanova, Adilbekov, M. Kalgimbaeva, B. Narbota

Methods:
- Baseline survey on small ruminant producers
  - Data checking and cleaning completed by 15 January 2009.
  - Analysis of rural household incomes, Jan-March 2009
  - Analysis of access of smallholders to natural resources, Jan-March 2009
  - Cross-site analysis of households’ flock size dynamics in the last 3 years, Jan-March 2009.

Activity 2. Socioeconomic Evaluation of the technological options

Staff involved: Dr. N. Alibaev, Dr. M. Uskenov Dr. J. Parzhanov, B. Narbota, Dr. Myrzaliev, Ms. E. Kunanbaeva, M. Kalgimbaeva

Study title: "Assessment of the socio-economic feasibility of livestock improvement technologies in South-Kazakhstan region"

Other staff: A. Kashkarov, S. Abulgaziev, R. Kanseitov, G. Toyshibekova, G. Lakhanova, Adilbekov, M. Kalgimbaeva, B. Narbota

Methods:

- Work on the economic assessment of proposed new technologies with the other research teams
  - Identification of the technologies to be assessed, Jan-Feb 2009
  - Development of guidelines for technology assessment, Jan-Feb 2009
  - Collection of the required data, March-May 2009
  - Analysis of the economic feasibility, June-Aug 2009
  - Preparation of reports and articles, Sept-Dec 2009

Activity 3. Market analysis

Staff involved: Dr. N. Alibaev, Dr. M. Uskenov Dr. J. Parzhanov, B. Narbota, Dr. Myrzaliev, Ms. E. Kunanbaeva, M. Kalgimbaeva

Master student: Ms. Kh. Mamanova, "Analysis of the determinants and outcomes of livestock producers' marketing strategies in Kazakhstan: The case of lambs and mutton market"

Other staff: A. Kashkarov, S. Abulgaziev, R. Kanseitov, G. Toyshibekova, G. Lakhanova, Adilbekov, M. Kalgimbaeva, B. Narbota

Methods:

- Analysis of Marketing strategies of rural households based on the producer survey at all sites, Jan-March 2009
- Analysis of monthly price fluctuations for staple food, forage and livestock products to be completed (started in Oct 2007), Jan-Dec 2009
- Continuation of weekly monitoring of livestock market prices, Jan-June 2009
- Analysis of market integration at all sites, July-Oct 2009
- Report writing, Nov-Dec 2009

Time frame for all activities:

Activities	**2009**											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Activity 1. Analysis of rural livelihoods Baseline survey on small ruminant producers												
Data checking and cleaning completed by January 15												
Analysis of rural household incomes												
Analysis of access of smallholders to natural resources												
Cross-site analysis of households' livestock flock size dynamics for last 3 years												
Activity 2. Socioeconomic Evaluation of the technological options Work on the economic assessment of proposed new technologies with the other research teams												
Identification of the technologies to be assessed												

Activities	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Development of guidelines for technology assessment												
Collection of the required data												
Analysis of the economic feasibility												
Preparation of reports and articles												
Activity 3. Market analysis												
Analysis of Marketing strategies of rural households based on the producer survey at all sites												
Analysis of monthly price fluctuations for staple food, forage and livestock products to be completed (started in Oct 2007)												
Continuation of weekly monitoring of livestock market prices												
Analysis of market integration at all sites												
Report writing												

Kyrgyzstan

Project sites: Ak-Beket village, Kemin district; Progress village, Chuy district; Komsomolskiy village, Sokuluk district

Activity 1. Analysis of rural livelihoods

Research team: J. Isakov, A. Ajibekov, U. Osmonaliev, A. Kachaganova

Methods:

- Baseline survey on small ruminant producers
  - Data checking and cleaning completed by 15 January 2009.
  - Analysis of rural household incomes Jan-April 2009
  - Analysis of access of smallholders to natural resources Jan-April 09
  - Cross-site analysis of households' flock size dynamics for last 3 years Jan-March 2009

Activity 2. Socioeconomic Evaluation of the technological options

Research team: J. Isakov, A. Ajibekov, U. Osmonaliev

Methods:

- Work on the economic assessment of proposed new technologies with the other research teams
  - Identification of the technologies to be assessed, Jan-Feb 2009
  - Development of guidelines for technology assessment, Jan-Feb 2009
  - Collection of the required data, March-May 2009
  - Analysis of the economic feasibility, June-Aug 2009
  - Preparation of reports and articles, Sept-Dec 2009.

Activity 3. Market analysis

Research team: J. Isakov, A. Ajibekov, U. Osmonaliev

Methods:

Lamb and mutton market

- Data checking and cleaning completed by 15 January 2009

- Analysis of Marketing strategies of rural households based on the producer survey at all sites Jan-March 2009
- Analysis of monthly price fluctuations for staple food, forage and livestock products to be completed (started in Oct 2007) Jan-Dec 2009
- Continuation of weekly monitoring of livestock market prices Jan-June 2009
- Analysis of market integration at all sites July-Oct 2009
- Report writing Nov-Dec 2009

Sheep milk market

- Review the socioeconomic report of the first phase of this project by Nariman, January 2009
- Identify the market potential for sheep milk from that report by Nariman, January 2009
- Conduct an opinion survey (using a very short checklist) of farmers who have been involved in the dairy sheep experiment, their neighbors and others in the community-men and women separately (Nariman will prepare the check list in consultation with Aden), February-March 2009
- Conduct a brief of local consumers opinion poll on their views of sheep dairy products (men and women separately), March-April 2009
- Conduct a quick survey of the retail stores in Kemin, Chuy and Sokuluk districts as well as the retail stores in Bishkek to find out if they are selling any dairy sheep products (including imported products), their prices and consumer preferences (Nariman to prepare the checklist in consultation with Aden), April-May 2009
- Report writing, July-August 2009

Time frame for all activities:

Activities	**2009**											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Activity 1. Analysis of rural livelihoods ***Baseline survey on small ruminant producers***												
Data checking and cleaning completed by January 15												
Analysis of rural household incomes												
Analysis of access of smallholders to natural resources												
Cross-site analysis of households' livestock flock size dynamics for last 3 years												
Activity 2. Socioeconomic Evaluation of the technological options Work on the economic assessment of proposed new technologies with the other research teams												
Identification of the technologies to be assessed												
Development of guidelines for technology assessment												
Collection of the required data												
Analysis of the economic feasibility												
Preparation of reports and articles												
Activity 3. Market analysis												
Lamb and mutton market												
Analysis of Marketing strategies of rural households based on the producer survey at all sites												
Analysis of monthly price fluctuations for staple food, forage and livestock products to be completed (started in Oct 2007)												
Continuation of weekly monitoring of livestock market prices												

Activities	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Analysis of market integration at all sites												
Report writing												
Sheep milk market												
Review the socioeconomic report of the first phase of this project-Nariman, January 09												
Identify the market potential for sheep milk from that report-Nariman, 09												
Conduct an opinion survey (using a very short checklist) of farmers who have been involved in the dairy sheep experiment, their neighbors and others in the community-men and women separately (Nariman will prepare the check list in consultation with Aden)												
Conduct a brief of local consumers opinion poll on their views of sheep dairy products (men and women separately)												
Conduct quick survey of the retail stories in the survey Kemin, Chuy and Sokuluk districts as well as the retail stores in Bishkek to find out if they are selling any dairy sheep products (even if it is imported), their prices and consumer preferences (Nariman to prepare the checklist in consultation with Aden)												
Report writing												

Tajikistan

Sogd province, Khujand site

Location: B. Gafurovskiy district, Jamoat Ismoil, villages: Korajingil, Takli, Ouyas and Kurgancha

Research team: Sh. Makhmudov, M. Boboev

Activity 1. Analysis of rural livelihoods

Methods:

- Baseline survey on small ruminant producers
  - Data checking and cleaning completed by 15 January 2009.
  - Analysis of rural household incomes, Jan.-March 2009
  - Analysis of access of smallholders to natural resources, Jan.-March 2009
  - Cross-site analysis of households' livestock flock size dynamics for the last 3 years, Jan.-March 2009.

Activity 2. Socioeconomic Evaluation of the technological options

Methods:

- Work on the economic assessment of proposed new technologies with the other research teams
  - Identification of the technologies to be assessed, Jan-Feb 2009
  - Development of guidelines for technology assessment, Jan-Feb 2009
  - Collection of the required data, March-May 2009
  - Analysis of the economic feasibility, June-Aug 2009
  - Preparation of reports and articles, Sept-Dec 2009

Activity 3. Market analysis (with a focus on mohair goat fiber)

Methods:

- Analysis of Marketing strategies of rural households based on the producer survey at all sites, Jan-March 2009
- Analysis of monthly price fluctuations for staple food, forage and livestock products to be completed (started in Oct 2007), Jan-Dec 2009
- Analysis of market integration at all sites, July-Oct 2009
- Report writing Nov-Dec 09
- Continued value chain analysis at Khujand site, Jan-May 2009

Time frame for all activities:

Activities	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Activity 1. Analysis of rural livelihoods Baseline survey on small ruminant producers												
Data checking and cleaning completed by 15 January												
Analysis of rural household incomes												
Analysis of access of smallholders to natural resources												
Cross-site analysis of households' livestock flock size dynamics for last 3 years												
Activity 2. Socioeconomic Evaluation of the technological options Work on the economic assessment of proposed new technologies with the other research teams												
Identification of the technologies to be assessed												
Development of guidelines for technology assessment												
Collection of the required data												
Analysis of the economic feasibility												
Preparation of reports and articles												
Activity 3. Market analysis (with a focus on mohair goat fiber)												
Analysis of Marketing strategies of rural households based on the producer survey at all sites												
Analysis of monthly price fluctuations for staple food, forage and livestock products to be completed (started in Oct 2007)												
Analysis of market integration at all sites												
Report writing												
Continued value chain analysis												

Tajikistan

Vakhdat district, Dushanbe site

Project sites: Buzbit village, Karsang, Mekhnatobod, Muminobodi Poyon, Muminobodi Bolo, and Zardolu villages in Vakhdat district; Kosatoaroshi Bolo, Kosatoaroshi Poyon, Chorvador villages in Varzob district

Livestock markets: Vakhdat in Vakhdat district; Rudaki in Rudaki district, Chorbog in Varzob district, Sharora in Gissar district

Forage and feed markets: Kolkhoz Russia in Rudaki district, Sultonobod in Rudaki district, and markets in Dushanbe

Food markets in Rudaki, Varzob, and Vakhdat districts and in Dushanbe

Research team: G. Safaraliev, A. Kodirov, Deputy Head of the Economy and Forecasting Dpt. Ministry of Agriculture, M.Sc. K. Soliev

Activity 1. Analysis of rural livelihoods

Methods:

- Baseline survey on small ruminant producers
  - Data checking and cleaning completed by 15January 2009.
  - Analysis of rural household incomes Jan.-March 2009
  - Analysis of access of smallholders to natural resources Jan-March 2009
  - Cross-site analysis of households' flock size dynamics for last 3 years Jan-March 2009

Activity 2. Socioeconomic Evaluation of the technological options

Methods:

- Work on the economic assessment of proposed new technologies with the other research teams
  - Identification of the technologies to be assessed, Jan-Feb 2009
  - Development of guidelines for technology assessment, Jan-Feb 2009
  - Collection of the required data, March-May 2009
  - Analysis of the economic feasibility, June-Aug 2009
  - Preparation of reports and articles, Sept-Dec 2009.

Activity 3. Market analysis

Methods:

- Analysis of the Marketing strategies of rural households based on the producer survey at all sites, Jan-March 09
- Analysis of monthly price fluctuations for staple food, forage and livestock products to be completed (started in Oct 2007), Jan-Dec 09
- Analysis of market integration at all sites, July-Oct 09
- Report writing, Nov-Dec 09.

Time frame for all activities:

Activities	**2009**											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Activity 1. Analysis of rural livelihoods Baseline survey on small ruminant producers												
Data checking and cleaning completed by January 15												
Analysis of rural household incomes												
Analysis of access of smallholders to natural resources												
Cross-site analysis of households' flock size dynamics for last 3 years												
Activity 2. Socioeconomic Evaluation of the technological options Work on the economic assessment of proposed new technologies with the other research teams												
Identification of the technologies to be assessed												

Activities	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Development of guidelines for technology assessment												
Collection of the required data												
Analysis of the economic feasibility												
Preparation of reports and articles												
Activity 3. Market analysis												
Analysis of Marketing strategies of rural households based on the producer survey at all sites												
Analysis of monthly price fluctuations for staple food, forage and livestock products to be completed (started in Oct 2007)												
Continuation of weekly monitoring of livestock market prices												
Analysis of market integration at all sites												
Report writing												

Theme 2: Range and Forage Productivity

The principal investigators to lead this theme on behalf of ICARDA are Dr. Asamoah Larbi (forage) and Dr. Mounir Louhaichi (range).

Kazakhstan

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

Location: Akdala village, Arys District

Collaborating scientists: Abdraimov Seyfulla, Ibragimov Talgat, Eskaraev Nurali, Sartaev Ergen (South-Western Scientific Production Center for Agriculture), Shabanova Ludmila from Astana University

Farmers: Abdukhalik Kasymbay, Duysen, farmers Kojanov Yusup, Ibragimov Oraz and Arynbayev Orinkhan.

Activity 4.1 Effect of oversowing on the productivity of degraded rangelands

Two on-farm experiments will be established with full participation of farmers to evaluate oversowing of degraded rangelands as a rehabilitation measure.

Objective:
The main objective of this experiment is to rehabilitate degraded rangelands using indigenous and well adapted shrubs.

Experiment 1: Comparison of the effects of oversowing with two indigenous shrub species

Methods:
Plant material:
A degraded rangeland site will be oversown with seeds of indigenous well adapted shrub species. The selected species include Haloxylon, Kochia and a mixture of both species.

Treatments:
A site near the settlements was selected. Seeds of Kochia and Haloxylon were collected during the months of September and October 2008. Sowing took place in early December 2008. The productivity

of the “improved” plots will be compared to undisturbed rangeland sites with and without grazing considered as control.

- Natural rangeland (control with no grazing)
- Natural rangeland + livestock grazing (represent current range/livestock practice)
- Natural rangeland + Haloxylon (5 kg/ha)
- Natural rangeland + Kochia (3 kg/ha)
- Natural rangeland + a mixture of Haloxylon and Kochia (4 kg/ha 3+2)

Experimental design:
The five treatments will be repeated four times. Plot size will be 150 m^2 (10m x 15m) and total field size 3000 m^2.

Observations:
Data will be collected every month from the start of germination until the end of the growing season.

- Determine percent plant cover (visually and digitally using platform photography).
- Determine plant density (number of plants/unit area)
- Assess indicators of soil erosion such as:
  - Rill: A small, intermittent water course with steep sides, usually only several centimeters deep (SSSA 1997). Rills generally are linear erosion features.
  - Pedestal (erosional): Plants or rocks that appear elevated as a result of soil loss by wind or water erosion (does not include plant or rock elevation as a result of non-erosional processes such as frost heaving).
  - Litter movement
- Record/rank dominant plant species: Plant species or species groups, which by means of their number, coverage, or size, have considerable influence or control upon the conditions of existence of associated species (SRM 1999). For this experiment dominant plants are those of the greatest size per unit area as measured by biomass, production, or cover.
- Record invasive plant species: Plant species that were absent in undisturbed portions of the original vegetation of a specific range site and will invade or increase following disturbance or continued heavy grazing (SRM 1999).
- Determine the biomass production.
- Determine total digestible nutrients (nutritional analysis).

Time frame:

Activities	**2008**				**2009**					
	S	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**
Site selection										
Seed collection										
Soil preparation & sowing										
Monitoring seed germination/plant growth & field data collection										
Data analysis										
Report preparation										

Experiment 2: Determining appropriate seeding rates for the main two shrub species used for rangeland rehabilitation

Methods:
Different seeding rates of Haloxylon and Kochia shrub plants will be studied.

- First, seed germination tests will be evaluated in the laboratory.
- Then, on-farm demonstrations will be conducted to compare re-vegetation successes rate of both species.

Results will be compared with undisturbed control plots with and without grazing.

Treatments:

- Natural rangeland (control with no grazing)
- Natural rangeland + livestock grazing (represent current range/livestock practice)
- Natural rangeland + Haloxylon 3 kg/ha
- Natural rangeland + Kochia 3 kg/ha
- Natural rangeland + Haloxylon 5 kg/ha
- Natural rangeland + Kochia 5 kg/ha

Experimental design:
The six treatments will be repeated three times. Plot size will be150 m^2 (10m x 15m) and total field size 2700 m^2.

Observations:
Data will be collected every month from germination to end of growing season.

- Determine percent plant cover (visually and digitally using platform photography). For instructions how to acquire vertical digital photography use the same procedure as outlined in experiment 1
- Determine plant density (number of plants/unit area)
- Record/rank dominant plant species: Plant species or species groups, which by means of their number, coverage, or size, have considerable influence or control upon the conditions of existence of associated species (SRM 1999). For this experiment dominant plants are those of the greatest size per unit area as measured by biomass, production, or cover.
- Record invasive plant species: Plant species that were absent in undisturbed portions of the original vegetation of a specific range site and will invade or increase following disturbance or continued heavy grazing (SRM 1999).
- Determine biomass production.
- Determine total digestible nutrients (nutritional analysis).

Time frame:

Activities	**2008**				**2009**					
	S	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**
Site selection										
Seed collection										
Soil preparation & seeding										
Monitoring seed germination/plant growth & field data collection										
Data analysis										
Report preparation										

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

Experiment 1: Determining planting dates and seeding rates for maize production

Methods:
Four planting dates and two seeding rates of hybrid maize will be tested to study yield potential and economics of improved fodder production.

Treatments:

Farmer 1	**Farmer 2**	**Farmer 3**	**Farmer 4**
Planting dates:	Planting dates:	Seeding rates:	Seeding rates:
15/04/09	15/04/09	35 kg/ha	35 kg/ha
30/04/09	30/04/09	25 kg/ha	25 kg/ha
15/05/09	15/05/09		
30/05/09	30/05/09		

Observations:
- Seed germination
- Plant density
- Plant height
- Days to maturity
- Grain yield, Biomass yield
- Nutritional analysis
- Economics of fodder produced will be estimated at market rates

Experiment 2: Fertilization of alfalfa fields

Methods:
Three ammophos application rates (40, 60 and 80 kg/ha) in alfalfa fields will be tested on one large farm (Kasymbay) and three household farms. Each treatment will be planted with four replications on the farm/households' fields.

Treatments:
- Alfalfa with no fertilization
- Alfalfa with 40 kg/ha ammophos
- Alfalfa with 60 kg/ha ammophos
- Alfalfa 80 kg/ha ammophos

Experimental design:
The experiment will be implemented on four farmers' fields. Plot size will be 50 m^2 (10x5m) and total field size 3200 m^2.

Observations:
- Plant height
- Green fodder yield
- Dry fodder yield
- Nutritional analysis
- Cost benefit analysis

Time frame:

Activities	**2009**											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Activity 4.2 – Experiment 1												
Land preparation												
Planting of maize												
Phenological observations												
Nutritional analysis												
Maize harvest												
Activity 4.2 – Experiment 2												
Alfalfa cut												
Ammophos application												
Monitor green and dry biomass yield												
Data analysis												
Cost benefit analysis												
Activity 4.2												
Field days with farmers and communities												
Reporting												

Expected outputs/milestones	**Date**
Improved fodder crop cultivars and agronomic practices disseminated	October 2009
Reduced winter feed gaps through increased alfalfa and maize production	Winter 2009

Kyrgyzstan

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

Location: Ak-Beket (Alimseit), Kemin district, on bir jilga (Kenesh), Chuy district

Collaborating scientists:
Scientists: K. Joldoshev, T. Attokurov, B. Asanakunov, I. N. Ponomarenko (Kyrgyz Research Institute of Livestock, Veterinary, and Rangelands)
Farmers: Asanov Rysbek, Abdimajitov Nurjan

Background/Justification:
Forage produced on irrigated fields and hay produced on natural hayfields provide about 50-80% of winter feed on the farms “Alymseit”, “Kenesh” and in the neighboring communities. In summer animals are grazed on natural mountain rangelands. However, productivity of irrigated fodder is low due to the use of poor agronomic practices (fertilization and seeding rates, low-yielding cultivars, mono-cropping), and that of the natural hay fields is low due to poor grazing management e.g. continuous grazing.

Objectives:
The objective of this activity is to undertake activities to improve the supply of high quality feed. Specific objectives include:

- to compare productivity of natural hay fields versus hay fields oversown with sainfoin
- to compare the effect of fertilization on productivity of hay fields
- to integrate alfalfa into the traditional wheat and barley mono-cropping systems

Activity 4.1: Productivity of rangelands in the Chuy province, Kyrgyzstan

Methods:
Experimental sites:
Trials will be conducted at three sites in Chuy province in northern Kyrgyzstan (Kenesh farm N 42. 60140° E 075. 41236°, Alimseyit N 42. 70239° E 075. 64924° and community rangelands).

Observations:
Pasture growth and botanical composition will be monitored at random positions in four permanent observation plots at each site. Cover, biomass and botanical composition will be assessed once a year in spring from herbage cut to ground level in 0.25 m^2 quadrats in each of the plots. Observations of net pasture growth (the difference between true growth and decay) will be based on changes in herbage mass in plots (three plots per block)at monthly intervals.

Time frame:

Activities	2008				2009					
	S	O	N	D	J	F	M	A	M	J
Site selection										
Plant cover										
Botanical composition										
Herbage mass										
Plot yield at monthly intervals										
Data analysis										
Report preparation										

Activity 4.2: Effect of over-sowing and ammonium nitrate fertilization on productivity of hayfields

These technologies were applied in combinations of: application of nitrogen, oversowing with sainfoin in different tillage methods namely ploughed and minimum, and different seeding rates. This activity was conducted on one medium scale farms Alimseyit 2008 and the activity will be monitored in the same field in 2009.

Experiment 1: Determining the effect of nitrogen fertilization on productivity of hayfields

Methods:
A hayfield at Alymseit farm will be selected. Three application rates of ammonium nitrate will be compared with non fertilized plots.

Treatments:
- Natural hayfield (control)
- Natural hayfield + 30 kg ha^{-1} ammonium nitrate
- Natural hayfield + 40 kg ha^{-1} ammonium nitrate
- Natural hayfield + 50 kg ha^{-1} ammonium nitrate

Experimental design:
The experiment will be established at Alimseyit farm in Kemin district with four replications per treatment. Plot size is 100m^2 (25x4 m); total area of the experiment is 1600 m^2.

Observations:
- Plant density
- Plant height
- Plant cover
- Botanical composition
- Biomass yield
- Cost benefit analysis

Experiment 2: Determining optimal soil preparation for planting sainfoin in hayfields

Methods:
Two tillage methods (ploughing and minimum tillage) to establish sainfoin in hayfields are being tested in this experiment. The undisturbed hayfield is compared as control. The experiment was established in March 2008 at Alimseyit farm and monitoring of the experiment will be continued in 2009.

Treatments:
- Natural hayfield (control)
- Hay field ploughed and seeded with sainfoin
- Hay field with minimum tillage and seeded with sainfoin

Experimental design:
Plot size is 10000 m^2 (200x50 m); total experimental area of the is 3 ha.

Observations:
- Plant density
- Plant height
- Plant cover
- Botanical composition
- Biomass yield
- Cost benefit analysis

Experiment 3: Determining appropriate seeding rates for sainfoin

Methods:
Two different seeding rates of sainfoin will be tested and compared with a natural hayfield as control.

Treatments:
- Natural hayfield (control)
- Control + 60 kg seeds of Sainfoin
- Control + 70 kg seeds of Sainfoin

Experimental design:
The experiment will be implemented on Alimseyit farm in Kemin district. The treatments will be repeated four times. Plot size is 100m^2 (25x4 m) and total area of the experiment is 1200 m^2.

Observations:
Data will be collected at monthly intervals from March-June.
- Plant density
- Plant height
- Plant cover
- Botanical composition
- Biomass yield at monthly intervals
- Cost benefit analysis

Two field days to discuss the benefits of oversowing and application of nitrogen are planned for participating households and pilot farms in Kemin and Chuy district in April and June 2009: (1) "Rational use of communal pastures in the Northern part of Kyrgyzstan" and (2) "New technological options to improve hay field productivity and to increase farmers' income"

Time frame for the activities:

Activities	**2009**											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Activity 4.2 – Experiment 1												
Application of ammonium nitrate												
Data collection												
Data analysis												
Activity 4.2 – Experiments 2 and 3												
Plant height												
Plant cover												
Botanical composition												
Biomass yield												
Cost benefit analysis												
Data analysis												
Plant cover and biomass estimation												
Activity 4.2												
Field days with farmers and communities												
Reporting												

Expected outputs/milestones	**Completion**
Productivity of community hayfield improved by 10% from oversowing and nitrogen application	July 2009
Different soil tillage method for improved hayfield and livestock productivity	August 2009

Activity 4.3: Integration of food/feed legumes and summer cereals into the winter cereal cropping systems

Double cropping is not a common practice in the conditions of Kyrgyzstan. Introducing mung bean or summer cereals (maize and pearl millet) into the continuous winter wheat and barley cropping is being proposed as an option to increase supply of quality feed and improve soil fertility.

Experiment 1: Determining appropriate seeding rates of mung bean for use as double crop

Methods:
This experiment will be conducted at the central experimental farm of the Kyrgyz Research Institute of Livestock and Pasture near Bishkek city. Four different seeding rates of mung bean crop will be tested after wheat harvest on a field that has been continuously planted with winter wheat or barley. The best seeding rate will be recommended for use under farm conditions and introduced to the households.

Treatments:
- Wheat
- Wheat + mung bean (14 kg/ha)
- Wheat + mung bean (16 kg/ha)
- Wheat + mung bean (18 kg/ha)
- Wheat + mung bean (20 kg/ha)

The five treatments will be planted in four replications. Plot size will be 25m^2 (8,3x3 m); total area will be 500 m^2.

Observations:
- Plant density
- Plant height
- Number pods per plants
- TKW
- Days to maturity
- Grain yield
- Forage yield
- Cost benefit analysis

Experiment 2: Testing of different pearl millet varieties as double crop

Methods:
This experiment will be conducted on an irrigated field at the central experimental farm of the Kyrgyz Research Institute of Livestock and Pasture. Wheat, barley and maize are the major crops grown by the private and public sector. There is an opportunity to introduce pearl millet to the existing crop production system in the households.

Treatments:
- Farmers' practice - maize (control)
- Pearl millet - HHVBC tall
- Pearl millet - Raj 171
- Pearl millet - EEBC

Experimental design:
Seeding rate is 25 kg/ha for maize and 6 kg/ha for Pearl millet. The four treatments will be planted in four replications. Plot size will be 25m^2 (8,3x3 m) and total area 400 m^2.

Observations:
- Plant density
- Number of leaves per plant
- Plant height
- Days to maturity
- Grain yield and TKW
- Forage yield
- Nutritional analysis
- Cost benefit analysis

Time frame for the activities:

Activities	2008			2009											
	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Activity 4.3 – Experiment 1															
Winter wheat planting															
Nitrogen application															
Wheat harvesting															
Land preparation															
Mung bean planting as double crop															
Field observations															
Mung bean Harvest															
Data analysis															
Activity 4.3 – Experiment 2															
Planting maize and pearl millet															
Nitrogen and herbicide application															
Irrigation and weeding															
Measuring green and dry fodder yield															
Cost benefit analysis															
Data analysis															
Activity 4.3															
Field day with farmers and communities															
Reporting															

Expected outputs/milestones	Date
Improved agronomic practices disseminated	October 2009
Improved soil fertility and reduced winter feed gaps through increased maize and pearl millet production	December 2009

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

Location: Kemin district: Ak-Beket (Alimseit), Chuy district: On bir jilga (Kenesh)

Collaborating scientists: R.Z. Nurgaziev, I.N. Ponomarenko, K. Joldoshev, T. Attokurov, B. Asanakunov (Kyrgyz Research Institute of Livestock, Veterinary, and Rangelands)

Background and justification:
Low-quality cereal crop residues such as wheat straw are important feed resources in the smallholder crop-livestock systems. Developing strategic supplementation option to optimize the use of the crop residues will increase meat and milk outputs and household's food security.

Objective:
To test strategic supplementation options using cereal crop residues for lamb fattening.

Approach:
Improved rations based on available crop residues and agro-industrial by-products will be composed and compared with farmers' practices for lamb fattening.

Experiment 1: Balanced rations for lamb fattening

Methods:
Treatments:

- Farmer's practice
- Balanced rations based on feeds available on the farm

Four groups of lambs for fattening (each 10 lambs), two groups for each treatment, will be formed in the farm Alimseyit in Kemin district.

Observations:
- Average daily gain
- Wool production
- Liveweight measurements

Experiment 2: Balanced rations for late gestation

Methods:
At least eight households in the village Akbeket will be selected to conduct an experiment on feeding during late gestation of ewes. Four households will feed their ewes according to local practice (chopped hay and barley or wheat straw) and are considered as control while in the other group of households will feed the animals with balanced ratio of feeding in the late gestation period. Nutritional quality of natural hay, straw and barley grain should be identified before experiment starts.

Treatments:
- Farmer's feeding practice
- Chopped hay and straw plus barley and minerals (balanced ration)

Observations:
- Liveweight measurements of ewes and lambs (average daily gains)
- Lambs survival

Time frame for both experiments:

Activities	2008						2009					
	J	A	S	O	N	D	J	F	M	A	M	J
Nutritional analysis of feeds												
Prepare rations												
Conduct feeding trials and collect data												
Analyze data and write reports												

Expected outputs/milestones	Date
Training course* for participating households and pilot farms in Kemin and Chuy district	March 2009

*Theme of the training course: "**Importance of preparation of balanced rations including crop residues for increasing livestock productivity"** planned for 10 March 2009.

Tajikistan

Sogd province, Khujand site

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

Location: B. Gafurovskiy district, Jamoat Ismoil, villages: Korajingil, Takli, Ouyas and Kurgancha

Collaborating scientists: Abdumutalib Jamoliddinov, Makhmoud Kasymov (Tajik University of Technology)

Students for data collection: Khudayberdiev Burkhon, Abdurakhmanov Kushmurad, Madaliev Turgunbay

Activity 4.1: Improving the productivity of degraded rangelands
Turgunboy Kasymov's pasture near the settlement Takli was selected as experimental site to test methods of improving the productivity of degraded rangelands. Two experiments were established at the selected rangeland site in March 2008; the first experiment was supposed to test the effect of nitrogen application and the second experiment the effect of oversowing with adequate species.

However, due to the drought in spring and summer 2008 the results of the first experiment were not satisfactory and the second experiment failed completely; both will be repeated in 2009.

Experiment 1: Determining the effect of nitrogen fertilization on productivity of degraded rangelands

Methods:
Nitrogen will be applied at rates of 30, 40 and 50 kg per hectare and compared with a zero nitrogen treatment as control. The same experimental design as in 2008 will be used.

Treatments:
- Natural pasture (control)
- Control + 30 kg/ha N
- Control + 40 kg/ha N
- Control + 50 kg/ha N

Observations:
- Plant density
- Plant height
- Botanical composition
- Biomass yield (before, during and after grazing)
- Cost benefit analysis

Experiment 2: Determining the effect of oversowing on the productivity of degraded rangelands

Methods:
This experiment was conducted in March. Field performances of the crops were not good because of continuous drought during March-August. Despite this, National collaborators studied biomass productivity at monthly intervals. This experiment will be repeated in the next year in the selected site. The site will be planted in combinations of: oversowing with saltwort and sainfoin mixture, saltwort, sainfoin individually. The natural rangeland will be used as control.
Seeds were collected in September and October 2008. Oversowing took place in early December, 2008.

Experimental design:
The treatments will be repeated four times. Plot size will be 150 m^2 (10m x 15m); total experimental area will be 3,000 m^2.

Treatments:
- Natural rangeland (control with no grazing)
- Natural rangeland + livestock grazing (represent current range/livestock practice)
- Natural pasture seeded with saltwort
- Natural pasture seeded with sainfoin
- Natural pasture seeded with sainfoin and saltwort

Observations:
Data will be collected every month from the start of germination until the end of the growing season.
- Determine percent plant cover (visually and digitally using platform photography).
- Determine plant density (number of plants/unit area)
- Assess indicators of soil erosion such as:
  - Rill: A small, intermittent water course with steep sides, usually only several centimeters deep (SSSA 1997). Rills generally are linear erosion features.
  - Pedestal (erosional): Plants or rocks that appear elevated as a result of soil loss by wind or water erosion (does not include plant or rock elevation as a result of non-erosional processes such as frost heaving).
  - Litter movement
- Record/rank dominant plant species: Plant species or species groups, which by means of their number, coverage, or size, have considerable influence or control upon the conditions of existence of associated species (SRM 1999). For this experiment dominant plants are those of the greatest size per unit area as measured by biomass, production, or cover.

- Record invasive plant species: Plant species that were absent in undisturbed portions of the original vegetation of a specific range site and will invade or increase following disturbance or continued heavy grazing (SRM 1999).
- Determine the biomass production.
- Determine total digestible nutrients (nutritional analysis).

Time frame:

Activities	2008				2009					
	S	O	N	D	J	F	M	A	M	J
Site selection										
Seed collection										
Soil preparation & Seeding										
Monitoring seed germination, plant growth and biomass										
Data analysis										
Report preparation										

Expected outputs/milestones	Completion
Oversowing and nitrogen application will improve productivity of community rangelands	October 2009

Activity 4.2: Introducing non traditional crops into the existing crop rotations

Methods:
This activity will be continued following the workplan of 2008. The summer cereal crops' varieties will be sown at recommended seed rate for fodder production.

Treatments:
- Wheat – fallow
- Wheat – corn
- Wheat – sorghum
- Wheat – pearl millet

The treatments will be tested on two farmers' fields (Mamatkulov Rajabboy, Khudoyberdiev Burkhon) in the village Uyas. Each treatment will be repeated four times. The plot size will be 50 m^2; total field size per farm will be 800 m^2 and total experimental area 1600 m^2.

Observations:
- Plant height
- Tillering capacity
- Number of leaves
- Biomass production
- Grain yield
- Nutritional analysis

Time frame:

Activities	2008											
	J	F	M	A	M	J	J	A	S	O	N	D
Site selection												
Land preparation and planting												
Nitrogen application and irrigation												
Field observations												
Data analysis												
Field days with farmers and communities												
Report writing												

Expected outputs/milestones	Date
Improved soil fertility and reduced winter feed gaps through increased maize and pearl millet production	December 2008

Activity 4.3: Testing of improved agronomic practices for maize

Methods:
The experiment will be repeated in 2009 with the same farmers/households as in 2008 (two households (farmer 1 and 3) in Karajingil village and two (farmer 2 and 4) in Uyas). Improved hybrid maize will be planted with different planting dates and seeding rates. Plot size is 25 m^2.

Treatments:

Farmer 1: A. Uskanov Planting dates for maize: 20/04/09 30/04/09 (control) 10/05/09 15/05/09	Farmer 2: K. Mamatkulov Planting dates for maize: 20/04/09 30/04/09 (control) 10/05/09 15/05/09	Farmer 3: T. Kilichev 50 kg/ha Maize+30 kg/ha soy bean 60 kg/ha Maize+40 kg/ha soy bean (control) 70 kg/ha Maize+50 kg/ha soy bean	Farmer 4: X. Abdurakhmonov 50 kg/ha Maize+ 30 kg/ha soy bean 60 kg/ha Maize+40 kg/ha soy bean (control) 70 kg/ha Maize+50 kg/ha soy bean

Time frame:

Activities	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Site selection and seed preparation	■	■										
Planting the seeds			■	■								
Nitrogen application and irrigation					■	■						
Monitoring and biomass record					■	■	■	■	■			
Data analysis									■	■		
Reporting										■		

Expected outputs/milestones	Completion
On-farm demonstration of introduced new agricultural crops	October 2009

Activity 4.4: Integration of legumes into cereal cropping systems

Methods:
Integration of legumes into cereal cropping systems will be demonstrated on one farm in Sogd province. There will be two different experiments on mung bean crop. In the first experiment four varieties of mung bean will be used while in the second experiment five different planting rates will be evaluated.

Experiment 1: Testing different mung bean varieties as double crop after wheat

Methods:
Ultra early, early, medium and late maturing varieties of mung bean will be tested on households' field as a double crop after winter wheat harvest. Days to maturity, grain yield, biomass yield and cost benefit analysis will be studied in the experiment. Wheat fallow will be used as control.

Treatments:

- Wheat/fallow (control)
- Wheat/mung bean (ultra early maturing)
- Wheat/mung bean (early maturing)
- Wheat/mung bean (medium maturing)
- Wheat/mung bean (late maturing)

Experimental design:
The experiment will be conducted on the irrigated field of one household. The seeding rate for mung beans will be 18 kg/ha. The treatments will be tested with three replications. Plot size is 25m^2 (8,3x3 m); total area is 750 m^2.

Observations:
- Soil quality will be analyzed before planting and after planting
- Seed germination
- Plant density
- Number pods per plant
- TKW
- Plant productivity
- Days to maturity
- Grain Yield
- Biomass yield
- Cost benefit analysis

Experiment 2: Determining the appropriate seed rates for mung bean as double crop after wheat

Methods:
Five seeding rates (12, 14, 16, 18 and 20 kilogram per hectare) will be evaluated and plant growth, height and biomass and grain yield determined.

Treatments:
- Wheat fallow
- Wheat/mung bean (12 kg/ha)
- Wheat/mung bean (14 kg/ha)
- Wheat/mung bean (16 kg/ha)
- Wheat/mung bean (18 kg/ha)
- Wheat/mung bean (20 kg/ha)

Experimental design:
The experiment will be conducted on an irrigated field of one household. The treatments will be repeated six times. Plot size is 25m^2 (8,3x3 m)and total area 900 m^2.

Observations:
- Chemical properties of soils will be analyzed before and after planting
- Seed germination
- Plant density
- Number pods per plant
- TKW
- Plant productivity
- Days to maturity
- Grain Yield
- Biomass yield
- Cost benefit analysis

Time frame for the activities:

Activities	**2008**			**2009**											
	O	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Activity 4.4: Experiments 1 and 2															
Winter wheat planting and harvesting															
Site selection and planting double crops															
Soil analysis															
Identification of fodder crops yield															
Monitoring of crop growth and yield															
Cost benefit analysis															

Expected outputs/milestones	Date
Legume crops integrated into cereal cropping systems	October 2009
Food/feed systems to increase grain and fodder	November 2009

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

Location: Korajingil, Takli, Uyas and Kurgancha villages, B. Gafurovskiy district, Jamoat Ismoil

Responsible scientists: Abdumutalib Jamoliddinov, Makhmoud Kasymov (Tajik University of Technology)

Students for data collection: Mamatkulov Radjabboy, Matazimov Abdunazar, Askarov Rakhmon, Madaliev Turgunbay

Background and justification:
Low-quality cereal crop residues, especially rice straw are important feed resources in the smallholder crop-livestock systems. Test strategic supplementation options to increase the use of cereal crop residues for goat will be conducted at eight different households. Each household will be used as a replication in the feeding trials. Low-quality cereal crop residues, especially rice straw are important feed resources in the smallholder crop-livestock systems. Developing strategic supplementation option to optimize the use of the crop residue will increase mohair, goat meat outputs and household food security. It is decided that locally made chopper machine will be used to improve feeding through chopping the straw and other crop residues. This activity was originally planned from January to March 2008 but due to cold winter and lack of feeds it was postponed and is now planned for the period December 2008-February 2009.

Methods:
Experimental design:
The experiment will involve 8 households.

Treatments:
- Traditional (no chopping - control) – Uskanov Abduvakhob, Khudoyberdiev Burkhon
- Traditional + supplements (rice straw mixed with grinded maize) – Mamatkulov A. and Mamatkulov R.
- Traditional + minerals – Matazimov Abdunazar and Askarov Rakhmon
- Traditional + supplements + sesame seed cake + minerals – Madaliev T., Umarova C

Observations:
- Voluntary intake
- Live weight measurements of does and kids
- Mohair production
- Mohair quality

Time frame:

Activities	2008						2009											
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Prepare rations																		
Conduct feeding trials																		
Liveweight measurements																		
Analyze data and write reports																		
Mineral feeding																		

Expected outputs/milestones	Date
Feeding systems to improve mohair and meat production	March 2009
Training course* for participating households in Uyas and Karajingil	September 2009

*Theme of the training course: "**Importance of preparation of balanced rations including crop residues for increasing livestock productivity"** planned for March 2009.

Tajikistan

Vahdat district, Dushanbe site

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

Location: Vahdat district, Jamoat Dusti

Collaborating scientists:
Leading scientists: Abdullo Madaminov, Tajik RI of Livestock, TAAS, PhD, Madali Maysupov Tajik RI of livestock, TAAS, Mavlon Pulodov, NGO "Ziroat" TAAS,
Other scientists: Muhitdin Khalikov, Institute of Botanic Academy of Sciences, RT
Postgraduate student: Ismoil Yuldoshev (Tajik Agrarian University)
Farmers: Madjid Bobishoev Mansur Bobishoev, Mamadsharif Niyozov, Khurshed Davlatov (village Nematabad), Rashid Azizov, Rajab Temurv (village Buzbit)

Introduction:
Dehkan or farmers units are characterized by a small number of animals and small area of arable land to produce of food and fodder crops as well as technical crops. Usually sheep are grazed on remote high mountain rangelands in summer and during autumn-winter-spring season on rangelands near the villages. During winter season there is shortage of fodder. The area of village rangelands is limited, their plant cover is highly degraded and yield is low due to overgrazing. On irrigated and rainfed fields, the yield of fodder crops is low due to suboptimal agronomic practices.

Objectives:
- to study botanical composition of the winter and summer pastures in central
- to organize and conduct demonstration trials on rehabilitation of productivity of village rangelands and natural hayfields jointly with the farmers,
- to test new varieties and types of fodder crops, and a package of cropping technologies to increase productivity of irrigated and rainfed fields,
- to train farmers in production of fodder crops by conducting of traveling workshops.

Activity 4.1: Botanical composition and productivity of the winter pastures at Gandjina Mountain and summer pastures at Kanyaz Mountain in Central Tajikistan.

Methods:
Observations:
Observations on pasture growth and botanical composition will be made at random positions in four blocks in each site. Plant cover and biomass yield will be assessed twice a year in spring and in summer from herbage cut to ground level in 0.25 m^2 quadrats in each of the plots. Biomass production and botanical composition data will be analyzed using ANOVA.

Time frame:

Activities	2009									
	J	F	M	A	M	J	J	A	S	O
Site selection										
Plant cover and biomass estimation at winter pasture										
Plot yield data collection at winter pasture										
Herbage mass at winter pasture										
Plant cover and biomass estimation in summer pasture										
Plot yield data collection in summer pasture										
Herbage mass in summer pasture										
Data analysis										
Report preparation										

Activity 4.2: Improving productivity of hay fields

A site was selected to improve productivity of the natural hayfield around villages. Demonstration trials will be conducted on rehabilitation of fodder productivity of natural hayfields and rangelands by sowing legumes and improving pattern of mineral dietary of plant cover.

Experiment 1: Determining the appropriate seeding rate of sainfoin

Methods:
Oversowing of natural hayfields with two seeding rates of Sainfoin (60 and 80 kg/ha) was tested in 2008 and compared with a natural hayfield (control or farmer practice). The data collection will be continued in 2009.

Treatments:
- Natural hayfield (control)
- Control + 60 kg/ha sainfoin
- Control + 80 kg/ha sainfoin

Experimental design:
The experiment was established on hayfields of two households. Each treatment was repeated three times on each hayfield. Plots were randomized according to slope: I replication – 1, 2, 3, 4 and 5; II replication – 2, 3, 4, 5 and 1; III replication – 3, 4, 5, 1 and 2. Plot size is 25 m^2 (8,3x3 m); total field size per household is 225 m^2 and total experimental area 450 m^2.

Experiment 2: Determining the effect of nitrogen and phosphorus fertilization on productivity of hay fields

Methods:
Hayfields near the settlement Nematabad were selected in spring 2008 to study the effect of nitrogen-phosphorus fertilization on productivity. There were encouraging results and it was decided to continue the experiment in 2009on the same hayfields.

Treatments:
- Natural hay field (control)
- Control + 45 kg/ha N as ammonium nitrate
- Control + 45 kg/ha N as urea
- Control + 45 kg/ha N and 30 kg/ha P

Experimental design:
The experiment will be established in the hayfields of two households with four replications per treatment. Plot size is 25 m^2 (10x2.5m); the total field area per household is 400 m^2 and total experimental area 800 m^2.

Observations:
- Plant height
- Plant cover
- Botanical composition
- Biomass production at monthly intervals
- Nutritional value

Time frame for the activities:

Activities	**2009**											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Activity 4.2 – Experiment 1												
Site selection, land preparation and planting												
Biometric data												
Data analysis												
Reporting												
Activity 4.2 – Experiment 2												

Site selection												
Nitrogen application												
Botanical composition												
Cost benefit analysis												
Data analysis												
Activity 4.2												
Field days with farmers and communities												
Reporting												

Expected outputs/milestones	**Completion**
Productivity of community hayfields improved by two times from oversowing and nitrogen-phosphorus application	July 2009

Activity 4.3: Integration of legumes into the cereal cropping systems

In the pre-mountain zone of Tajikistan the majority of the cattle owners are small farmers, who are now renting land from government and are started to cultivate different agricultural crops.

Experiment 1: Testing different e appropriate mung bean varieties as double crop after wheat

Methods:
Ultra early, early and late maturing varieties of mung bean will be tested on the households' field as a double crop after wheat harvest. Days to maturity, grain yield, biomass yield and cost benefit analysis will be studied in the experiment. Wheat fallow will be used as control.

Treatments:
- Wheat/fallow (control)
- Wheat/mung bean (ultra early maturing)
- Wheat/mung bean (early maturing)
- Wheat/mung bean (late maturing)

Experimental design:
The experiment will be conducted on the irrigated field of one household. The seeding rate for mung beans will be 18 kg/ha. The treatments will be tested with three replications. Plot size is 25m^2 (8,3x3 m); total area is 1000 m^2.

Observations:
- Seed germination
- Plant density
- Number of pods per plant
- Days to maturity
- Grain Yield
- Biomass yield
- Cost benefit analysis

Experiment 2: Determining the appropriate seed rates for mung bean as double crop after wheat

Methods:
Three different seeding rates (16, 20 and 24 kg/ha) will be evaluated and plant height and growth, and biomass yield measured at monthly intervals. Wheat fallow is included as control.

Treatments:
- Wheat fallow
- Wheat/mung bean (16 kg/ha)
- Wheat/mung bean (20 kg/ha)
- Wheat/mung bean (24 kg/ha)

Experimental design:
The experiment will be conducted on the irrigated field of one household. The treatments will be tested with three replications. Plot size is 25m^2 (8,3x3 m); total area is 1000 m^2.

Observations:
- Seed germination
- Plant density
- Number of pods per plant
- Days to maturity
- Grain Yield
- Biomass yield
- Cost benefit analysis

Experiment 3: Determining appropriate fertilization of alfalfa fields

Methods:
Three nitrogen application rates (40, 60 and 80 kg/ha) for alfalfa will be tested on four farms.

Treatments:
- Alfalfa – no fertilizer (farmers' practice)
- Alfalfa with 40 kg/ha ammophos
- Alfalfa with 60 kg/ha ammophos
- Alfalfa with 80 kg/ha ammophos

Experimental design:
Each treatment will be tested with four replications. Plot size is 50 m^2 (10x5m); total field size per farm is 800 m^2 and total experimental area 3200 m^2.

Observations:
- Plant height
- Plant density
- Tillering capacity
- Green fodder yield
- Dry fodder yield
- Nutritional analysis
- Cost benefit analysis

Time frame for the activities:

Activities	2008			2009											
	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Activity 4.3: Experiment 1 and 2															
Winter wheat planting and harvesting															
Site selection and planting double crops															
Identification of fodder crops yield															
Monitoring of crop growth and yield															
Cost benefit analysis															
Activity 4.3: Experiment 3															
Site selection and planting alfalfa															
Ammophos application															
Monitoring of crop growth and yield															
Cost benefit analysis															
Reporting															

Expected outputs/milestones	Date
Legume crops integrated into cereal cropping systems	October 2009
Food/feed systems to increase grain and fodder production.	November 2009

Theme 3: Improvement of livestock productivity

The principal investigator is Dr. Barbara Rischkowsky.

Kazakhstan

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

Location: Ak-Dala village (Arys district) and Akbulak village (Ordabasin district)

Collaborating scientists:
Responsible scientist: Marat Tuekbasov, Aydar Kashkarov
Other scientists: T. Bigara (teacher at Southern Kazakhstan State University)
PhD student: Ms. Z. Tuganbaeva
MSc thesis: I Mambetov from South-Kazakhstan State University

Methods:
The experiment conducted in 2007/2008 will be repeated and the same methods applied. From August 2008 to August 2009 four households with the number of sheep listed below will participate in the experiment.

Farmer's name	No of Karakul sheep	No of fat-tailed sheep
Farm "Kasymbay"	100	100
Household "Abdykerim"	-	40
Household "Bahytjan (new)	-	50
Household "Abish" (new)	-	40

Two households ("Ergesh" and "Andas") that were involved in the experiment in 2007/2008 sold their animals and have been replaced by two new households that expressed their interest to test new technologies of early lambing. They are located in Akbulak village, Ordabasin district, 27 km from Shymkent.
Household "Bahytjan" (Bahytjan Ergesh) has 50 ewes. The farmer has 0.25 hectare of land for vegetable garden, 0.5 hectare for forages and he rented 2 hectares of public land. He also has 15 rams for fattening and additional 15 yearling rams (born this year).
Household "Abish" (Abish Jetpish) owns 40 ewes and 0.4 hectare of vegetable garden, and 0.25 hectare for producing forage. He also rented 0.5 hectares public land. He also has 20 rams for fattening and 10 male yearlings (born this year).

Time frame:

Activities	2008						2009											
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Preparation of ewes and rams to mating	I		T *															
Mating period		I		T														
Monitoring of the physiological condition of ewes at the last period of pregnancy**					I			T										
Supplementation of ewes. Developing of ewes' supplementation technology at the last period of pregnancy and suckling period on a base of available feed.					I	I	I	I										
Lambing, recording of fertilization rate and prolificacy of ewes						I	I		T									
Growing of lambs, developing the technology of early lambed lambs							I	I	I	T	T	T						

Activities	2008						2009											
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
growing																		
Recording of lambs survival						I	I	I	I T	T	T	T						
Selling of lambs, marketing of early lambed lambs									I		I		T	T				
Training of farmers to new technologies of early lambing											X							
Preparing of technical report																X		
Preparing and publishing of scientific papers															X	X		
Consideration of developed technologies on Scientific Council of Institute and publishing of recommendations for farmers and agricultural specialists***																	X	X

Notes: I – improved (experimental) group, T – traditional (control) group, X – both
*in T only sires will be supplemented;
**biochemical indexes of blood will be investigated in addition to general health status;
*** recommendations will be summarized: preparation ewes and rams to mating, additional feeding of ewes in the last period of pregnancy and suckling period, on a base of available feed (chopped barley and corn), technology of growing of early lambed lambs, marketing of lambs.

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

Location: Ak-Dala village (Arys district)

Collaborating scientists:
Responsible scientists: J. Parzhanov, B. Baytashov, E. Kanceitova, K. Tlegonova (South-western Scientific Production Center for Agriculture, SWRCA)

Methods:
The experiment conducted in 2007/2008 will be repeated and the same methods applied. The following number of lambs owned by the farm "Kasimbay" and the household "Abdukarim K" will be included for early weaning, fattening, and milking of ewes:

Farmer's name	Karakul sheep		Fat-tailed sheep	
	Early weaning	Traditional weaning	Early weaning	Traditional weaning
Farm "Kasymbay"	40	40	40	40
Household "Abdykerim"	-	-	20	20

Time frame:

Activities	2008					2009											
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Preparation of ewes and rams to mating																	
Mating period																	
Monitoring of the physiological condition of ewes at the last period of pregnancy and lactation																	
Supplementation of ewes. Developing of ewes' supplementation technology at the last period of pregnancy																	

Activities	2008					2009											
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Lambing and recording of lambs																	
Growing of lambs, developing the technology of lambs growing for early weaning																	
Milking of ewes, developing of ewes milking technology																	
Early weaning of lambs																	
Fattening of ewes, developing of fattening technology for early weaning lambs																	
Preparing of technical report																	
Preparing and publishing of scientific papers																	
Consideration of the developed technologies on Scientific Council of Institute and publishing of recommendations for farmers and agricultural specialists																	

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

Location: Ak-Dala village (Arys district)

Collaborating scientists:
Responsible scientists: A. Ombaev, B. Norbuta, E. Kunanbaeva (SWRCA)
PhD student: A. Saniyazova (SWRCA): one chapter of her thesis deals with this activity
Master students: R. Shimelkova, Junior Scientist at the laboratory of genetics, morphology and biochemistry
Student of SKPU: A. Kaldykozova
Entrepreneur: G. Kuleeva from Ak-Dala

Methods/Approach:
Improved processing of sheep and cow's milk will be further evaluated. Optimized methods for dairy processing have been developed in collaboration with a private entrepreneur and will be demonstrated to interested communities in Ak-Dala and neighbouring villages. Farmers will be trained practically on methods for making yogurt, kvass and totra. The same and/or other interested households will be trained in sausage making. Marketing options and prices for the new/improved products will be tested and a cost/benefit analysis conducted in order to evaluate the impact on farmers' income.

Time frame:

Activities	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Developing the technology for preparing of homemade sausage (cont).												
Laboratory investigations of homemade sausage. Developing quality standard for homemade sausages.												
Preparation of homemade cheese. Developing the technology for preparing homemade cheese under home conditions												
Preparation of yogurt. Developing the technology for preparing yogurt in home conditions												
Preparation of kvass*. Developing of the technology for preparing kvass in home conditions												
Preparation of totra**. Developing the technology for												

Activities	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
preparing totra under home conditions												
Training of farmers for producing homemade (asyp) sausage and milk processing												
Preparing and publishing scientific papers												
Preparing technical report												
Consideration of the developed technologies by the Scientific Council of the Institute and publishing recommendations for farmers and agricultural specialists												

Notes: *beverage from milk serum; **totra is preparing from milk fat.

Kyrgyzstan

Activity 9: Developing management practices for improved sheep productivity

Location: Akbeket village Kemin district.

Collaborating scientists
Principal investigators: R.Nurgaziev, A.Ajibekov, I.Razzakov, K.Abdikerimov, N.Abdykerimov.
Post graduate: T.Katosheva, D.Nazarbekov, K.K.Abdikerimov

Methods:
Improved husbandry practices will be implemented on the farms “Alimseyit” and “Kenesh” and in the households located in the small town “Akbeket” Kemin district and in "Donaryk" Chuy district.
Improved husbandry practices include:

- optimum combination of grazing with additional feeding in the winter and early spring periods;
- winter feeding of animals, close to the balanced rations;
- Monitoring sheep lambing;
- Monitoring growth and development of lambs;
- Selection and culling of ewes
- Training farmers and households to diagnoses, prophylactics and treatment of infective, parasitic and non-infective sheep diseases;
- Optimal insemination times with taking into account breeding value.

Experimental design:
The experiment started in 2007 will be continued. Households were divided in two groups for comparing improved management of livestock versus traditional. 10 households have been using improved management practices in Akbeket village in 2007/2008 and two households were used as control group – Khudaybergen Sadybakasov (50 sheep) and Taalay Duysheev (30 sheep). The number of control households will be increased in 2008/2009 season.

Data to be collected:

- Fertility
- Lambs survival at weaning
- Lambs live weight at birth, in two months, and weaning period
- Ewes live weight in spring and autumn
- Wool production

Time frame:

Activities	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Organizing winter feeding of animals (balanced rations for late gestation and lactation)												
Prepare sheds for lambing of ewes (cleaning,												

Activities	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
disinfection)												
Monitoring of lambing and lamb weighing												
Testing of milk for brucellosis												
Mineral feeding of newly-born kids (chalk, fluorine-free phosphate, salt, meat-bony flour)												
Appraisal of coarse wool sheep												
Appraisal of fine wool sheep												
Trenching lambs against monieziosis (tape worms)												
Health examination of animals, spring bathing against mange, organization of summer grazing on remote ranges												
Weaning of lambs, allocation of good rangelands												
De-worming												
Ranking of rams, testing blood from sires for infectious epididymitis												
Health examination of animals, autumn selection of ewes, weighing of lambs, preparing of sires for mating												
Autumn bathing against mange, preparing sheds (cleaning, disinfection)												
Organization and carrying out of ewes mating												
Immunization of ewes against clostridiosis												

Expected outputs/milestones	Date
Training courses* for participating households and pilot farms in Kemin and Chuy district	December 2008 February 2009
Cost/benefit analysis	August 2009
Technical report	September 2009

*Themes for the training courses: (1)**"Time schedule to prevent infectious and invasive diseases, including animal brucellosis"** planned for 10 December 2008; (2)**"Veterinary and sanitary measures to improve lamb survival and growth"** planned for 10 February, 2009.

Activity 10: Production diversification: Improvement of milk productivity in sheep breeding

Location: Chuy district – Kenesh farm

Collaborating scientists:
Principal investigators: R. Nurgaziev, A. Ajibekov,
Other staff: N. Abdymajidov, K. Abdykerimov, K.K. Abdykerimov, A. Abdyrasulov, A. Karybekov.

Objectives:
- To develop an appropriate breeding scheme to produce crossbred dairy sheep
- To assess phenotypic and productive characteristics of crossbreed animals of different genotypes in comparison with local coarse wool sheep.
- To assess milking abilities of crossbreed and local coarse wool sheep
- To process sheep milk into ayran and test quality.

Methods:
The performance of crossbreeds (½ Awassi x LCW, ¼ Awassi x LCW, ¾ Awassi x LCW) will be compared with local coarse wool fat-tailed sheep in the farm Kenesh, Chuy district. Local coarse wool ewes (LCW) will be mated with 2 Awassi sires in the mating period 2008 and ewes with genotype ½ Awassi x LCW with LCW sire for obtaining progeny with genotype ¼ Awassi x LCW. Weaning of

lambs will be at the age of 9-10 weeks. Ewes will be milked during 55-60 days, two times a day in the morning and evening. Milk will be processed into ayran. The nutritional value will be determined and the taste assessed through degustation in comparison with ayran from cow milk.

The management of the Awassi crossbred will follow the management plan (best husbandry practices) outlined under Activity 9.

The socioeconomic team will conduct a market study to evaluate the potential for sheep and sheep dairy products (see Kyrgyzstan – Activity 3).

Data to be collected*:*
- Liveweight of lambs at birth, at the age of 2, 4, 8 and 12 months
- Body conformation at birth, at the age of 2, 4, 8 and 12 months
- Fertility of ewes
- Survival rates of lambs and ewes
- Daily milk production for the period of 55-60 days

Time frame:

Activities	**2009**											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Organizing winter feeding of animals with balanced rations for late gestation and lactation	■											
Prepare sheds for lambing of ewes (cleaning, disinfection)		■										
Monitoring of lambing, taking of basic measurements and weighing			■									
Testing of milk for brucellosis			■									
Mineral feeding of newly-born kids (chalk, fluorine-free phosphate, salt, meat-bony flour)				■								
Appraisal of Awassi and local coarse wool sheep					■							
Trenching lambs against monieziosis (tape worms)						■						
Recording of milking Awassi breed sheep (milk yield and quality)												
Health examination of animals, spring bathing against mange, organization of summer grazing on remote ranges						■						
Weaning of lambs, weighing, body measurements, and allocation of good rangelands								■				
De-worming								■				
Testing blood from sires for infectious epididymitis.								■	■			
Health examination of animals, autumn selection of ewes, weighing of lambs, preparing of sires to mating.									■			
Autumn bathing against mange, shed preparation (cleaning, disinfection)										■		
Organization of ewes mating, recording and weighing											■	
Immunization of ewes against clostridiosis												■

Expected outputs/milestones	**Date**
Field days (demonstration and participatory evaluation of Awassi sheep production with neighboring small farms)	July 2009
Full analysis of comparative productivity of Awassi crossbred (different genotypes) versus local sheep	September 2009
Cost/benefit analysis of Awassi crossbred versus local sheep under optimized management and with improved males	December 2009

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

Location: Kemin district: 10 households in “Akbeket" village.

Collaborating scientists
Principal investigators: R. Nurgaziev, A. Ajibekov, K. Abdukerimov, K.K. Abdukerimov
Other scientists: A. Karybekov, N. Abdukerimov

Methods
A community based sheep breeding scheme was introduced to sheep farmers in Akbeket village under guidance of Dr. Mueller in October 2007. The breeding scheme aims at facilitating farmers' access to improved sires, in this case Aikol rams that were acquired from a pedigree breeding farm in Ton district, Issyk-Kul province.
Initially 10 households were interested. After farmers considered the risks involved by using a new breed and realizing the work involved, some farmers resigned to participate and other were excluded due to bad quality of ewes. Currently 5 farmers are actively involved. The selection scheme for ewes and offspring was developed in 2007 and was revised during the field visit of Dr. Mueller in October/November 2008. A detailed workplan was developed for the breeding season 2008/2009 (see below).
October 2009, upon return from summer pasture and previous to mating, is a key monitoring month. Several key selection decisions will take place including a new cycle of selection and mating, based on collected data. The second most important monitoring point in time is spring before start of the summer pasture grazing. A detailed report on this activity is under preparation by Dr. Mueller.

Workplan:

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

Expected outputs/milestones	Date
Analysis of comparative productivity of progeny from Aykol versus local sires	November 2009
Training course* for participating households and pilot farms in Kemin and Chuy district	October 2009

*Theme for the training course: (1)**" Raising highly productive animals through improved livestock management"** planned for October 2009.

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

This activity will not be continued in 2009 as no progress could be achieved in community based milk processing and marketing in the previous years.

Tajikistan

Sogd province, Khujand site

Activity 13: Improvement of goat breeding in households for improved productivity (flock structure, feeding, selection/culling and animal health)

Location: Sogd province, villages Koradjingil, Takli, Uyas

Collaborating scientists:
Responsible scientists: Dr Mat'azim Kosimov (Director, Sogdian branch of Tajik RI of Livestock production)
PhD students: F. Kosimov, (Sogdian branch of Tajik RI of Livestock production);
Master students: A. M. Kosimov, Theme "Introduction of tribal matter elements to goat farms" (Khujand branch of Tajik University of Technology);
Other staff: J. Samadov (Sogdian branch of Tajik RI of livestock production).

Objective:
The main objective is to test a number of low-cost husbandry practices to improve flock productivity and farmers' incomes.

Specific objectives are:
- to assess farmers' flock structures and to optimize them also in relation to the planned breeding schemes (activity 15).
- to select the best ewes and bucks and cull non-productive goats with special attention on raising young stock with good characteristics;
- to improve feeding and animal heath care of goats.

Methods:
The following husbandry practices will be introduced in the flocks of the improved farmers.

Optimized flock structure: The farmers will be trained to optimize their flock structure (by sex and age). They are also being trained in recording the number of animals in each age/sex class and to record all flock entries, off-takes and losses.

Strategic feeding (taking into account the goats' demands and available feed resources at the farms): The farmers will be trained on the forage demands of different age and sex groups of goats at the different physiological states (mating, gestation, lactation period) and the effective use of available feed. Feeding of nontraditional supplements was introduced.

Veterinary measures: Special attention will be given to the prevention of the most frequently encountered goat's diseases in the region. Farmers will be trained on preventive measures and on simple and accessible treatment of diseases.

As results will be presented the introduction degree of the proposed methods for an improvement goats breeding in the households and farms of the integrated group. Results will be compared with the control (traditional) group. Possibly, will be calculated the economic effectiveness of the inculcated methods.

Experimental design:
The improved group consists of 6 farmers/households and in the control (traditional) group of 7 farmers/households:

#	Name of farmers	Number of animals
I – Improved group		
1	Turgunboy Madaliev	146
2	Rahmon Askarov	121
3	Abdunazar Matazimov	314
4	Sherali Tilloev	94
5	Sulaymon Umarov	179
II – Traditional group		
1	Abduvohid Mamtkulov	132
2	Abdurahmon Hayitmatov	42
3	Abdumalik Khanaev	70
4	Komil Mamatkulov	32
5	Ravshan Dushaboev	64
6	Abduvahob Uskanov	53
7	Boir Parpiev	41
	Total	**434**

Data collection:

- Liveweight and body condition score of female and male goats
- Individual evaluation (age, size, body length, fineness, hair density) of female and male goats (Autumn)
- Liveweight of kids (at birth, at 1, 3, 6 months age)
- Survival rate of kids at weaning (kids at weaning/kids born)
- Fertility (does kidded/ does mated)
- Fiber production (volume and quality)
- Cost-benefit analysis

Time frame:

Activities	**2009**											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Efficient use of available feed	■	■	■									
Recording of kidding			■	■								
Weighing of kids (at kidding, 1-,3-,6 months)			■	■		■			■			
Volume and qualitative composition of the produced wool			■	■								
Weaning									■			
Prophylactic veterinary measures			■		■				■		■	
Introduction of the simple recording schemes			■	■					■	■		■
Determination of liveweight and body condition of does and bucks									■	■		
Selection of best does and bucks									■	■		
Determining optimum flock structure (sex and age groups)									■	■		
Mating season										■		
Development of recommendations for goat management (management calendar)												■

Activity 14: Improvement of shearing and classification of fiber, standardization, based on the international standards, by quality, impurity and age

Location: Villages Koradjingil, Takli, Uyas in Sogd province

Collaboratoring scientist: Dr Mat'azim Kosimov

PhD students: F. Kosimov, M. Umarov (Sogdian branch of Tajik RI of livestock production);

Master students: Alisher Kosimov (Khudjand branch of Tajik University of Technology);

Other staff: A. Rahimberdiev, A. Mamatkulov (Sogdian branch of Tajik RI of livestock)

Objective:
The objective of this activity is to improve market prices achieved for Mohair fiber through grading fibers into different quality classes by age and sex during shearing.

Methods:
The following activities will be undertaken:
- Collection of wool samples from different sex and age groups.
- Laboratory analysis of fibers
- Study the international classification system of Mohair fiber
- Develop Tajik Angora goat's fiber classification system with consideration of international standards and marketing requirements
- Training of farmers and scientists for world quality standards
- Study the marketability of different fiber categories
- Mobilization of the communities for cooperative marketing

Data collection:
- Evaluation of fiber quality in fiber laboratory in Almaty
- Countercheck results of fiber analysis from Almaty in an internationally authorized laboratory (INTA laboratory in Argentina)
- Assessment of market prices and possibilities of different fiber qualities

Time frame:

Activities	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Collect fibers from different sex-age groups from a large number of flocks												
Training farmers in separating and marketing fibers by age and sex												
Testing marketability of different categories of fibers												
Laboratory analysis in Almaty												
Develop new fiber standards on the basis of international trade												
Training farmers and scientists to assess fiber according to international quality standards												

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

Location: Sogd province, Karajingil, Takli and Uyas villages

Collaborating scientist:
Principal investigator: M. Kasimov, consultancy: Joaquin Mueller (INTA, Bariloche, Argentina)
Post graduate student: F. Kosimov (Soghd Branch Tajik Research Institute of Livestock)
MSc students: A. Kosimov, K. Makhmudov (Khojand Branch of Tajik Technology University)
Collaborators for data collection: A. Rahimberdiev (Soghd Branch Tajik Research Institute of Livestock), T. Madaliev, S. Umarov (farmers).

Objective:
The objective is to create a decentralized community based breeding scheme to facilitate access of farmers to improved animals and to produce the fine fiber quality required for value addition.

Methods:
The followings activities are undertaken to reach this goal:

1. Formation of breeding flocks with the best goats in the village and neighboring villages participating in the activity
2. Development of breeding plans by the communities informed by market assessments
3. Farmers' training for pedigree selection and establishment of simple monitoring schemes

Formation of breeding flocks:
In the mating season 2007 the best does and bucks in the "improved" group of farmers (see Act. 13) were selected for the nucleus on the basis of individual estimation of their productivity and were marked with individual tattoo numbers.
The current status of the nucleus is as follows:

No.	Name of farmers	No of animals, selected for nucleus
I – Improved group		
1	Turgunboy Madaliev	34
2	Rahmon Askarov	20
3	Abdunazar Matazimov	23
4	Sherali Tilloev	27
5	Sulaymon Umarov	30
	Total	**134**

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

Shearing:
At shearing in May 2009, fleece weights and fleece samples will be taken from nucleus females, bucks and 2008-born progeny. As in the previous year fleece weights will be recorded by weighing the whole fleece using scales with at least 0.05 kg accuracy. Sampling site is the region of the middle of third last rib. At least 20 grams from each animal should be removed by shearing at skin level. The fleece sample will be sent to the Alrun Wool Lab in Almaty for analyses. Average fiber diameter, its Coefficient of Variation (CV) and Standard Deviation (SD), comfort factor (percent of fibers below 30 microns) and medullation will be determined.

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

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

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

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

and knowledge to reach the overall measurement class. Typically 25% of animals should be classed as superior, 50% as average and 25% as inferior in overall measurement.
Similarly animals within each color group and age-sex category will be thoroughly inspected considering visual traits as described in last year report (Mueller 2007). Visual inspection ends with an overall visual class of each animal, based on weighted consideration of all visually assessed traits. Again three classes are possible: Superior animals, Average animals and Inferior animals. A similar 25:50:25 proportion of classes is also suggested.
Final selection will be based on both measured performance and visual performance, the decision depending on sex and number of candidates in each class.

Workplan (November 2008-October 2009):

Date	Activity
Oct 2008	*Grazing.* All animals returned from summer pastures
Oct 2008	*Selection.* Young and adult females are selected and ear-tagged for establishment of the nucleus.
Oct 2008	*Mating* starts October 20 and finishes after about 45 days. Wherever possible sire-dam mates are recorded.
Nov-Apr 2008	Winter feeding
March 2009	*Kidding* starts about 15th March. Kids are ear-tagged and dams of kids are identified
May 2009	At *marking* (and/or castration) promising male kids are kept un-castrated.
May 2009	*Shearing.* All adults and 2008 born kids are shorn. For all nucleus animals fleece weights are taken and fleece samples sent to Wool Lab.
May-Sep 2009	*Grazing* in summer pastures.
Oct 2009	Goats return from summer grazing.
Oct 2009	Results of Mohair sample analyses are returned from Wool Lab and are now available to substantiate selection of animals.
Oct 2009	A workshop on Mohair selection is recommended.
Oct 2009	*Visual assessment* of all animals in the nucleus including 2007 born male (un-castrated) and female kids. Staple length will be assessed with a ruler at the mid-side sampling site.
Oct 2009	*Selection.* Based on visual assessment and measured performance nucleus females and replacements are selected (or re-selected) and ear-tagged.
Oct 2009	*Mating.* Best bucks and selected females are mated in the two color groups.

Activity 16: Value added local processing of goat fibers by women and assessing the characteristics of naturally colored mohair and its potential for marketing

Location: Sogd region, villages: “Katabulak”, “Adrasman”, “Takli”, “Karadzhingil” and “Taboshar”

Collaborating scientists: Dr. Liba Brent (University of Wisconsin) and Dr. Matazim Kosimov (Sogd-Branch Tajik Livestock Research Institute)

Planned activities in Khujand from September 2008-December 2009:

1. Continue to research and classify different types of Angora fleeces (white and colored) to determine the relationship between fleece type and yarn quality.

The objective of this activity is to determine which types of fleeces can be spun into the highest quality yarn that exhibits properties such as fineness, softness, strength, integrity, low prickle and luster. Based on the preliminary research, the fleeces of Tajik Angora goats include a wide variety of fibers. The character and distribution of these fibers affect the quality of the yarn. For example, down fibers increase the softness of the yarn but decrease luster while kemp fibers create the sensation of prickle. The project team plans to continue researching the fiber content of different fleeces, white and colored, and its effect on yarn quality. This information will be used to create a typology of fleeces based on fiber types and processing qualities. Selected fleeces will be tested by spinning yarn samples and evaluating the yarn (its fineness, prickle, shedding).
The fleeces and yarn samples will also be ranked in terms of color based on input from American knitters. The origin of the fleeces will be recorded and information on producers, goats, fleeces and

yarns will be entered into a database together with fiber samples. This will allow us to learn which farmers and which goats produce the highest quality fleeces.
The initial fiber tests can be performed visually and with the help of a magnifying glass and a microscope. These low-tech evaluation methods are easily accessible to farmers and spinners who will collaborate with the team on evaluating the fleeces. It is important to involve these two groups of stakeholders in the process to develop a shared sense of purpose in evaluating Tajik mohair to improve quality and price. The producers and the processors need to learn that the quality of the mohair is directly linked to their capacity to earn incomes from sales of raw fiber and from processing.

2. Work with farmers to improve mohair quality and create spinners' herds.
The project needs to identify farmers who produce the best mohair for spinning and train all farmers in improving mohair quality. The team will focus on testing the fiber of goats that belong to farmers who already participate in the project or are willing to actively collaborate on producing mohair for spinning. In this way we will be able to work not only with the mohair but also with the goats that produce it. The goats that produce high quality fleeces will be marked and selected to form so called "spinners' herd." The farmers will be encouraged to form such herds and breed these goats separately to produce quality mohair for spinners. The project will promote market linkages between the farmers and spinners' groups and will facilitate the purchase of high quality fleeces by spinners.
The farmers will be trained in evaluating goats and fleeces on the basis of fineness, kemp and other characteristics important in yarn production, using the criteria developed in activity #1. They will be shown yarn samples and mohair products and explained the pricing of mohair on the world market. The yarn-making experiment will in fact approximate the world market by paying farmers higher prices for fine, kemp-free fiber which is not valued on the local market.
The additional activity that would be very useful is the development of a breeding program for fine mohair, including the import of animals or sperm. However, a new project might be necessary to do this.

3. Train women spinners in evaluating, skirting and cleaning mohair fleeces to produce luxury fiber.
Traditionally, the Tajik women spun yarn for the Russian market using cheap, low-quality fleeces of adult goats. The opposite strategy is necessary to produce luxury yarns that could compete on the American market. To produce such yarns, the groups of women need to know how to select the best fleeces for spinning. This means that they need to understand the selection criteria and the techniques of examining and preparing the fleeces. The project already began training women in selecting quality fleeces but much more systematic work needs to be done to complete the training process. In the fall and spring when new kid mohair fleeces are available, women will receive training in evaluating individual fleeces for fineness, presence of kemp, short and modulated fibers, luster and other qualities that affect yarn quality. The team will develop a training seminar that focuses on different aspect of fiber selection, sorting, preparation, processing and selling. This includes:

a) Explaining the relationship between the fleece, the yarn and the price.
The participants will be shown samples of different fleeces, yarns and knitted products to demonstrate the relationship between the fleece type, yarn quality and the quality and price of the final product. The participants will also examine differently priced yarns currently on the market to demonstrate the positive correlation between yarn price and its fineness. The project will propose to purchase only those yarn samples that have desirable qualities defined by the project.

b) Training women in selecting quality fleeces.
The participants will continue to learn how to examine and select fleeces. All women will be given a magnifying glass and trained to evaluate different types of fleeces for softness, kemp, luster, color, etc. A fleece-rating contest will be organized among the participants to test their skills and make the exercise more interesting. The farmer who produces the best fleeces will receive a prize and so will the women who show the best skills in rating fleeces. It is very important that the participants have the necessary skill to evaluate fleeces at the time of the spring shearing season when they buy mohair for spinning.
The participants will also learn various techniques of processing different types of fleeces to collect quality fiber. This includes skirting some fleeces to separate contaminated parts (i.e. parts of the fleeces that include a high percentage of kemp) and to manually separate hair from kemp fibers. This technique is used by several Russian women in Khujand who produce the highest quality yarn for shawls. The project will work to enlist these women as trainers.

c) Training women to knit shawls and make new types of yarns.
Women who express a desire to knit mohair shawls will be trained to use knitting patterns recommended by American knitters. This will guarantee that they make marketable products. In addition, new types of yarn that use locally produced silk and mohair will be developed.

d) Designing and printing a manual on sorting, skirting and processing fleeces for the participants and other women who want to join the project.
The team plans to design a manual that will use mostly images to demonstrate some of the techniques of evaluating and sorting mohair fleeces.

4. Promoting the manufacturing of spinning wheels.
Most women who participate in the project would like to obtain a spinning wheel to replace their spindle. Spinning wheels are easier to use and much more productive than spindles. The project will try to promote local production of spinning wheels although this activity is likely to be constrained because funding a local spinning wheel production is beyond the budgetary capacity of the project. At this point is it also more prudent to focus our resources on facilitating the production of quality raw mohair.

Planned activities in the US from September 2008-December 2009:

5. Developing a marketing infrastructure for Tajik mohair yarn and knitted products.
The project plans to continue working with the US knitters and yarn storeowners on testing yarn samples and developing a pricing structure and a marketing strategy for the Tajik yarns. Although some yarn samples are now ready for test-marketing, an appropriate marketing package for the yarns needs to be developed. Given that the fleeces and the yarns spun from them differ in terms of color, fineness and other characteristics, a successful marketing will require the development of a marketing system suitable for selling unique, diverse, handspun yarns. This system will differ from standard marketing techniques used to sell factory-made, standardized mohair yarns currently on the market. Some of the components of the marketing system will include:

a) Designing and printing a brochure that informs customers about the Tajik yarn and the women who produce it.
An information brochure will be designed and printed to inform the potential buyers about the Tajik yarn and the spinners. The brochure will include condensed information about the qualities of the yarn and about the group of spinners who produced it. The brochure will be included with each batch of yarn sold.

b) Developing packaging and a label for the yarn.
Yarns spun from the highest quality fleeces will be sold together either in a box or as a bunch of tied skeins. The team has to develop the appropriate packaging for the yarns and design and print a standard label to wrap around the skeins.

c) Buttons with photographs of spinners.
The American knitters recommended that the marketing package includes “buttons” with photographs of the spinners. The buttons (which are cheap to produce) would be included with the highest quality yarns produced by specific spinners. The purpose of this would be to personalize the yarn which would increase its appeal among the knitters and separate it from mass-produced, machine-made yarns.

d) Yarn samples will be distributed in stores in Wisconsin.

e) Yarn website will be upgraded.
The website should be diversified to include information about the project that is useful for the project participants, sponsors and development specialists. However, the site also needs to serve as a marketing tool and provide information about the yarn to knitters who are interested in purchasing it. It is important to upgrade the site to satisfy both of these objectives.

Tajikistan

Vakhdad district, Dushanbe site

Activity 17: Improving sheep breeding management in the communities, the aspects of feeding, lamb breeding, maintaining and sheep reproduction

Location: Buzbit, Nematobod, Karsang (Dusti jamoat), Vakhdad district.

Collaborating scientists: A. Karakulov, F. Ikromov, Kh. Davlatov (Tajik Research Institute of Livestock)

Farmers: A. Bobokhonov, A. Mahmudov, N.Rizoev and others.

Graduate student: B. Turaev (Tajik Agrarian University)

Objective:
The objective of this activity is to test improved management strategies such as supplemental feeding, early weaning and improved selection strategies that can be easily adopted by farms and households.

Activity 17.1: Supplemental feeding of ewes in last period of gestation.

This experiment is a repetition of an experiment that was conducted in February 2008 with two farmers that showed promising results. In February 2009 two groups of ewes of 40 animals each will be formed in households of Jamoat Dusti. Ewes in the experimental group will be fed with 0.3 kg of concentrates per day and mineral supplement for 30 days during late gestation. The effect of supplemental feeding on lamb survival, lamb live weight at birth and growth during the first month of lactation will be studied. The economic benefit will be calculated.

Activity 17.2: Early weaning of lambs, fattening, sheep milk production and dairy processing.

Two groups of lambs, born in spring 2009, will be formed with at least 30 animals in each group. One group will be weaned early at an age of 3 months age, the other group (control) will be weaned at 4-4.5 months according to farmers' practice. The early weaned lambs will graze on pastures and fed with 0.2-0.3 kg/day of grains. The ewes in both groups will be milked after weaning in May and June. In addition, ewes that lost their lambs (about 15-17% mortality of newborn lambs) will be milked in the flocks participating in the experiment. The effect of early weaning on lamb survival and growth, meat quality, and milk production will be studied.
Availability of sufficient spring and summer pastures can be used as an additional reserve for obtaining additional income like sheep milk. There is and milking of such ewes can allow obtaining different kinds of milk products. Also is planned study of chemical composition of ewes milk, their milkiness, variants of milk processing into sour milk products, cheese and brynza.

Activity 17.3: Fattening and growing of experimental lambs for meat.

According to the project PhD student's Work plan for studying of meat qualities of Gissar rams experimental lambs will be fattening during 60 days. By the end of fatten 3 lambs from control and 3 from experimental groups will be slaughtered. Chemical composition of meat and fat tail of rams will be studied.

Activity 17.4: Selection of ewes and desirable rams of Gissar breed).

The continued use of the same Gissar sires in the households or of crossbed rams has led to inbreeding and loss of genetic potential and to a decrease in the meat qualities in Gissar sheep flocks. Therefore the purpose of this activity is a "refreshment of blood" by using best sires in the communities, brought from other farms and neighboring districts. In October 2008 best Gissar ewes (about 20-25) from the village sheep population in Djamoat Dusti will be selected and mated with the best sires. Preference will be given to those rams that have typical breed features and are not related to the ewes. The performance of the offspring will be compared with offspring in non selected flocks.

Data to be collected:
- Fertility (lambed ewes /mated ewes);
- Prolificacy (lambs obtained/lambed ewes);
- Live weight of ewes and lambs;
- Lambs survival at weaning (weaned lambs/born lambs);
- Fattening qualities of lambs.

Activity 17.5: Improvement in feed supply through improved storing, forage processing and preparation of feed mixtures

It is planned to evaluate and improve farmers' storing methods of forage (cutting, mowing and storage of voluminous fodders) and harvesting and storing of grains.

Feed mixtures on the basis of available feed resources (roughage, grains, etc) will be proposed and prepared with interested farmers. Furthermore, the feasibility of chemical treating of straw will be discussed with farmers.

Promising options will be tested with interested farmers and documented.

Time frame for all activities:

Activities	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Additional feeding of ewes in the last period of gestation and recording live weight												
Recording of lambing and prolificacy of ewes. Measuring live weight of lambs												
Preparation of ewes for outrun to the summer pastures. Determination of ewes' milkiness												
Recording, analysis and evaluation of harvesting and stocking up forages (alfa-alfa and natural forbs)												
Recording of live weight gain at ewes and lambs												
Early weaning of lambs and their growing on pastures, milking of ewes and processing of milk												
Using of the best selected sires, recording of mating results in the experimental group												
Fattening lambs for studying their meat qualities												
Processing, analysis and generalization of the experiments results, preparation of technical report and Kh.Davlatov's PhD dissertation												

Theme 4: Knowledge exchange

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

Approach:

The Professional Officers, one for each disciplinary theme, being based at the ICARA Tashkent office, play an active part in the planning and implementing the project activities and link the national researchers to the principal investigators at ICARDA.

Training courses and participatory workshops for farmers are integral part of many project activities and are scheduled according to the project implementation and seasonal production cycle. Often these trainings and workshops involve small household farms and medium size farms to establish or enhance an exchange of experience between different types of farmers in the communities.

Field days and workshops for a wider range of stakeholders will be organized in 2009 to discuss successes and failures of the different interventions.

Graduate students are using some of the project activities for their field research. Their theses will contribute to the technical reports that are being prepared after completion of full cycles of interventions.

2 South Asia-Pakistan

Theme 1: Socioeconomics

Rainfed and irrigated research sites

Activity 1.1: Assessment of Feed Livestock Production Technologies introduced at Feed Livestock Project Sites for Improvement of Fodder and Livestock feed

Responsible scientists:
Nisar Ali Shah, Zubair Anwar, Dr. M. Sharif, Dr. Saddiq Javed, Dr. M. Azeem Khan and Abid Hussain; Socioeconomic Program, SSI, NARC and Economics Department, University of Agriculture, Faisalabad

Location: Rainfed site: Lodhay village, Tehsil Gujar Khan, Irrigated site: Chak No. 74 SB & Chak No. 105 SB villages

Problem Statement:
The collaborating fodder and livestock research scientists working in the project are introducing technologies or package of technologies at the project sites to enhance the availability of quality feed and fodder for increasing the productivity of livestock. Improving the livestock productivity in the project area relies greatly on the availability and adoption of appropriate technologies by the resource-poor farmers. The project focuses on the validation and extrapolation of technologies developed by provincial, national and international research institutions for similar agro-ecological zones.

The applied research in project area is being conducted in collaboration with national and international research institute. Viable technological components from national institutes were identified and tested for validation at farmer's field in a participatory manner. The Fodder Research Program (NARC), Fodder Research Institute, Sargodha, Livestock Research Institute (NARC), Social Sciences Institute (NARC), University of Arid Agriculture, Rawalpindi and University of Agriculture Faisalabad are collaborating to execute research activities in the project area. These scientists are now working on validation and adoption of the promising technologies with the farming communities.

The present activity aims to understand the farmer's perception of the proposed technologies, their compatibility with the climatic conditions, natural resources and farmers' resources, along with their impacts on the incomes of the farming community. The main aim of technology assessment at different stages of its development is to "provide an assessment of farmers' priorities, decision criteria, resource availability, constraints and possible development opportunities" (Anderson and Dillon 1985). The field trials managed on participatory principles provide farmers' views, their acceptance of the intervention and information on the compatibility of the intervention with the farming systems and an opportunity to further fine tune (Anderson, 1985 and Hildebrand and Poey, 1985).

The study explores the status of the technologies and farmers' choices, and problems related to the adoption of these technologies. All this will be helpful to identify the adoption behavior of the farmers for the tested technologies. This will serve as a feed back to the researchers and development agencies for better planning and redesigning their activities so that they can be adopted in a systematic manner.

Objectives:
The specific objectives of the study are:

- To examine the compatibility of project interventions with the farm situations and cropping patterns.
- To understand farmers' perceptions of the adoption of project interventions.
- To provide feed back to the concerned scientists and development departments.

Methods:
The list of the farmers hosting research trials for technology validation will be provided by the collaborating research scientists. Data will be collected from participating and non-participating

farmers to solicit their perceptions about the technology validation process, technology preferences and constraints and prospects in the adoption of these technologies. Farmer's perceptions about the compatibility of technologies to the farm resource situations will be established to improve the relevance of the technologies. Detailed survey will be conducted in collaboration with the researchers involved at all the project sites for technology validation. Different set of questionnaires will be developed for each technological intervention and data will be collected from the host and fellow farmers to record their perceptions. Descriptive analysis will be carried using SPSS.

Expected Output and Potential Beneficiaries:
The research and extension systems in particular and farmers in general would be the potential beneficiaries of this research activity. The findings would help researchers understand the compatibility of their technical findings to the farmers' perceptions. This in turn helps in modifying the existing components or introduction of new components in technological packages.

Time frame:

Project Activities	2009											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Preparatory Work:												
Review of literature												
Questionnaire designing												
Field Visits	At different stages of the trials (planning, selection, implementation-Data collection by the researchers etc), social scientists would take their observations											
Survey design:												
Questionnaire pretesting and finalization												
Formal Survey												
Data Entry												
Data cleaning												
Cross-checking of data												
Tabulation plan												
Data Analysis												
Report writing												
First Draft												
Final Report												

Activity 1.2: Economic analysis of the experimental data of the feed livestock interventions at the project sites

Responsible scientists: Nisar Ali Shah, Zubair Anwar, Dr. M. Sharif, Hasnain Shah, Dr. M. Azeem Khan and Abid Hussain.

Problem Statement:
Before recommending any technology to the farmers its assessment and economic evaluation is imperative. There are several elements in such an assessment (CIMMYT, 1988). First the researchers must discuss the results with the farmers to get their evaluation of the different treatments in their fields (see activity 1.1). The experimental results must also be subjected to agronomic evaluation and statistical analysis. Finally the economic analysis of the results is essential. The economic analysis helps researchers to look at the results from the farmers' view point, to decide which treatments need further investigations, and which recommendations can be made to the farmers. Farmers adopt different components sequentially using economic and other criteria of relevance to their choice (Byerlee and Hess de Polance, 1986). The prime intention of the study is to explore the economic viability of technologies finalized by the research institutes for wider dissemination.

Objectives:

- To determine economic viability of tested technologies
- To estimate the production increases and other economic impacts related to wider adoption of these technologies
- To provide feedback about the results to the collaborating research and development institutions for making necessary adjustments in their programs.

Methods:
Methods developed by CIMMYT 1988 for economic analysis of the experimental data will be followed. The data will be provided by the research scientists from the beginning of the project. The information about prices of inputs and outputs along with market constraints will be collected by social scientists.

Plan of Work:
Depending upon the availability of data from the concerned scientists, field surveys will be planned and a report will be provided within two months after the availability of required data from the researchers.

Theme 2: Forage production

Rainfed research site, Lodhay village

Activity 2.1a: Evaluation of winter cereal-vetch mixtures for fodder yield and quality under rainfed conditions (on-going)

Location: Lodhay village, Tehsil Gujar Khan, Koont Farm, AAUR

Responsible scientists: Dr. M. Ansar, Mr Ashiq Hussain and Mr Sartaj Khan

Master student: Mr Muhammad Nadeem

Background:
Livestock in the rainfed area of Punjab is mostly sustained on cereal fodders crops and their residues because cereals produce higher dry matter yields than legumes. However, they are often of low nutritional quality and consequently the productivity of the animals is low. Cereals and legumes grown in mixture as fodder crop have great potential for livestock in rainfed areas. The cereals constitute more carbohydrates while legumes tend to be higher in protein and mineral contents. Thus, quantity and quality of forages can be improved through appropriate cereal-legume combinations of fodder crops.

Objectives:

- To disseminate and demonstrate the best improved package of winter forage mixtures
- On-farm participatory training and capacity building of researchers and farmers
- One master student will complete his thesis with two years data to be published in a scientific journal.

Activity 2.1b: Mixed cropping of non traditional winter legumes and oats for sustainable forage productivity (ongoing).

Location: Koont Farm, AAUR

Responsible scientists: Dr. Muhammad Ansar

Master student: Mr Adeel Anwar

Objectives

- To evaluate the performance of different cereal-legume forage crops under rainfed conditions
- To test the quality (crude protein) of different forage crops and their mixtures.
- On-farm participatory training and capacity building of researchers and farmers.
- One master student will complete his thesis with two years data to be published in scientific journal.

Activity 2.1c: Evaluation of summer cereal-legume mixtures for fodder yield and quality under rainfed conditions (ongoing)

Location: Lodhay, Koont Farm

Responsible scientists: Dr. Muhammad Ansar, Ashiq Hussain and Sartaj Khan

Master student: Mr Yasir Mehmood

Objectives:

- To evaluate the performance of different summer cereal-legume forage crops (confirming previous results)
- To test the quality, in particular crude protein content, of different forage crops and their mixtures
- To disseminate and demonstrate the best improved packages of summer forage mixtures
- On-farm participatory training and capacity building of researchers and farmers
- One master student will complete his thesis with two years data to be published in scientific journal.

Activity 2.1d: Evaluation of oat-vetch seeding ratio for fodder yield and quality

Collaborating scientists: Dr. Muhammad Ansar, Ashiq Hussain and Sartaj Khan

Master student: New student to be identified

Objectives:

- To determine the appropriate oat-vetch seed mixture for higher forage yield and quality.
- To test the quality (crude protein) of oat-vetch with and without mixture.
- Complementary practical on-farm participatory training and capacity building of researchers and farmers.

Methods:

Treatments:

Oat:Vetch proportions**:** T1 = 55:45; T2 = 70:30; T3 = 85:15; T4 = 100:0; T5 = 0:100

Activity 2.1e: Effect of cutting stages and post cutting intervals on HCN contents in sorghum forage

Location: Lodhay village and AAUR

Responsible scientists: Dr. Muhammad Ansar, Ashiq Hussain and Sartaj Khan

Master student: Mr. Muhammad Adnan

Objectives:

- To determine the HCN level of sorghum forage at different growth stages and post cutting intervals for safe feeding to livestock.
- On-farm participatory training and capacity building of researchers and farmers.

Methods:

Treatments:

Varieties: V1=Local (control); V2= Chakwal Sorghum; V3= JS 2002

Growth Stage: A) 40-DAS (almost one meter height); B) 60-DAS (heading)

Post cutting intervals: 1) Fresh; 2) 3 h after cutting; 3) 6 h after cutting; 4) 9 h after cutting.

Activity 2.2: Seed production of improved winter and summer fodder crop varieties

Location: Lodhay village

Collaborating scientists: Ashiq Hussain, Dr. M. Ansar and Sartaj Khan

Objectives:

- To multiply the best fodder crop varieties on farmers' fields to ensure sustainable access.

Methods
No. of farmers = 4-6 for each crop
Area for each crop = 2-3 kanals/farmer/season
Winter crops: Oat (cv. PD2LV65)
Summer crops: Millet (cv. MB-87); Sorghum (cv. Chakwal Sorghum); Guar (cv. BR. 99)

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

Location: Lodhay village, Tehsil Gujar Khan

Collaborating scientists: Ashiq Hussain, Sartaj Khan and Dr. Muhammad Ansar

Background:
There are acute shortages of green fodder for livestock during May-June and December-January in the rainfed areas. During this period livestock productivity decreases. To cover the shortage of green fodder during the lean period the following options are available:

- Preservation/conservation of good quality cereal legume hay that a farmer can produce on his farm.
- To make available green fodder from irrigated land under dug-well (few farmers have this opportunity).
- Use of concentrates (relatively expensive option and few farmers can afford it).

In the project area there are 20 dug-wells and about 40 acres lands can be irrigated from these wells. Some of the farmers have already started the business of green fodder production for sale. Therefore, the project is working with these farmers to improve the green fodder production from their enterprises by introducing improved technology packages and study the impact on forage availability in the community.

Objectives:

- to increase green fodder availability in the lean periods in the project area in order to minimize cost for concentrates and hence costs of milk production
- to raise income of farmers through fodder selling enterprises.

Methods:
The feasibility and profitability of fodder selling enterprises is being tested with 5-8 interested farmers. The farmers are being trained in improved agronomic practices. Maize will be sown in spring (March) and berseem & oats in winter (October) for fodder production. Improved varieties of maize, berseem and oats will be planted using improved agronomic practices.

Data collection
Percent germination, plant height, green fodder yield, dry fodder yield, will be determined. The price of green fodder per 40 kg will be recorded as well as who buys the green fodder and how that person is going to utilize the fodder to evaluate what changes this intervention will cause in the traditional livestock feeding systems.

Time frame for all activities under Theme 2:

Activities	2008						2009											
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Evaluation of winter cereal-vetch mixtures for fodder yield and quality.																		
Mixed cropping of non traditional winter legumes and oats																		

Activities	2008						2009											
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Evaluation of summer cereal-legume mixtures for fodder yield and quality																		
Effect of cutting stages and post cutting intervals on HCN contents in sorghum forage																		
Evaluation of oat-vetch seeding ratio for fodder yield and quality.																		
Seed production of improved winter and summer fodder crop / varieties.																		
Evaluation of selling oats and berseem as winter season fodder crops																		
Evaluation of selling maize as spring season fodder crop																		

Expected outputs/milestones	Completion
Second cycle of testing of new and high yielding varieties of winter and summer fodder crops completed	December 2009
Improved fodder production packages including agronomic practices for winter and summer crops introduced	December 2009
Increased access to quality seed and seed producer groups established	December 2009
Master students complete their studies	December 2009
Research papers will be published	December 2009

Irrigated research site, Chak No. 74/SB and Chak No.105/SB

Location: Chak No. 74/SB and Chak No.105/SB, Sargodha

Responsible scientist: Dr. Ghulam Mohy-ud-Din

Other Staff: Mehmood Ali Shah, (Chak 105/SB), Muhammad Ashraf (Chak 74/SB)

Background:
During the first year evaluation of improved fodder crop varieties sown using improved production technologies, were done comparing with local traditional varieties and technologies.
During the second year the improved fodder crop varieties sown as sole were compared with sown in mixture cereal and legumes comparing with local traditional practice of the farmers. Now after achieving the good results from improved varieties, it is planned to produce the seed at farmer's fields for its sustainability.

Objectives:
- To introduce sustainable seed production system at farmers field
- To conserve the fodder crops through making hay and silage for lean period
- To make the green fodder balanced by mixed cultivation

Activity 2.1: Sustainable seed production of fodder crops

Methods:
Seed production: Seed of newly developed fodder crop varieties will be produced with farmers' participation
Winter forage crops: Berseem and Oats
Summer season: Sorghum, Pearl Millet, Maize and Cowpeas
Area to be sown: 15 acres (6.07 ha) for each crop in each village
Winter crops: 7-8 farmers for each crop in each village
Summer crops: 3-4 farmers for each crop in Chak 74/SB; 3 farmers for each crop in Chak 105/SB
Total no of farmers: approximately 21 farmers in Chak 74/SB and 18 in Chak 105/SB.

It is proposed to implement sustainable seed production through local entrepreneurs. The proposed model looks as follows:

Data to be collected:
- Seed production (t/ha)
- Income from seed
- Economics of fodder produced will be estimated at market rates

Economic analysis will be carried out.

Activity 2.2: Conservation of fodder crops through hay making

Methods:
No. of farmers for hay: 10 in each village, one acre with each farmer (cereal and legumes)

Treatments
Winter season: Berseem; Oats (Improved varieties)
Summer season: Mixture of Sorghum, Pearl Millet, Maize and Cowpeas (Improved varieties)

Recommended agronomic practices and fertilizer will be applied. Quality analysis of hay will be done.

Activity 2.3: Evaluation of improved fodder crop varieties sole and in mixture comparing yield and nutritional quality with local fodder crops

Methods:
Crops to be tested (repetition of last year to confirm results):
Winter season: Mixture of Berseem + Oats; Oats; Berseem
For Berseem some of the farmers will test varieties and subsequently produce seeds in the same field; for the other crops forage evaluation and seed production will be separated.

Summer season: Mixture of Sorghum + Pearl Millet + Maize + Cowpeas; Sorghum; Pearl Millet; Maize; Cowpeas
Seed production and forage evaluation is done on separate fields.

Experimental design: RCBD

Data to be collected:
- Germination
- Plant height
- Green fodder yield
- Nutritive analysis (Dry matter, crude protein, crude fiber, ether extract, ashes, nitrogen free extract)

Time frame for the research activities

Activities	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Sustainable seed production of fodder crops												
Conservation of fodder crops through hay making												
Evaluation of improved winter and summer fodder crop varieties sole and in mixture comparing with local fodder crops for yield and nutritional quality												

Theme 3: Livestock productivity

Rainfed research site, Lodhay village

Activity 3.1: Evaluation of different fodder crops (hay) and improved concentrates on milk yield in buffaloes & cows and meat production in buffalo and cow calves.

Location: Lodhay village

Responsible scientists: Dr. Imdad Hussain Mirza; Mr. Sartaj Khan

Other staff: Staff of PBG department, UAF

Background:
In rainfed (Barani) areas there are two scarcity periods in terms of fodder availability, namely May-June and December-January. During these lean periods farmers feed their animals on low quality dry roughages, which results in low productivity of livestock. To overcome these fodder scarcity periods, hay making needs to be introduced. High quality hay can substitute green fodder. It is expected that the usual decrease in productivity in these periods can be minimized, and that the technique can be easily adapted by farmers.

Farmers in these areas mostly use cereal fodders for their livestock in the growing season, while low quality dry roughages are fed during scarcity periods. These cereal fodders are relatively low in protein, as well as calcium and phosphorous, which results in poor productivity. The project, therefore, is testing the introduction of mixtures of cereals with legumes.

Forages alone cannot meet all nutritional requirements of high producing buffaloes. Hence, supplementation with concentrates is required. Traditional concentrates with traditional versus improved forages will be tested. Commercially prepared concentrates are not considered for this trial because of problems of availability.

Objectives:
Overall objectives of this study are

- To compare the effect of feeding improved vs. local fodder crops as hay on livestock production
- To compare the effect of feeding oats + berseem hay along with concentrates tested last year.
- To outscale last year's success in using sorghum + guar and supplement to a higher number of farmers with lactating animals.
- To test the effect of supplementation with new concentrate mix (cotton seed meal & corn gluten feed 20%, oil supplementation) along with summer cereals + guar as roughage
- To measure the effect of different improved fodder crops as hay and strategic concentrates supplementation in feedlot fattening.
- To calculate cost benefit ratio of the three systems.

Methods:
Treatments:
Improved feeding regimes will be tested against local practice.
The improved feeding regimes are:

a) Summer: sorghum/millet + guar hay + strategic concentrates
b) Winter: Oats + 15% berseem hay + commercial concentrate

Experimental Design:

- Completely Randomized Design
- Replications: 10-20
- Experimental animals: Treatment and control animals will be kept by different farmers.
- Farmers having more than 2 dairy animals and more than 6 fattening calves shall be charged for 50% of the concentrate price.

Observations/Data to be collected for evaluation

- Daily milk production by the farmer and weekly by the site facilitator
- Daily feed intake by the farmer and weekly by the site facilitator.
- Weight of animals for two consecutive days at the start and end of experiment
- De-worming at the start of the feedlot experiment

Time frame for the research activities:

Activities	2008						2009											
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Hay making from summer and winter fodder crops																		
Testing of feeding rations including hay																		
Cost benefit analysis																		

Expected outputs/milestones	Date
Increased farmer skills in preservation and storage of fodder	December 2009
Effect of feeding hay plus supplements on the performance of buffalos tested	December 2009
Preliminary cost/benefit analysis of feeding hay in periods of feed scarcity	December 2009

Activity 3.2: Quality and Value Addition to Milk

Location (Site/village): Village Lodhay (Doultala), Tehsil Gujar Khan, Rawalpindi.

Responsible Scientist: Tariq Aziz, Dairy technology program, ASI, NARC, Islamabad.

Other Staff: One Laboartory/field assistant

Activity 3.2a: Mobilization and awareness with special focus on women and small/poor farmers for clean milk harvest through induction of good hygienic practices and teat dips

Background:
Unhygienic milk production is the first limiting factor in adding quality and value to milk. Wide spread prevalence of sub clinical mastitis which is a contributory factor in poor bacterial quality of milk and low productivity/resale value of lactating animals in Pakistan. Our past experience in the project area showed very encouraging results particularly to eliminate clinical mastitis and control sub-clinical mastitis while working with male farmers having had herds of 3 to18 animals. Now we want to expand the activity to poorer/ smaller farmers and also improve the womens' skills in this area.

Objectives:
- To raise awareness and involve poor/small farmers and especially women to adopt clean milk production practices for better and hygienic milk quality.
- To introduce and induct CMT and teat dips to prevent/control mastitis thereby improving value of animals and their productivity and quality of milk.

Methods:
Interested farmers and their wives willing to participate in this activity will be trained on clean milk production and hygiene including Methods of proper milking and precautionary measures. They will be trained by practical demonstration and hand-on training on the use of teat dips and CMT.

Research approach:
All animals in the herd will be evaluated for presence of clinical and sub-clinical mastitis with CMT test kit. The impact will be monitored by estimating the incidence and prevalence of mastitis.

Experimental design:
50 farmers/households owning 1 to 3 animals will be included in this activity (target is 75 to 100 lactating animals including animals of farmers that had been already involved in the previous year). The remaining animals of the community will serve as control.

Observations/Data to be collected for evaluation:
Incidence of clinical and sub clinical mastitis will be recorded before and after introduction of teat dips/preventive mastitis control program and the organoleptic/physiochemical quality of milk will be evaluated.

Time frame:

Activity	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Practical training on clean/hygienic milking												
Application of mastitis tests (CMT)												
Mastitis control program (teat dips etc)												
Observation / data on mastitis & milk quality												

Activity 3.2b: Substituting expensive/commercial teat dips and consumables of CMT kit with alternative cheaper supplies available in local market

Background:
Presently, standard supplies for activity 3.2a are being used that are relatively expensive and most likely will not be available once project activity is over. To make the intervention sustainable, supplies available in the local market that can serve as cheap and economical substitute will be introduced to one group of animals and compared with a control group being tested with standard supplies.

Objectives:
- To test substitute cheaper dips and train participating farmers on how to prepare them.

Methods:
Educated farmers and their wives, will be trained on how to prepare the cheap substitutes by practical demonstration and hand-on training on the formulation of teat dips and CMT supply.

Research approach:
The efficacy of the alternate supplies will be tested with a group of lactating animals that will be evaluated for presence of clinical and sub-clinical mastitis with alternates test kit in comparison to the standard equipment.

Experimental design:
A group of about 15 to 20 (4 to 5 farmers) lactating animals will serve as treatment for alternate supply and the rest of the animals from activity 3.2a will serve as control for standard supply. The activity will be continued for 4-6 months.

Observations/Data to be collected for evaluation:
Efficacy of supplies will be judged on the basis of incidence of clinical and sub clinical mastitis. Organoleptic / physiochemical quality of milk will be evaluated. Side / adverse effects both for animals and human will be recorded. Cost effectiveness will also be calculated.

Time frame:

Activity	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Awareness Session on alternate supplies												
Practical training on preparation and use of alternative dips												
Application of mastitis tests (CMT)												
Mastitis control program (teat dips etc)												
Observation on mastitis incidence, milk quality and adverse effects												

Activity 3.2c: Adding quality and value to milk by enhancing skills in dairy product preparation

Background:
Sales of livestock and their products are major sources of income for livestock producers in the target communities. Most small-scale farmers do not add value to their products to capture potential market

niches. In a few cases, where value addition is practiced, inefficient and labor-intensive traditional methods are used resulting in low-quality products. Helping farmers and their families to add value to their milk is likely to improve household income and reduce rural poverty. By consuming value added hygienic products community health and nutritional status will also be improved.

Objectives:

- Mobilization and awareness on role of value addition in poverty reduction.
- Training on raw milk handling, its processing and dairy product preparation.
- Skill enhancement on organizing small scale dairy product business.

Methods:
A group of interested smallholders/poor farmers and their wives will be formed and trained in improved processing milk into pasteurized milk, cheese and yoghurt. The project will focus on women to enhance their skills in product preparation at household level to capture potential market niches in the village. Use and maintenance of cold chain / low temperature will be emphasized and technical knowledge will be provided for better utilization of household facilities such as refrigerators and freezers. The members of the community will be motivated to capture benefits from the value addition process, enhanced bargaining power and improved marketing links.

Research approach:
Training of community members will be through field days and practical training sessions.

Experimental design:
Improved methods of product preparation will be compared with the traditional one in terms of product quality and price.

Observations / data to be collected for evaluation:
Standard assessment and perception/feed back from the community.

Time frame for the research activities

Activity	J	F	M	A	M	J	J	A	S	O	N	D
Practical training on raw milk handling/processing at household level.												
Practical training on raw milk handling / processing to run small business.												
Training on subjective quality evaluation												
Assessment and perception on activities												

Irrigated research site, Chak No. 74/SB and Chak No.105/SB

Activity 3.1: Evaluation of different feeding regimes for lactating animals and fattening

Location: Chak No. 74/SB and Chak No.105/SB, Sargodha

Responsible scientist: Dr. Imdad Hussain

Other Staff: Mehmood Ali Shah, (Chak 105/SB), Muhammad Ashraf (Chak 74/SB)

Background:
In the previous years three feeding regimes were evaluated. The results showed that green fodder of improved varieties and concentrates (balanced ration) were more effective. It is now planned to evaluate a cheaper balanced rations instead of balanced ration with high cost concentrates.

Objective:

- To test the effect of different feeding regimes on milk and meat production.

Methods:

Evaluation of three feeding regimes in buffalo and cows will be done for milk yield and milk quality in buffaloes and for fattening buffalo and cattle calves.

Number of households and animals:

No. of households in Chak 74/SB	= 10,	No. of house holds in Chak 105/SB	= 10
No. of buffaloes in Chak 74/SB	= 24,	No. of buffaloes in Chak 105/SB	= 24
No. of cows in Chak 74/SB	= 18,	No. of cows in Chak 105/SB	= 18
No. of buffalo and cattle calves in Chak 74/SB	= 15,	No. of calves in Chak 105/SB	= 15

The experimental design for dairy production and fattening will be same, only feed quantity and proportions will differ between the feeding experiments for milk production and fattening.

Treatments:
Three treatments will be tested with winter and summer crops:

1. Improved fodder (Cereal +legume) and concentrates
2. Improved fodder (Cereal +legume) and cheaper formula for concentrates
3. Farmers local practice

Experimental period:
Hay from the summer crops in 2008 (Mix of Sorghum, Pearl Millet, Maize and Cowpeas) will be tested in February-March 2009.
Hay from winter crops grown in 2008/2009 (berseem and oats) will be tested in May-June 2009.

Experimental design: RCBD
Locations = 2, Treatments= 3 and replications = 8 buffaloes per treatment in each village, 6 cows per treatment in each village and 5 calves per treatment in each village, in three trials respectively.

Data to be collected for evaluation

- Daily milk production /animal
- Fat percentage and SNF from the milk
- Daily feed intake
- Weight of animals at the start and end of experiment
- Economics of rations and animals products

Time frame for the research activities:

Activities	2009					
	J	F	M	A	M	J
Feeding regimes during winter season for lactating animals						
Feeding regimes during lean period for lactating animals						
Feeding regimes during winter season for fattening animals						
Feeding regimes during lean period for fattening animals						

Activity 3.2: Marketing options study for value added products produced in the village

Location: Chak No. 74/SB and Chak No.105/SB, Sargodha

Responsible scientist:Dr. Nuzhat Huma

Other Staff: Mehmood Ali Shah, (Chak 105/SB), Muhammad Ashraf (Chak 74/SB)

Background:
In the last year the women association in each village was trained in making value added products as pasteurized milk, flavored milk, fruit/ flavored yogurt, cottage cheese, whey healthier, peanut butter and condensed milk (Khoya). Efforts for marketing of the products were made but were not very succesful. During 2009 different marketing options will be studied to sustain improved processing.

Objectives:

- To find market channels for the sale of products prepared by the women associations.

Methods:
Products: Flavored milk, Pasteurized milk, Cottage cheese, Whey healthier, Condensed milk (Khoya), Flavored/ fruit yogurt and Peanut butter

No. of women trained: 35 in Chak no. 105/SB; 30 in Chak no.74/SB

Places to be studied for marketing:
Local market in the two villages
City area: i. Schools, ii. Super stores, iii. Bakers and sweet makers

Duration: January-June and September-November

Observations/Data to be collected for evaluation:

- Daily production
- Nutritive analysis for quality maintenance
- Sale of products and income
- Economics of rationing and animals products
- Net benefit in each product

Time frame for the research activities

Activities	**2009**											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Standardization of dairy products made by women associations at the project sites												
Marketing of chilled milk, flavored milk and pasteurized milk												
Marketing option study for cottage cheese, fruit/ flavored yogurt, whey healthier and condensed milk (Khoya)												

Theme 4: Knowledge Exchange

Rainfed and Irrigated Research Sites

Activity 4: Enhancing knowledge exchange for increased feed and livestock production

Location: Rainfed site: Lodhay village, Tehsil Gujar Khan; Irrigated site: Chak No. 74 SB & Chak No. 105 SB villages

Responsible scientists at rainfed site: Dr. Imdad Hussain Mirza; Mr. Sartaj Khan; Mr. Tariq Aziz; Mr. Nisar Ali Shah

Responsible scientists at irrigated site: Dr. Ghulam Mohy-ud-Din and other staff

Objectives:

- to disseminate the fodder production technologies in farmer communities
- to motivate the farmer communities to adopt improved varieties and improved agronomic practices
- to get feed back from the farmer communities to solve emerging problems
- to improve scientific and technical capacities of participating staff in research for development
- to improve the competency of scientists and technicians in research methodology, data analysis and reporting of results (report writing and presentation) and publications of results

Approach:

Monthly meetings with participating staff are being organized to discuss progress in project implementation. All families in each of the three villages i.e. Lodhay, Chak No. 74/SB and 105/SB) are involved in the project activities and take part in community meetings when project activities are being introduced, discussed and agreed on. Special training workshops are being conducted on improved milk processing techniques based on traditional processing methods.

Field days and workshops will be organized for farmers and other stakeholders to exchange knowledge on improved fodder and production technology and on milk processing.

Time frame:

Activities/Expected outputs	2009											
	J	F	M	A	M	J	J	A	S	O	N	D
Monthly meetings of teams to discuss progress on implementation	x	x	x	x	x	x	x	x	x	x	x	x
Field days, and workshops for stakeholders to exchange knowledge			x	x				x	x			
Training of stakeholders in fodder crops production, preservation and feeding			x	x				x	x			
Training of farmers in value addition of milk (increasing shelf life, yogurt production techniques)		x	x	x			x	x	x			

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IV Regional Activities

Activity 1: Capacity building: training of scientists in the area of integrated feed resources and livestock production at ICARDA and in the countries

Collaborators: PIs (Aden Aw-Hassan, Asamoah Larbi, Mounir Louhaichi and Barbara Rischkowsky), National Coordinators of Kazakhstan, Kyrgyzstan, and Tajikistan

Key scientists in Central Asia involved in the project will be trained on the job and at ICARDA HQ by scientists from ICARDA and ARIs in the area of socioeconomic, integrated feed resources and livestock production.
In Pakistan the socioeconomic students are being trained by Dr. Azeem Khan from PARC and professors from the University of Faisalabad and Rawalpindi, the students involved in Theme 2 by Dr. Ansar, University of Rawalpindi.

Expected outcomes:

- POs trained in data entry and analysis
- Training courses on experimental design and analysis, and scientific writing and data presentation course training course for participating scientists in Pakistan
- Liba Brent (University of Wisconsin) will continue working with the Tajik team on value addition to fiber production through improved local processing and Joaquín Mueller from INTA, Argentina, with the Kyrgyz and Tajik teams on community based breeding schemes.

Activity 2: Project supervision and interregional knowledge exchange

Collaborators: Project coordinator, PIs and National Coordinators

Progress implementation in Central Asia will be monitored by frequent visits of Professional Officers at strategic times and in all countries by supervision visits of ICARDA scientists. The annual progress report will be finalized end February 2009.
A two day final wrap-up regional workshop bringing together scientists from CA and SA will be conducted in October 2009. This workshop will be documented by workshop proceedings in English and Russian.

Expected outcomes:

- Annual progress report for 2008 by end February 2009
- At least one supervision visit of all ICARDA scientists
- Regional Workshop to be held in October 2009 in Islamabad/Pakistan or in Almaty or Shymkent/Kazakhstan.

Activity 3: Web based knowledge exchange (Virtual information Center)

Collaborators: Project coordinator, webmaster in Tashkent office, National Coordinators and webmasters in the countries

The webpage designed in Tashkent office in Russian and English will be further developed by ICARDA and the partner institutes. A follow-up training of webmasters trained in the partner institute in 2008 will be carried out in 2009 to encourage the partner institutes to actively use the webpage for knowledge exchange with the project partners and other institutes.