ICARDA
Science for Better Livelihoods in Dry Areas

IFAD
Enabling poor rural people to overcome poverty

Improving Livelihoods of Small Farmers and Rural Women through Value-Added Processing and Export of Cashmere, Wool and Mohair

IFAD Grant 1107 – ICARDA

Final Technical Report

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Project websites for additional information: http://cac-program.org/fiber; http://www.adventureyarns.com (marketing website); IFAD Asia: http://asia.ifad.org/web/1107-icarda

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List of Acronyms

AKF	Aga Khan Foundation
AREEO	Agricultural Research, Education and Extension Organization
ASRI	Animal Science Research Institute, Karaj, Iran
CACSARC-kg	Central Asian Craft Support Association's Resource Center - Kyrgyzstan
CESVI	Italian, "Cooperazione E Sviluppo", cooperation and development
FAO	Food and Agriculture Organization of the United Nations
GIZ	German Society for International Cooperation
ICARDA	International Center for Agricultural Research in the Dry Areas
IFAD	International Fund for Agricultural Development
INTA	Instituto Nacional de Tecnología Agropecuaria (National Agricultural Research Center in Argentina)
KGS	Kyrgyz Som
NGO	Non-Governmental Organization
OFDA	Optical-based Fiber Diameter Analyzer
US	the United States
USA	the United States of America

Executive Summary

This grant was designed on the basis of a fiber value chain model in Northern Tajikistan developed by the IFAD-ICARDA Grant Programme *"Community Action in Integrated and Market Oriented Feed-Livestock Production in Central and South Asia*" (ICARDA 816). The programme demonstrated that Tajik Angora goat producers benefited from the introduction of improved breeding and husbandry practices to produce quality, kemp-free fiber, and that local women could process this high quality mohair into luxury yarns and find lucrative export markets if provided with training, market feedback and linkages to buyers. The new grant project proposed that the methodology and lessons learned by the ICARDA 816 grant could be successfully applied to assist cashmere and wool producers and women fiber processors in Southern Tajikistan, Kyrgyzstan and Iran while continuing the activities with goat producers and women processors in northern Tajikistan.

Small producers of sheep, cashmere and Angora goats in Kyrgyzstan, Iran and Tajikistan share the problem of poor access to world fiber markets. This also hurts local processors who add value to fiber – in most cases poor rural women. The women also lack access to markets where handmade, luxury clothing and handicrafts made of natural fibers are highly valued. The producers therefore either sell unprocessed fiber to traders or women processor use it to make cheap, low quality products that sell for low prices, loosing considerable earning opportunities as a result. To compete on high end international markets the women need access to processing equipment and technologies, information and knowhow regarding product quality and appealing designs.

The overall goal of the programme was to improve the livelihoods and income of small livestock producers and rural women through improved production, processing and export of value-added fiber in producing areas of Tajikistan, Kyrgyzstan and Iran. The objective of the project was to set up a value chain focused on fiber goat production fiber harvesting, processing and marketing. The target groups were small producers of cashmere, mohair and wool and women processor groups in Northern and South-East Tajikistan, Kyrgyzstan and Iran; all four project sites were located in marginal areas which represent typical fiber producing and processing areas and where the population depends on livestock. From August 2009 to September 2013, the project worked with pilot groups at the four sites: in total 23 women processor groups involving 257 women (Sept. 2013), and 148 goat and sheep farmers owning a total of nearly 10,000 animals.

The project was composed of five interrelated components that were considered critical for successfully developing a fiber value chain

1. Characterize production systems and improve fiber production of small ruminants in all target sites.
2. Work on formation and capacity building of women's groups to develop fiber processing and export of value-added fiber and products in all pilot sites. Encourage the development of women-led small businesses.
3. Develop sustainable market chains that link fiber producers and processors with buyers.
4. Research on changes of income of fiber producers and women processors and their effects on livelihoods and gender roles.
5. Linkages (business, scientific and cultural) between the pilot communities and the global communities of producers, processors and consumers of fiber and fiber products.

At the new sites, the project teams started with characterization of the production, fiber processing and marketing systems: the available breeds/genotypes, in particular with regard to fiber quality and yield, and the current status and major constraints in goat and sheep production were assessed. This was complemented by studies on the local fiber processing activities and markets (Component 1). Fiber quality was studied through visual and laboratory assessments; e.g. two baseline studies on Mohair in Northern Tajikistan and Cashmere quality in Iran were published. For example, in Iran, where little was known about the nomad cashmere production system, the project established a knowledge base through several complimentary studies on the nomadic production system, the quality of cashmere produced, combing procedures, and cashmere marketing. Based on these 'baseline'

studies, the project team designed a community or farmer based breeding scheme for each production system jointly with the communities/farmers. While in Iran, the phenotypic variability allowed a selection within the goat herds, in Tajikistan and Kyrgyzstan it was decided that the required improvements in fiber quality and yield could only be achieved by 'importing' higher quality sires/semen from outside the country or outside the sites, respectively. The participating farmers were highly motivated and fully engaged in the breeding activities at all sites. Considerable phenotypic improvements were achieved. In Northern Tajikistan crossbreeding with Texas Angora sires decreased the fiber diameter and kemp and increased the yield of Mohair in the offspring at first shearing. In Iran, the selected sires for the nucleus herds were clearly superior in fiber quality and yield compared to their contemporaries. In Badakhshan, the proportion of Altai type goats in the very heterogeneous flocks increased considerably, and thereby 15% higher cashmere yields, higher body weight, and a higher proportion of white cashmere/cashgora was observed. In Kyrgyzstan, the proportion of the Tian Shan type sheep and the quality standard of the semi-fine wool increased along with improved fertility rates of ewes through a combination of culling of unproductive ewes and those that did not meet the breed standard and the shared use of high quality Tian Shan rams. The improved wool quality directly benefited the women felters in the same villages by providing them with good quality wool for a number of felt products like chair mats and shirdaks.

The components on fiber processing and market linkages (2 and 3) in Tajikistan focused on 1) collecting data on local and international mohair and cashgora value chains, 2) analysis of products, processing methods, markets and prices; 3) experiments in developing new product lines for mohair and cashgora fiber in close collaboration with the beneficiaries including experiments in processing technologies, product development, organization of processing groups and test-marketing; 4) small-scale, feasibility tests of the new product lines for cashgora and mohair; and 5) analysis of the feasibility tests and developing strategies for improving and scaling up the value chains. The feasibility test proved that Tajik spinners in both regions could produce high quality mohair and cashgora yarn that had a strong demand on the US export market. In comparison with the low quality mohair yarn that sells for $10-15/kg in Tajikistan, the new luxury yarns were wholesaled for $140/kg (mohair yarn) and $150/kg (cashgora yarn). In Naryn the project team including CACSARC-kg , a very experienced regional non-governmental Organization, worked intensively with four felting groups to explore which investments in equipment, facilities and skills are required to allow the women to work more efficiently and improve quality and design of traditional felt products. The project also developed new product lines, e.g. felt slippers with leather soles, targeting regional and international markets. It also linked the women groups to reliable supplies of quality raw fibre. After intensive trainings, experimenting with designs and targeted test-marketing, product lines for different markets have been developed, and costs and profits calculated. The project results can be utilized for developing business models for felting groups including minimum initial investments required to make the groups fully effective. The progress on fiber processing was less advanced in Iran, partly because the national team could not be supported with international expertise in the same way as in the other countries, but also because there was not such a strong tradition in fiber processing as in the other sites to build on. Three groups of nomad women were formed, and a training program on spinning techniques, dying, and knitting was implemented which enabled the women to improve their skills and knowledge.

The project team calculated earnings and profits for goat producers and fiber processing groups in Central Asia (Component 4). In Northern Tajikistan about 20 goat producers can increase their annual income by US$125 each through selling kid Mohair to processor groups due to the higher price paid by the women processors given that at present the annual demand is about 800 kg. Total earnings and profits for a processing group of 35 women involved in Mohair yarn processing are calculated at approximately $2,504 per month and $30,048 per year. The average monthly earnings per processor for part-time work will be $71.54. The average earnings are low because some women (for example women who scour, card and dye yarn) will work only about 5-7 days/month. Others (spinners, dehairers) might work 14-21 days. Although the earnings are not high, they represent approximately 33% increase in the monthly income of an average rural family in the region, or 50% increase in the income of a poor family. The local demand for combed cashmere/cashgora from the women spinners

in Badakhshan, allow the goat keepers, also mainly women, to fetch about $21 from selling 1 kg of combed cashgora fiber as opposed to previous earning of $2-3 from selling 1 kg of sheared fiber. It is expected that in Badakhshan at the minimum 10 women from each of the 8 pilot villages will be able to spin yarn for sale on permanent basis. The monthly income from spinning is estimated at US$ 52.5 plus profits from sale of US$35[1]. Once the system is fully established, it will create additional income for the local communities from combed fiber collection ($33,667) and processing ($84,000).
The total annual income obtained by the four felting groups in Naryn Province in Kyrgyzstan involved in the project from the beginning has increased by 2.3 times from US$5600 in 2010 to US$18500 in 2013[2]. The strong emphasis on product quality and design in the trainings of the felting groups in Kyrgyzstan led to UNESCO Awards of Excellence for Handicraft Products in Central Asia to two of the felting groups in Kyrgyzstan in 2012.

The project facilitated and created linkages between producers, processors, scientific communities, government and private organizations. It also stimulated linkages between the project sites: trainers from CACSARC-kg trained women in Northern Tajikistan on dying, weaving and knitting techniques; the women group in Asht trained women from Badakhshan and Kerman in spinning with electric spinning machines; the low-cost electric spinning machines developed in Khujand were exported to Badakhshan and Naryn; and an expert on Artificial Insemination (AI) in goats from the Animal Science Research Institute in Karaj planned and conducted two AI campaigns together with his Tajik colleagues in Northern Tajikistan.

The practical lessons learnt from the participative implementation of improved husbandry practices, selection of breeding animals and fiber processing were converted into information leaflets and booklets in English and local languages (available on the project website: http://cac-program.org/fiber).

A new IFAD-Aga Khan Foundation grant project that started in summer 2013 will complete the development of the business models for women processors in Tajikistan and Kyrgyzstan and start scaling out. The project activities in Iran were highly valued by the direct beneficiaries, the nomad organization and the local government which was clearly expressed by the respective representatives in the two stakeholder meetings held in Baft area. Thus, the team hoped that a follow-up national project would be funded to build on the achievements and further support the breeding program, organize joint cashmere marketing and further explore the potential for women processor groups, and especially the investment in a dehairing facility.

The value chain approach used by this project proved very useful as it provided a clear direction and structure to the project activities, was reinforced by market dynamics, engaged different groups of beneficiaries along the value chain and delivered comprehensive results in multiple areas. The value chain approach also helped to focus on income-generating activities which are very important for beneficiaries in marginal areas. However, this type of project is demanding in terms of funding, time and expertise as it has to address multiple, often unforeseen problems at different points of the value chains. These demands stretched the limits of a 4-year grant that was divided among 4 sites in 3 countries; therefore for future grants it should be carefully evaluated if focusing on fewer sites would be more effective.

[1] Profits are estimated based on the successful test marketing of cashgora yarn at a whole sale price of US$ 150 per kg.
[2] The income was also monitored till September 2013 which means that the total income at the end of 2013 will be even higher

1 Introduction

The project was designed on the basis of activities of the IFAD/ICARDA Grant Programme "Community Action in Integrated and Market Oriented Feed-Livestock Production in Central and South Asia" (ICARDA 816) in Northern Tajikistan which completed its activities in June 2009. The programme collaborated with small producers on improving the production of Angora goats and developing new mohair markets. The results of the programme indicate that Tajik Angora goat producers can benefit from the introduction of improved breeding and husbandry practices to produce quality, kemp-free fiber. Local women can process this high quality mohair into luxury yarns and find lucrative export markets if provided with market feedback and linkages to buyers. The programme demonstrated how new technologies, market information and linkages between producers, processors and buyers can be successfully mobilized to empower small livestock producers and fiber processors to improve earnings and livelihoods.

The new grant project proposed that the methodology and lessons learned by the ICARDA 816 programme could be successfully applied to assist cashmere and wool producers and women fiber processors in Southern Tajikistan, Kyrgyzstan and Iran while continuing the activities with goat producers and women processors in northern Tajikistan.

Small producers of sheep and cashmere and angora goats in Tajikistan, Kyrgyzstan and Iran share the problem of poor access to world fiber markets and as a result experience considerable losses of income. This also hurts local processors who add value to fiber – in most cases poor rural women. The women lack access to distant markets where handmade, luxury clothing and handicrafts made of natural fibers are highly valued and thus lose considerable earning opportunities. In addition to poor linkages to markets, cashmere, mohair and wool producers lack scientific, organizational and technical support to improve breeding and fiber quality. In Central Asian countries such as Kyrgyzstan and Tajikistan, centralized, state-run breeding programs that supported sheep and goat production collapsed after the breakdown of the Soviet Union and were never replaced by breeding programs for small, private producers. Neither were the new private farmers trained in proper harvesting, grading and sorting of cashmere and mohair to satisfy market standards. These deficiencies not only affect fiber quality but threaten the long-term competitiveness and sustainability of these sectors and the livelihoods of tens of thousands of families who depend on incomes from fiber production and processing. Many of these families live in poor and often remote agro-ecological regions where the production of small ruminants such as Angora and Cashmere goats represents the only source of livelihood.

This project focused on the defined needs of these families in order to improve their livelihoods and income putting special emphasis on rural women through improved production, processing and export of value-added fiber in producing areas of Tajikistan, Kyrgyzstan and Iran.

The project collaborated with sheep and goat producers in the three countries on finding ways to overcome constrains in breeding and animal husbandry, produce better animals and earn higher incomes from fiber sales. The project also worked with rural women on developing new models of fiber processing to produce quality yarn and handicrafts for export. The project focused on well-identified fiber products with market prospects. It started with a baseline with identification and understanding of constraints to production and marketing opportunities. In addition, by promoting an intensive south-south and south-north interaction, the programme offered a high quality expertise and a wealth of information and skills with direct benefit to NARS, development projects and farmers of the region.

The project responds to the strategic objectives (b), (d) and (e) and to both IFAD's grant policy objectives, in as much as it: promotes innovations in a participatory, community-based and demand driven approach to strengthen the communities' capacity and their organizations; facilitates access to technologies and markets; and improves poor rural people's income and productivity of natural resources. The proposed programme particularly responds to the IFAD objective of helping the rural poor to gain access to improved agricultural technologies and production services.

2 Grant description and implementation arrangements

2.1 Grant goal, objectives, components and target groups

The overall goal of the programme was to improve the livelihoods and income of small livestock producers and rural women through improved production, processing and export of value-added fiber in producing areas of Tajikistan, Kyrgyzstan and Iran.
The objective of the project was to set up a value chain focused on fiber goat production and fiber harvesting, processing and marketing.

The target groups were small producers of cashmere, mohair and wool and women processor groups. The pilot sites at the four project sites in Iran, Kyrgyzstan and Tajikistan were selected to represent typical fiber producing and processing areas.

The IFAD-ICARDA project was working at four sites:

1. Sogd region, northern Tajikistan: on breeding Angora goats and processing mohair into yarn and products;
2. Badakhshan region, eastern Tajikistan on breeding cashgora goats and processing cashgora and cashmere into yarn and products;
3. Naryn region, Kyrgyzstan: on improving wool quality and producing wool felt handicrafts for regional and international markets;
4. Kerman province, Iran: on cashmere goat breeding and spinning cashmere yarns by women's groups.

At each site, the project collaborated with producers of sheep or fiber goats on improving breeding, animal husbandry and fiber quality, and worked with women's groups on developing a new, sustainable business model to process local fiber into luxury export products. Improvements in sheep and fiber goat production helped farmers earn additional income from selling wool, mohair and cashmere. Learning how to process these fibers into yarns, knitted products, felts and other handicrafts opened new earning opportunities for poor women in remote, rural areas and helped some women overcome severe poverty.

The grant components included:

- Component 1: Characterize production systems and improve fiber production of small ruminants in all target sites.
- Component 2: Work on formation and capacity building of women's groups to develop fiber processing and export of value-added fiber and products in all pilot sites. Encourage the development of women-led small businesses.
- Component 3: Develop sustainable market chains that link fiber producers and processors with buyers.
- Component 4: Research on changes of income of fiber producers and women processors and their effects on livelihoods and gender roles.
- Component 5: Linkages (business, scientific and cultural) between the pilot communities and the global communities of producers, processors and consumers of fiber and fiber products.

Map of the project sites

Target groups:
The project targeted a small number of communities at the four project sites. The number of direct beneficiaries varied with the nature of the activity (Table 1). In the case of establishing breeding programs only a small number of farmers were included as it demanded very intensive work and data collection on the farms. The fiber processing activities targeted three to ten women pilot groups to fully develop a business model to be outscaled by development partners.

Table 1: Number of beneficiaries at the four project sites at the end of the project

Beneficiaries	Northern Tajikistan	Badakhshan	Kyrgyzstan	Iran	Total
No of women processor groups	9	6	5	3	23
Total no of women	84	54	67	60	257
No of herders/farmers	9	98	13	8/29	148/169
Total no of goats/sheep[a]	1,485	1,070	1,888	1896	9550

[a] Goats in Tajikistan and in Iran, sheep in Kyrgyzstan.

2.2 Grant implementation arrangements

The project was implemented by ICARDA in partnership with NARS, NGOs and universities and with the support of qualified consultants. The project manager at ICARDA (Dr. Barbara Rischkowsky) was responsible for the overall project management and financial administration. Dr.

Liba Brent (Terrra Institute) as principal investigator played a key role in the project implementation. She has been working intensively with the women processors to improve their skills to produce yarns and handicrafts for international markets, identify and communicate their demand for raw fiber to the producers and thus establish the linkages between fiber producer, women processors and product markets in the pilot regions and in particular with markets in Europe and the US. Dr. Joaquín Mueller from INTA guided the development of breeding structures with active participation of the producers and based on the demands of the women processor groups.

ICARDA's regional office in Tashkent and the country office in Iran supported the programme in administrative issues.

In each country, teams were created to provide the needed expertise. Key partner research institutes (NARS) and organizations were selected based on earlier successful collaboration and recommendations by Liba Brent and IFAD. National coordinators from the NARS were selected for each programme site. They supported the implementation of all project activities, linked the project to the Ministries of Agriculture and Academy of Sciences and reported to the Project manager and the Principal Investigator.
Major team members included:

ICARDA team:
Barbara Rischkowsky, project manager and small ruminant specialist
Liba Brent, principal investigator and socio-economist, Terra Institute, University of Wisconsin, Madison
Dr. Joaquín Mueller, community based breeding specialist, INTA (Instituto Nacional de Tecnología Agropecuaria), Bariloche

ICARDA regional/country office:
Nariman Nishanov, administration for Central Asia and professional officer on socioeconomic research
Jozef Turok, Regional Coordinator, Central Asia and the Caucasus
M.H. Roozitalab/Seyed Ata Rezaei, Coordinator, ICARDA-Iran Program

Tajikistan:
Dr. Fazzlidin Ikramov, Livestock specialist, Director, Tajik Research Institute of Livestock
Dr. Ma'tazim Askarovich Kasimov, Site coordinator Sogd Province and Mohair goat breeder, Director, Sogd Branch of the Tajik Research Institute of Livestock
Mr. Qonun Davlatqadamov, Site coordinator, Agrarian Adm. Department, Ishkashim Province, Badakhshan

Kyrgyzstan:
Dr. Asanbek Ajibekov, small ruminant breeder, Kyrgyz Institute of Livestock and Rangelands, Bishkek
Ms. Sevetlana Balaeva, CACSARC-kg, Central Asian Craft Support Association's Resource Center, Kyrgyzstan (NGO)

Iran:
Dr. Hamid Reza Ansari-Renani, fiber specialist, Animal Science Research Institute, Karaj, Iran
Mr. Syed Syedmomen, Cashmere specialist, Kerman Research Institute, Kerman

At the inception of the project and once each year an annual project review and planning meeting was held at the project sites or in Tashkent, Uzbekistan to review progress and jointly plan activities and budget for each site. A Steering Committee was formed to oversee project progress and planning. The members represented the main participating institutions and included:

- National Focal Points in Central Asia: Djamin Akimaliev, Khukmatullo Akhmadov
- National and Site Coordinators: Hamidreza Ansari-Renani, Asanbek Ajibekov, Fazzlidin Ikramov Matazim Kasimov
- CACSARC-kg: Svetlana Balalaeva

- ICARDA Project leader and Principal Investigators: Barbara Rischkowsky, Liba Brent, Joaquín Mueller
- IFAD: Laura Puletti (Grant manager), Antonio Rota (Technical Advisor)

As requested in the grant design document progress and financial reports were prepared by the collaborators every six months (31 January and 31 July) starting on 31 January 2010 and compiled by the project coordinator to be submitted to IFAD. Additional reports/publications were prepared according to completion of project activities.

2.3 Changes in grant implementation context, grant design or outreach

A significant change in the grant implementation was the fact that Liba Brent could not contribute to the project activities in Iran which had been part of her original assignment. The original plan had been that Liba Brent would be responsible for establishing women processing groups in Central Asia and Iran. Various attempts in 2010 and early 2011 were made to obtain a visa for Dr. Brent, but the joint efforts of ICARDA's project office and the Agricultural Research, Education and Extension Organization (AREEO) in Iran failed. The lack of expertise and support was a huge disadvantage for achieving this project component in Iran. The project tried to compensate through arranging training of Iranian women in Tajikistan and remote control of quality of yarn and knitted products samples by Liba Brent. However, it proved very difficult to obtain the official permission for the trip of the Iranian women, the training finally took place end May/early June 2012. The communication between the Iranian team and Liba Brent did not function very well. Thus, the Iranian team organized women trainings with the support from Kerman but they lacked a clear market orientation.

The need for additional expertise in organizing the production-marketing channel and developing the appropriate market infrastructure for women's groups was recognized at the inception workshop. To meet this demand, IFAD organized a supervision mission by an experienced marketing consultant from the US, Docey Lewis, to Tajikistan and Kyrgyzstan jointly with Liba Brent. The insecure situation in Kyrgyzstan in 2010 did not allow including Kyrgyzstan into the supervision mission in May 2010 as originally planned. Thus, it was first envisioned that Ms. Lewis would come back in fall but then decided to use local experts on felt project design instead and CACSARC-kg included establishment of international market linkages into their agenda. Through intensive test-marketing in the US and Europe and exploring new contacts, CACSARC-kg and Liba Brent succeeded to establish a number of new market links for the felting groups (see 2.3). The situation in Kyrgyzstan also hindered the international scientist to travel to Kyrgyzstan and to hold the regional workshop and steering committee meeting in Bishkek in 2010 and 2011.

A difficulty for the technical support missions was the uncertainty of the flight connection between Dushanbe and Khoroq. Flights were often cancelled because of unsuitable weather conditions and the road conditions in late fall, winter and spring were often hazardous which made traveling in key periods for interventions (e.g. shearing and mating) quite unpredictable, very time-consuming (by car it took about 17-24 hours from Dushanbe to Khoroq) ad difficult to plan the multi-country .

3 Review of performance and achievements by component

3.1 Project Activities in Sogd region, Northern Tajikistan

3.1.1 Component 1: Characterize production systems and improve fiber production of small ruminants at all target sites

The project activities in Northern Tajikistan (site description see Annex 1) research activities were developed based on a fiber value chain model that had been jointly developed by the ICARDA team and the Tajik Livestock Institute and in an earlier IFAD/ICARDA grant program (ICARDA 816). The earlier Project had also conducted household and market surveys at the project site so this baseline information was available at the start of the project (http://www.cac-program.org/livestock/).

3.1.1.1 Developing breeding programs with Angora goat farmers

The earlier grant program had also tested the quality of Tajik mohair and had started using the data to develop an appropriate breeding program. It had analyzed mohair samples in a laboratory in Almaty, Kazakhstan using OFDA 4000 (Kosimov *et al*., 2013) and performed fiber testing through processing mohair into yarn and knitwear. These tests have shown that Tajik mohair is coarser (approximately by 2-3 micron) than American, Australian and South African mohair and that Tajik Angora fleeces are less homogeneous, meaning that they include several different types of fibers. This is partially the result of Soviet-era breeding preferences that focused on strong mohair that was demanded by Soviet textile factories. The tests have also shown that Tajik mohair includes medullated fibers (almost 20% of goats had 2% or more medullated fibers). These fibers are highly undesirable in processing. Kemp has been almost completely eliminated in American, Australian and South African Angora goats as a result of concerted breeding efforts.

Given that fine, kemp-free mohair is highly valued on the world market (the price per weight unit for fine fiber is usually 3-5 times higher than the price of coarser fiber), the shortcomings of Tajik mohair led to the formulation of specific fiber quality related breeding objectives: the need to decrease fiber diameter and kemp content. The project designed a breeding plan in view of these priorities that focuses on creating white and colored breeding nuclei that will produce improved Angora bucks for private farmers.

The project started with establishing a system to form nucleus groups to mate the best available animals within the flocks. Eight farmers from Asht with comparatively smaller goat flocks (50-185 animals) collaborated to form white and black breeding nucleus flocks. They pooled their best males and females in the mating season 2009/2010. Two other farmers, Usarboy Kholmatov and Khaydarali Khakimov, with 130 and 180 animals, respectively, that live in remote sites established black nucleus groups within their flocks that were mated separately from the main flock. The phenotypic differences in major traits between the animals selected for the nucleus groups and the main population are shown in Annex 2. An unexpected result of this mating scheme was that the nucleus farmers achieved a high kidding rate and a high kid survival rate while other farmers lost 30-50% of their kids in the winter 2009/2010. The reason was that the mating organized by the project was done in the optimal period from 22 October to 22 November 2009, so that the kidding period lasted only one month and started in March 2010 when mild temperatures and availability of feed provided good conditions for the does and the kids. Farmers who did not participate in the breeding program kept the bucks with their flocks from August to November. As the rangelands were in comparatively good conditions due to favorable rainfall in 2009, mating started early and was spread over a relatively long period. Consequently, the kidding season at those farms was much longer and started as early as January. The winter in 2010 was harder and longer than usual, and most farmers were unable to protect the kids born in January and February from the cold temperatures and to supply enough feed for the does.
This initial organizational effort produced a good number of superior offspring in the participating herds and provided the base for selection within the flocks throughout the project duration. The project team worked on selection of the best bucks and does and culling of inferior animals with the

goat farmers in Asht district but also involved goat farmers from B. Gafurov district (ICARDA grant 816). For example, two young colored mohair bucks from Usarboy Kholmatov in Asht district were procured for the flock of Suyunboy Mamarasulov in B. Gafurov district. Assistance was also provided to Turgunboy Madaliev for procurement of a white mohair buck from a famous farmer in the region. The project team examined the flocks regularly for mohair quality and yield, exterior, and live weight. In spring data were collected on fleece yield and quality as well as body conformation and size. In fall, the project team mainly worked with farmers on culling of goats and selecting breeding animals with special attention on the selection of breeding bucks. Based on the annual monitoring, the project team discussed with the farmers about issues of mohair production and the need for improving the fiber quality for processing.

In September 2013, nine nucleus groups within Angora goat herds have been fully established through selection and monitoring (Table 2). Six out of the nine farmers breed white goats (n=1,050), and three farmers dark mohair goats (n=435). The total number of superior nucleus does is 518 does out which 138 are dark mohair does. Over the four years of consolidation of the flocks, the farmers managed to steadily improve their nucleus groups which can now be considered an improved genepool for the Tajik Angora breed.

Table 2. List of dark and white nucleus flocks fully established at the end of the project

Farmers	**Goat flock as of Jan. 2013**			**Color of goats**	**District**
	Total no	Superior does in the nucleus			
		No	%		
Gafur Fozilov	210	81	38.6	White	Asht
Nemat Raimkulov	245	68	27.8	White	Asht
Tirkashali Urunboev	108	46	42.6	White	Asht
Kholmatov Usarboy	180	37	20.6	Dark	Asht
Khaydarali Khakimov	130	48	36.9	Dark	Asht
Turgunboy Madaliev	158	74	46.8	White	B.Gafurov
Uktam Ibragimov	144	47	32.6	White	B.Gafurov
Anorboy Kasymov	185	64	34.6	White	B.Gafurov
Khujam Mamarasulov	125	53	42.4	Dark	B.Gafurov
Total	**1,485**	**518**	**34.9**		

3.1.1.2 Organizing import of American semen to Tajikistan

While selection for higher fiber quality was done through selection in the pure Tajik Angora flocks, the project also looked at possibilities to speed up genetic improvement of the quality of Tajik mohair through the introduction of imported genetics, in particular to eliminate kemp fibers, decrease fiber diameter and increase homogeneity and weight of mohair fleeces. Such improvements are expected to have a long-term positive impact on mohair marketing and processing: improvement in mohair quality is expected to raise the value of Tajik mohair on domestic and international markets, and higher quality fiber will be cheaper to process into yarns and textiles for export.

The project evaluated options of importing improved genetics from different countries and decided that the best and most feasible option would be to import either animal or semen from Texas. However, the costs of importing live animals proved to be too high. Consequently the project team pursued the import of frozen semen. Eight top-rated Angora bucks for semen collection in 2010 were purchased at an auction in Sonora after completing a performance test at the Sonora Research Station administered by the Texas A&M University. Eligible bucks had a maximum kemp content of 0.1%, med fiber content of 0.4% or less and with an overall test score of 110 or higher. The team also

selected one buck with a high clean fleece weight and two bucks with low FD. The semen was collected at "American Genetics and Biologicals" in Bryan, Texas in the fall and winter 2010-2011. 1812 doses of semen were collected from the selected bucks and shipped to Tajikistan in October 2011.

Artificial insemination (AI) using frozen goat semen was conducted for the first time in Tajikistan. During the Soviet period, Tajik Angora goat scientists used artificial insemination with fresh semen. Thus, the Tajik team solicited help from an experienced inseminator of the Iranian partner institute, Ramin Aliverdi. Mr. Aliverdi made a scoping visit to the pilot site in September 2011 to meet with Tajik scientists, prepare the insemination plan and assess local facilities and equipment needs. Then he conducted the insemination campaigns together with Tajik researchers in October 2011 and 2012. Team members included specialists from the agricultural cooperatives, AI technicians and farmers. A strict time schedule for synchronization and insemination was established (Table 3).

Table 3. Calendar of Artificial Insemination (AI) campaigns in 2011-2012

	Day	**Time**	**Date in 2011**	**Date in 2012**
Group 1				
Sponge or CIDR pouting	0	8-10 AM	15/10/2011	10/10/2012
PMSG + PGF2A	9	10-12 AM	24/10/2011	19/10/2012
Sponge remove	11	10-11 AM	26/10/2011	21/10/2012
Heat detection	12	15-17 PM	27/10/2011	22/10/2012
Artificial insemination	13	7-10 AM	28/10/2011	23/10/2012
Group 2				
Sponge or CIDR pouting	0	8-10 AM	16/10/2011	11/10/2012
PMSG + PGF2A	9	10-12 AM	25/10/2011	20/10/2012
Sponge remove	11	10-11 AM	27/10/2011	22/10/2012
Heat detection	12	15-17 PM	28/10/2011	23/10/2012
Artificial insemination	13	7- 10 AM	29/10/2011	24/10/2012
Group 3				
Sponge or CIDR pouting	0	8-10 AM	17/10/2011	12/10/2012
PMSG + PGF2A	9	10-12 AM	26/10/2011	22/10/2012
Sponge remove	11	10-11 AM	28/10/2011	23/10/2012
Heat detection	12	15-17 PM	29/10/2011	24/10/2012
Artificial insemination	13	7-10 AM	30/10/2011	25/10/2012

In 2011 237 goats from five farmers were pooled for the AI campaign (Table 4), and 209 were inseminated. In 2012 the number of the participating farmers reached nine including three farmers from B. Gufarov District (Turgunboy Madaliev, Fattokh Khonaev and Khujam Mamarasulov); three AI groups with 308 selected does were formed (Group I – Dulana site, Group II – Takli site and Group III – Taboshar) from which 250 does were inseminated. The third group consisted of the supernucleus owned by the Sogd Branch of the Tajik Livestock Research Institute (40 selected superior does) and, as an experiment, 25 colored goats from the breeding flock owned by farmer Kh. Mamarasulov.

Unfortunately, the conception rate of does was low. The share of live kids born from Angora bucks' semen formed 11.8-16.0% of the total number of inseminated does. In 2012 26 crossbred kids and in 2013 40 kids were born from seven different sires. Observations of the inseminated does during gestation period indicated that the number of abortions and still births was very low (4-6 cases). Thus, low motility rate of semen after defrosting (15-55%) was the major reason for the low fertility rate.

Table 4. Farmers and number of does involved in the Artificial Insemination campaign with imported semen of Angora bucks in fall 2011-2012.

	Farmers	**Years**	**Inseminated does**	**Semen of buck (ID number) used**						
				45	**9**	**19**	**59**	**20**	**21**	**23**
I	Gafur Fozilov	2011	66		27		1		29	9
		2012	50	15	14	14	7			
	Nemat Raimkulov	2011	63		25	31	7			
		2012	-							
	Sokhib Ibragimov	2011	-							
		2012	34	7	7	10	10			
II	Uktam Ibragimov	2011	36	2	34					
		2012	31	8	8	6	9			
	Ulugbek Beknazarov	2011	31		11			20		
		2012	19	9			10			
	Khaitkul Askarov	2011	13	13						
		2012	-							
	Azizjon Khojimatov	2011	-							
		2012	15		8	7				
	Turgunboy Madaliev	2011	-							
		2012	26	15		11				
	Fattokh Khonaev	2011	-							
		2012	10				10			
III	Supernucleus	2011	-							
		2012	40	1		3		19	6	11
	Khujam Mamarasulov	2011	-							
		2012	25	4		21				
	Total	***2011***	***209***	***15***	***97***	***31***	***6***	***20***	***29***	***9***
		2012	***250***	***59***	***37***	***72***	***46***	***19***	***6***	***11***

The performance of the first progeny born in 2012 was monitored in comparison to local kids born from the same flocks (see more details Annex 3). From the 237 inseminated does 26 offspring from Texan and 112 offspring from local bucks were obtained. A total of 7 Texan and 9 local bucks had offspring. Unfortunately not all sheared offspring were sampled, so that fiber traits were measured on 34 local and only 9 Texan offspring.

Birth weights resulted by 0.3 kg higher in Texan kids but further body weights were similar between genotypes. At about 4-5 months of age fleece samples were collected and analyzed in the Bariloche Fiber Laboratory (Argentina) in July 2013. The results indicate a significant lower fiber diameter in Texan kids. Other differences tended to favor Texan kids but did not reach statistical difference. No difference between genotypes was found in medullation.

In March/April 2013 the first fleece weight and staple length (measured with a ruler on the skin of the goat) were significantly higher in Texan buck offspring. Fleece weight in crossbreds was 1.14 kg compared to 0.62 kg in locals. Interestingly fineness estimated visually was not different but measured fiber diameter in Texan offspring (22.5 microns) was significantly finer than in local offspring (27.4 microns). Also comfort factor and fiber curvature were higher in Texan offspring. There was a large difference in medullation, in particular in med fibers measured at the base of the fibers but not statistically different, most probably, due to the low number of samples available from Texan offspring. Overall visual assessment of progeny resulted in a much higher percentage of "superior" animals born from Texas progeny

Concluding, the import of semen resulted highly advantageous and despite the disappointingly low number of live offspring, the team considers the results as a big progress. Farmers were happy about obtained crosses (kids) and widely discussed the new progeny. They raise these kids with a big interest and hope to increase their number to improve quality of the flocks. Remaining semen should

be used in multiplier flocks. Further research is needed to establish if heterosis effects were important and if there are unwanted side effects such as disease susceptibility or fitness reduction.

Group of the crossbred kids at 4.5 month age

Crossbred kid before 2nd shearing

Dr. Matazim Kosimov discussing fiber quality with a farmer near Dulana, April 2011.

3.1.1.3 Extension support for Angora goat farmers

Farmers were also trained on methods of husbandry practices and basic monitoring of animal performance on the farm. In the summer-fall period 2010, issues of preparing higher quality feeds for the winter were discussed with farmers. Farmers stored different types of forages based on affordability: alfalfa hay, hay from the range, sorghum, maize stalks, camel's-thorn, and wheat or rice straw. To replenish does' deficit in nutrients and minerals, supplementation with concentrated feeds and mineral briquettes was suggested in the nucleus flocks. The project team recommended using higher quality feeds for feeding of the does during the last 1.5 months of the gestation period and at the start of lactation period. Consequently, the project team introduced supplementation with minerals (briquettes) in the beginning of spring and upon return from the summer rangelands, and feeding of concentrates of the bucks in the mating period and the does in the winter period. The researchers also discussed the role of grazing on good rangelands during the mating season.

Infectious and parasitic diseases are one of the major problems in maintaining the health of goats and the project trained the farmers on preventive veterinary measures for their flocks. Upon return from the summer rangelands and in the beginning of spring animals were treated with anthelmintic agents (tablets, suspensions, injections), and washed with antiparasitic agents (neocidol).
The project team assisted farmers in containing an outbreak of Contagious Caprine Pleuropneumonia (CCPP) that affected Angora goats at the pilot sites. In 2010-2011 a large percentage of goats in Northern Tajikistan were infected with CCPP. The disease also impacted Angora goat flocks of farmers who participate in the ICARDA/IFAD project. Farmers contacted the project scientists about the disease and the scientists contacted the Veterinary Institute in Dushanbe. A team of scientists from the Veterinary Institute came to the project site in Markhamat village in the Asht district to assess the situation. Three infected goats that were not treated were slaughtered for autopsy. External inspection and viscera autopsy preliminarily confirmed the assumed diagnosis of CCPP. Laboratory analyses of organs and tissues conducted by scientists of the Institute later revealed that the strain was of another type than the classic CCPP.

The project scientists helped to treat the goats with injections of antibiotics (tetracycline) which helped to prevent a high mortality in goats. However, a relatively high number of Angora does aborted after injection of antibiotics (Table 5).

Table 5. Data on infected goats of nucleus farmers

No	Farmers' name	Total number of goats	Number of infected goats		% of abortions in does
			total	including does	
Nucleus Flocks					
1	Khujan Mamarasulov	108	28	11	54
2	Usarboy Kholmatov	158	12	4	75
3	Tirkashali Urunboev	116	14	5	60
4	Makhmudali Turaev	85	3	0	0
Control Flocks					
1	Ikromali Mirzoakhmedov	65	48	30	70
2	Eryigitov (associate)	14320	6580	2816	68

The epidemic caused significant mortality and abortions of goats in the region. However, the losses would have been even more severe had the project scientists not intervened by alerting the national veterinary authorities and helping farmers to obtain and administer vaccines. The event shows the importance of a support system that includes extension personnel whom the farmers can contact in the time of crisis, and that can mobilize governmental support on behalf of the producers. By encouraging close collaboration between the farmers and local scientists, the ICARDA/IFAD project is helping to develop such a system at the pilot site. Up to the end of the project, no further outbreak of CCPP disease was observed in the project area due to the preventive measures promoted by the project.

3.1.1.4 Establishment of a new market for fine kid mohair

The IFAD-ICARDA project has been helping producers also by finding more lucrative markets for quality fleeces. This assistance is linked to the project activities in local fiber processing and export of luxury yarns and knitted products. The project helps farmers to sell their quality fleeces for higher than local market prices to groups of women processors who are looking for quality mohair for spinning.

In 2010, for example, the demand for mohair was strong and farmers sold their clip to traders early in the season in April and May. Spinners were unable to find quality mohair for the rest of the year and could not produce enough yarn for the project. To avoid mohair shortages in the future, the project started in 2011 to organize purchases of quality kid fleeces at the mohair markets and on private and cooperative farms. The team visited mohair markets in Khodzhand and Asht and a number of private and cooperative farms in the Asht, Gafurov and Matchinsk region. During the farm visits the scientists evaluated goats, sorted and purchased kid mohair, and conducted training on fiber quality assessment with farmers. Women who spin yarn for the project were invited to visit the farmers, discuss their needs in terms of fiber quality and select and buy suitable fleeces. The mohair purchasing campaign gave the project team not only the opportunity to buy fiber for spinners but to strengthen relationships with Angora goat producers. The team made visits to new farms and established new contacts with farmers, visually assessed and compared goats and fiber on different farms, discussed the project agenda to improve breeding and fiber quality through imported genetics, showed farmers photos of Texan Angora goats whose semen will be used in Tajikistan, and allowed farmers to compare their fleeces with samples of American mohair fleeces. All these activities contributed to strengthening collaborative ties between the project team and the farmers and promoted farmers' interest in breeding, improving fiber quality and supporting local mohair processing. The direct relationship between producers and processors was beneficial for both parties as they learned about each other's needs and priorities. It allowed them to understand mohair production and processing more fully and develop more flexible and mutually beneficial arrangements regarding mohair sorting, sale and purchase. The direct feedback from processors combined with price incentives gives farmers specific information regarding the desirable and undesirable characteristics of their fleeces and guides their decisions in breeding and fiber production. The spinners were learning about fiber quality at different

farms which will help them with fiber purchases in the future. During the 2011 shearing season the project team purchased around 400 kg of quality fiber for processing into yarn and products.
Based on this experience the project team, the women processors and the farmers collaborated on improving the purchasing system in the subsequent years. The system now works well and the farmers, buyers and women processors have the capacity to collect up to one ton of quality mohair during the season.

Cooperative farm Kushatov sold fine kid fleeces to the project, April 2011.

3.1.2 Component 2: Work on formation and capacity building of women's groups to develop fiber processing and export of value-added fiber and products in all pilot sites. Encourage the development of women-led small businesses.

The project worked with rural women in the Asht region to develop a business model for processing locally produced mohair into yarn and products for export. Two women's groups are using the model to produce and export mohair yarn that wholesales for $140/kg in the USA, earning fair income and profits. Three additional groups were trained to add value to the yarn by producing knitted and woven products for domestic luxury market and for export. Currently the spinning, knitting and weaving groups provide a source of income for approximately 78 women who have no earning opportunities besides seasonal work in agriculture. Under the project's guidance, the groups are developing into sustainable small businesses that can fill orders from foreign buyers and ship yarn and products to the USA or Europe. The report discusses the process of developing the business model for fiber processing, the accomplishments, lessons learned and challenges that remain.

3.1.2.1 Research on Mohair Processing and Marketing and Product Development

3.1.2.1.1 <u>Research on yarn production in the pilot region</u>

In 2009-2010 the project team conducted research on mohair processing and marketing in the Asht

region in northern Tajikistan. The Asht region is one of the centers of Angora goat production and women in Asht have been spinning mohair yarn for sale for several decades. In some villages, as many as 20-25% of adult women spin and sell yarn throughout the year. The system of yarn production is the following – a spinner goes to a weekly mohair market and purchases one or two cheap mohair fleeces for ~25 somoni/kg ($5.20). She processes the fleeces into yarn within a week or two, brings the yarn to the market and sells it for 40 somoni/kg ($8.30), earning about 15 somoni for spinning 1 kg of yarn ($3.12). It takes her two days to scour, card and spin the yarn – her daily earnings are about $1.56. The quality of the fiber and the yarn is low, and so are the woman's earnings. Local traders buy the yarn from spinners and use it to produce cheap, coarse socks or mittens for export to Russia.

Spinners selling yarn at the mohair market, Asht region

3.1.2.1.2 Exploring alternative markets for high value-added yarn

The project team searched for alternative, more lucrative markets for mohair yarn, including the US market for knitting yarns. Research on yarn sales in 2010 indicated that the US knitting yarn market was growing, with thousands of yarn stores across the US offering luxury wool, silk, mohair and cashmere yarns from many different countries that sold for high prices. Based on the prices of mohair knitting yarns sold in the USA, the project estimated that a Tajik spinner could produce and sell 1kg of high quality yarn for $50-70 as opposed to 1kg of low quality yarn for $10. However, the spinner would need quality kid mohair fiber and the yarn would have to be evenly spun to compete with commercial, machine-spun yarns on the US market.

3.1.2.1.3 Selecting a product to imitate & compete with

The project conducted a thorough research of luxury mohair knitting yarns sold in the United States and selected a 4-ply commercial mohair yarn the Tajik spinners could try to replicate using their small electric spinning machines or spindles. This 100% kid mohair yarn from Australia called "Wagtail yarn" (http://www.wagtailyarns.com.au/online-store/yarns.aspx) became a prototype for the production of 100% kid mohair yarn handspun in Tajikistan. The project planned to sell the new Tajik yarn at the same price point as the Australian yarn ($140 wholesale, $280 retail), and make sure it was of equal quality.

Wagtail Mohair, http://www.wagtailyarns.com.au/online-store/yarns.aspx

The product development process was challenging – the team searched for the most talented spinners in several villages and for the highest quality kid mohair fleeces on multiple farms to combine the best raw material and the highest spinning skills to produce yarn equal to or better than Wagtail yarn - fine, soft, lustrous and attractive to American knitters.

Tajik spinners with first samples of the new kid mohair yarn

The project coordinator took samples of yarns made by different spinners to a knitting store in Madison Wisconsin, USA and worked with a group of professional knitters to test the samples by knitting swatches and provide direct feedback to the spinners.

Wisconsin knitters test yarn samples made in Tajikistan by knitting swatches

The greatest technical challenge in producing competitive yarn comparable to the Australian Wagtail yarn was the quality of Tajik mohair. Tajik mohair fleeces were heterogeneous and included a relatively large percentage of kemp and medullated fibers. This made the Tajik mohair yarn more scratchy and not as soft and lustrous as the Wagtail yarn. The only way to remedy this problem was to dehair the fleeces prior to spinning. The dehairing involved separating medullated fibers, kemp and down from the fleeces either by hand or by using a comb. The dehairing technology was developed by one of the spinners after all attempts at finding a sufficient supply of kemp-free fiber had failed.

After a yearlong process of sample production and testing, the Tajik spinners started to produce yarn that could successfully compete on the US market and was comparable to the Australian yarn "Wagtail Yarn," only handspun. The yarn, made from manually dehaired fiber, was named "Mohair Magic." The next experiment was to test-market the new "Magic Mohair" yarn and assess market demand. During the second and third year, the project test-marketed the yarn in American yarn stores and at the Fair Trade Holiday Festival in Madison, Wisconsin. Samples of yarn were also exported to Vienna, Austria. The yarn sold successfully, and received many compliments from customers. The project started receiving orders for larger quantities from small distributors and yarn stores. The mohair yarn produced in the Sogd region was marketed by the Feel Good Yarn company http://feelgoodyarnco.com/tajik-mohair-yarn.html#.Uug6_o56hmA for $28/100 grams. A second company, Peace Fleece, plans to start marketing the yarn in February 2014. The yarn sells quite well and the buyers are interested in a continuous supply. Based on the market feedback, pricing of the yarn @ $140/kg wholesale is accurate.
After confirming a solid demand for the new yarn at a wholesale price of $140/kg and a retail price of $280/kg, the project team began to develop a yarn production model that would allow the spinners to: 1) scale up production, 2) maintain quality standard, 3) decrease production cost, 4) fulfill export

orders, 5) ensure fair wages for producers and as well as reasonable prices for distributors and customers.

Tajik Mohair Magic yarn can successfully compete with Australian Wagtail mohair yarn

3.1.2.2 Developing a centralized processing model to scale up yarn production

Initially the project experimented with the simplest model - asking individual spinners who made yarn for the Russian market to produce "Magic Mohair" yarn of the desired quality for the American market. The women could not successfully manage all processes required to produce the yarn. During the second, third and fourth year, the project worked on developing a processing technology & business organization that would allow the women to produce the new yarn in a larger volume and consistent quality.

Prior to forming a processing group, the project searched for a group leader. The team interviewed many spinners and tested their samples until it selected the most experienced spinner, Ms. Tuluikhon Abdulazizova from the Markhamat village, to become the group leader. The team then collaborated with Ms. Abdulazizova on forming the first processing group and developing all processing operations.

The processing would start with the purchase of high quality raw fiber in a sufficient quantity. This fiber would then have to be dehaired, scoured, carded, spun and dyed according to standard by trained groups of women organized by a capable leader. Technological, organizational and pricing guidelines for all these processes were developed (see details in Annex 4).

Ms. Tuluikhon Abdulazizova became the leader of the Markhamat spinning group

Many organizational, technical and financial aspects of the business model need to be further improved to scale up yarn production, make fiber processing more efficient and convenient for the women, and increase their productivity and earnings. Making such improvements will require investments that were beyond the capacity of the ICARDA project.

Technical improvements:

1. Set up a spinning workshop with a stable supply of electricity in winter: rent a facility, purchase solar panels or generator, equip the workshop with tables, chairs and additional spinning machines and organize heating and lighting. Estimated cost: $6,000.
2. Improve scouring – set up a mini scouring operation with running water and a heating system. Estimated cost: $6,000.
3. Improve dyeing – set up a mini dyeing operation to dye large batches of yarn. Estimated cost: $3,000.
4. Continue training spinners in spinning quality yarn. Develop new types of unique yarns. Estimated costs: $2,000.

Organizational improvements:

5. Improve accounting system. Train women to do electronic business accounting.
6. Improve communication, including computer and internet access and skills of women's groups.
7. Register the group as a cooperative or private family business.
8. Organize a system for managing earnings and profits.
9. Establish strong linkages with yarn importers and retailers through repeat transactions; respond to buyers' needs.

Financial improvements:

10. Establish internal and external sources of financing to fund processing activities.
11. Design a profit-sharing system.
12. Set up financing system for the support Hub.
13. Set up a "board of directors."

Cultural improvements:

14. Work on overcoming gender barriers that limit women's capacity to run a business through the assistance from support institutions such as the Hub, and through training, mentoring and soliciting support from the larger community and the government.

3.1.2.3 Developing other types of processing: Knitting

Production of quality yarn opened new opportunities to add value to the yarn and generate new sources of income for Tajik women such as making knitted products. The project team took the following steps to develop the knitting module/component:

3.1.2.3.1 Market research on knitted products

The team conducted market research on knitted products from mohair on line and in stores in the USA and selected products that could be knitted in Magic mohair yarn. Samples and prices of products were recorded, product samples were collected and possible market venues for similar products made by Tajik knitters were identified. The project team also reviewed knitted products made in Tajikistan and their potential to be redesigned into export products.

3.1.2.3.2 Selecting a group leader

To set up a knitting group, the project team first searched for a talented leader with experience and interest in learning new knitting methods and training others. To indentify potential candidates, the project team solicited knitted samples from women in the pilot villages and asked about the best local knitters. The team was introduced to Mrs. Dilorom Khaitova, a highly experienced knitter from the Oshoba village with excellent qualifications to lead a knitting group. The team started working with Ms. Khaitova on knitting samples using models and patterns imported to Tajikistan by the coordinator. Ms. Khaitova was able to reproduce many of these products in the luxury yarn.

Mrs. Khaitova, the knitting group leader, with her son and product samples

3.1.2.3.3 Forming a knitting group

The project team began forming a knitting group in collaboration with the group leader. The group has to include only highly skilled knitters who can be trusted to work with expensive yarn and knit products of exceptional quality and design that can compete on high-end markets. The products have to be made exactly according to buyers' specifications and in a timely fashion. To establish a group capable of handling these tasks, the project team used the following approach:

1) Selected several designer products that could be made with mohair yarn for export
2) Worked with the group leader to reproduce these products in mohair yarn
3) Priced the products and started soliciting orders from potential buyers
4) Started training knitters to make the products
5) Established a knitting group under the leadership of Mrs. Khaitova that can produce the products according to standard

Learning to knit is a long process that requires 1-2 years at the minimum. The training and the knitting group formation under the leadership of Mrs. Khaitova has been ongoing. Approximately 18 women are now trained to make socks, scarves and hats according to standard and will start filling their first order for 30 scarves and hats in September 2013. The samples of knitted products will be sent to the

USA in November 2013 and test-marketed at the Fair Trade Holiday Festival and at a boutique called "Change" in Madison, WI.

The knitters are being trained in making a scarf and a hat for a clothing store in Madison, WI.

3.1.2.3.4 Training in making patterns

In May 2013 the project organized training with an experienced knitter and yarn storeowner from Kyrgyzstan in reading and writing patterns for Ms. Khaitova and other women. The training was organized by the Central Asian Crafts Support Association's Resource Center (CACSARC-kg). During the 4-day training Mrs. Khaitova and fifteen other knitters learned how to read and write patterns and practiced new knitting techniques. The training was very valuable for the women. Mrs. Khaitova and other knitters plan to apply their new skill to produce patterns for sale together with the Magic Mohair yarn. Such patterns can be marketed by the yarn distributors and could also sell online.

3.1.2.3.5 Production of cheaper knits from undehaired yarn

The project is developing knitting of cheaper products from dehairing waste. After dehairing, 2/3 of each mohair fleece is discarded as waste. This fiber can either be sold or spun into 2nd quality undehaired yarn. The feel of this yarn is slightly scratchy and although it cannot be used for luxury garments it may be very good for socks. In 2012 the project team started knitting socks from this yarn based on a sample of hand knitted socks imported from Mongolia. 15 knitters work with the project on making socks and the first batch of socks was exported to the USA in spring 2013 and will be test-marketed in winter 2013 – 2014.

Mohair socks from second quality yarn

The production of socks can be scaled up relatively easily given that many women are experienced sock knitters and the production of sock yarn from undehaired fiber is cheaper. Socks are a cheaper, utilitarian product that may find a broader market than luxury knits, regional as well as international. The test-marketing experiment in 2013 will offer information on how to develop this type of product.

The project coordinator also imported several books on sock knitting to Tajikistan in 2012. Ms. Khaitova and other more experienced knitters will use patterns from these books to make new models of fashionable socks for the Hyatt hotel gift shop and for export. Finally, sock yarn could also be exported to the USA and sold together with sock patterns. The project is currently working with the yarn retailer "Knit Outta the Box" on developing this type of production.

3.1.2.4 Developing other types of processing: Weaving

Another production line piloted by the project is weaving. The project conducted research on woven mohair products on local and international market and chose to focus on the production of mohair blankets for export. Blankets were selected because of their versatility, value and the absence of handwoven, 100% mohair blankets on the market, which implies lesser competition.
In 2011 the project, together with CACSARC-kg, trained a group of women from the town of Taboshar to weave on a "Fanny II" loom which was imported from Canada. The loom cost $4,500 including shipping. An experienced trainer from Kyrgyzstan was invited to conduct the training, and the lead weaver became Mrs. Shoira Kosimova who successfully completed the training and showed talent and dedication to developing the weaving business.

Mrs Shoira Kosimova leads the weaving group

In 2012 Mrs. Kosimova produced several mohair blankets and the project team taught her to make a new blanket design using a special dyeing technique that produces multi-colored yarn skeins. The multi-colored yarn is then spun into exceptionally beautiful blankets. In November 2012 the new blankets were test-marketed at the Hyatt hotel gift shop in Dushanbe and immediately sold for $135 a piece. The blankets will also be test-marketed in the USA in winter 2013 by "Clothroads". All blankets test-marketed at the Hyatt hotel have sold and the owner of the Hyatt placed an order for more blankets with Mrs. Kosimova who now has a stable market for her groups' products.

Mohair blankets made by Mrs. Kosimova and her group are finding good markets

The production of blankets has a good potential for expansion – weaving is easy to learn (easier than spinning or knitting) and many women are interested in weaving. Mohair is perfect for blankets and there is a very little competition in terms of blankets of this design and quality not only on local but also on the international market. However, the production cost of the blankets is relatively high and the blankets have to be marketed as luxury products which takes more effort. The cost of a loom is also high ($4,000-$5,000). The looms currently have to be imported. Their production could be organized in Tajikistan in the future, but with $10,000 - $15,000 investment (at the minimum) in machinery, material, training and workspace. Metal components for looms would have to be imported.

To scale up the blanket production it will be necessary to:

1. Import additional looms – or produce them locally (the project currently has only one loom)
2. Organize training for weavers
3. Increase yarn production and/or set up special yarn production for blankets
4. Develop yarn dyeing specifically for weavers
5. Start working with buyers and retailers who specialize in marketing these types of products
6. Design a marketing brochure and develop a trademark for the blankets

3.1.2.5 Developing other types of processing: Carpets

Research on local carpet production has shown that carpet weaving in Tajikistan was not well developed compared to countries such as Afghanistan or Turkmenistan. This presented a problem in developing the carpet-weaving sector. On the other hand there is very little competition in 100% mohair carpets on the world market which gives the Tajik producers an edge against carpet weavers in countries where carpet production is much more highly developed. 100% mohair carpets are expected to find a good demand given their superior quality – luster, softness, bright colors and durability – if they are professionally made. Another reason for developing carpet weaving in Tajikistan is that carpet yarn does not require dehairing and is spun from adult mohair. Carpet-production thus provides a new market for quality adult mohair that cannot be used for garments. Such market is very important for Tajik mohair producers.

The project team searched for skilled carpet weavers allover Tajikistan and eventually started collaborating with a professional carpet weaver in Istaravshan who can produce quality mohair carpets. The project reached until the stage of developing a competitive product. It designed several carpets using contemporary design and the Istaravshan weaver produced the first sample that was exported to the USA to solicit feedback in 2013. The first carpet had multiple problems and the weaver received a detailed feedback from a US carpet expert regarding the improvements needed. A second sample will be produced in view of the feedback in fall 2013. Once the weaver produces a competitive carpet sample the project plans to work on marketing and find a designer who will produce carpet designs specifically for the project.

Mohair carpet production started in Istaravshan

The Istaravshan carpet weaver has funds and is investing in carpet production. He is willing to train women in Istaravshan in carpet-making and build his own workshop. The project plans to help him with product development, feedback on product samples and marketing.

To scale up the carpet production it will be necessary to:

1. Produce a small collection of high quality carpet samples
2. Find buyers who will collaborate on test-marketing the samples
3. Expand production based on the results of the test-marketing
4. Develop a brochure that describes mohair carpet production
5. Invest in training in carpet-weaving, carpet yarn production and dyeing
6. Find a foreign designer who will produce designs for the Tajik weavers

3.1.2.6 Shortcomings in Fiber Processing

3.1.2.6.1 Insufficient funding for workshops, equipment and new technologies

The project learned that high quality yarn for export cannot be produced by individual spinners but requires centralized processing and division of labor. The project did not have sufficient resources to develop centralized processing - fund a workshop for women's groups, purchase processing

equipment and invest in infrastructure such as water and electricity supply that is necessary to scale up production and increase efficiency and earnings. For this reason it has been difficult to scale up the existing businesses and set up additional groups. It is important that the IFAD AKF project supports the groups with additional investment in equipment and infrastructure.

3.1.2.6.2 Financing for women's groups

The groups need external sources of financing to establish processing. The ICARDA project funded the groups and set up internal financing through investing proceeds from yarn sales back into processing. The project also helped to set up a savings account for the groups to deposit proceeds from yarn sales. However, the groups will need access to external borrowing to grow. The new IFAD AKF grant will work on developing external financing for the groups.

3.1.2.6.3 Business environment in Tajikistan

Tajikistan presents many hurdles for small business development. Small businesses have to overcome inadequate legal infrastructure, widespread corruption, very poor physical infrastructure (terrible roads, lack of electricity), lack of professional business services (in shipping, lending, financial transactions), isolation from markets, competition from China, etc. All this makes business startups in Tajikistan more costly and difficult to organize.

3.1.2.6.4 Cultural and gender issues

Tajikistan is a very difficult place for women to work and lead a business. The traditional role of women is to be mothers and housewives, not business owners or even members of women-led producer groups. Some women are not allowed to work outside their home and especially younger women cannot travel, even locally, without a male or an older female relative. Although many rural women have experience in working with fiber and are eager to learn new processing skills and join the groups, most do not have secondary education or work experience outside their home. This makes it very difficult to find women who can be trained to manage all the complex tasks involved in running a business in four years.

3.1.2.6.5 Developing and maintaining quality standards for luxury products in Tajikistan

There are few high quality, luxury goods available in Tajikistan, let alone made there. The rural women processors have never seen luxury products. Instead, they have been surrounded by the lowest quality Chinese products all their lives. Not knowing about high quality products makes it more challenging for the women to learn to uphold high quality standards when making their own products. This in turn makes it costly and challenging for the leaders to monitor their work. This is one of the reasons why having a workshop and learning from the most accomplished processors is very important for all artisans.

3.1.3 Component 3: Develop sustainable market chains that link fiber producers and processors with buyers.

3.1.3.1 Yarn Marketing

The project started test-marketing yarn samples at the Sow's Ear yarn store in Verona, Wisconsin, USA and at a Fair Trade Festival in Madison, Wisconsin in 2009 - 2010. The samples sold well and the project worked on scaling up production in 2011 - 2012 and began collaborating with two companies that focus on marketing hand-made yarn and textiles – "Clothroads" and "Knit Outta the Box".

Clothroads is a company based in Colorado that markets high-end fiber handicrafts from different parts of the world. The project sent samples of yarn to Clothroads for test-marketing in July 2011. The samples sold well and one of the owners of Clothroads sent the Tajik yarn for review to a prominent

on-line knitting magazine the "Knitter's Review": http://www.knittersreview.com/article_yarn.asp?article=/review/product/120419_a.asp. The review, which is read by most professional knitters and yarn storeowners in the United States, generated excellent publicity for the yarn in 2012. The Clothroads company received a number of orders for the yarn and several additional companies showed interest in distributing it. The project team continues to collaborate with Clothroads on yarn marketing. Currently, Clothroads sells the yarn on their website: http://www.clothroads.com/category/regions/asia/tajikistan/.

In 2012 the project started collaborating with "Knit Outta the Box," a company that sells unique, luxury, handcrafted yarns with a story from different parts of the world. Mohair Magic Yarn fits perfectly the profile of a product the company's founder, Laurie Gonyea, is interested in: it is handspun, unique, made of 100% mohair and produced under fair trade conditions that benefit poor rural women in Tajikistan. Mrs. Gonyea is a professional knitter and a knitting instructor and plans to design patterns specifically for the yarn. She received first samples of the Tajik yarn in November 2012 and placed an order for the yarn with the project. In March 2013 she received the first shipment of yarn from Tajikistan and plans to start marketing the yarn in August/September 2013: http://www.knitouttathebox.com/.

Laurie Gonyea, "Knit Outta the Box" owner, with Tajik mohair yarn

Clothroads and Knit Outta the Box plan to market yarn and collaborate with the Tajik artisans on designing new types of yarn as well as knitting patterns and products. The companies will provide the producer groups with consumer feedback in the course of the 2013 marketing season and make suggestions how to improve the yarn. Based on this first marketing experience, the business

partnership between the producer groups and these companies will be further developed and strengthened.

In addition, the project established a local outlet for the yarn – several knitters at the American Embassy in Dushanbe tried the yarn and began purchasing it directly from the spinning groups. The project is setting up a direct linkage between the Asht spinners and the knitters at the US Embassy to facilitate the business. Knitters from other Embassies and international organizations that work in Tajikistan will also be linked with the groups.

To establish sustainable relationships with buyers, it is important that the producers are fully aware of the buyer's requirements and have the capacity to meet these requirements. One of the main jobs of the project team is to train the yarn producing groups to accommodate the needs of the yarn distributors in terms of quality, consistency, volume, preparation of individual skeins, colors, natural versus chemical dyeing, etc. This makes it easier for the buyers to successfully market the yarn and ensures new orders for producers. It is also important that the buyers are well informed about the skills and capacities of the producers so they can suggest specific improvements in processing and develop a marketing strategy in view of the limitations and capacities of the processing groups. The project team makes sure that the communication linkages between the buyers and the processors are clear and that the interests of both parties are considered. Mediation between the buyers and the processors will be conducted by the Hub at the end of the project.

3.1.3.2 Knitted Products

The project test-marketed the first samples of knitted products at a Fair Trade Festival and in a boutique called Spirals in Madison, WI in 2010 - 2012. Based on the results of the test-marketing the project selected product samples – scarves, hats and sweaters – that have a good marketing potential. The project is now training knitters to make the products and plans to market the first order of 30 scarves and hats in a "Change" boutique and at a Fair Trade Holiday Festival in Madison in winter 2013 - 2014.

The project also plans to test-market the first shipment of 48 pairs of mohair socks from undehaired yarn that were imported to the USA in 2013. The socks will be test-marketed in winter 2013 and the production of socks will be further developed based on the results of the test-marketing and feedback from consumers and retailers.

In addition, the project team is looking for high-end designers who would be interested in designing mohair products that could be knitted in Tajikistan from Magic Mohair yarn and marketed under the designer's brand name. Knit Outta the Box and Clothroads are also interested in marketing some knitted products and patterns for the yarn produced by Tajik knitters.

The project established a local market linkage for knitted products – the Hyatt hotel gift shop owner ordered several products from the knitting group in Asht and test-marketed them in 2013. Some of the products, especially scarves, sold well the knitters' group received an order for them. The group leader is currently training knitters to produce such scarves.

3.1.3.3 Mohair Blankets

As noted earlier, the demand for the blankets is expected to be strong on the international and regional market. The blankets successfully sold at the Hyatt hotel gift shop and the group received several orders for the blankets from the gift shop owner. The blankets sell for $135 and more, which allows the women to earn approximately $25 profit per blanket in addition to earning income from weaving. The Hyatt hotel gift shop is a perfect market for the current volume of blanket production – a small group of women weaving on a single loom. In fact, the group is currently unable to satisfy the demand for blankets from the Hyatt hotel.

Based on future investment in looms and training, the women will be able to increase the volume of production and the project will be able to explore additional markets, especially export markets. In the United States the blankets have to sell for a high price as luxury products given their high production cost. This will require a more sophisticated marketing, including a brand name and a well-designed information booklet about their production. The project team and Clothroads will work on developing a marketing strategy for the blankets in 2013.

Training on designing new types of blankets continues – in June 2013 the weavers received a training from Japanese and Kyrgyz designers in making blankets with Saori design that are expected to be very popular on local and international markets. In order to take a full advantage of the strong demand for this product, the weavers and their families have to invest in improving weaving conditions - the loom has to be placed in a well lit and heated room that is separate from the family's living quarters. The weavers have to organize yarn production specifically for weaving and find assistance with childcare for Shoira Kosimova who is the group leader but has little time to weave because of her small children.

3.1.3.4 Raw Fiber

The US company "Peace Fleece" purchased 10 kg of scoured Tajik mohair for its felting kit and to blend with US wool. The company might be interested in purchasing more fiber. However, the Tajik processing group would first have to organize a scouring operation as the exported mohair fleeces were not professionally scoured and it was very difficult for Peace Fleece to find a US company willing to card the matted fiber. This once again points to the limit of developing processing without a sufficient infrastructure.

3.1.3.5 Mohair Carpets

The project made progress in developing the production of high quality mohair carpets and continues to work with the carpet weavers on reaching a satisfactory product standard. The key problems with carpet samples produced in spring 2013 were identified and it is expected that in 2014 the standard for a competitive Tajik mohair carpet will be developed. The project is planning to test-market the first two mohair carpet samples at the Fair Trade Holiday festival in winter 2013 - 2014 and keep improving carpet production based on the feedback already received. The option of marketing carpets will also be discussed with Clothroads after the carpet-weaving technology is fully developed and the weavers' group in Istaravshan can guarantee product quality.

3.1.4 Component 4: Research on changes in income of fiber producers and women processors and their effects on livelihoods and gender roles.

3.1.4.1 Increased Earnings of Fiber Producers

By setting up fiber processing businesses, the project created a new market for kid mohair and generated opportunities for at least 20 Angora goat producers to earn higher prices by supplying the processing groups with quality kid mohair. Prior to the project, producers sold all kid mohair for a low price of $4.16/kg on the local market. Now they can sell quality kid mohair to the women's groups for $7-7.3/kg.

In 2014 the two processing groups set up by the project plan to purchase around 800 kg of mohair and the producers will earn around $5,840 from mohair sales. Moreover, the processing groups will provide a stable market and prices and protect the mohair producers from price fluctuations on the local fiber market.
Currently, around 20 Angora goat producers collaborate closely with the project and sell their kid mohair directly to the processing groups. On average, each farmer earns additional $125.60 from selling mohair to the women's groups as opposed to local traders (Table 6).

Table 6. Additional income for fiber producers who sell mohair to processing groups

Number of producers	Income from sale of 800 kg of kid mohair on the local market	Income from sale of 800 kg of kid mohair to local processors	Additional income from sale to local processors	Additional income per farmer
20	$3,328	$5,840	$2,512	$125.60

Kid mohair sheared at the Gafur farm is sold to local processors

Income from increased fiber productivity per goat

The project is helping producers in Tajikistan to increase fiber productivity per goat by introducing imported American genetics. The first results indicate that the offspring of Tajik and American Angora goats produce nearly twice as much fiber compared to local goats at first shearing. Although currently only a small number of producers benefit from having access to the crossbred goats, the breeding program continues and the number of improved animals will gradually increase. In coming years, more crossbred breeding bucks will become available to a greater number of producers and the benefits of increased fiber production and earnings will spread more widely.

Tajik/American Angora kids produce a considerably greater volume of mohair

3.1.4.2 Earnings of fiber processors

Earnings from yarn production

The project created new earning opportunities for Tajik women in fiber processing: yarn production, knitting and weaving. The main yarn-making group currently generates earning opportunities for approximately 35 women who dehair, scour, card, spin and dye the fiber. The group will be able to produce around 30 kg of yarn per month, earning the following income and profits (Table 7):

Dehairing: 12 dehairers dehair 36kg of kid mohair, earning **$526** ($14.60 for 1kg of dehaired fiber)
Scouring: 3 women earn **$72** for sourcing 36 kg of dehaired kid mohair ($2 for scouring 1kg of fiber)
Carding: 2 women earn **$66** for producing 33 kg of carded fiber ($2/kg per kg of carded fiber)
Spinning: 16 spinners earn **$1030** for spinning 30 kg of yarn ($34.35/kg)
Dyeing: 2 dyers earn **60** for dyeing 30 kg of yarn ($2/kg)
Total earnings from yarn production: $1,754

Additional expenses:
Cost of fiber: $600
Cost of dye: $100

Total cost of production: $600+$100+$1,754=$2,454/30 = ~$82 per 1kg of yarn

Packaging & Labeling: $3/kg = $90
Shipping: $20/kg = $600
Tariffs: $10/kg = $300
Total shipping: $990/30 = $33

FOB USA price = $82+33 = $115
Profits: ~$25/kg
Wholesale price: $140 (0.0373/per 1 meter of yarn)

Profits for exporting 30 kg of yarn to the USA: approx. $750
Profits ($750) + Earnings ($1,754) = $2,504 (total income for producer group in 1 month)

Table 7. Earnings and profits from yarn production ($US)

Processing activities	# of women	Monthly payment	Monthly income per person	% of profits per activity (subgroup earnings/total labor cost)	Weighted share of profits per person	Part-time monthly income & profits per job	Approx monthly income & profits per group
Dehairing	12	526	43.8	30	18.75	62.55	751
Scouring	3	72	24	4	10.00	34.00	102
Carding	2	66	33	4	15.00	48.00	96
Spinning	16	1030	64.3	59	27.65	91.95	1472
Dyeing	2	60	30	3	11.25	41.25	83
Total	**35**	**1754**		**100**			**2504**

Total earnings and profits for the group will be approximately $2,504 in one month and $30,048 per year. The average monthly earnings per processor for part-time work will be $71.54. The average earnings are low because some women (for example women who scour, card and dye yarn) will work only about 5-7 days/month. Others (spinners, dehairers) might work 14-21 days.

Although the earnings are not high, they represent approximately 33% increase in the monthly income of an average rural family in the region, 50% increase in income of a poor family. The women also have the opportunity to work more and earn additional income.

Group leader in Asht preparing yarn for export

The project established a second processing group in Taboshar based on the model used in Asht. The group is also starting to produce yarn, under the same conditions. The group currently includes 20 women and additional women 15 women are being trained. The project expects that by the end of the

year there will be two groups of 55 women that can earn approximately $47,215 in income and profits from fiber processing per year.

3.1.4.2.1 Suboptimal conditions for yarn production

The processing groups have difficulties increasing productivity and earnings and scaling up mohair processing due to poor infrastructure. The yarn production is challenging because the women have to do all processing (dehairing, scouring and carding) "in house," - unlike the cashmere processors who work with fiber that is scoured, dehaired and carded in Afghanistan. To do "in house" processing efficiently, the groups require a workshop with a scouring and dyeing facility, a reliable water and electricity supply and new spinning machines – infrastructure the ICARDA project could not invest in due to the lack of resources.

The most serious constraint the groups face is the lack of electricity during winter months when the spinners have the most time to work. This problem could be partially resolved by using solar panels that easily power light bulbs and spinning machines. In 2012 the project was able to supply one $500 solar panel for the lead group that powers 4-5 spinning machines. The panel was purchased with proceeds from yarn sample sales. However, several additional panels are needed so more spinners can work.

In order to set up a centralized power supply (solar power or a generator), the groups need a workshop. The workshop needs to be equipped with spinning wheels, lighting, heating, tables and chairs to make it convenient and comfortable for the women to work during all seasons. Having access to a workshop would allow the women to be more productive and make better yarn. Many women complain about not being able to concentrate when spinning at home because of their children and other distractions that affect their productivity and yarn quality. Another advantage of a workshop is that the leader can monitor the groups' work more easily and notice problems in time to correct them. Finally, women find working together and away from home a welcome opportunity to socialize with one another – although they go to work, they also consider it a "retreat." Overall, most women expressed a strong preference for working in a workshop, or at least having the option to do so. Only women with very small children said they preferred to work at home.

Although the women are capable of producing beautiful, competitive yarn and are starting to earn stable incomes under these challenging conditions, their productivity is much lower than what it could be if they had running water, power, workshop and the appropriate equipment and tools. It is also difficult to scale up the project without investment in infrastructure, although many women want to join the existing groups or form additional groups. Making improvements in infrastructure will be the objective of the new AKF project.

3.1.4.2.2 Weavers group's earnings

The project established a weaving group that makes mohair blankets for sale and earns a stable income. A weaver will spend one week working part-time to weave a blanket (2.2 square meters in size) and earn $41 for weaving it (approximately $20 for weaving one square meter of fabric). This means that a weaver can earn $164 per month from part-time weaving. This also represents a substantial contribution to family income. The blankets have a good market at the Hyatt hotel in Dushanbe, and can be exported to the USA and Europe.

The project was able to import one loom and established only one weaving group that includes 5 weavers. Many more groups could be established with additional investment in weaving looms and training. Such investment is important as the demand for mohair blankets is strong and the Taboshar group cannot even fill the demand from the Hyatt hotel gift shop. The new AKF project plans to import additional looms. It is important to note that the investment in weaving has to be accompanied with the investment in infrastructure for yarn production, given that the weavers rely on the spinners to make yarn for them.

3.1.4.2.3 Knitting group's earnings

The project established a group of 18 knitters. Some of the knitters make mohair socks and some plan to make scarves, shawls and sweaters. A knitter can knit 12 hats per month for $8 each, working part time, and earn $96. A more highly skilled knitter will earn approximately ~$45-50 for knitting a sweater. Knitting part time, she can produce 2-3 sweaters per month, earning $90-$150. The knitting group is currently making an order of 30 scarves and hats that will be exported to the USA in September 2013.
Based on the preliminary calculations, with some improvements in processing infrastructure, a skilled spinner, knitter or weaver will be able to earn around $100-200 per month from fiber processing. The earnings will be proportional to his or her skills and productivity. However, most women can be fully productive only if they have access to a workshop.

3.1.4.3 Financial and Social Benefits for Women

Based on interviews with women processors, most women contribute their earnings to a common pool of family income. The husband and wife decide how to use these earnings, but the husband generally has the final say. Although women do not have a full discretion over their income, their status within the household rises once they become a wage earner. Women reported feeling more valued by family members and experiencing an increased sense of self-worth as they started to earn income. Some women noted that it felt good not to have to ask their husbands for money.

Work and income is especially important for women whose husbands are in Russia but cannot find a job and send money home. These women feel much more secure by being able to earn money to buy food, clothing and school supplies for their children. Women who do not have other sources of livelihood are often the most productive spinners, knitters and weavers and earn the highest incomes.

By joining the processing groups the women not only gain a new source of income but become part of the global community of craftspeople who work with fiber. The groups have a website that covers their activities and their international exposure will continue to increase as they establish stronger linkages with buyers and also knitters who use their yarn in the United States and other countries. The fact that they can produce yarn and products demanded by foreign buyers gives them a great source of pride and accomplishment.

Working in a processing group also gives the women the opportunity to socialize, bond and collaborate, and create a cohort that can be a source of advice, support and care for its members. The processing groups can also become a political force and lobby local representatives for help with establishing a workshop, for example. The groups have the option to form larger associations of craftspeople with shared interests that can lobby the government and promote the emergence of civil society.

The project team noted that the self-esteem and importance of the spinner, knitter or weaver increases in proportion to her role in the processing business. The leaders of the groups who are most skilled and play a key role in organizing the spinning and knitting activities are earning the greatest respect from family and community members. They become role models with the capacity to empower, inspire and teach other women and men how to utilize their talents and become fiber processors or business leaders. Although being a group leader is a stressful and demanding job, the women in these positions strive and grow in their skills, experience, income and status and enjoy their new jobs very much.

However, for some women, especially younger women with small children, the opportunity to work can conflict with their obligation to care for their children and in-laws and perform household chores – a tension they share with many women in developed countries. In view of local traditions, the care for the woman's family (children, husband and parents) ought to take a priority over her work,

education, training, earning an income or running a business. Because women in Tajikistan are valued primarily as a family support staff, they have many fewer choices compared to western women when trying to balance work and family or invest in activities of their choice. It is generally easier for younger women to go to work with other women in a workshop than trying to carve time and space to work at home as they often lack the authority to do so. This is yet another reason why having a workplace is very important for the processors.

3.1.5 Component 5: Linkages (business, scientific and cultural) between the pilot communities and the global communities of producers, processors and consumers of fiber and fiber products.

3.1.5.1 Key linkages

The project worked to establish key linkages between fiber producers, processors and buyers that allow the production and marketing to operate and develop.

1. The project strengthened linkages between mohair producers and processors. The farmers who produce quality fiber are developing close linkages with the processors who buy fiber from them. The processing groups provide the farmers with a stable market and income and also feedback on their fiber. The farmers are learning about the processors' needs in terms of fiber quality which helps to influence their breeding practices.
2. The project linked the processing groups (spinners, knitters and weavers) with foreign buyers such a Clothroads and Knit Outta the Box. The companies are now marketing the groups' products and provide the artisans with important feedback regarding quality and design.
3. Through the buying companies the producer groups are becoming connected with consumers of yarn and products who are learning about the women, their communities, countries and cultures.
4. The project also established local marketing linkages between the groups and the Hyatt hotel gift shop. The gift shop started marketing mohair blankets and knitted products and the gift shop owner also provides the groups with feedback and helps them with product development.
5. The project linked the yarn producers with knitters at the US Embassy in Dushanbe who enjoy knitting from the kid mohair yarn and plan to visit the groups.
6. The project established linkages with carpet weavers in Istaravshan and carpet experts and designers in the USA who help them design mohair carpets for export.
7. The project strengthened linkages between the processing groups and the "Hub" managed by the Kosimov family. The Hub facilitates the establishment of linkages between the fiber producers, processors and importers of fiber products.

3.1.5.2 Scientific papers, newspaper articles and brochures

International Journals

Kosimov, F.F., Kosimov, M.A., Mueller, J.P., Rischkowsky, B. (2013). Evaluation of mohair quality in Angora goats from the Northern dry lands of Tajikistan. Small Ruminant Research, 113 (1): 73–79, DOI 10.1016/j.smallrumres.2013.02.002.

Brent, L. (2012). Can Texas Soften the Tajiks? Spring 2012, Vol. 9, Issue 1, Wild Fibers Magazine, http://www.wildfibersmagazine.com/

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Brochures

- "Tajik Mohair Goat Breed" (*in Russian and Tajik*
- "Mohair Magic" (*flyer in English, Russian, Tajik, Uzbek languages*).
- "Farmer's questionnaire" (*in Russian, Tajik, Uzbek languages*).
- "Farmer's notebook" *(Notebook for data recording, farmer's pocket book, which gives farmers an opportunity to keep records on available livestock, flock structure, etc.; in Tajik and Uzbek languages)*
- "Farmer's Brief Hand-book on Major Diseases in the Conditions of Northern Tajikistan, Their Treatment and Prevention" *(in Russian, 19 pp.)*
- "Breeding, Feeding and Husbandry Practices for Goats" *(in Tajik, 35 pp.)*
- "Goat Production on Private Farms*" (in Tajik, 38 pp.)*

3.2 Project Activities in Badakhshan, Tajikistan

3.2.1 Component 1: Characterize production systems and improve fiber production of small ruminants at all target sites

The project team worked in eight pilot villages in Ishkashim district of Gorno-Badakhshan Province (see site description in Annex 1). In 2009-2010 the project team conducted research on goat and cashmere production in the pilot villages to learn what kind of fiber was available for processing and in what volume. Informal interviews were carried out with goat producers. Cashmere goat breeding and husbandry was discussed with the farmers and goat flocks in each village visually assessed. The team learned that the majority of village women in Ishkashim raised small flocks of goats primarily for meat and milk.

Pamiri woman with her small goat flock

The team learned that the women sheared their goats in April and sold the hair to Kyrgyz traders for $2-3 kg. The traders took the fiber to Osh Kyrgyzstan and from there it was sold to China. The Kyrgyz traders collect over 1 ton of fiber from the pilot villages each year. Value added processing of goat fiber was practically non-existent, with the exception of a few older women who used it to spin yarn to make traditional Jurabe socks. The team learned that the village flocks included many different types of goats. The goats that produced the largest amount of fiber (~500g sheared) were crosses of Altai and Angora goats that were imported to Ishkashim from Russia and northern Tajikistan in the 1980s. Although the Altai and Angora state breeding farms located in this area dissolved after the collapse of the Soviet Union and most purebred goats were sold to Afghanistan and Pakistan, their crosses still remained in the region. The fiber these crosses produced was closer to cashgora than cashmere (18-22 micron in diameter, 4-6 cm in length), but still soft enough to make quality yarn and products. The fiber of the brown Altai crosses was generally finer and shorter than the fiber of the white Angora crosses.

Typical Altai cashgora goat

None of the households interviewed practiced selection of breeding animals. Some of the households kept one or two non-castrated bucks that mated with goats in the communal flock. These bucks were selected randomly and there was no trade or purchase of bucks from other villages. As a result of this unorganized, unselective breeding, there were many different types of goats in the village herds and most of them were not particularly good as either meat or fiber producers. The local meat type goats represent about 65% of animals in the flocks. Out of the 35% of fiber type goats, approximately 20% were Angora crosses, 10% were Altai crosses and 5% were local cashmere-type crosses. Some of the meat-type goats produce 50-150 g of fine, short cashmere, but the volume and style of cashmere among the native goats seemed highly variable; the Angora crosses produce 500-700 g of 20-24 mic fiber that is about 4-8 cm in length; the Altai crosses produce up to 500 g of light to dark brown cashgora-type fiber that is 17-21 mic and 3-5 cm in length; the cashmere-type crosses produce fiber that is 16-18 mic and about 3 cm in length. Because of the short staple length, cashmere-type fiber is not suitable for hand spinning, cashgora-type fiber is preferable. Some villages still had as many as 30% of the Altai crosses but other villages had much less, the same applied Angora/Cashmere crosses. The "Cashgoras" produce a blend of guard hair, kemp, mohair and cashmere fibers.

Angora crosses are also common

Altogether, 2276 goats were raised in the 8 pilot villages in June 2010, on average 7 goats per household (Table 8).

Table 8 Distribution of project participants and their goats in June 2010

Village name	People	Families	Goats	Cross-bred does	Goats combed
Andarob	437	56	366	140	138
Dasht	296	37	310	88	41
Devlokh	155	19	198	60	0
Garmchashma	620	86	228	58	96
Khaskhorog	261	32	257	69	49
Kukhilal	245	30	464	109	47
Snib	265	37	243	68	30
Syst	289	37	210	23	42
Total	**2568**	**334**	**2276**	**615**	**443**

3.2.1.1 Developing a breeding program

From discussions with farmers, extension officers and traders it became clear that in addition to size, health and reproductive ability of the goats the objective is to increase the production of white cashgora fiber that can be spun, dyed and knitted into colorful products such as the Jurabe socks which contribute substantially to the income of the farmers, in particular rural women.

A simple village (community) based breeding structure was envisaged and discussed with farmers. The structure required to identify best females in each village and mate them with the best males available in a nucleus flock. By doing so, the probability of obtaining outstanding males in the nucleus was increased compared to the traditional all-flock random mating. Male progeny from non-nucleus females were castrated and nucleus born males became candidates to replace existing old or inferior bucks. The essentials of the breeding plan were the same for each village but operation differed slightly between them and between years following particular situations and agreements.

Few adequate bucks were identified in the different villages; therefore it was considered importing cashmere producing bucks from Herat, Afghanistan or Altai cashgora bucks from Russia. The Herat cashmere goats were easier to import (on land) but have two disadvantages – they produce short cashmere (about 2 cm long) that would be much more difficult to process into yarn than cashgora. Secondly, they are raised in a different climate and might face difficulties adapting to the conditions in the Pamirs. The Russian Altai goats were more difficult to transport to Tajikistan but produce similar fiber to the present Altai and Angora crosses. Their fiber can be easily spun and they have a history of adapting well to the local conditions. According to the information obtained from their origin, Altai goats have a strong constitution, harmonic body structure and show good adaptation to harsh conditions of year-round rangeland grazing in mountain areas. It was decided to bring in 8 young (1.5-2.5 year-old) white Altai bucks produced near Novosibirsk as opposed to brown Altai bucks that were imported in the 1980s.

Selection of nucleus does was based on fiber quantity and quality amongst those females reproductively sound and healthy. Selected females are tagged. Fiber quantity was planned to be based on combed fiber weight and fiber quality determined visually with preference of white, fine and long cashgora. Each year additional nucleus does were selected and tagged. Selection of male and female kids born in the nucleus of each village was based on visual assessment of own cashgora quantity and quality as well as on the reproductive performance and cashgora quality of its dam. Whenever possible, combed fleece weight and fiber analyses results were used instead of visual assessment for selection.

The breeding program started in summer 2010 with the identification of nucleus does in each village flock. At the same time 8 Altai bucks were selected and bought in Russia. The selected bucks were transported by truck from the Altai farm to Novosibirsk, and flown from Novosibirsk to Dushanbe, Tajikistan. After two weeks in quarantine at the Tajik Livestock Institute in Dushanbe, the bucks were shipped by truck to Khorog and from there on to the villages arriving at the end of October 2010. At this time, mating had already started in village nucleus flocks with available local bucks.

Nucleus progeny born in March 2011, 2012 and 2013 increased over time (Table 9). Progeny belonging to the smaller villages are included in the larger village flocks.

Table 9. Nucleus progeny by village and year of birth.

Village Name	2011[a]	2012	2013
Andarob	19 (6)	34	75
Dasht	13 (11)		85
Devlokh	0		
Garmchashma	2 (4)	30	49
Khashkorog	39 (5)	58	159
Kukhilal	(6)		
Snib	(9)		
Syst	0		
Total	73 (41)	122	368

[a] in parenthesis progeny from imported Altai bucks.

The breeding program was not designed to prove genetic progress and rather was designed to be effective for genetic progress under village conditions. Combed fiber production of imported bucks was about 50% higher than that of local bucks and selected local bucks were also about 50% better than regularly used bucks so that if such differences were of genetic origin we can expect an improvement of 25% in their progeny. The progress might be somewhat higher since does for the nucleuses were also selected to resemble more the Altai type. In fact the data collected in the villages show that combed cashmere weight is about 15% higher in Altai type does than in Local type does. Angoras are intermediate. Live body weights were fairly similar in the different genotypes in the villages.

Live weights of the breeding bucks were taken after their return from the summer rangelands in 2012. Altai bucks weighted 52.3 kg, Altai crosses 30.4 kg and local bucks 33.0 kg. Altai and Local bucks were adults and Altai crosses were young and still growing. From these weights it is expected that live weight will increase considerably in the progeny of Altai bucks. Larger progeny will also produce more cashgora fiber since the correlation between body weight of does and their combed fiber weight is positive (r=0.27).

Eventually genetic progress should be apparent in the phenotypic performance of progeny born. In Table 10 the performance of the 3 first progeny crops is described. However, from these results it is not possible to draw conclusions on production trends because of large environmental effects between years and because the dates of weighing varied in each year and the fiber growing period also differed.

Table 10: Least squares means of phenotypic performance of nucleus progeny.

	Progeny born 2011				Progeny born 2012			Prog. born 2013	
Factor	BW	WW 168	CW 397	YW 397	BW	CW 365	YW 396	BW	WW 44
Andarob	2.53	12.1	349	16.5	2.71	293	18.2	2.71	6.0
Dasht	2.41	11.9	342	16.3	2.77	282	19.5	2.62	6.1
Garmchashma	2.78	11.7	338	16.8	2.75	284	19.0	2.64	5.9
Khaskhorog	2.68	12.2	356	16.8	2.57	276	19.1	2.65	5.9
Snib	--	--	--	--	--	--	--	2.77	5.7
Females	2.56	11.8	344	16.1	2.55	272	18.4	2.39	5.6
Males	2.64	12.2	349	17.0	2.85	295	19.5	2.97	6.3
Black	2.59	11.9	346	16.5	2.72	285	18.7	2.73	5.9
Grey	2.59	12.0	345	16.4	2.72	281	19.2	2.63	5.9
White	2.63	12.0	348	16.8	2.66	285	18.9	2.67	5.9

Coat color is not dependent on environment and shows a clear progress in successive years; the proportion of white progeny born increased from about 50% in 2011 to nearly 70% in 2013 .This is clearly an effect of the imported white Altai bucks. The frequency of the desirable white coat color animals has increased and will continue to increase. The progressive increase of white coated does in the nucleuses and general flocks will also increase combed cashgora weights and not decrease liveweights. Data comparing productivity of adult does of different color indicated a higher combed cashmere weight in white goats.

A large number of farmers (2568) of 8 villages participated in the planning and conduction of the breeding plan and share its benefits through the village wide use of imported and selected bucks and their improved progeny. Farmers were impressed by seeing the first results of targeted breeding that showed how using quality breeding bucks resulted in offspring that produced a larger volume of quality fiber and had a higher live weight. Combed quality fiber was readily marketed with improved prices or transformed into high value textile products

3.2.1.2 Veterinary activities at pilot sites

Animal diseases are one of the key problems causing significant losses for households at project sites. Spreading of several infectious and parasitic diseases, such as pleuropneumonia of goats, smallpox and helminthosis, were observed in 2011 and to a lesser degree in 2012. Vaccines were provided to women farmers to prevent and treat the diseases, for example in 2012 2,800 doses of vaccine against sheep and goat smallpox, 1,600 doses of vaccine against pleuropneumonia, and 800 doses of antihelminthic drug (Alben). Vaccination against the mentioned diseases was done in September/October. The project team discussed with the goat owners about the importance of vaccinations to convince them of making a small investment for protecting their animals.

Vaccination at pilot sites, October 2012.

3.2.2 Component 2: Work on formation and capacity building of women's groups to develop fiber processing and export of value-added fiber and products in all pilot sites. Encourage the development of women-led small businesses.

The project team developed a model for processing cashmere and cashgora fiber into yarn for export in the eight villages. It worked with women on combing fiber goats, collected, sorted and priced the fiber, organized dehairing in Afghanistan, delivered 26 spinning machines to Badakhshan, trained spinners, set up yarn production and identified export channels. The processing model is now fully developed. 80 households are earning higher incomes from fiber sales and a group of 26 spinners is producing yarn that will be exported to the USA in September 2013. The report outlines the development of the processing model and the requirements for scaling up cashgora yarn production in Badakhshan.

3.2.2.1 Research on Markets for Cashmere Knitting Yarn

Production of cashmere-type fiber in Badakhshan provided the opportunity to organize a local production of cashmere-type yarn for export. The project coordinator researched the market for cashmere knitting yarn in the USA and learned that there was very little competition in handspun cashmere. Chinese and Afghan handspun cashmere yarn was imported to the USA but the yarn was a single or double-ply, very thick, and of relatively low quality.

Fine, handspun, 4-ply cashmere or cashgora yarn was not available on the market and the prices of cashmere yarns were even higher than mohair prices – $77 for 100 gram skeins: http://www.jadesapphire.com. The demand for cashmere yarn among American knitters was also high due to its exceptional softness. Based on this information, the Tajik spinners had a good opportunity to enter the market with a new, high-quality yarn spun from the fiber of their own goats.

3.2.2.2 Model for cashmere processing in Badakhshan and product development

Goat fiber was never commercially processed in the pilot area. The project needed to set up a new system that would yield high quality yarn and allow the women and men to earn fair wages from fiber harvesting and processing. The work on developing such system began with fiber assessment and experimental processing to learn which processing technology would produce the best yarn. The team first examined samples of sheared fiber and concluded it could not be processed into quality yarn because of a large percentage of guard hair. To obtain fiber with less guard hair, the goats had to be combed as opposed to sheared. The project team decided to organize combing of goats and experiment with spinning combed fiber.

The experiments in fiber processing were important not only for developing a new processing technology, but also for learning about the community and allowing the community to learn about the project and the team. The team and the community members had the opportunity to repeatedly interact and develop collaborative ties and trust.[3] In the course of the experiments the team could identify the most skilled and motivated men and women who wanted to collaborate on the various activities. These new partners then worked with the project on developing all components of the processing system, including fiber collection, dehairing and spinning, and also helped organize goat breeding activities.[4]

Based on the results of the processing experiments, the project decided to develop two types of yarn: dehaired yarn for export, and undehaired yarn for local knitting and weaving.

1. Production of dehaired yarn included the following steps:
   - combing goats and collecting fiber in all pilot villages
   - sorting fiber based on color and quality
   - organizing fiber dehairing in Afghanistan
   - organizing spinning of dehaired fiber in pilot villages
   - developing export market channels for yarn and products
   - organizing knitting and weaving with the dehaired yarn.

2. Production of undehaired yarn included:
   - combing goats and collecting fiber in all pilot villages
   - sorting fiber based on color and quality
   - scouring fiber
   - carding scoured fiber on "Orlovchanka" carding machine
   - organizing spinning from undehaired, scoured and carded fiber in pilot villages
   - organizing knitting and weaving with undehaired yarn (focused on knitting Jurabe socks)
   - developing marketing channels for Jurabe and other products.

3.2.2.3 Components of the Processing System

3.2.2.3.1 Combing and Fiber Collection

The project team worked for three years to organize all processing components, starting with fiber collection. Combing and fiber collection was organized in all pilot villages in 2010 to assess quality, volume and processing characteristics of combed cashmere. The team located a source of fiber combs in neighboring Afghanistan and imported and distributed 400 pieces of two types of combs to households in spring 2010. The team asked women to comb their goats and package fiber collected from individual animals separately. In April 2010 166 women from 8 pilot villages combed over 60 kg of fiber. The fiber was sorted into four categories based on fineness and the presence of guard

[3] Mutual learning, understanding, shared interests and trust that emerge in the process of repeated interactions between the team and the community members is the most valuable "currency" without which a development project cannot fully function, let alone succeed. The process of developing shared interests and trust takes at the minimum 2 years.

[4] Selecting collaborators is time consuming as it requires repeated interactions to learn who is skilled, reliable, interested in learning and experimenting, and willing to contribute time and effort to accomplish the project goals. Individuals with the best set of skills and personal characteristics are the single greatest asset of any project. They teach the project team how to work in the community, help develop successful technologies, provide leadership, organize community members and mobilize local resources and support for the activities. The most skilled and capable individuals can then be placed in charge of the activities developed jointly with the project and can guarantee their long term success and sustainability.

hair, vegetable matter and other contaminants. Each category was purchased for a different price: 1st class fiber for $21/kg, 2nd class for $14.50/kg and 3rd class for $5/kg. 4th class fiber was not purchased and left for the Kyrgyz to buy for $3/kg.
Fiber collection is now fully developed. Approximately 80 households participate in the combing and bring their fiber for sale. Between 2010 – 2013, the project collected and purchased around 280 kg of combed cashgora and cashmere in the villages.

Combed fiber can be sold at a local collection point

In 2013 the project set up a fiber collection point in Andarob village that opens at the beginning of the combing season at the end of March. It is managed by local women spinners who were trained to evaluate, sort and purchase fiber from the villagers. The fiber is evaluated and priced according to class as established in 2010. Villagers have responded to the price incentive and the quality of combed fiber increased consistently since the first combing experiment in 2010. In 2013 the project purchased 48.7 kg of cashmere and cashgora fiber in Andarob, and over 90% (44.3 kg) was of 1st quality. The Andarob collection point will make fiber sale convenient for the community and the number of households who sell combed fiber to local spinners is guaranteed to increase in the following years.

Leader of the Andarob spinning was trained to evaluate and purchase fiber

In 2011 collection of cashgora fiber was also organized in Roshkala valley, Sezd village, that has one the largest flocks of cashgora goats in Badakhshan. The Roshkala villagers have experience in combing and collecting fiber since the Soviet period when they worked for a large collective farm that produced cashgora goats and harvested their fiber for processing in Russia. The project is now successfully building on that experience and collaborating with the villagers on fiber collection. The Roshkala farmers are very pleased that once again there is a good market for their fiber that pays considerably more than the Kyrgyz traders, and enthusiastic about continuing to breed the Altai fiber goats. Fiber collected in Roshkala will be initially processed by spinners in Ishkashim pilot villages. After the fiber processing model is fully tested in Ishkashim it can be duplicated in Roshkala and processing groups can be set up in Sezd and other villages.

Fiber purchasing in Roshkala valley

As more households learn about fiber collection in Sezd and Andarob, the interest in combing goats and selling fiber to spinners continues to increase. In 2010 the project collected 67 kg of combed fiber and in 2013 it collected close to 111 kg. The projection is that the amount of combed fiber can easily double in 2014, especially if additional combs are supplied to households in Roshkala valley. 111 kg of combed fiber will produce around 60-70 kg of dehaired fiber. 60-70 kg of fiber will be sufficient to supply the first spinning group in Andarob village for the rest of the year.

3.2.2.3.2 Dehairing Organized in Afghanistan

One of the greatest accomplishments of the ICARDA project was linking Tajik cashgora producers with cashmere processors in Afghanistan and organizing the dehairing of Ishkashim fiber collected in 2010-2012 in Herat, Afghanistan in 2012. With the help of the Aga Khan Foundation, the project transported over 100 kg of combed fiber to a cashmere processing factory in Herat where it was scoured and dehaired. 54 kg of dehaired material was sent back to Badakhshan in July 2012. The scouring yield was 92% and the dehairing yield was close to 60%, both very good indicators of fiber quality.

The softness of the dehaired Tajik fiber was excellent, even by the standards of the Afghan cashmere processors. This confirmed a key hypothesis that inspired the experiments with fiber collection and processing in Badakhshan - that locally produced cashgora fiber could be locally processed into high quality yarn for export (as opposed to being exported to China), and provide a sustainable source of revenue for the local population, especially women.

The collaboration with Afghan cashmere processors continues. In the fall 2012 a second dehairing plant opened in Faizabad, Afghanistan, only about 100 km from the Ishkashim pilot site. The project already made arrangements with the CEO of the Faizabad plant, Mr. Abdul Hotak, to dehair fiber collected in 2013 in Faizabad. The price for dehairing is very reasonable - $5-6 for 1 kg of dehaired material. Dehairing in Faizabad will substantially decrease the shipping cost of the fiber and allow the women to retain higher profits from yarn sales.

Sorted, combed cashgora, prepared for dehairing in Faizabad

3.2.2.3.3 Electric spinning machines delivered to Badakhshan; training for spinners organized

Women in Badakhshan used traditional spindles or old wooden spinning wheels that were much less productive and convenient than electric spinning machines used by spinners in northern Tajikistan.

Traditional spinning wheels were not suitable for commercial yarn production

Another important accomplishment of the ICARDA project was connecting the spinners in

Badakhshan with spinners in northern Tajikistan and organizing training for 2 women from Andarob on spinning and yarn production in the Markhamat village in the Asht region. Secondly, the project organized a delivery of 26 electric spinning machines from northern Tajikistan to Badakhshan in 2012.

Women in Badakhshan showed great enthusiasm about using electric spinning machines

In the fall 2012 the team started training women in all pilot villages how to use the electric machines. The women who were trained in northern Tajikistan in spring 2012 worked as trainers. Women in all villages were very enthusiastic about learning how to spin on the machines and found them much more productive and easier to use than their traditional tools. The team left one or two electric spinning machines in each village for the women to continue training.

3.2.2.3.4 Spinning group organized; group leader selected and trained

The project collected yarn samples from women in all villages to select the best spinners and formed the first spinning group in the Andarob village in spring 2012. The group is led by Mrs. Dzholnamo who is an excellent spinner, and her husband Khush, who is the village leader and very supportive of the spinning and knitting business.

Mrs. Dzholnamo, who participated in the training of trainers in fiber processing in northern Tajikistan in spring 2012, trains spinners how to use the machines and selects qualified spinners to join the group. The spinners begin training by making yarn samples from their own wool. Those spinners who produce consistent quality samples receive dehaired cashgora fiber and start making yarn for sale. The project and the group established a price of 0.056 somoni or 0.01167 for one meter of yarn. This means that a spinner earns $5.25 for spinning one 450m skein. A spinner can spin 1 skein per day if she works part time, 2 skeins if she works full time, and the productivity of the spinners continues to increase with practice. $5.25 - $10.50 is an important contribution to the wellbeing of the spinner and her family.

Mrs. Dzholnamo trains women in all pilot villages to spin on electric spinning machines

Mrs. Dzholnamo monitors the work and product quality and keeps an account of fiber distributed to spinners, the yarn produced and the payments received by spinners. She received a computer from the project coordinator and will be able to maintain an electronic account of the processing activities in the future.

Although the women in Badakhshan have less experience in spinning than the Asht spinners, they are enthusiastic learners committed to producing luxury yarn for export. Dozens of women from all pilot villages are coming to Mrs. Dzholnamo's house for training. Mrs. Dzholnamo and her husband are very proactive in organizing the spinners and dedicated to developing a successful community-based business.

3.2.2.3.5 Spinning Workshop Established

The dehaired cashgora used by the Badakhshan spinners will be even more expensive raw material than the mohair used in northern Tajikistan - the project team calculated that 1kg of dehaired cashgora will cost ~$55. This means that cashgora processing will require a high level of training and will have to be carefully managed and monitored to prevent any errors that would result in the waste of dehaired fiber. This kind of monitoring is more easily done in a workshop. The Andarob group took the initiative to set up a spinning workshop where women from all villages can come to train and spin together. The group leader allocated one room in her house to set up the workshop and the project helped to equip the workshop with lights, tables, stools and a CD player. Women from Andarob and other villages come to the workshop to spin whenever convenient.

At the workshop Mrs. Dzholnamo and other experienced spinners can easily monitor the less experienced spinners, provide them with feedback and training, and decide when a spinner is ready to work with the dehaired cashgora fiber. Spinning yarn consistently and according to standard is challenging and not all trainees succeed in joining the spinning group – only approximately 1/3 of spinners who try to meet the standard succeed. In spring 2013 there were 20 trained spinners in the permanent group spinning cashgora yarn for export and another 25 women in training. The 26 machines imported by the project have been in use at all times and the interest among women in

learning the skill and earning income has been very high. Women in other villages are also hoping to organize similar spinning groups once there are additional spinning machines available. The new AKF project already started to work on forming new groups and supplying them with machines.

Spinning workshop in the house of Mrs. Dzholnamo

The Andarob spinning group is currently spinning 54kg of fiber that was dehaired in Afghanistan in 2012 and plans to send the first shipment of yarn to the USA in September 2013.

3.2.2.3.6 Carding machine delivered from Asht to Badakhshan

The Andarob group also plans to make some undehaired yarn that will be used for knitting socks. The processing technology for making undehaired yarn includes scouring, carding and spinning. To card the fiber, the spinners' group needed a carding machine. After a long search, the project team found a suitable used machine in the Asht region in northern Tajikistan in October 2012. The project purchased the machine for the group for $4,000 and delivered it from Asht to Andarob.

The carding machine is a key piece of processing equipment that will help the Andarob group to diversify their business and make undehaired yarn for Jurabe socks and other products in addition to dehaired yarn for export and luxury knits. The production of undehaired yarn will also provide the opportunity for spinners with fewer skills to join the group as the quality standard for this yarn will be slightly lower than the standard for the dehaired export yarn. This means that some spinners who did not pass the test for spinning yarn for export might be able to make undehaired yarn for local processing.

To fully develop the production of undehaired yarn, the Andarob group still needs to organize a mini-scouring center and a dyeing center. The group is actively searching for scouring and dyeing equipment and purchased a unit that can be used for souring and dying yarn in summer 2013.

"Orlovchanka" carding machine was purchased and transported to Badakhshan in 2012

3.2.2.4 Organizing knitting

3.2.2.4.1 Designing products

The project team worked on organizing a knitting group in Badakhshan that could add value to the cashgora yarn by making products for export. The project coordinator researched knitted products made by well-known designers and selected several samples that could be reproduced in cashgora yarn. The samples together with cashgora yarn spun in Badakhshan were delivered to the leader of the knitting group in northern Tajikistan and she reproduced the designer knits in cashgora yarn.

The project coordinator showed samples of the first cashgora products to potential buyers in Madison, WI. Based on discussions with the buyers, the products are of excellent design and quality and could be produced for sale in winter 2014. The project team is currently pricing the products and discussing orders with storeowners in Madison, WI.

Products knitted from cashgora yarn can be successfully marketed in US boutiques

3.2.2.4.2 Selecting a Leader and Forming a Knitting Group

The project works on training and selecting knitters to form a knitting group in one of the pilot villages. The group will be organized based on a model used in Asht, northern Tajikistan: a highly experienced group leader will be selected on competitive basis; she will then train knitters in producing specific products for export. Those knitters who succeed in producing the items according to standard will have the option to join the permanent knitting group and start producing the garments on order, earning income from each finished item. Given that the knitters will work with expensive yarn and produce luxury export products, a great emphasis will be placed on quality monitoring by the group leader. The leader will be responsible for filling export orders on behalf of the group and for monitoring the work of each group member. She will receive a share of the groups' profits as compensation for managing the group. The knitting group in Badakhshan will maintain ties with the knitting group in northern Tajikistan and share experience, design ideas and marketing opportunities. Establishment of the knitting group will be completed by the new AKF project.

3.2.2.4.3 Products from undehaired yarn

Prototypes of products from undehaired yarn are also being designed. In the fall 2012 the project team and the knitters in Badakhshan started to develop a new model of Jurabe socks from undehaired cashgora yarn that could be used for the local tourist market and for export. The new model will combine traditional and contemporary design elements and is intended for export and for tourists. To develop the new model and to find candidates for a group leader, the project team solicited the most experienced knitters in the pilot villages to make a sample of improved Jurabe socks based on specific suggestions, and offered a $50 reward for the best prototype. A knitter from the Sist village won the contest and was given an order for a new pair of Jurabe.

The new Jurabe socks will continue to be improved until the project has a fully developed, standard prototype that can be mass-produced. Other products such as leg warmers and gloves from the undehaired cashgora will also be designed and produced.

Traditional Jurabe socks need to be redesigned for a contemporary market

A second group specialized in making Jurabe-type products will then be established in one of the villages. The location will depend on where the team finds a highly skilled leader capable of organizing the group, training knitters and monitoring quality. The project plans to identify a group leader among knitters in pilot villages in the process of developing the new product.

3.2.2.5 Organizing weaving

The project would like to organize blanket weaving with undehaired and dehaired cashgora yarn in Badakhshan. The team transported some dyed, undehaired cashgora yarn from Badakhshan to northern Tajikistan and weavers in Taboshar made a sample blanket from the yarn on their Fanny II loom. The blanket is very beautiful and will be test-marketed in the USA in winter 2013 - 2014. Based on preliminary research, the demand for luxury cashgora blankets is expected to be high and blanket weaving in Badakhshan can be successfully developed provided the new AKF project can supply the women with looms.

3.2.3 Component 3: Develop sustainable market chain that links fiber producers and processors with buyers

Cashgora yarn will be marketed through the same channels as mohair yarn. In winter 2012 the first samples of dehaired cashgora yarn were shown to companies that buy mohair yarn and received highly positive feedback. All buyers, including Clothroads, Knit Outta the Box and Swans Lake expressed interest in marketing the yarn and are looking forward to the first shipment. Because the cashgora yarn is similar to cashmere in softness and because there is no handspun cashgora yarn on the market, the Pamiri yarn will have very little competition and the demand for it is expected to be strong.

The Andarob spinning group is currently processing 54 kg of dehaired cashgora fiber and the first order of yarn will be exported to the USA in September 2013 and marketed in winter 2013-2014. Based on the project calculations, the production price of 1 kg the cashgora yarn will be

approximately $115 and the yarn will retail for approximately $360/kg – a competitive price for this type of product. In addition to yarn, the team created new outlets for Pamiri knitwear in Madison, WI including the "Change" fair trade boutique in Madison. These market linkages will be developed further after the first shipment of yarn and products reaches buyers and they start marketing the products.

The Andarob spinning group has the advantage of support from family and community members who speak good English. This means that the spinners will be able to learn how to communicate with buyers directly. The Andarob group leader has a computer and an internet in her house and her husband and children help her translate messages to and from English and respond promptly to e-mails. A communication Hub will be established in Andarob and any new spinning groups can be linked with buyers through the Andarob Hub.

3.2.4 Component 4: Research on changes of income of fiber producers and women processors and their effects on livelihoods and gender roles

The project helped to increase income from fiber sales for 80 fiber goat producers in the Ishkashim pilot area and for 20 producers in the Roshkala valley. It set up a fiber processing group that generates income for 26 spinners from several pilot villages. More importantly, the project established a system for fiber collection, processing and export that can be scaled up with relatively small investment. This scaled up system can create income opportunities for approximately 400 men and women in the pilot villages and generate $130,000 in yearly revenues for households in the pilot region.

3.2.4.1 Increased incomes from fiber production

The project increased income from fiber production through the following activities:

- Established new market for combed fiber for local processing
- Trained local producers to increase the production of first quality combed fiber
- Created competition for fiber that forced Kyrgyz buyers to increase prices
- Improved fiber productivity per goat
- Increased the % of fiber goats in village flocks

3.2.4.1.1 Benefits from new market for combed fiber

Prior to the project involvement, households in Ishkashim and Roshkala sold shorn fiber to Kyrgyz traders for $2-3/kg. Now approximately 80 (27%) households in Ishkashim and 20 households in Roshkala sell combed fiber to the processing groups for $21/kg (Table 11). Additional households plan to participate now that two fiber purchasing centers have been organized in Andarob and Sezd village and the new AKF project plans to deliver carding combs to goat producers in Roshkala.

An average household that sells fiber to spinners in Ishkashim has about 10 fiber goats and each goat currently produces around 200 g of combed fiber. This means that one household now earns about $42 from selling combed fiber as opposed to $15 from selling sheared fiber to Kyrgyz buyers – an increase of $27. Households in Roshkala have better pastures and produce around 70 goats each. Their goats also produce a higher volume of down – around 225-250g. This means that Roshkala producers can earn $367.5 from selling combed fiber as opposed to $105 from selling sheared fiber – an increase of $262.50 per producer (Table 12).

Table 11. Increase in income from the sale of combed fiber to local spinners versus sheared fiber to Kyrgyz buyers

Region	# of house-holds (hhs)	# of fiber goats per hh	Income per goat from sheared fiber (sold to Kyrgyz buyers)	Income per goat from combed fiber (sold to local processors for $21/kg)	Increase in income from selling combed fiber per goat	Overall increase in income per household from sale of combed sale	Overall increase in income of pilot households per year
Ishkashim	80	10	500 g fiber per goat, $3/kg = $1.5	200 g fiber per goat, $21/kg = $4.2	$2.70	$42- – 15 = $27	$2,160
Roshkala	20	70	$550 g fiber per goat, $3/kg = $1.65	$225g fiber per goat, $21/kg = $4.725	$3.08	$330.75 – 115.5 = $215.25	$4,305
Total	**100**						**$6,465**

Table 12. Household income from fiber sales prior and after the project

Region	Number of households	Number of goats	Total number of goats	Income from sheared fiber prior to project involvement	Income from combed fiber after project involvement	Difference in income
Ishkashim	80	10	800	1,200	3,360	2,160
Roshkala	20	70	1400	2,310	6,615	4,305
Total	**100**	**80**	**2200**	**3,510**	**9,975**	**6,465**

Villagers are earning higher incomes by selling 1st quality comb fiber for local processing as opposed to sheared fiber for export to China

3.2.4.1.2 Income benefits from increased production of 1st quality fiber by households.

The households also increased their income from fiber sales by improving quality of combed fiber in the course of the project (Table 13). In 2010, the project team collected 31.1 kg (46%) of fiber of first category that sells for $21/kg, 16.1kg (23%) of fiber of second category that sells for $14/kg and 21.2 kg (31%) of third category fiber that sells for $5. In 2013, the project collected 107 kg (96%) of first category fiber and only 4 kg (4%) of second category fiber. The volume of first category fiber sold by the households nearly doubled in the course of the project, from 67 kg in 2010 to 107 kg in 2013.

Table 13. Increased production of 1st quality fiber by households

Year	**2010**		**2011**		**2012**		**2013**		**Total**
Fiber/Earnings	Fiber (kg)	Earnings (USD)	Fiber (kg)	Earnings (USD)	Fiber (kg)	Earnings (USD)	Fiber (kg)	Earnings (USD)	
Fiber I.	31.1 (46%)	653.1	42.8 (83%)	898.8	44.3 (91%)	930.3	107 (96%)	2247	
Fiber II.	16.1 (23%)	147.2	7.7 (16%)	107.8	4.4 (9%)	61.6	4 (4%)	56	
Fiber III./IV.	21.2 (31%)	106	1.3 (1%)	6.5	0	0	0	0	
Total Fiber	**68.4**		**51.8**		**48.7**		**111**		**279.9**
Total Earning	**906.3**		**1013.1**		**991.9**[5]		**2303**		**5214.3**

3.2.4.1.3 Benefits from competition with Kyrgyz traders

Prior to the new market for combed fiber established by the project, Kyrgyz traders working for Chinese buyers were the monopolists on the local market and could dictate prices. The establishment of a new market for combed fiber created competition for the Kyrgyz buyers and forced them to gradually raise prices for sheared fiber from 15 to 30 somoni as the households refused to sell them fiber for less. This means that even those producers who did not sell combed fiber to the project benefited by a substantial increase in income from fiber sales as the price for sheared fiber in 2013 doubled in some areas as a result of increased competition (Table 14).

Table 14. Increased income from sheared fiber sale as a result of competition

Region	**Approximate volume of sheared fiber purchased by Kyrgyz buyers in 8 pilot villages**	**Price for sheared fiber prior to the new market for combed fiber**	**Price for sheared fiber after the market for combed fiber was established**	**Change in income**
Ishkashim	1,000 kg	$3,000	$6,000	$3,000
Sezd village	700 kg	$2,100	$4,200	$2,100
Total	**1,700 kg**	**$5,100**	**$10,200**	**$5,100**

3.2.4.1.4 Benefit from improving breeding

Thirdly, breeding program with Altai breeding bucks established by the project in combination with a new, lucrative market for combed cashgora fiber contribute to the production of 1) more productive fiber goats and 2) higher percentage of fiber goats in village flocks. One purebred cashgora goat gives at least 400 g of fiber – at least twice as much fiber compared to a crossbred fiber goat. If a woman sells fiber from 10 purebred as opposed to crossbred cashgora goats, she will earn $84 as opposed to

[5] Earnings from fiber sales in 2012 were low as a result of very harsh and long winter in 2011-2012. The villagers lost close to 1/3 of livestock and fiber production was much lower.

$42 from fiber sales (Table 15). Similarly, a woman will increase her income from fiber if she has 80-90% of fiber goats in her flock as opposed to 30% (which has been the average at the start of the project).

Table 15. Increased income from more productive fiber goats

Region	**Total number of fiber goats**	**Fiber per goat**	**Income from fiber**	**Fiber per purebred goat**	**Income from fiber**	**Increase in income from fiber due to higher productivity**
Single household	10	200 g	$42	400 g	$84	$42

Secondly, most families currently have only 25-30% of fiber goats in their flocks. As a result of the increased prices for fiber and the establishment of fiber processing, the villagers are becoming interested in using only quality, fiber-producing bucks for mating and castrate all other bucks. Eventually these breeding preferences will result in the village flocks with ~80% of fiber goats. This will substantially increase fiber production and income from fiber in the region (Table 16).

Table 16. Increased income from increased percentage of fiber goats in household flocks

Region	**Total number of goats**	**25% of fiber goats in flocks**	**Income from fiber sales**	**80% of fiber goats after breeding activities**	**Income from fiber sales**	**Increase in income from fiber due to larger percentage of fiber goats in flocks**
280 households in Ishkashim that produce goats (94%)	2469	740	$3108	1975	$8295	$5185

As a result of community breeding, the number of fiber goats in village flocks continues to increase

Scaling up the purchase of combed (and sheared) fiber

Based on the expansion of processing activities, the demand for combed fiber is expected to increase. Currently, the project supports 26 spinners. Once all spinners complete training and start producing yarn at full capacity they will be able to process approximately 312 kg of dehaired fiber per year (12 kg per spinners) which translates to approximately 520 kg of combed fiber from 1,300 cashmere-type goats that produce 400 g of fiber. This gives the project the opportunity to increase collection of combed fiber 5 times, from the 111kg collected in 2013 to 555 kg, adding $10,920 to the local economy per year. Increase in fiber collection will be easy after additional households are supplied with fiber combs and after the new AKF project expands fiber collection in Roshkala valley in 2014 where 26,000 goats are currently produced. Assuming that approximately one third of Roshkala goats produce fiber (which is a conservative estimate), and each goat can bring $4.725 in earnings, the Roshkala producers will be able to earn $40,950 from selling combed fiber to local processors. Their earnings can increase further as they start producing a greater percentage of quality fiber goats that produce a larger amount of fiber.

The alternative short-term solution to secure enough fiber for the spinners in 2014 is to purchase combed and sheared fiber and dehair both materials in Afghanistan. The Afghan processors are interested in collaborating on dehairing combed and sheared fiber supplied from Tajikistan. The new AKF project plans to help the Afghan processors compete with Chinese buyers for sheared cashgora and cashmere produced in Tajikistan. This is likely to generate competition and increase the price of sheared fiber without affecting the market for combed fiber – neither Chinese nor Afghan buyers can afford to buy combed cashgora fiber for $21/kg. This price is viable only when the fiber is locally processed into high-end export products.

3.2.4.2 Income from spinning

The project imported 26 spinning machines and created earning opportunities for 26 spinners. Additional spinning machines will be supplied by the new AKF project. When determining the spinner's earnings, the project takes to account 1) local salaries (the wage cannot be lower than what

the women could earn doing other similar work) and 2) production cost & retail price of yarn (the production cost & retail price cannot be higher than the cost of similar products on the market).

The project team developed the following pricing schema for the yarn, based on discussions with spinners about wages and estimations of price for which the cashgora yarn could be sold in the USA:

The preliminary pricing of the cashgora yarn:
Raw fiber: $21/kg
Transport to dehairing facility in Faizabad, Afghanistan and back: $6/kg
Scouring and dehairing in Afghanistan: $6/kg, yield 60%
600 g of dehaired fiber: $33; 1 kg of dehaired fiber = $55
Spinning 1 kg of fiber = 4,500 meters of yarn, $0.01166 per meter = $52.50/kg
Production cost of 1 kg of yarn: $107.50

Dyeing: $3.50 for dye, $3 labor
Dyed yarn: $114/kg

Labor cost: $52.50 (spinning) + $3 (dyeing) = $55.50

Packaging: $1/kg
Shipping: $20/kg
Tariffs: $10/kg
FOB USA price: $145

Wholesale price: $0.04 meter = **$180/kg**
Profits: $35/kg

Women's Earnings:
The project imported 26 spinning machine to the Andarob village and created the first spinning group that includes 26 women. The project team expects that trained cashgora spinners will earn similar wages as spinners who work with mohair. Based on information provided by the group leader in 2013, an average spinner is able to spin around 1kg of yarn/month earning $52.50 in income. The spinner will also receive ½ of the profits earned from the sale of 1kg of yarn ($17.50), which means her total earnings will be $70/month. The other half of the profits will be used for business expenses and investment by the group. The group will produce approximately 312kg of yarn/year. The total yearly profits and earnings of the group will be $17,316 (labor cost) + $10,920 (profits) = $28,236 (Table 17).

Table 17. Earnings of the Andarob spinning group (26 spinners)

Spinning groups	Number of spinners	Average monthly earnings per spinner	½ of Profits from 1 kg yarn	Monthly income	A spinner's yearly income	Average yearly earnings of spinners' group	Group yearly profits (1/2 of total profits)	Total income
Andarob group	26	Ten 100g skeins@5.25 skein = $52.50	$17.50	$70	$840	$21,840 (spinning) + $936 (dyeing) = $22.776	$5,460	28,236

Spinner from Andarob is pleased with her earnings

The spinner's group will generate a demand for approximately 521 kg of combed fiber per year which will generate additional $10,941 in earnings from fiber sales for the community. Total yearly earnings from fiber processing will be approximately $39,177 (Table 18).

Table 18. Combed fiber demand of Andarob spinning group

Raw fiber needed for 1 spinner per month	Raw fiber needed for 1 spinner per year	Cost of raw fiber for 1 spinner per year	Raw fiber needed by 26 spinners per year	Income from fiber sales of combed cashmere
1.67 kg	20.04 kg	$420.84	521 kg	$10,941

Scaling up processing activities

Many women in the pilot region and beyond are interested in spinning and the supply of dehaired fiber can be increased substantially in Ishkashim and in Roshkala. The likelihood that the marketing of cashgora yarn in the USA will be successful at this price point is also high. This provides a good foundation for organizing additional processing groups and scaling up production.

Scaling up production of dehaired cashgora yarn will be easier than organizing mohair yarn production now that the dehairing of cashgora fiber has been arranged in Afghanistan. While the mohair processors have to dehair, scour and card the fiber themselves before spinning, the Pamiri spinners will receive clean, dehaired, disinfected fiber from the factory that is ready to be spun. Unlike the spinners in northern Tajikistan, the Pamiri spinners will also benefit from having uninterrupted electricity in winter months which will help in scaling up production. To scale up cashgora yarn production based on the processing model developed by the project it will be necessary to:

1) organize the supply of additional carding combs to households in Ishkashim and Roshkala to increase the volume of combed fiber; train households in combing goats
2) purchase and dehair sheared fiber to supplement combed fiber collection in 2014
3) organize a supply of additional spinning wheels from northern Tajikistan
4) organize additional spinning groups: select and train capable group leaders who can train others, monitor quality and fill orders
5) set up spinning workshops for the new groups
6) link the new groups with the Andarob workshop/hub that has developed market channels

Activities 1-6 are currently being organized by the new AKF project.

The IFAD-ICARDA project has been training spinners in all pilot villages and expects that at the minimum 10 women from each pilot village will be able to spin yarn for sale on permanent basis – 80 women in total. This will create additional income for the local community from fiber collection ($33,667) and processing ($84,000), $117,667 total (Tables 19 and 20). The scaled operation is expected to provide earning opportunities for approximately 80 spinners and 330 small and medium goat producers in the region.

Table 19. Estimated income from spinning after scaling up yarn production

Spinning groups	**Number of spinners**	**Monthly income and profits of one spinner**	**Monthly income of 80 spinners**	**Average yearly income of spinners in pilot villages after scaling up processing**
4 groups, 20 spinners each	80	$52.5(income) + $35(profits) = $87.5	$7,000	$84,000

Table 20. Income from the sales of combed fiber after scaling up yarn production

Undehaired fiber per spinner per month	**Undehaired fiber per 80 spinners per month**	**Undehaired fiber per 80 spinners per year**	**Income from 1,603 kg of fiber for producers**
1.67 kg	133.6 kg	1,603 kg (approx. 4,000 fiber goats)	$33,667*

*Fiber will be supplied by approximately 330 small and medium scale producers (average income earned by Ishkashim and Roshkala producers is $100 per producer)

3.2.4.3 Income from knitting

The community can earn additional income from adding value to yarn and making knitted products for local market and for export. Income from knitting a new version of Jurabe socks from locally produced cashgora yarn could have a substantial impact on the increase sales, markets and incomes for Tajik knitters. The proceeds from producing knitted products will be calculated after the producers finish the first samples for sale in September 2013.

3.2.4.4 Improvements in Livelihood and Social Status

Income generating activities in fiber harvesting and processing are important especially for women given that in Badakhshan women are fully involved in the entire value chain: produce goats, harvest and sell fiber and spin and knit.

An average family in Ishkashim earns about $200 from various sources including pensions, jobs and the sale of produce. Additional $70 is a 35% increase in the household income which represents a substantial improvement in the family's welfare. It is especially important that the income is earned by women who are most likely to spend it on supporting their children.

Based on interviews with spinners from the Andarob group, their productivity and earnings gradually increase as they gain more practice in spinning. The project expects that many women will earn at $100 – $200 per month after they become more skilled. The spinners benefit not only by having a stable, flexible job at home or at a nearby workshop, but by having the option to receive cash as soon as they finish one skein of yarn, which can be done in a few hours. This means that if a woman needs money urgently, she can spin a skein of yarn and get paid $5.25. The spinners confirmed that the option of being paid immediately is very important for them.

Women who have a stable source of earnings have a greater sense of financial security which gives them a peace of mind. They feel more independent and have fewer worries that their children or parents will go hungry or that they will not be able to pay for medical care or schooling. To have a greater financial security is vital for economic and psychological wellbeing of the entire family. Therefore, creating an earning opportunity for one woman directly translates into helping a household of 4-6 persons.

Spinning yarn for income can save women from desperate poverty

Social status of the spinners also improves as they become known as wage earners and recognized for their expertise and craftsmanship. The project promotes the recognition of individual spinners by marketing their yarn in the United States under their name and building on-line contacts between the American knitters who use the yarn and the Tajik spinners who make it. This creates a unique

partnership that starts with the Tajik woman spinning yarn and continues with the American woman using the yarn to knit a product.

The spinners also benefit by being part of a women's collective and in control of their work and business. They know that no one is taking advantage of them and that they receive fair wages for their work. Exporting products to the United States, seeing how their products sell online and receiving positive feedback from buyers and knitters gives the spinners a sense of accomplishment they often do not get from the other hard work they do.

The group leaders and the women who excel in yarn production benefit from special recognition in their community and for having the opportunity to become a trainer and travel to other regions to train new spinners. The most productive and talented spinners are encouraged to learn new skills related to business management and can become leaders of the spinning business – often the first ones in their community. Leading a small business that provides earning opportunities for other women is a great source of pride for a woman who lives in a remote, rural community that is characterized by extremely high unemployment and very few sources of livelihood.

3.2.5 Component 5: Linkages (business, scientific and cultural) between the pilot communities and the global communities of producers, processors and consumers of fiber and fiber products

3.2.5.1 Key linkages

1. The project strengthened linkages between women and men who produce goats and harvest and sell cashgora fiber and women and men who buy and process fiber. The project opened a new market for combed fiber, helping producers earn additional income
2. The project developed a linkage with goat and fiber producers in the Roshkala region. The Roshkala producers and now also benefiting from selling combed fiber for local processing.
3. The project organized a "technology transfer" from northern Tajikistan to Badakhshan: it delivered spinning machines and a carding machine from Asht region to the main fiber processing group in Ishkashim region.
4. Linkages between the mohair and cashgora women processors were strengthened through training of trainers in May 2012 when women from the Badakhshan site were trained in Asht, northern Tajikistan.
5. Very important linkage was created with AKF and Afghan cashmere processors when cashgora fiber from Badakhshan was successfully dehaired in Herat, Afghanistan in July 2012. This linkage will secure fiber dehairing in Afghanistan and open a new market for Tajik fiber in Afghanistan.
6. The project developed market linkages for yarn and products make in Badakhshan. It introduced potential buyers to cashgora yarn spun from dehaired fiber and product samples and established marketing opportunities for the yarn and products with US companies. First products were exported to US buyers in fall 2013.

3.2.5.2 Scientific papers and brochures

Scientific papers

Recommendation for Goat Producers on Issues of Breeding and Technology. Ikromov F., Davlatov Kh. and Davlatqadamov Q. Dushanbe, Er-graph, 2013, 48 pp.

Methods of Improvement of the Productivity Traits in Pamiri Goats. Ikromov F., Davlatov Kh. and Davlatqadamov Q. Collected papers of the Livestock Institute at TAAS, "Breeding and Technological Methods of Productivity Improvement in Livestock, Poultry, and Bees", Dushanbe, 2013, pp.156-158;

Utilization of Breeding in Development of the Pamiri Cashmere Goats. Proceedings of the Republican Workshop of the Livestock Institute at TAAS titled "Breeding is a Basis for Development of Livestock Production", Dushanbe, 2013, pp.156-158;

Productivity Traits of the Pamiri Crossbred Goats Using the Altay Cashmere Breed of Goats Imported from Russia". Ikromov F., Davlatqadamov Q., L. Brent, B. Rischkowsky. Reports of TAAS, 2013.

A PhD thesis is being prepared by the candidate Davlatqadamov Qonun, associate scientist at Pamir agricultural research station, titled "Utilization of Foreign Cashmere Breeding Bucks for Improvement of Productivity in Pamiri Goats".

Brochures

Manual on Goat Breeding Using the Imported Genetics, F. Ikromov, Kh. Davlatov, Livestock Institute at Tajik Academy of Agricultural Sciences, IFAD, ICARDA. Dushanbe, 2013.

3.3 Project activities in Naryn region, Kyrgyzstan

3.3.1 Component 1: Characterize production systems and improve fiber production of small ruminants at all target sites

Sheep meat and wool production in Kyrgyzstan decreased as a result of the economic reforms in rural areas accompanied by privatization of flocks and cultivated areas, and a breakup of the wool marketing system developed during the Soviet Union. In 1985, there were 10.5 million sheep in Kyrgyzstan producing 32.5 thousand tons of wool compared to 4.8 million sheep and 11.0 thousand tons of wool in 2010. Small farms and households became major wool producers accounting for 99.2% of total national production. At present about 46.2% of the fine and semi-fine wool produced is sold through middlemen at low prices without quality considerations, while 53.8% is used for personal needs. There is no demand for coarse wool. The proportion between the price of 1 kg sheep meat and 1 kg wool is 4:1 which resulted in a shift from fine and semi-fine wool sheep to coarse wool fat-tail sheep. The privatization also led to a very heterogeneous flock sizes and structures. Households keep sheep flocks of 10-15 up to 100-150, most below a size where efficient selection can be organized. As a result, the quantity and quality of the wool has declined in the past two decades. In Naryn province there is a local market for quality wool as the province is famous for its traditional felt production – processing of local sheep wool for production of carpets and other handicraft products like shyrdak, ala-kiyiz, kalpak, etc. But the women processors often do not have access to quality fine and semi-fine wool required for production high quality felt products.

Naryn oblast (province) of Kyrgyzstan

Based on interviews with felters, the two types of wool best suitable for producing quality felt are Merino wool and semi-fine wool from Tian Shan sheep. The project estimated that a women group of 15-20 women will require about 400 kg of raw wool, e.g. one shyrdak takes about 3.5-5 kg of wool to produce (at 50% yield this means about 13-20 kg of clean wool per artisan); about half of it fine and the other half semi-fine wool.

Thus, the IFAD-ICARDA project aimed at improving the supply of quality fine and semi-fine (crossbred) wool in small farms and households in the same villages where it worked with artisan women's groups to develop direct relations between wool producers and processors; therefore it also developed relations with large sheep producers for sources of high quality Merino wool.

In 2009/2010 the project team visited 23 farms to identify contact large farmers and household sheep owners:

- Lakhol village, Naryn district: 5 farms with a flock of 380 sheep;
- Min-Bulak village, Naryn district: 6 farms with a flock of 210 sheep;
- At-Bashi village, At-Bashi district: 3 farmers keeping 1,227 sheep;
- Shamshi village, Kochkor district: 1 farmer with 1,100 sheep;
- Orgochor village, Jeti–Oguz district (Issyk-Kul province): 8 farmers with a flock of 1,393 sheep.

During the site visits a rapid assessment of the sheep wool produced was made:

- Lakhol: crossbred (white homogeneous, large crimp, uniform in fiber length and fineness, fiber length 11-13 cm, 40-45 Som/kg
- Min-Bulak: fine and semi-fine, crossbred, fiber length 7-9 cm, for felt
- At-Bashi: fine, heterogeneous, not typical, 3-4 types in fleece, 58-60 Som/kg
- Shamsi: fine Merino, fiber length 9-13.5 cm, 60-64th quality, 58-60 Som/kg.

Thirteen samples of fine wool from At Bashi and Kochkor were analyzed with OFDA 2000; the range in fiber diameter was 19.3-25.8 microns and in fiber length 7.5-10.5 cm.

Based on this rapid assessment the following farmers were selected as wool suppliers for the artisan groups: G. Usupbaeva from Lakhol village for crossbred (semi-fine) wool; M. Manapbaev from At-Bashi village for fine wool; U. Abdurasulov from Shamsi village for fine Merino wool. Each year the project team procured the required quantity of wool from these framers.

Other findings from the farm visits included:

- There is no organized breeding system; as a result sheep of various breeds with different wool quality and colors are found in the villages.
- No selection of breeding animals is practiced by the farmers.
- Wool productivity of sheep is low (2.5-3.0 kg per shearing);
- Sheep wool shearing is conducted manually using "dzhuushan" that leads to a shortening of fiber length by 0.5-1.0 cm
- No grading of wool quality is practiced.
- Semi-fine wool is sold to middlemen for 30- 50 Kyrgyz Som (KGS) per kg without sorting, while the coarse wool is sold for 5 KGS per kg.
- In the villages no trained specialists for classifying wool and sheep are available.
- Farmers and household farmers are interested in breed improvement through an organized breeding program.
- All interviewed farmers emphasized the high potential of Tian Shian sheep production.

As the farmers and household owners were interested in genetic improvement of sheep through targeted breeding, e.g. by utilization of improved breeding rams, it was decided to establish semi-fine crossbred wool producing farmers' groups at Lakhol and Min-Bulak sites. This also aimed at creating close links between wool producers and processors at these sites. A survey of the wool producers was conducted in the two villages in 2010 to reveal major characteristics of the production system (Annex 6). The breeding program targeted production and improvement of semi-fine (crossbred) wool, as crossbred wool is a suitable raw material for production of chair mats, slippers and other felt products.

The team took the following steps to achieve an overall improvement of sheep flocks with emphasis, on improving wool quality:

- classification of sheep genotypes through assessing their phenotypic traits;

- procurement of good Tian-Shan rams and their utilization in farmers' and household flocks at Lakhol and Min-Bulak site;
- monitoring of changes in the sheep flock composition;
- monitoring (visual evaluation and laboratory study) of wool quality and quantity;
- support of farmers through provision of anthelminthic agents and mange treatment of sheep.

3.3.1.1 Monitoring of breed structures in the flocks

The livestock specialists A.S. Ajibekov, D.V. Chebodaev, and I.A. Ajibekov regularly visited the project sites. They provided practical advice on sheep breeding and management and also monitored flock composition. The farmers at both sites were provided with anthelmintics for their sheep; and the farmers at Lakhol with preventive agents against mange.

To improve breed homogeneity and wool quality in the sheep flocks, the project procured pure Tian-Shan rams from farmers in Lakhol village. Till May 2010, a breeding station for Tian-Shan sheep breed existed in Lakhol village, which was then privatized. Thus, many animals in the village were pure-bred and still met the breed standards. In each mating season in 2011, 2012 and 2013 the project procured 4 rams (Table 21), so that in 2012 seven improved rams were used for mating with 491 ewes. (One of the rams at Min-Bulak site had died in 2012.)

Table 21. Tian Shan rams procured by the project and utilized by participating farmers by mating season

	2011	**2012**	**2013**
Lakhol site			
Number of rams	2	4	6
Number of mated ewes	245	251	
Min-Bulak site			
Number of rams	2	3	5
Number of mated ewes	205	240	

Classification of sheep genotypes in the participating flocks was done annually. The flock structure by breed recorded in the beginning of the project in 2010 is shown in Table 22.

Table 22. Classification of sheep flocks by genotype (2010)

Site	Total number of sheep	Fine wool sheep, %	Tian-Shan sheep (%)	Coarse wool, %
Lakhol	313	-	64.3	35.7
Min-Bulak	210	16.0	49.0	35.0
At-Bashi	1,227	58.8	-	41.2
Kochkor	1,100	100.0	-	-

By 2013 the proportion of Tian-Shan sheep in the flocks in Lakhol village had increased from 64.3% to 78.7%, and in Min-Bulak from 49.0% to 61.4%. The percentage of the 184 lambs born in Lakhol in 2013 with typical crossbred wool traits was 73.4%, and out of 70 yearling females 71.4% were Tian-Shan. In Min-Bulak 66.9% of the 139 lambs born were Tian Shan type (see more details in Annex 7). Although there are still indigenous coarse wool sheep of different colors in the flocks, the transformation of the mixed heterogeneous flocks to more homogenous Tian-Shan breed flocks has progressed well.

The combination of farmers' training, preventive care, improved rams and selection of breeding animals also led to improved fertility: in Lakhol lambs born per 100 ewes increased from 69 in 2011 to 89 in 2013 and in Min-Bulak from 64 in 2011 to 83 in 2012 (Please note that in 2013 the rate was 71 lambs per 100 ewes in Min-Bulak but one farmer had left the group and two new ones had joined.)

3.3.1.2 Improving and monitoring sheep wool quality

Sheep are usually shorn in Min-Bulak village site in April and in Lakhol in May manually using special scissors. It should be noted that manual shearing reduces the shorn fiber length by 0.5-1.0 cm as fiber remains on the animal's body.

Most animals were evaluated visually; fiber length and fiber diameter were estimated from a wool sample shorn from the sheep's side. The visual assessment of the wool shorn in 2013 showed that the quality had improved as a result of the utilization of selected Tian-Shan rams and increased number of 'typical crossbred' wool sheep in the flocks. The visual assessment of quality traits for the wool shorn at "Min-Bulak" site in 2013 showed that, compared to previous years, fiber length had improved, as well as the proportion of typical crossbred wool in total wool produced. In general, the proportion of 'standard crossbred wool' (fiber length of 11 cm and longer and fiber diameter corresponding to 58th and 56th quality standard) in the total wool produced went up by 4.7% from 39.0% in 2011 to 43.7% in 2013.

About 92.4% of the wool produced in Lakhol had a fiber length of 11 cm and above which corresponded to first class. By fiber fineness, 87.0% of the wool had a fineness of 56 and 50 quality standard (QS) typical for medium fine crossbred wool, 12.0% a fineness of 60-58 QS or fine crossbred wool, and 7.9% was classified as coarse crossbred wool. Compared to the wool quality assessment in 2011, in particular the share of fiber with a length of 12 cm and above had increased and the proportion of the semi-lustrous wool corresponding to 56th and 50th QS typical for first class and first sub-class wool.

In addition to the visual assessment, twenty-one samples were collected from three age/sex groups and analyzed with OFDA-2000 equipment in 2011 (Table 23). The range in fiber diameter was 23.9-34.8 microns and in fiber length 9.0-13.0 cm. The sampling was repeated in 2013. The results of the analysis indicate that sheep wool produced by farmers at Lakhol site meet requirements for crossbred wool by fiber diameter and fiber length, while wool at Min-Bulak site meets the standards for crossbred wool only by fiber diameter. The results also indicate that the wool quality in rams and yearlings improved during project duration in the Lakhol flocks but the number of samples was too small to confirm this trend.

Table 23. Results from OFDA 2000 analysis of wool samples by age group, site and year

Age/Sex group by site	**2011**			**2013**	
	n	**fiber diameter, microns**	**fiber length, cm**	**fiber diameter, microns**	**fiber length, cm**
Lakhol					
rams	4	27.8	13.1	26.5	11.3
ewes	3	26.7	14.0	27.0	11.0
yearling females	12	29.2	12.9	25.4	13.3
Min-Bulak					
rams	2	25.1	11.3	27.1	12.1
ewes		-	-	27.8	10.0
yearling females		-	-	25.5	9.8

At both sites the total wool produced by the flocks either increased or remained the same, while the yield per sheep increased in all flock with the exception of one flock at Min Bulak site (Table 24). The number of sheep in the flocks fluctuated largely.

Table 24. Changes in wool production from semi-fine wool sheep at Lakhol and Min Bulak sites from 2011 to 2013

	2011			2013		
	No of sheep	shorn wool (kg)		No of sheep	shorn wool (kg)	
		total	per sheep		total	per sheep
Lakhol						
G. Usupbaeva	78	242	3.1	108	388	3.6
N. Akunov	34	95	2.8	17	55	3.2
R. Kasmaliev	50	140	2.8	52	177	3.4
M. Asanaliev	20	54	2.7	43	152	3.5
Y. Sadykov	75	225	3.0	38	117	3.1
Total/Average	**257**	**756**	**2.9**	**258**	**889**	**3.5**
Min-Bulak						
A. Musaev	10	25	2.5	3	9	3.0
O. Ismadiyarov	17	46	2.7	13	36	2.8
S. Musaev	28	69	2.5	23	73	3.2
J. Samakov	21	53	2.5	18	56	3.1
E. Musaev	60	160	2.7	19	47	2.5
T. Asenov	19	44	2.3	41	113	2.7
B. Musaev				18	47	2.6
Total/Average	**155**	**397**	**2.6**	**135**	**380**	**2.8**

Concluding, the systematic monitoring and visual assessment of wool quality, consistent selection by moderate culling of atypical animals, and utilization of pure-bred rams in the flocks, led to improvements in the quality of crossbred (semi-fine) wool available to the artisan groups in Min-Bulak and Lakhol village. The envisaged direct wool supply was confirmed in Min-Bulak where in 2013 73 kg of the crossbred wool produced by farmer S. Musaev was purchased and utilized by the artisan women's group of this site, which had not been the case before. Furthermore, farmer E. Musaev managed to sell 46 kg of his wool at 45 Kyrgyz Som per kg.

3.3.2 <u>Component 2:</u> Work on the formation and capacity building of the women group in all project sites to develop value added processing and export of wool and wool products. Encourage the development of women-led small businesses

The project worked with 70 women artisans in Naryn region of Kyrgyzstan. The artisans were engaged in producing wool felt handicrafts and organized in 5 pilot groups located in 5 villages: At-Bashy and Acha-Kaindy villages in the At-Bashy region, and Min-Bulak, Lakhol and Kulanak villages located in the Naryn region.

At the start of the project the felting groups produced traditional felt rugs and carpets called *shyrdaks* that are widely demanded on the local market and to a lesser degree on international markets. The project activities focused on developing new, competitive felt products, establishing new market outlets, including access to international markets, and transforming the pilot groups into sustainable businesses through training in processing and design, introduction of new equipment and processing technologies and institutional and market support. The report covers the project achievements, problems, lessons learned and tasks for future.

3.3.2.1 Increasing quality and assortment of products produced by pilot groups

<u>Survey of raw material (sheep wool) and assessment of wool quality.</u>
The quality of felt products depends of the quality of wool used for felting. To assess raw material needs of the felting group, the project team conducted a survey of raw material requirements among

wool processors in different regions of Kyrgyzstan in 2010. The survey covered 58 groups of wool processers, including 13 groups in Naryn region and 19 groups in Bishkek.

The analysis of the survey results showed that 85 % of wool used by processing groups in Bishkek is Merino. 90 % of the artisans surveyed thought that the quantity of Merino wool in the country was decreasing and the quality deteriorating. Respondents noted that wool was heterogeneous, dirty and needed multiple cleaning. The wool was not properly classified and sorted, and pure Merino wool was very rare. The majority of respondents agreed that it was difficult to buy wool of good quality. In Naryn oblast 13 % of felters used merino type wool, the rest used semi-fine, coarse, and semi-coarse wool.

Analysis of expenditures for raw materials and relative incomes from different products (Tables 25 and 26) led to the following conclusions:

- The use of merino wool in production of fashionable, luxury products (souvenirs, accessories, scarves) increases the added value nearly 15 times compared to the processing of semi-coarse and other types of wool (mostly for shyrdaks);
- Distribution of added value per 1 worker in Bishkek is approximately 4 times higher than in Naryn oblast.

Table 25. Analysis of volume and type raw materials used by felt processing groups

Region	**Number of questioned organizations**	**General volume of wool used per year**	**Including: %**				
			Merino	**Semi-mixed**	**Crossbred**	**Semi-coarse**	**Other**
Bishkek	19	13.5 tons	85.2%	2.2%	4.4%	6.5%	1.7%
Naryn region	13	68.3 tons	13.1%	50.0%	0.7%	31.6%	4.6%

Table 26. Analysis of incomes and expenditures for raw materials of felt processing groups

Region	**Number of employees**	**Among them women (%)**	**Approxi-mate income per year ($)**	**Approximate cost of raw material ($)**	**Value-added cost per kg of wool ($)**	**Average annual income per person ($)**
Bishkek	252	95.2%	372,000	21,700	25.9	1476.0
Naryn region	522	96.6%	200,300	78,500	1.8	383.7

Quality assessment of wool and felt

The problem of quality raw materials remained topical throughout the project implementation.

Wool: The project initially decided to use merino wool for all types of products. However, experience showed that merino wool is a relatively rare type of wool and quality merino cannot be easily found in the Naryn region. Merino wool purchased in 2011 was of low quality and difficult to scour. The project team and the artisans decided to substitute local, crossbred wool for products such as chair mats. Dr. Ajibekov arranged a supply of quality crossbred wool for the groups from farms in the Lakhol village. Replacing merino wool with crossbred wool lowered the production cost of the chair mats without decreasing quality. Crossbred will also be used to produce slippers.

Although crossbred wool is good for chair mats and slippers, products such as scarves require very fine merino wool of 19-20 micron. The artisans purchase merino wool in the form of tops from a wool processing factory in Tokmak near Bishkek. Merino tops was regularly purchased with the assistance

of the project and also from earnings from product sales. At the end of 2012, 31 kg of white tops were purchased for $12.8/1 kg.

Cleaned and dyed crossbred wool in Min-Bulak village

Industrial versus home-made felt: First samples of the slippers were produced from felt purchased at the factory "Asia – Runo". However, the factory currently produces felt of very low quality; the felt is dirty, uneven and has defects that result in considerable waste when the felt is cut into patterns. In addition the price of the felt is high at 550-600 Som ($12-13) per kg, contributing to a high production cost of the slippers. The high price and poor quality of the factory felt has made it difficult to fully develop slipper production.

The factory accepts orders for clean felt of specified thickness, but the minimum volume of the order has to be 1 ton. The project has no funds and no need to order felt in such quantities.

In 2012, in Acha-Kaindy village, felt for slippers was produced on the felting machine. They used semi-coarse short-nap wool from young sheep. The produced felt met the standards for producing slippers. Subsequent attempts to produce quality felt for slippers did not yield good results – the felt was of variable thickness and quality. Although all groups mastered the technology of making felt on a felting machine, the quality of felt still does not meet the standard for slippers production. The problem of arranging a stable production of quality felt for slippers on felting machine owned by the groups will be resolved with the help of the IFAD-AKF project.

3.3.2.1.1 Training in wool processing.

In the beginning of the project, trainings on improving hand processing of wool were conducted for all pilot groups. Trainings for At-Bashy and Lakhol groups were supported by the ICARDA project; trainings for Min-Bulak and Acha-Kaindy groups were conducted with the assistance of AUB-Charity Public Foundation. The trainings were conducted by Kenjekan Toktosunova, an experienced trainer from Tamchy village, Issyk-Kul region.

The trainings covered the following topics and activities:

- Characteristics of different types of wool;
- How to determine the wool quality;
- Primary cleaning of wool by hand;

- Washing of wool using soda ash and AVE liquid;
- Proper techniques of wool processing – cleaning, washing, drying.

During the training the women used textbook written by a well-known felter Jyldyz Asanakunova from Issyk-Kul region and published in 2009.

Illustrations from the methodological textbook on hand processing of wool and on felt production.

3.3.2.1.2 Mechanizing felt production.

In 2010-2011, a machine-builder Sapar Ismailov from Kyzyl-Tuu village of Issyk-Kul oblast made 4 felting machines and installed them in At-Bashy, Acha-Kaindy, Min-Bulak and Lakhol villages of Naryn oblast. In 2013 he made and installed a felting machine in Kulanak village.

All groups also received new chii canvases needed for machine felting. The felting machines are now used by the artisans to produce felt for shyrdaks and slippers.

Making felt on the felting machines allows the groups to:

- reduce time needed for felting 4 – 5 times compared with hand felting;
- reduce hard physical labour that is required during hand felting;
- reduce net cost of the felt;
- improve the quality of felt (homogeneity, consistent thickness).

In 2010-2011, two Russian-made wool carding machines with the processing capacity of 100 kg of wool per day were purchased and installed in Lakhol and Min-Bulak villages. The machines are well suitable for primary wool carding. A third Russian-made wool carding machine "Asia-Runo" with the capacity of 40 kg/day was installed in At-Bashy village.

In spring 2012, the project team replaced old carding cloth on two of the carding machines in Min-Bulak and Lakhol villages (the machines were purchased used), and performed a tune-up on the machines. Currently all carding machines are fully functional and it is possible to obtain well carded wool at all project sites.

The use of wool carding machines increases the efficiency of felting, lowers the production cost and substantially improves felt quality. The carding process can be repeated several times to further increase quality. The group can use the carding machine not only to card wool used by the group, but provide wool carding services for other villagers who need carded wool for felting or other purposes. The Lakhol group provides such service for local people. This group is located in the most remote village with very few job opportunities. The wool carding service is an excellent source of additional income for the group.

Practical training on wool scouring the machine in Lahol village

In spite of the fact that the IFAD-ICARDA project purchased second-hand equipment, the quality of the used, Russian-made carding machine is much better than similar, newly produced Chinese machines that were purchased in 2008-2009 for different artisan groups by other organizations through an ADB project. Sadly, 30 new wool carding machines purchased for these groups in China under the ADB grant stand idle or are used for very crude work, such as making cotton-wool batting.

3.3.2.2 Introducing new design, processing technologies, products and quality standards.

3.3.2.2.1 Developing and test-marketing new products.

The Naryn felting groups are located in a remote region, far away from markets, and lack experience in product development and design. The project team collaborated with the groups and professional designers on developing an assortment of different products including pillows, chair mats, felt and silk scarves and slippers. The project helped the groups test-market the new products on local, regional and international markets and assess market demand based on the results of the test-marketing. The project also invited an American marketing expert to Kyrgyzstan in spring 2010 to identify competitive felt products for international markets. However the visit did not take place due to social and political unrest in Kyrgyzstan at that time.

The test marketing experiments allowed the project to assess demand for different types of products on different markets. The following products were tested on different markets:

Local markets:	Shyrdaks, shyrdak chair mats, ala-kiyiz chair mats with traditional ornaments, felt slippers.
Regional markets:	Felt slippers, scarves.
International markets:	Felt slippers, chair mats, felt scarves, silk & felt scarves, shyrdaks.

From the assortment of products produced by the pilot groups, felt slippers designed by the project proved to have the best marketing potential on regional and also international markets. Ala-kiyiz felt slippers are more costly to produce than simple felt slippers especially in terms of skilled labor, but enjoy a strong market demand if they are made according to standard.

Stitched ala-kiyiz slippers (average production cost of $10) were successfully sold in Hungary ($17-20), in Germany ($25-30), and at local and regional markets ($12-15).

The groups also started to produce a new version of sewn felt slippers based on a prototype made by an Italian designer from “Altra Qualita” who worked with felting groups in Tajikistan. Although a strong demand for these slippers has not been identified to date, the project team believes that the

basic form is satisfactory and with improvements in decoration and felt quality these slippers will also find a good market.

Silk scarves with felt ornaments were successfully test-marketed on local and regional markets and at international craft fairs. The competition in these types of products is extremely high as most Kyrgyz felting groups produce such scarves and the local and regional market is saturated. Thus, to successfully produce for international markets, the artisan women need support from professional designers.
Felt scarves made from factory-spun merino tops are demanded on local, regional and export markets. Several types of felt scarves have been developed, including warm silk and felt scarves for men.

The artisan group from Acha-Kaindy village is a leading producer of scarves for local, regional and international markets

Ala-kiyiz chair mats found good demand on local and regional markets, craft fairs, and also on export markets. However, they proved to be too expensive to export because of their weight and bulkiness. A series of two-sided ala-kiyiz chair mats from wool dyed with locally prepared natural dyes (onion peels, barberries, nut membranes, herbs) produced by the women of the Min-Bulak group was awarded a UNESCO Award of Excellence for Handicraft Products in Central Asia in 2012.

UNESCO Award of Excellence for Handicraft Products: two-sided ala-kiyiz chair-mats made from naturally dyed wool in Min-Bulak village

One of the first products developed and test-marketed by the project were felt pillows. Unfortunately the pillows found little demand on local and regional handicraft markets. With support from professional designers, "luxury pillows" could potentially sell on high-end export markets but their relatively large weight and volume would make their shipping cost prohibitively high. So the project stopped working on this product.
More detailed results on developing and test-marketing the above described products are described in Annex 8.

Traditional products – felt rugs in shyrdak technique.
The shyrdak felt rug is traditionally the main handicraft product made by the Naryn felters, and often the only source of their income. The project did not focus on shyrdak production but helped the groups to promote the development of shyrdaks. Two out of five pilot groups (in Atbashy and Acha-Kaindy villages) make shyrdaks along with the new types of products supported by the project. The knowledge and experience the groups acquired through trainings on design and color combinations had a positive impact on improving the quality of their shyrdak rugs. The groups were also able to apply their experience in chair mat production when producing shyrdaks and vice versa.

The artisans also successfully used felting machines obtained with the help of the project to produce felt for shyrdaks. Production cost of 1 square meter of felt made on a felting machine is 130-150 Som, and felt purchased at bazaar costs 350-380 Som. Shyrdaks are sold at the bazaar at the price of 3000-3500 Som per square meter.

In 2013, the group from Acha-Kaindy village sold shyrdaks for $6033 (Table 27), which constitutes 66% of the group's income.

Table 27. Incomes from selling shyrdaks by the group from Acha-Kaindy village in 2013 (total amount $ 6033)

International markets, $US			Regional markets, $US			Local markets, $US		
Kuwait	Hungary	Holland	Almaty	«Oimo» Festival (Bishkek, Cholponaty)	Naryn	Bishkek	Tourists	Orders
170	1200	660	73	807	849	415	522	1337
Total: $ 2030			**Total: $ 880**			**Total: $ 3123**		

In 2012, the "Cheber Koldor" group from Acha-Kaindy village was awarded the "UNESCO Award of Excellence for Handicraft Products" for a round-shaped shyrdak, 1.85 meter in diameter.

Shyrdak for the International market

3.3.2.3 Training strategy for groups and individual artisans.

3.3.2.3.1 Trainings on design, processing technologies and marketing

During the first years of the project, the project team conducted trainings for the groups on design and processing technologies on-site in the villages. In 2012 the project team introduced trainings in the form of fellowships and practical trainings in Bishkek for the most capable members of the groups. The project focused on those groups and artisans who could use the project support most effectively. The most talented and motivated artisans used the trainings to increase the quality of their products and also helped to train other artisans in their groups.

During the project duration, the following trainings were conducted:

- 2010: 12 local trainings in the villages, 2 trainings in Bishkek, altogether 14 trainings (7 of these trainings were funded by other donors).
- 2011: 6 local trainings in the villages and fellowships in Bishkek on slipper production for 5 women from each group.
- 2012: 1 training on natural dyeing in Min-Bulak village; fellowships in Bishkek on the production of slippers and scarves.
- 2013: practical classes on improving felting on felting machines in At-Bashy, Acha-Kaindy, Min-Bulak and Kulanak villages.

In April 2012, leaders of the three groups, Sh.Omuralieva, T.Amanova and B.Zhamanbaeva took part in the regional training of trainers in Issyk-Kul, which was organized CACSARC-kg and supported by the project "Advancing women's economic opportunities in Fergana valley handicraft and textile supply chain " financed by the US Government.

Sh.Omuralieva and B.Zhamanbaeva present calculations of the price for the product on the training of trainers

Trainings on technology, design and marketing conducted under the project allowed the pilot groups to:

- Increase product diversity;
- Increase product market competitiveness;
- Learn how to assess the quality of raw materials and develop skills in quality fiber processing;
- Recognize that product quality is a prerequisite for a sustainable handicraft business;
- Learn the basics of marketing and pricing;
- Identify the most talented artisans in the groups, divide responsibilities within the groups based on the abilities and skills of their members.

3.3.2.3.2 Methodical and visual aid for artisans.

The project team paid special attention to the preparation of methodological and visual training materials. Trainers and designers prepared samples of products for trainings on technologies and design to illustrate each training topic. The groups were provided with color wheels (to identify matching color combinations), description of processing technologies, templates for slippers of all sizes, albums with pictures of scarf samples, catalogues with various designs and color combinations for chair-mats, scarves and other products.

During trainings on marketing the groups received hand-outs including detailed instructions on price formation.

The following methodical materials (in the form of illustrated master-classes) were printed and distributed within the groups:

1. Wool processing and felt making.
2. Production of warm felt scarves;

3. Production of felt and silk scarves;
4. Natural dyeing;
5. Production of two-sided ala-kiyiz chair mats;

The IFAD-AKF project will continue the publication of the technical manual series.

3.3.2.3.3 Apprenticeships in studios and workshops.

Paid work of Naryn artisans in the studios and workshops of recognized designers was an important component of their training. In 2012, several artisans from Acha-Kaindy, Lakhol and Kulanak villages worked from two weeks to two months in the workshop of designer Kamala Abdykadyrova on the production of felt and silk scarves. This was an important apprenticeship for the artisans. In addition, few young artisans from Acha-Kaindy, Lakhol and Min-Bulak villages who moved to Bishkek to study worked at a designer's studio producing felt & silk scarves and other products for a Dutch company "Felt for you" and other clients in winter 2013.

Shirin Amanova, Acha-Kaindy, is implementing the order from Holland, October 2012

3.3.2.3.4 Establishment of Experimental Design Studio.

Currently, a group of 10 young women from the pilot villages who currently live in Bishkek formed an experimental felting group. A portion of profits earned in 2012 was used to make the first rent payment for the premises and to buy raw materials – silk, merino tops and other supplies.

Students from Naryn in the new design studio in Bishkek

The experimental design studio in Bishkek will be supported by the IFAD-AKF project (as a new group). The group started producing orders of scarves and other products in September 2013.

Trainings in the experimental design studio will support the creativity of talented, young artisans and help them design new, fashionable products that will be produced by the Naryn groups. The key objective of the experimental group will be to develop samples of new products under the supervision of recognized designers and organize the production of these products together with the Naryn pilot groups.

Tasks of the experimental design studio in Bishkek will include:

- To develop new samples of felt products;
- To improve professional skills of Naryn artisans in the studios of well-known designers;
- To make products for orders in Bishkek;
- To teach new technologies and designs in the villages;
- To place orders for new products in the villages and monitor their production;
- To prepare information about new products for a website;
- To develop marketing of the groups' products

3.3.2.4 Shortcomings in processing

3.3.2.4.1 Problems in production:

1. Wet felting technique used to produce most products requires warm premises and running water. All Naryn groups have work premises that can be used only in summer and cannot work in winter when the women have the most free time.
2. The groups lack regular access to quality raw materials.
3. The groups lack a revolving fund to purchase raw materials.
4. The groups still lack some equipment needed for wool processing (such as wool washing machines) and some finishing equipment (a leather sewing machine) that is needed to produce products such as felt slippers.
5. Groups do not maintain the required quality standard of some products which lowers their market competitiveness.

3.3.2.4.2 Solutions:

1. To expand the assortment of competitive felt products;
2. To improve and publish methodical aid and manuals for all types of products;
3. To develop standards for all types products and provide the groups with clear guidelines regarding these standards.
4. To create raw materials bank (wool, tops, silk, leather, colors and dyes) to consistently supply artisans with quality materials (on self-supporting basis);
5. To provide the groups with wool-washing machines, manufacturing centrifuges and other relevant equipment through the IFAD – AKF project;
6. To resolve infrastructural problems – warm work premises for groups where they can felt during winter months.
7. To develop production of felt for slippers on felting machines owned by the groups;
8. To rent premises and procure equipment for the experimental design-studio that was set up in Bishkek to support young artisans from Naryn (computer, printer, needed furniture, other supplies).

3.3.3 Component 3: Develop sustainable market chains that link fiber producers and processors with buyers.

At the beginning of the project artisans sold felt products only on the local market. In the course of the project all groups increased product sales on local, regional and international markets. The project

team discovered new niches for the groups' products on the local market, promoted products on regional market in Almaty, Kazakhstan, test-marketed products in the USA and developed access to European markets in Belgium, Germany, Hungary and the Netherlands.

3.3.3.1 Test-marketing felt products on local markets.

Project artisans work actively on local markets. The groups sell their products in Naryn, find wholesale buyers and customers for scarves and slippers and also sell products to tourists. Since the second half of 2011, the pilot groups participated in craft fairs in Bishkek where they established contacts with new customers and wholesale buyers. Each group indentified a specific local market for their products:

- The Acha-Kaindy group, as follower of Janyl Alibekova, a well-known and recognized felter from Acha-Kaindy village who died in spring 2012, sells felted handicrafts to tourist groups during the summer season and receives orders for shyrdaks from local residents and organizations. The group also participates in craft fairs in Bishkek and sells products at the Central Department Store in Bishkek.
- The At-Bashy group regularly sends products for sale to the souvenir booth in "Tash-Rabat" Tourist Centre and organizes charity fairs.
- The Kulanak group sells its products through the UN-Women net, the Aga-Khan University and has local customers.
- The Min-Bulak group participates in trade fairs in Naryn and Bishkek, has orders from local people and from wholesale buyers with whom the group developed business ties when participating in craft fairs. The group also sends its products for sale to the Central Department Store in Bishkek.
- Lakhol group is in the most difficult situation regarding access to local markets because of its remote location, poor roads and severe climate. The project tries to assist the Lakhol group by buying their products and re-selling them in Bishkek and on regional markets.

Participation in different craft fairs is one of the most important marketing venues. Every year since 2010, two artisans from each pilot group participated in the "Oimo" International Festival held annually in late July-early August, the first 3 days in Bishkek, then for a week in Cholpon-Ata, the main resort town on lake Issyk-Kul. More than 120 artisans from a number of countries participate in the festival. In 2013, artisans from all groups covered their expenses during their stay at the Festival. The project only helped with renting their boutiques. In 2011, the pilot groups sold their new products (slippers, chair mats, pillows, scarves) for more than $2,000 at the Oimo festival. In 2012 they sold products for $3,000 and in 2013 for over $3,000.

One of the key benefits of the festival is that the artisans learn about the competitiveness of their products – they compare their products and prices with those of other artisans and receive feedback from customers. They also establish contact with wholesale buyers and can barter products with other sellers – for example they can exchange their felt products for silk from Uzbekistan they need to make felt & silk scarves.

3.3.3.2 Test-marketing on regional market.

A regional market for the artisans' products is Almaty, Kazakhstan. The project found customers for slippers and chair mats who were ready to buy for cash small consignments of products on regular basis to sell at the Central Department Store in Almaty. However, the regional trade is not very profitable due to transportation cost and difficulties with customs on the Kyrgyzstan-Kazakhstan border. The prices of felt handicrafts in Almaty are only 10-15% higher than in Bishkek which only covers transport expenses.

In March 2013 the artisans Burulush Zhamanbaeva (Min-Bulak village) and Toyunbubu Amanova (Acha-Kaindy village) participated in the Central Asian Crafts Fair in Almaty held on March 2013. The women were invited to Almaty as recipients of the UNESCO Award of Excellence for Handicraft

Products. They participated in the award ceremony and tried to sell products. However their products did not sell well - the total income was only $250. Based on the analysis of sales in Almaty the project decided that working on this market would not be a priority.

3.3.3.3 Test-marketing in the USA.

Since 2010, Liba Brent conducted test marketing experiment felt products made by the pilot groups in Wisconsin, USA. The results of the test marketing show that products such as felt and silk scarves are most profitable because of the considerable difference between their production cost and the sales price and because the scarves are light which lowers the transportation cost.

Although the demand for felt and silk scarves was relatively good, the overall market for luxury clothing and accessories in Wisconsin is limited. There are relatively few stores that sell luxury, hand-made products, and some of those stores carry products made by local or US artisans only. In order to expand the market, it is necessary to market these products in larger cities in northern United States.

A few scarves still remain in the USA to be sold; the income from selling the products for three winter seasons was $1,823. The funds were partially used to buy German-made industrial sewing machine for stitching felt and leather, and for raw materials and other supplies.

3.3.3.4 Test-marketing in Europe.

The years 2012 and 2013 have become a real "discovery" of Europe for the artisans and their products (more details in Annex 8). The project test-marketed products in a number of EU countries including Hungary, Netherlands, Belgium and Germany, and developed long-term business ties with European buyers. In 2012 the project started selling felt products through the Dutch web company www.felt4you.nl, at fairs in the Hague and through a Belgian company www.caravanistan.com. Selected felt products were first test-marketed by Svetlana Balalaeva at the Festival of Folk Arts in Hungary in 2012 and in the subsequent year, representatives of the women artisan groups participated actively in the festival. In June 2013 the artisan women also participated also in in the International Festival of Homeworkers in Bulgaria in June 2013

3.3.3.5 Assistance of CACSARC-kg with product sales abroad.

Products purchased from the artisans by the project were also sold at international fairs attended by the CACSARC-kg office staff and members of the project. In 2012 project products were test-marketed during fairs in the United Arab Emirates (Dubai), Germany (Berlin), Turkey (Ankara), Holland (Amsterdam), Uzbekistan (Tashkent), Tajikistan (Dushanbe) and others.
In August 2013, products of two recipients of the UNESCO Award of Excellence for Handicraft Products Burulush Zhamanbaeva (slippers) and Toyunbubu Amanova (scarves) were sold at the prestigious Folk Art Market in Santa Fe, the USA.

3.3.3.6 Introducing internet sales

The Project made first steps towards internet sales through popular artisan websites including www.felt4you.nl (Holland) and www.caravanistan.com (Belgium). The project also agreed to cooperate with internet sales website www.Globeinin.com, (US, California, representative in Bishkek Pete Rognli). The project is exploring the opportunity to advertise and sell the products via the project marketing site www.adventureyarn.com; www.cacsarc-kg and www.cacsatrade.kg are currently under reconstruction.

3.3.3.7 Shortcomings in marketing and recommended solutions

Marketing problems:

1. The establishment of direct marketing channels is very complicated for artisans because of absence of modern communication facilities, remoteness from central areas, and language barriers;
2. The artisans need additional practice in selling and promoting their products and interacting with customers at the fairs;
3. The artisans do not fully understand the role of product distributors;
4. The groups still lack sufficient number of regular wholesale buyers and customers.

Recommended solutions:

- Develop a marketing center (HUB) linked to the design studio that will create sustainable linkages between the Naryn groups and local and international buyers, and function on self-supporting basis;
- Further expand market access in Europe and the USA;
- Prepare relevant assortment of products for each fair based on the analysis of previous marketing experiences;
- Strengthen relationships with existing customers through timely and professional completion of their orders;
- Find wholesale buyers for unique, quality products such as the felt slippers made by the groups;
- Select marking specialists in each group and train them in marketing and advertising the group's products.

3.3.4 Component 4: Research on changes in income of fiber producers and women processors and their effects on livelihoods and gender roles.

This report provides an overview of project investments directed to wool processing and sheep wool production and summarizes performance results of artisan women's groups involved in sheep wool processing for the period from January 2010 to September 2013.

The project team conducted socioeconomic studies with the following objectives:

- to analyze the structure of investments made by the project to support both farmers and artisan groups
- to explore trends in income generation by artisan women from wool processing for entire period of project implementation from 2010 to 2013
- to identify the income structure to trace the dynamics and change in priority product setting during marketing.

Data collection was based on personal interviews with artisans. The team collected information from 5 artisan groups listed in Table 28. A new group of 15 artisan women from the Naryn district called Kulanak joined the project in mid 2012.

Table 28. Artisan groups involved into project

Site	The number of artisan women			
	in the beginning of the project	end of 2011	end of 2012	as of Sept. 2013
At-Bashi	15	13	13	14
Acha-Kaindy	15	15	15	15
Min-Bulak	15	14	14	14
Lakhol	10	9	9	9
Kulanak	-	-	15	15
Total	**55**	**51**	**66**	**67**

3.3.4.1 Project investments

The analysis of project investments covered the period from Jan. 2010 to Sept. 2013. Nearly 60% of the project investments in the activities of farmers and artisans were provided in 2010 to boost wool processing and product manufacturing by improved equipment, devices, and materials. The breakup of funds allocated for fiber processing and improved sheep wool production is provided in Table 29 and Figure 1. Total amount of funds spent for these two project components was more than 33 thousand US dollars. Share of funds channeled to support artisan groups by production inputs and materials formed 91% for the entire implementation period, while the remaining funds were spent for breeding and veterinary services. The highest percentage of investments (61%) was made, as expected, in equipment and supplies.

Table 29. List of the project investments by years

Item	Total, $US (% share in total)	Years			
		2010	2011	2012	2013
Equipment and expendable materials	20,504 (61%)	13.431	4.095	1.691	1.287
Felt	1,861 (6%)	493	524	768	76
Silk, leather	1,551 (5%)	135	487	646	283
Tables and other tools	2,181 (7%)		1,927	129	126
Dyes, accessories	1,208 (4%)	166	539	283	220
Boot-trees for slippers	749 (2%)		132	406	212
Rams	2,558 (8%)	2,558			
Veterinary services	359 (1%)		359		
Wool	2,387 (7%)	2,387			
Total ($US)	**33,358**	**19,170**	**8,063**	**3,923**	**2,204**

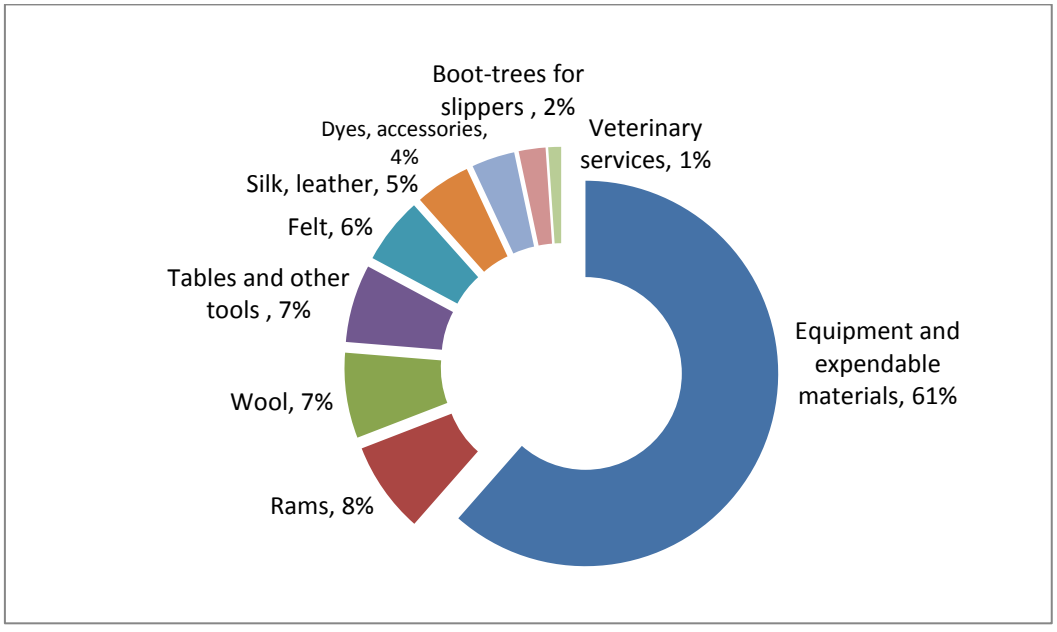

Figure 1. Distribution of project funds spent for fiber processors and farmers (%)

Reinvestment of earnings from product sales

The total income from selling the artisans' products by the project team in 2012 was $US 5848 (out of this $830 is profit from selling products in the USA). Total income from selling the artisans' products during 8 months in 2013 was $3872 (out of this $225 is profit from selling products in the USA) and $128 is a remainder from sales in 2012.

This money was re-invested into the project and used as a revolving fund to purchase products from the artisans, to pay for artisans for work on orders, purchase of raw materials and supplies needed to implement orders, and pay marketing expenses (Table 30).

Table 30. Reinvestment of incomes ($US) from selling artisans' products by the project team

Description	2012	2013
Total income from sales	**5848**	**4000**
Reinvestment in:		
Products purchased from the artisans using revolving fund	1547	891.4
Payment of artisans' work for orders	664	526.6
Purchase of raw materials for implementation of orders and on-site work of the groups:	1379	803.8
Payment to designers for improving design of scarves, dyeing wool and silk for orders, creating samples of templates for slippers, etc.	285	202.1
Payment for meals and travel expenses of artisans who worked on orders in Bishkek:	128	151.4
Purchase of equipment and tools for the groups	1209	243.8
Marketing expenses related to selling the products outside Kyrgyzstan	448	808.1
Rent of premises for the group in Bishkek		195.7
Postal expenses		82.3
Communication expenses, transport	60	94.8
Remainder from sales at the end of the reported period	128.	
Total	**5848**	**4000**

In 2012 the team purchased products for $773 from the artisans. In 2013 the team spent $640 on products. Products were purchased from the artisans at retail prices which include a profit of 20% - 50% depending on the type of product. Products were sold to buyers and customers at negotiated prices.

The project team successfully sold all products purchased from the artisans using the project budget and the revolving fund; by the end of December 2012 the project had no products left for sale, by the end of September 2013 the project had $145 worth of products to sell.

3.3.4.2 Changes in income of the artisan groups

Analysis of income obtained by artisan groups shows the positive trend, i.e. all four groups have gradually increased their income compared to 2010. Overall, total income of the 4 groups participating in the project from the beginning has increased by 2.5 times from Jan. 2010 to Sept. 2013. Data for 2013 are not final, as the groups are expected to earn significantly in fall and winter seasons. At the same time, the fact that income figures have already exceeded those recorded in 2012 in three groups except At-Bashi, is very promising (see Figure 2 for details).

The highest annual income from sheep wool products (5,770 USD) was recorded by the At-Bashi group in 2012. Both stable high income and its share in a family budget of the At-Bashi group members indicate the sustainability of this group.

Although women in Lakhol group got the lowest income among four groups, they managed to obtain 46% higher income for nine months of 2013 compared to income generated in 2012. This significant gain is largely attributed to the group leader, Gulmira Usupbaeva, who has a strong willingness to succeed.

As for the Kulanak group, women managed to obtain 850 USD (5%) from wool products for nine months of 2013, while income from the other sources formed about 16,000 USD (95%).

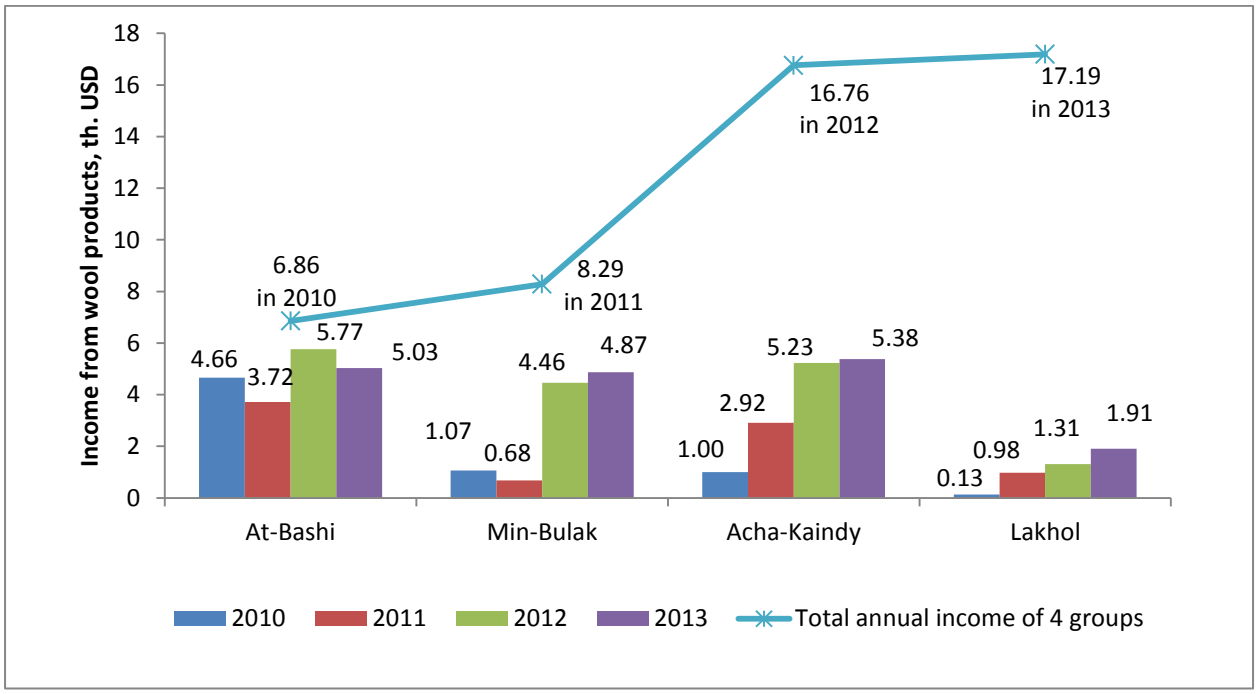

Figure 2. Income obtained by artisans from wool products

Total income from sheep wool products obtained by 4 groups for 4 year period formed 49,090 USD including 24,120 USD from products newly introduced by the project. Total income of groups for nine months of 2013 has already exceeded that of 2012 (Table 31).

Table 31. Income from wool product sales by product type (in 1000 $US)

Product name	**Total**	**2010**	**2011**	**2012**	**2013**
Shyrdaks, ala-kiyiz	22.45	3.10	2.74	9.20	7.41
Chairmats	7.59	1.40	2.92	1.90	1.37
Slippers	5.55	-	0.93	1.40	3.22
Scarves	10.99	1.60	1.70	3.96	3.73
Souvenir	0.29	-	-	0.10	0.20
Other	2.23	0.76		0.20	1.27
Total	**49.09**	**6.86**	**8.29**	**16.76**	**17.19**

The figures on income distribution by product type show that throughout the implementation period, shyrdaks and ala-kiyiz provided on average around 40% of earnings from sheep wool products. Income share of chairmats decreased from 33% in 2011 to 8% in 2013 mostly because of the focus of the groups changed to more transport-friendly products. These include scarves contributing 25% of total felt product income and improved models of slippers with an 18% share in total income recorded for nine months of 2013 (Figure 3).

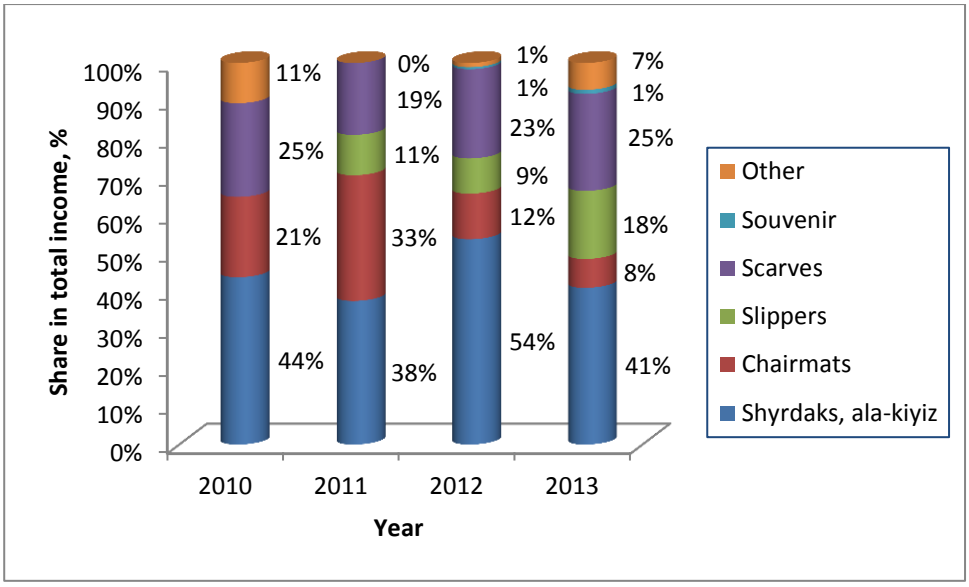

Figure 3. Distribution of income by product type

The groups managed to obtain 16 to 20% of family income from wool processing and felt products as of September 2013 (Figure 4). Both Acha-Kaindy and Lakhol groups significantly increased income share from felt products in household income by 15% from 5 and 1% to 20 and 16%, respectively. Considering willingness and commitment of the groups to improve product quality and increase production as well as their participation in the global fiber product festivals and fairs, artisan women have a good opportunity to address the issues of rural employment and to achieve better living standards through stable higher incomes obtained from wool products.

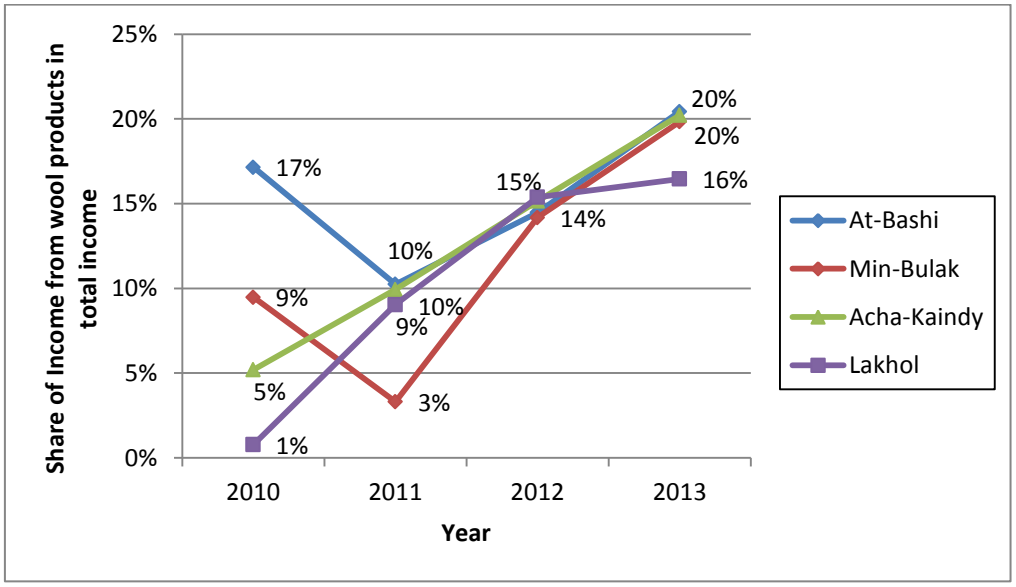

Figure 4. Share of income generated from wool products in total household income

The analysis of incomes earned by the pilot groups shows that the groups' earnings grew every year. Currently, products produced by groups from Acha-Kaindy, At-Bashy and Min-Bulak villages are on sale in the shops in Bishkek. The Acha-Kaindy group received an order from the USA for 400 pairs of slippers to be produced by the end of the year. Thus, the total income from selling products in 2013 will further increase.

3.3.4.3 Impact of project activities on women's status

The income women earn from the handicraft business considerably improves their social status. Their ability to contribute to the family budget has helped to increase gender equality within the family and the women's capacity to make decisions.

The Naryn women's families, including their husbands and children, have the opportunity to witness how the development of the handicraft business helps to improve their livelihood. This motivates them to support the women in multiple ways. The husbands and other relatives of the group leaders help to maintain the carding and felting machines, assist with transport and maintenance of the workshop premises and also take part in the discussion of strategic issues. Such attitudes in the rural areas testify about the increasing recognition of the women's contribution to economic welfare and social status of their families.

In addition to its economic impact, the project also helped to train and educate the women – the trainings, exchange visits and local and international travels to fairs and project meetings broadened the women's perspective and helped them develop self confidence and pride in their craftsmanship. The women developed a positive outlook regarding their personal growth and the development of their business. They increased their cultural knowledge and artistic skills and learned how to market products and how to develop a business strategy. They acquired new ideas, contacts, skills, habits and perspectives and learned how to mobilize capacities and resources that are necessary for making a living in the context of the global market economy. They learned that they could succeed in making competitive products for demanding customers in Central Asia, the United States and Europe and receive not only income but also recognition and praise for their craftsmanship which gives them a sense of pride and accomplishment.

During the project implementation, group leaders Toyunbubu Amanova (the former Director of school in Acha-Kaindy village), Burulush Zhamanbaeva (teacher of mathematics at the school in Min-Bulak village) traveled outside Kyrgyzstan for the first time in their life. During the project implementation leaders of the pilot groups participated in ICARDA meetings and seminars in Dushanbe, visited Central Asian craft fairs in Almaty and international craft fairs in Kuwait, Bulgaria and Hungary with the help of funds provided by the project and other institutions. Participation in the international events expanded professional outlook of the Naryn artisans and gave them the opportunity to integrate into international artisans' communities. During the multiple fairs the artisans attended they managed to earn thousands of dollars in product sales which helped them to support their families and to further develop their business.

3.3.4.4 Success stories

- In November 2012 an international UNESCO jury in Tehran awarded Certificates of Excellence for Handicraft Products to products made by the groups from Min-Bulak and Acha-Kayindy villages.
- T. Amanova as a winner of the UNESCO Award of Excellence for Handicraft Products, was invited by the World Crafts Council to Kuwait to in the international craft fair on 20 – 25 January 2013, where she presented the art of Kyrgyz shyrdaks.
- As recipients of the UNESCO Award of Excellence for Handicraft Products, women from Acha-Kayndy and Min-Bulak villages received an order for felt slippers and felt scarves to be presented at the UNESCO boutique during the prestigious Santa Fe International Folk Art Market held in July 2013 in Santa Fe.
- «Ak-Bairak» Public Foundation received a new 7-seat Toyota car in recognition of their important social work from the governor of the Naryn region as a gift;
- Artisans of the pilot groups are ready to use their own money to buy raw materials and to pay fees for their participation in craft fairs because they learned that attending craft fairs is important for the development of their handicraft business.
- In 2013, leaders of the pilot groups in At-Bashy, Acha-Kaindy, Min-Bulak villages obtained patents to develop handicraft businesses.

- In order to enhance the project sustainability, an experimental design studio was set up in Bishkek. Young women-students from Naryn now work in the studio.
- Products made by the Naryn artisans received many compliments from visitors of international fairs in Hungary, Bulgaria, Kuwait and other countries.
- Pilot group leaders and activists from Naryn region joined craft communities of Kyrgyzstan and participate in projects and events organized by the crafts sector.

3.3.5 <u>Component 5:</u> Linkages (business, scientific and cultural) between the pilot communities and the global communities of producers, processors and consumers of fiber and fiber products.

Multiple cross-national linkages (in science, commerce, know-how and culture) were developed and supported by the project.
The project continued to develop multiple new linkages between artisans of the pilot groups in Naryn oblast and designers of Kyrgyzstan, raw material suppliers, buyers of handicraft products, and international organizations:

1. Naryn artisans continued to collaborate with designers of Kyrgyzstan who provide consultations, conduct fellowships and practical trainings for the project artisans on designing new, quality products.
2. The Naryn artisans strengthened ties with the CACSARC-kg Office, which provides marketing support to the artisans .
3. The project linked Naryn wool processors and buyers with local, regional, European and American markets and helped generate demand for new products: felt slippers, chair mats and scarves.
4. The project team and the artisans established linkages with organizers of craft fairs and artisans in Hungary, Bulgaria and Kazakhstan.
5. The project expanded and strengthened relations between the Naryn groups, communities of artisans and raw material suppliers from Kyrgyzstan and other Central Asian countries.
6. The project linked the groups with the owners of online handicraft stores in Europe and Kazakhstan.
7. The project supported the groups' participation in the UNESCO Project "UNESCO Award of Excellence for Handicraft Products in Central Asia and Iran".
8. The project linked the artisans with governmental institutions including the Ministry of Culture and Tourism of the Kyrgyz Republic .
9. The project promoted cooperation between the pilot groups and the World Crafts Council.
10. The project established linkages between the groups and the International Association of Home-based Workers.
11. The project produced a brochure Improvement of the fine sheep wool quality (Recommendations for farmers), D. Chebodaev, A. Ajibekov, IFAD, ICARDA, Kyrgyz National Agrarian University named after K. Skryabin, Kyrgyz Research Institute of Livestock Production and Rangelands (2 separate versions printed in Russian and Kyrgyz languages). Bishkek, 2013.
12. The work on genetic improvement of Tien-Shan sheep (Lakhol site) was filmed for a short documentary called "Wealth of the country" produced by "Kyrgyztelefilm" studio

3.4 Project activities in Kerman Province, Iran

3.4.1 Component 1: Characterize production systems and improve fiber production of small ruminants in all target sites.

The nomadic pastoralist system in Baft district in Kerman province is well known in Iran for producing cashmere from Raeini goats (see Annex 1). Dehaired cashmere is one of the finest and softest luxury natural fibers of the world used mainly for clothing providing warmth and lightness. Iranian cashmere is generally 2-3 µm coarser than Chinese and Mongolian cashmere and is therefore cheaper. On the other hand Iranian cashmere is longer and has more crimp than cashmere from China, Mongolia and Afghanistan. The project targeted groups of small producers near Baft city, the center of the Raeini Cashmere goat production in Kerman province.

Nomad woman helping to direct the goats into the pen, Sohrab Mousapour's flock, May 2011

3.4.1.1 Baseline study on production system at the pilot site

There is little information on the nomadic goat production system in Iran. Thus, the project team conducted a survey in order to understand the production system characteristics and productivity of Raeni goats at the start of the project. In autumn 2009 a total of 30 Siahjel nomad families of Raen origin were chosen at random within ± 20 km of Baft city in Kerman province.
Interviews using a structured questionnaire were carried out to characterize the production system in terms of family labour force, work sharing, livestock numbers, management and marketing practices, and diseases.
The nomads move their livestock over large distances within the rangelands of the region from May to November, and the majority migrate south during autumn and winter. Of the nomad families, 87% live with and manage their animals together with one or more other related families. All household heads are males. All family members are involved in raising livestock; males and hired laborers dominate the physically harder jobs like shepherding and breeding, while women are involved in milking and caring. Of the animals, 80% are owned by adult or young unmarried males, none by daughters. Average proportion of goats and sheep per family flock are 89% and 8%, respectively, which indicates that Siahjel nomads mainly rely on goats. Adult breeding females constituted the largest group within the goat herds. The rationale for keeping a high number of male goats may be related to their greater production of cashmere. Diseases accounted for 57% of adult and 88% of young animal deaths. The most prevalent diseases were enterotoxaemia, foot-and-mouth disease, pneumonia, agalactia and diarrhoea. Animal sales, meat, cashmere and milk production are the major

reasons for keeping goats. Rangeland is considered as the main source of feeding (85% of total annual feed intake); the remaining 15% is provided by stubble grazing. However, the herds do not produce enough meat, milk and cashmere to sustain the life of the nomad families, and thus, they often have to sell part of their stock which will further decrease their income.
(full details of the survey results are available online: Ansari-Renani et al., 2013, Pastoralism: Research, Policy and Practice, 3:11. http://www.pastoralismjournal.com/content/3/1/11)

3.4.1.2 Baseline study to establish database on fiber quality at the pilot site

In addition a baseline study on cashmere quality and its variation in Raeini herds was carried out in order to determine the scope for improvement, in particular of fineness which would increase the market price and thereby the income of the nomad producers. In April 2010, a stratified fiber sampling was organized in the twenty-nine Raeini nomad herds that were interviewed for the production system study. The majority of the cashmere goats kept in the region is white in color which implies that farmers had been selecting against colored cashmere in the past. Hence, only white goats were sampled. Samples were collected from four randomly selected goats of each sex (females, males) by age (1, 2 and 3 years) combinations; in total 686 samples were obtained; Sampling was conducted in early spring (mid-April 2010), prior to the seasonal molt and regular annual shearing period. Fleece weights (FW) and midside fleece samples were taken from a total of 686 male and female cashmere goats of 1, 2 and 3 years of age belonging to 29 herds. Cashmere yield (CY) was deter-mined from the weight of dehaired cashmere to weight of shorn fiber. Cashmere fibers were analyzed using an OFDA instrument. A general mixed linear model including sex, age and sex by age interaction as fixed effects and herd as random effect was used to analyze the data and measure the relationships between different cashmere characteristics and fleece attributes. The overall means ± standard deviations were for fleece weights (FW) 507 ± 183 g, cashmere yield (CY) 56.5 ± 12.2%, mean fiber diameter (MFD) 19.7 ± 1.5 µm, fiber diameter standard deviation (FDSD) 4.5 ± 0.6 m, fiber curvature (FC) 62.9 ± 8.5◦/mm and staple length (SL) 54.2 ± 7.0 mm, respectively. Herd effect was significant for all traits except for SL and sex by age effect was only significant for MFD. One year old males and females had finer cashmere than older goats. FW and FDSD were higher in males and CY and FC was higher in young animals.
Raeini cashmere is white, and can be characterized as long and highly curved. However, steps must be taken to improve fiber diameter to capture higher prices in the international markets. Significant differences were found between goats and between herds indicating the potential to improve cashmere quality and the need for adopting proper management and selection methods. This may be achieved through selection of goats with finer cashmere taking care of maintaining the excellent cashmere staple length and curvature. Moreover, sorting the clip in fiber diameter lines would certainly improve cashmere quality; cashmere fleeces from one year old goats and that of fine older goats should be kept separate from the coarser cashmere fleeces after harvesting and before packaging. However, at present no price differential is paid to the producers for fine cashmere, as a major portion of cashmere produced is exported without any added value through processing. Cashmere harvesting and buying takes place over a short period of time in spring. The nomad producers and small-scale domestic traders are not aware of world market prices for different cashmere quality classes. As a result of the current marketing system and lacking infrastructure nomad producers do not achieve good prices and have little incentive to produce better quality cashmere. (published in Small Ruminant Research: Ansari-Renani, H.R. *et al*., 2012, http://www.sciencedirect.com/science/article/pii/S0921448811004421).

3.4.1.3 Introducing better cashmere harvesting methods

Raeini goats start shedding at the early spring commencing on the neck, chest and shoulders spreading to the back and rump. The nomad producers shear their goats in mid-spring, 1 to 2 months after onset of shedding using double blade knives. Results from previous studies indicate that 30% of cashmere is lost during shedding season and if not harvested it is wasted. Introducing combing would increase the weight and commercial value of cashmere. International experience describes the advantages of combing and recommends that cashmere farmers change their harvesting techniques to combing. Combed cashmere is cleaner, has a higher yield (cashmere : hair) ratio, and has a longer fiber length.

Cashmere shedding is very common in Raeini goats at the end of winter and beginning of spring

The project purchased two types of metal combs from Afghanistan. In total 200 small and 80 larger combs were distributed in spring 2010 and 2011 and the baseline and nucleus farmers were trained on how to use the combs. Because of the mild winter in 2010 the shearing period was about one to two months earlier than the year before; so the combs arrived too late to be tested.

The two comb types imported from Afghanistan

Testing the two types of combs

One flock owner from the baseline sample group tested the two types of combs (small and large) more intensively for the project to determine which comb is more efficient and handy to use for the future. The effect on cashmere harvest, cashmere quality and combing time was studied.

Alireza Mousapour is holding a sheared female goat. He also used the long combs to comb some of his goats, May 2011.

Two groups of 20 goats of different ages were combed with either a large or a small comb, three times with intervals of 2 weeks in early spring when natural fiber shedding has started. Combed cashmere weight, duration of combing, fiber diameter, and down yield were measured. A sample of combed cashmere was analyzed using a Laserscan instrument. A general linear model including type of comb, stage of combing and age of goat was fitted to analyze the data. Small combs collect more cash-mere (31.0 vs. 21.7 g, $P < 0.01$) than large combs without affecting down yield or down fiber diameter ($P > 0.05$) but combing time is higher (3.75 vs. 2.79 min, $P < 0.01$). In the first two combing sessions much more cashmere was obtained than in the last (28.1, 32.0 and 19.0 g, respectively, $P < 0.01$), but the weight of total combed cashmere was much less than typical shorn fleece weights. Small combs with short rods are preferable since more cashmere can be collected without affecting its quality (published in Small Ruminant Research: Ansari-Renani, H.R. et al., 2013, DOI 10.1016/j.smallrumres.2013.06.013).
However, most nomads did not use the combs for cashmere harvesting except for a few goat owners that tested the combs for the project. From these famers the project bought some good quality cashmere to be dehaired in a processing factory. Combing can be justified only if a considerable price premium can be obtained from selling combed cashmere instead of selling shorn cashmere, or if the combed cashmere is used to add value on-farm. If this is the case, It is clear that cashmere harvesting through combing will only become interesting for goat owners if they can achieve a better price for the combed cashmere or if the combed material can be used for value addition by the women.

Comparison of combed and sheared cashmere characteristics

Before promoting combing advantages and disadvantages need to be carefully analyzed. Combed cashmere carries fewer guard hairs produced by primary follicles and has therefore a higher percentage of down fibers than sheared cashmere. It can also be expected that combed cashmere has longer down fibers since shearing will leave a fraction of the fiber on the skin of the animal. Thus, combed cashmere should fetch better prices and combing cashmere has been recommended instead of shearing. A small experiment to examine two different types of cashmere types was undertaken in June 2012 involving combed cashmere from Raeini does belonging to one nomad herder and sheared cashmere belonging to eight nomad herders (nucleus herds) comparing cashmere yield and quality. Combing was carried out using small combs in three sessions at 2 weeks intervals starting in shedding season at the end of March. Shearing involved using double blade scissors to collect the fiber at shearing season at the end of May. The animals were kept on pasture without any supplementary feeding.

The combed and sheared cashmere samples were analysed at the Sefit Pajan fiber laboratory in Semnan province. Fiber diameter was measured using a micro-projector method and length lining and measurement apparatus. The results clearly showed the differences of harvesting method on cashmere staple length and percentage of hair (Table 32). Percentage of hair was much higher in the sheared cashmere (10.5% versus 45.5-61.6%). This huge difference indicates that using combs will reduce the the labor and the time to process the fiber in the factory. Staple length of combed cashmere was higher than the sheared cashmere. Thus, combed cashmere should fetch better prices and combing cashmere has been recommended instead of shearing. But to promote cashmere combing which would benefit the owners of the cashmere processing factories, they would need to be willing to pay a premium price to cashmere producers.

Table 32. Differences in mean fiber diameter, fiber length and % of hair between combed and sheared cashmere before and after scouring measured in the Sefit Pajan cashmere processing plant

Cashmere type/ farmer	Cashmere Characteristics				
	Color	Before scouring		After scouring	
		Length (mm)	Hair (%)	Length (mm)	Diameter (um)
Combed Shorn fleeces	White	60.5	10.58	36.4	19.35
Sohrab Mousapour	White	50.5	61.61	35.2	19.27
Mohammad Namdar Mousapour	White	46.9	47.85	32.1	18.13
Mahmoud Ghassemi	White	48.6	45.71	32.4	19.46
Alireza Mousapour	White	49.9	46.00	35.6	19.95
Dad-Mohammad Mousapour	White	48.1	45.58	36.8	20.05
Ebadullah Mousapour	White	48.2	47.81	32.7	18.85
Mehrab Ghassemi	White	55.4	44.60	36.1	19.30

3.4.1.4 Baseline study on cashmere marketing and processing in Iran

Raw cashmere export is an important source of foreign currency for Iran. Iran expanded its processing facilities to produce better quality cashmere and to become an integral part of the world cashmere industry. However, most of the cashmere is still sold either raw or dehaired to European and Chinese processors through exporters. Limited information exists nationally and internationally on trading, processing and retailing of Iranian cashmere.

The project did a baseline study to collect primary source information from key actors and complimentary secondary data from both national and international sources. Interviews and discussions were conducted in Persian language from August to December 2011 mainly in the eastern regions with key cashmere industry actors in Iran: producers, buyers and processors. Three different structured questionnaires for producers, buyers and processors were completed to compile information regarding quality and quantity of cashmere, selling season/month, factors important to

make decision of cashmere price, means of transport, kind of payment, type of agreement with buyer/seller, market accessibility, type of sorting/storage, packaging, processing machines: scouring, garneting, dehairing, combing, challenges, education, training and customs. In August/September and October/November 2011, forty cashmere farmers were interviewed in Baft and Birjand regions of Kerman and South Khorasan provinces, respectively. In December 2011 15 middlemen in the main market centers of Kerman, Sirjan, Birjand and Mashad city and the owners of cashmere mills in Semnan and Mashad provinces were interviewed. Price information for the value chain analysis was obtained from the different sources (actors) along the value chain, and cross-checked.

Cashmere marketing

The most important actors involved in getting the cashmere from the producer to the consumer are: the collector at farm gate, the country assembler or cashmere-warehouse handler or dealer or a combination of the two, local cashmere pools, the commission merchant, the broker, and the manufacturer. The local buyers collect cashmere from the cashmere producers in the nomadic areas sell unsorted raw cashmere at lower prices than could be expected if the cashmere was sorted at source into quality classes. Nomad cashmere producers do not receive seasonal price information on cashmere through reliable and up to date sources; 41 and 32% of nomads receive scattered marketing information from traders and neighbouring farms while 14 and 13% received their information from associations and markets respectively.

The local buyers collect cashmere from the goat owners in the cashmere producing areas and either sell it to a merchant in town or store it in their own facility. Cashmere is loosely packed in tall narrow polyester bags (90×36×30 cm), weighing about 100-150 Kg per bag.

Many local dealers or purchasers of small quantities of cashmere do not specialize in cashmere but also deal with other products of the region such as furs, hides, pelts, iron, poultry, or possibly livestock. Usually they resell the cashmere ungraded, at a flat price. There are also cashmere pools that have operated for years in the cashmere provinces, and are becoming more numerous in the Eastern provinces. These pools are usually made up of many growers' clips in a nearby locality that pool their cashmere in one central location and have buyers come and make a price offer. Sometimes the cashmere may be sorted, but more often this is not the case.

The manufacturer or country buyer sends his representative through the small towns to dealer or to local warehouses to buy the cashmere. The principle centres for gathering and rough sorting raw cashmere in Iran are Baft, Sirjan, and Birjand. The cashmere purchased in Baft and Sirjan is then shipped to one of the main trading centres such as Mashad and Kerman (Figure 5), where it is graded or prepared for the mills and resold to manufacturers in Iran or exported (Figure 6).

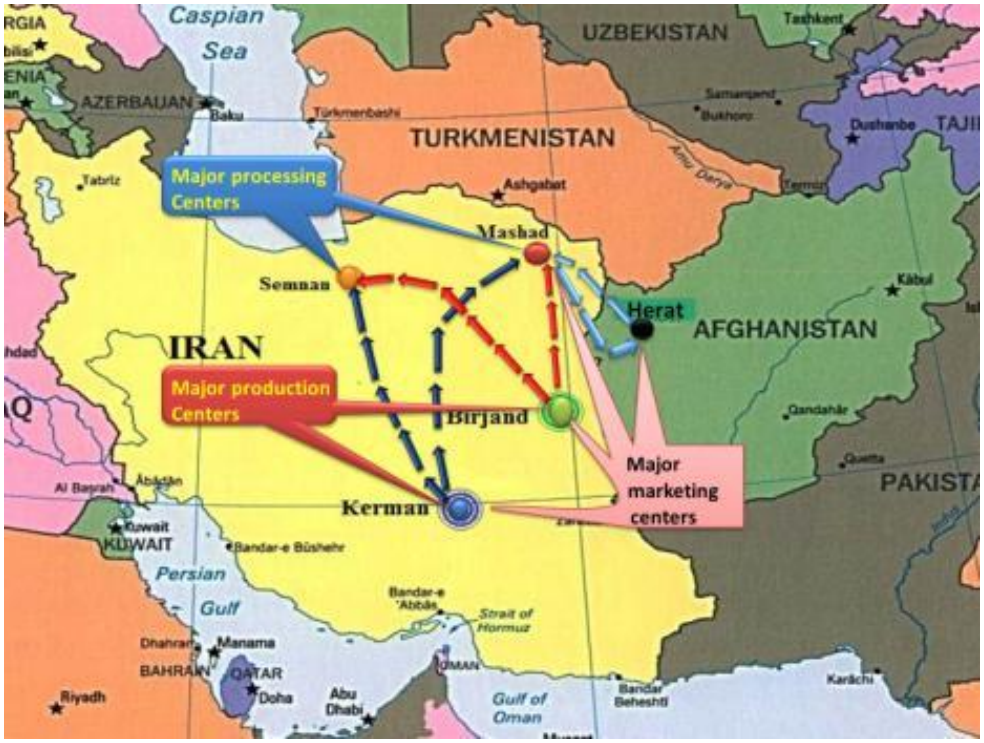

Figure 5. Major production, marketing and processing centres of Iranian cashmere

Especially, Mashad, the center of Khorasan Razavi province, is a very important centre of cashmere industry as most of the large manufacturers, exporters, dealers and selling agents and warehouse dealers are located there. As the province shares a border with Afghanistan, it also plays an important role in processing and marketing of Afghan cashmere industry.

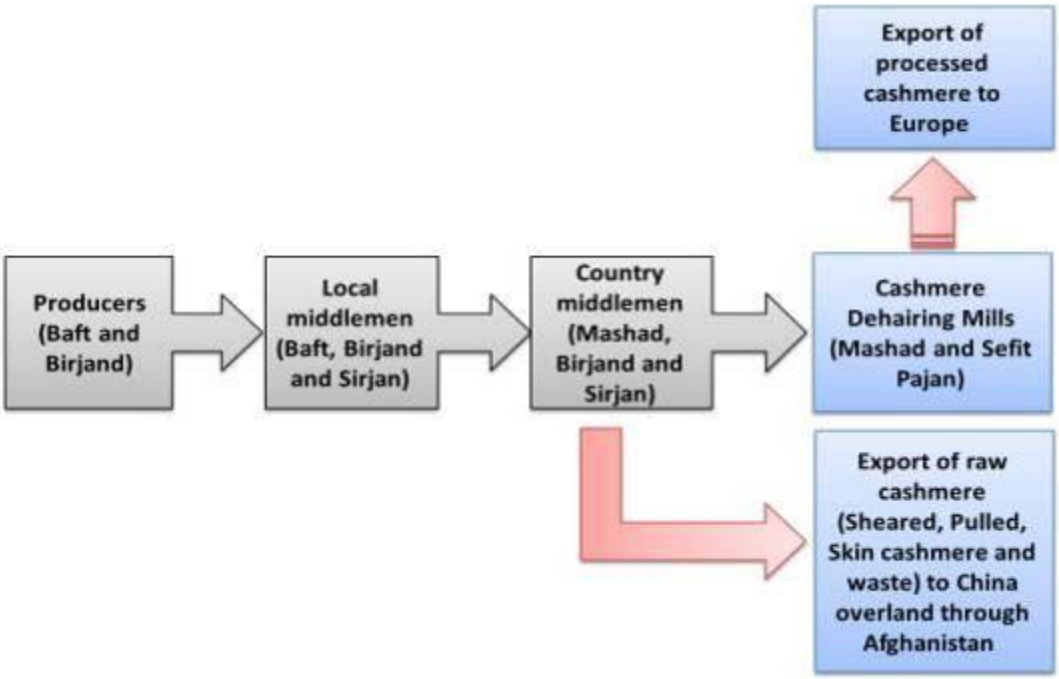

Figure 6. The principle market channel for cashmere in Iran.

The majority of Iranian processed dehaired cashmere is exported to China, England, Italy and Belgium for further processing.

The Iranian mills buy some of their cashmere direct from growers, but most is purchased from dealers. In 2006 total scouring capacity of seven Iranian cashmere processors was 4985 tons. The processors had 429 employees with an asset of 6725 milliard rials (US$672 million dollars). The total capacity of 8 Iranian dehairing processors was 1844 tons with a total asset of 10492 milliard rials (1049 million dollars) and 383 employees. Local mills in Mashad and Semnan scour and dehair about 30% of the locally produced cashmere and 29% of Afghanistan clip. Almost all of the processed cashmere is exported to European countries for making tops and garments. World trade of Iranian cashmere is accounted for principle cashmere-importing countries of China, England, Belgium and Italy. China is not only a heavy producer but also a major importer of Iranian raw cashmere. The Iranian government has from time to time taken action to encourage the export of processed cashmere as the added value of this type of fibre is much higher than exporting raw cashmere.
A large percentage of raw sorted cashmere is exported to China in containers containing 10 MT or 20 MT of cashmere in pressed bales. Transportation is predominantly overland through Afghanistan to China. Another part of the raw sorted cashmere is sent in bales by trucks or by train from gathering centres to Bandar Abbas and Khoramshahr, the main Iranian exporting ports in the Persian Gulf and shipped to Italy, Belgium and England. Afghan cashmere which is dominantly brown is traditionally transported to Belgium through Iran. Verviers, in Belgium, used to be the main market centre for cashmere; nowadays, the role of Verviers as the main market place has diminished, but for Afghan cashmere Verviers is still a major destination through Iran.

Cashmere price and value addition

Mean fibre diameter is greatly affecting the cashmere price; for example, the diameter of Iranian and Afghan cashmere is by 2-3 µm greater than that of Chinese cashmere. Colour is also an important factor, white being the most valuable because it can be used not only as it is but can be dyed to the pastel shades which are often required for knitwear. Brown is less valuable because it can only be dyed to dark shades.
Raw cashmere is processed in several stages: hand dehairig, scouring, machine dehairing, spinning, weaving or knitting, manufacturing and finishing. It is quite usual for cashmere to be moved through several countries during processing from raw cashmere to finished garment. Adding value to cashmere at several stages of processing means that the final price for clean, dehaired and spun cashmere can be up to four times the raw greasy price received by producers. At present no price differential is paid to the producers for fine cashmere, as a major portion of cashmere produced is exported without any added value through processing. As a result of the current marketing system and lacking infrastructure nomad producers do not achieve good prices and have little incentive to produce better quality cashmere. Value addition takes place at different stages of the production chain, with the highest added value activities at the upward section of the chain. Currently Iran's industry is engaged in cashmere production, harvesting, scouring, dehairing, carding and combing; the low to medium added value activities in the chain.
(More details on cashmere marketing in Iran in Ansari-Renani, H.R. et al., 2013. Cashmere in Iran. Animal Sciences Research Institute, Karaj, Iran, 91pp, http://temp.icarda.org/cac/fiber/publications.asp).

3.4.1.5 Developing a breeding program focusing on fiber quality and yield

The full details of the methods and results related to the breeding program are provided in Annex 9.

Selection of nucleus breeders

In March 2010, 8 out of 29 farmers interviewed in the baseline study were selected for initiation of the breeding program (Table 33). The criteria to select these 8 farmers included: interest to implement a breeding program which includes animal identification of selected animals, data recording and fleece sampling. Since it was also intended to examine the opportunities of adding value to the cashmere on farm, an additional criterion was the interest of the women in the family in cashmere combing, yarn making and further yarn processing. As the nomads move up to 100 km within a season, we relied on a nomad guide with family and tribal links to our farmers to locate them.

Table 33. Cashmere goat nucleus herds established with 8 selected nomad farmers

Herd owner	Winter grazing location	No. does selected	No. bucks selected	Mating system*
Ghassemi, Mahmud	Roodan	40	2	1
Ghassemi, Mehrab	Roodan	40	2	2
Moussapour, Reza	Roodan	40	2	1
Moussapour, Sohrab	Baft	40	2	2
Moussapour, Mohammad	Roodan	40	2	1
Moussapour, Dad Mohammad	Roodan	40	2	1
Moussapour, Ali Reza	Roodan	40	2	1
Moussapour, Ebadullah	Roodan	40	2	2

*Mating system 1: mating of selected female goats in separate fenced corrals; 2: Mating of selected female goats by separate grazing.

Defining breeding objectives and selection indices

Farmers expect to increase their economic return from their goat flocks through higher meat, milk and fiber output and trough reduced costs. Therefore higher reproduction rate, higher growth rates and higher fleece weight of the goats are of main interest. Farmers sell all fleeces, although middlemen prefer fleeces with low fiber diameter, high luster and low spur. The latter feature is related to down yield. In the international market white color, fine fibers and high fiber length fetch better prices. The baseline study showed that Raeini cashmere is largely of white color, has long fibers and good curvature but is relatively coarse. It also revealed that there is scope within the pilot site herds to decrease fiber diameter without reducing other fiber qualities.

The breeding objective for Raeini cashmere goats should be to increase live weight, increase cashmere weight and reduce cashmere fiber diameter in healthy, easy care animals. A breeding objective function was developed and selection indices were constructed.

Fleece weights are about 500 g/goat and 64 animals of different ages are sold or consumed annually. Price of shorn cashmere is on average 21 USD/kg and the price of goat meat is 8 USD/kg. Based on the Chinese cashmere market data, the micron premium is about 10% of the cashmere price. For such a production system and product prices the following breeding objective function has been derived:

$H = 0.16*FW - 7.97*DD + 1.20*WW + 0.82*YW + 1.98*AW$

In this function fleece weight (FW) is in g, down fiber diameter (DD) is in mic and weaning (WW), yearling (YW) and adult (AW) body weight is in kg.

To construct formal selection indices, appropriate phenotypic and genetic parameters are required. Phenotypic parameters were taken from own field data. It was planned to record WW, YW, FW and DD. This was done progressively over the years. Heritabilities and genetic correlations were taken as averages from published results on Asian goat populations. Based on the above breeding objective function and parameters, three selection indices were constructed for different combinations of available performance records. Index1 is for the case of having recorded weaning weight, fleece weight and down fiber diameter. Index2 is for the case when yearling weight rather than weaning weight is available together with fleece weight and down fiber diameter. Index3 is calculated for the case when fiber analyses are not available.

$Index1 = WW + 0.117\ FW - 3.59\ DD$
$Index2 = YW + 0.054\ FW - 1.83\ DD$
$Index3 = YW + 0.057\ FW$

Development of a breeding structure

Several breeding system options were proposed by the project team and comprehensively discussed, first with regional agricultural officials and scientists and then also with farmers and shepherds. The option of one farmer producing bucks for all 8 farmers was quickly discarded. Even though the 8

participating farmers knew each other well, all preferred to run their own program, independently from each other. The nomadic lifestyle hinders such collective initiatives. The option of concentrating selection efforts on a few animals in each flock, that is the establishment of a nucleus with best males and best females, was readily accepted. Typically 10% of breeding females of a flock should be in the nucleus. Flock size of participating farmers ranged 300-400 with about 50% breeding females. Thus, depending on the individual flock size, about 20 females and one buck would be enough. However, in order to decrease inbreeding rate and reduce the risk of choosing an inferior buck it was agreed to have 2 bucks and a total of 40 does in each nucleus, even though not all flocks were of the same size.

Initially it was proposed to use one own buck and add one buck from the regional, governmental, Raeini goat breeding station (Figure 7). This option was eventually discarded and only home bred bucks were used. In the following years the proposed breeding system considers progeny testing of the two bucks and replacement of the inferior one in the test with a young male with outstanding performance. A key management practice is to maintain nucleus male progeny intact, but castrate all general flock male progeny.

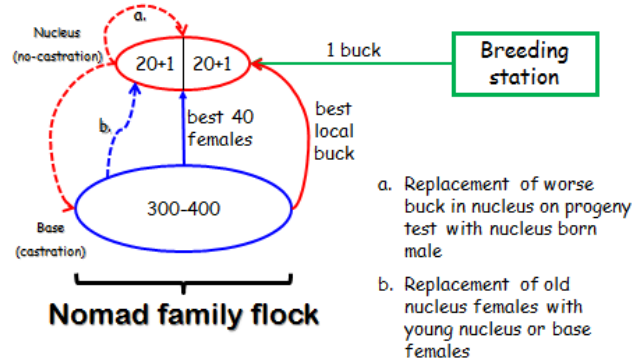

Figure 7. Initially proposed breeding system for each of the 8 nomad family flocks

Forming the nucleus herds

The breeding program started with the selection of foundation nucleus animals and mating in 2010. Selection of the 40 nucleus foundation females and 2 bucks was undertaken by visual inspection of goats in each flock by its owner and the project team in April 2010. Only white coated bucks and young (2 and 4-teeth) does were considered as nucleus foundation animals. Visual selection criteria also included health status, size of the animals, density of the fleeces and softness of the fiber, all these traits are related to traits in the breeding objective. An overall visual score from 1 (inferior) to 5 (superior) was used. In general animals with a score of 4 or 5 are visually acceptable for mating in the nucleus and animals with a score of 1 or 2 are rejected or culled.

One of the nucleus flocks and a young female presented by the farmer as desirable breeding animal.

Selected animals were identified with ear tags and their horns painted at random with two colors. All 8 farmers arranged to get the 40 nucleus does mated with two bucks separately from the base flock and in separate color groups using fenced corrals. To do this, the project provided all 8 famers with 42 m^2 meshed wire fence and either barley or its equivalent in cash to help feed the nucleus in the corrals or to help to pay for the extra labor required for separate shepherding. This contribution in goods or cash has been an incentive for farmers to adopt the new technology rather than a necessity since its monetary value is not substantial. Farmers found out that the fenced corrals are easy to construct, easy to transport and relatively cheap. Five farmers kept the nucleus animals in the fenced corrals day and night, other three farmers preferred to keep them in the corral during the night but graze the two colored groups separately during the day. After about 20-30 days of separate mating, all animals were run together.

National Project Team, Sohrab Mousapour, Joaquin Mueller and Barbara Rischkowsky are selecting superior bucks for Mr. Mousapour's nucleus herd.

Selection differentials achieved for nucleus females

In order to assess the selection differentials effectively achieved in the first visual selection process (May 2010), fleece samples were taken from females of the general flock and from females of the nucleus flock from each farmer and analyzed for down yield and down diameter at the Almaty Fiber Laboratory (Kazakhstan). Selection differentials for females were calculated as the difference between the average performance of nucleus females and the average performance of females in the whole flock. The whole flock average was calculated by weighting the average performance of nucleus and base females with the respective number of animals in each part.

The results show that selection differentials achieved for the traits analyzed in the samples were variable amongst farmers and on average not significantly different from zero. Clearly, important traits like down yield and down fiber diameter were not accurately assessed visually or were not considered properly during selection. It is however also possible that other traits of importance, such

as body weight, fleece weight and body condition (as indicator of adaptation) achieved positive selection differentials.

Selection differentials achieved for nucleus males in 2011 and 2012

For the second year mating, the same females were used but more selection pressure was made on males. Farmers visually selected 10 one-year-old and 10 adult male candidates in January/February 2011 amongst all males available in the flock. Note that at this phase of the breeding program there were no nucleus born candidates and no progeny tested bucks available. The project team took fleece samples from these 20 animals of each farmer and tested them in the Bariloche Fiber Laboratory (Argentina) to obtain down yield and down fiber diameter. Thus, in April/May 2011 bucks for the second mating in the nucleus were selected in two further stages. The top 3 males within each of the two age groups were selected on an index combining down weight and down diameter. Fleece weights were not available therefore down weight was estimated from the individual down yield and a constant fleece weight. Down weight was weighted by its price and down diameter deviation by a tenth of down weight price per kg. Out of the 3 bucks of each age group (yearlings and adult), farmer's selected one for mating his nucleus in June/July 2011. On average selected bucks (one old buck and one young buck in each flock) were 1.0 mic finer and had 5.9% higher down yield. Since fleece samples were taken after a first visual selection; selection differentials calculated as the performance difference between selected bucks and sampled bucks, probably underestimate the real selection differential. Also, other, non-measured, traits may have achieved additional favorable selection differentials.

With the selection of nucleus replacements for the third year mating in June/July 2012 the breeding program entered a selection and mating procedures routine; since nucleus-born animals were now in reproductive age (first progeny was born in November/December 2010). As in the previous year one adult and one young, in this case, nucleus born buck were selected to replace original nucleus bucks using the same index as in the previous year but this time with individual fleece weights. By using records on fleece traits, substantial selection differentials were achieved: on average selected bucks were 0.5 mic finer and had 31 g (6.2%) higher down yield.

2013: Selection of nucleus sires based on progeny testing

The controlled mating and kidding in the nucleus herds allowed pedigree recording. Progeny born in 2011 was recorded for weaning weight at about 4 month of age, fleece weight and down diameter based on the analyses of a fleece sample sent to the Almaty Fiber Laboratory. Formal Index1 (based on WW, FW and DD) was used to evaluate these animals. The index values of the progeny of each of the two sires used in each of the nucleus herds were averaged so that the superior sire could be retained in each nucleus based on average progeny performance. The superior buck can be selected and used with relatively high confidence in his breeding value. The selection accuracy based on a progeny test with 15 progeny measured on a trait with 0.25 heritability (such as down fiber diameter) is 70% as against to an accuracy of 50% for selection based on own performance.

2013: Selection of young replacement male from progeny

The second sire for the nucleus is selected visually by the famer amongst the nucleus progeny based on the 3 top ranked young bucks on Index1. The average selection differentials achieved in each nucleus by selecting young replacement bucks from the nucleus progeny for the 2013 mating were 27% higher fleece weight and 2% lower fiber diameter but 2% lower weaning weights (average of the 3 proposed bucks in relation to average of candidates). Next best young bucks were used to replace old and inferior base herd bucks.

Evaluation of the breeding program

The breeding program involves 8 extended families with about 120 persons running a total of about 3000 goats. The nomads participated in the planning and conduction of the breeding plan and share its benefits through the use of selected bucks and their improved progeny. The level of participation and dimension of the breeding program has to be evaluated in the context of the difficulties of nomadic way of life and its limited infrastructure. The breeding program generated additional interaction

between farmers, local authorities and scientists. The resulting organization and communication allowed discussion and consideration of other important issues such as value adding and marketing. The breeding program was not designed to prove genetic progress and but to be effective for genetic progress under nomadic conditions. To formally prove genetic progress it would have been necessary, for example, to run a control flock or regress breeding values on year of birth. Control flocks are not available and it was not possible to calculate population wide breeding values because of lack of comprehensive genealogy of the animals. However, genetic progress can be predicted from the design of the program, for example considering the selection differentials achieved. Expected genetic progress can be estimated from the product of average selection differentials and heritabilities of traits.

The breeding program in the 8 farmer flocks is now in its fourth cycle. Some planned aspects worked smoothly others advanced with more difficulties than expected. For example nucleus and general flocks are mated separately as planned despite demanding considerable management innovations. On the other side it was planned to record birth date, type of birth and body weight at birth in order to adjust weaning weights and other early live measurements but this was apparently too complicated for farmers. It was also not possible in the first 3 years to record yearling weight therefore Index 1 was used instead of the more efficient Index 2.

In the period 2010-2013 the breeding program has been implemented with external technical and economic support. However the paramount challenge of a community based breeding program is to progressively become self-sustainable or sustainable under local support conditions. For this to happen extra costs and labor must be kept as low as possible. In order to keep costs and labor low, fiber analyses and recording must be minimized. For this a simplified system was proposed for the future. In this system only top male progeny in the nucleus requires fleece analyses (Figure 8).

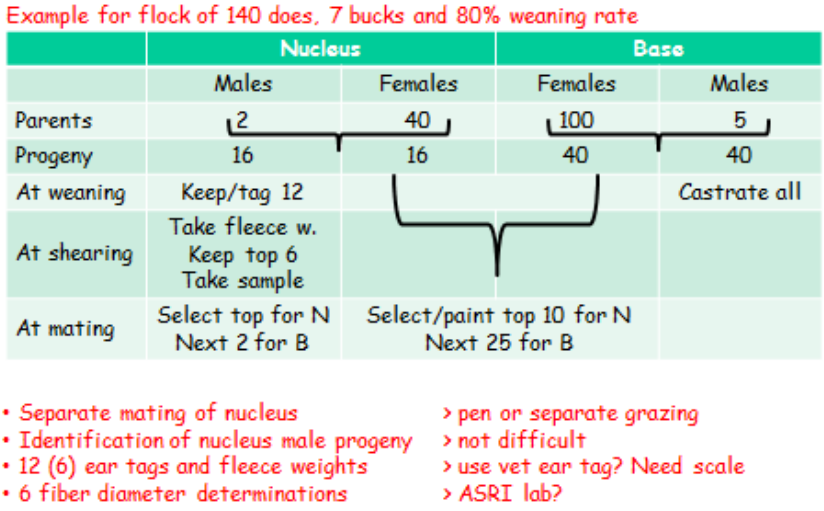

Figure 8. Simplified selection system for each of eight nomad extended family flocks

A crucial incentive to select for cashmere quality is that farmers get price premiums. At present there is no micron premium paid to farmers but this may change as the marketing becomes more competitive and objective information is valued along the transformation chain. The project which launched the present cashmere breeding program facilitated the analyses of fleece samples by using foreign Fiber Laboratories. The logistics to collect, submit and get the results from these laboratories in addition to the costs involved exceed the capacity of farmers and the capacity of local extension officers. In particular since at present there is no fiber analyses laboratory providing sample analyses services to farmers. Thus, a sustainable breeding program requires operating without fleece samples. Index3 does not require fiber analyses and could be used together with visual appraisal of fiber diameter.

Knowledge sharing and demonstration on the breeding program during the farmers' day on 13 May 2012

The purpose of the breeding program and the selection process was explained to about 40 nomad cashmere producers that participated in the farmers' day (see below).

The shortcomings of Raeini goat cashmere leads to specific breeding objectives: the need to decrease fiber diameter while maintaining the good staple length and curvature.

During the presentations the purpose of the breeding program and the most important points in implementation were explained to the nomad producers. The explanations included:

- Overall goal is to increase the income of farmers by increased production.
- Producing more and better cashmere.
- More and better cashmere depends on environment and genetic merit of animals.
- Improvement of environment means better nutrition, health, etc.
- Improvement of genetic merit means progeny with higher fleece weights, higher cashmere yields and lower fiber diameter than the parent generation.
- Selecting and mating the best males with the best females and discarding low producing animals.
- Best animals are mated separately in a "nucleus" flock so that progeny born in the nucleus concentrate best genes.
- Best males born in the nucleus are candidates for replacing inferior and old males in the nucleus and next best go to the "base" flock.
- Selection of "best" males is based on objective fleece weight and visual fiber diameter assessment.
- Males not born in the nucleus should be castrated to ensure that the progeny is produced from superior bucks.

In the practical demonstrations that followed the presentations in the tent, it was then explained to herd owners on how to select superior females and males based on visual assessment of fiber quality, such as fineness, curliness and density of cashmere fiber, and body size, conformation and condition.
Using animals from the flocks of Alireza Mousapour and Masoumeh Mousapour, demonstrations included:

- Superior nucleus and their F1 progeny ;
- Selection parameters that should be considered, i.e. body conformation and condition of the animal, cashmere characteristics and color;
- Cashmere trait that were considered for selecting the superior does and bucks;
- Raeini cashmere bucks with high and low breeding values;
- Different cashmere qualities.

The participation of the farmers in the meeting gave them the opportunity to discuss the breeding program and to assess and compare their flocks with the demonstration flock. The participants raised questions on utilization of the improved bucks at the site and the breeding objectives directed to more cashmere and meat production.

Organizers and nomad farmers participating in the demonstration of selecting superior bucks, May 13, 2012.

Explanations on selection of superior bucks during the farmers' day, May, 13, 2012.

3.4.1.6 Support with veterinary medicine and feeds

The baseline study revealed that diseases accounted for 57% deaths of adult animals. The national project team provided the farmers with antibiotics and syringes for treatment against most common diseases. Vaccinations are regularly carried out by governmental veterinary services. In years with long and snowy winters, nucleus herds were provided with animal feed to prevent substantial losses of the breeding animals.

3.4.2 Component 2: Work on formation and capacity building of women's groups to develop cashmere processing at pilot site

Three cooperatives of women cashmere yarn and handmade crafts producers under the leadership of Mrs. Masoumeh Mousapour, Mrs. Jeiran Mousapour and Mrs. Mahtab Mousapora in nomadic areas of Zarab, Baft and Goushk villages of Baft city, respectively. At the end of the project these cooperatives have 60 members from nucleus herds and other nomad cashmere farms. In addition to providing dehaired cashmere to spinners, the project presented one electronic yarn making machine and two spinning wheels to nomad farmers in 2012.

The aims of these organizations are:

1. Production of cashmere yarn using either simple electronic yarn making machine or traditional spindles.
2. Production of cashmere products such as hats, socks, shawls etc.
3. Find a market for cashmere yarn or finished products in the international market.

Once clear product lines have been developed, the Iranian team envisaged to use the project marketing website to promote Iranian cashmere yarn and products.

3.4.2.1 Trainings on yarn production

Mrs. Najmeh Karegar from the national project team and Mrs. Mahtab Mousapour from the nomadic community of Baft were trained on spinning yarn in Khujand, Tajikistan in May 2012.

Details on training

Theme:	Making yarn
Date:	29 May-5 June 2012
Duration:	8 days
Trainer:	Liba Brent and Ms. Abdulazizova,
Place:	Markhamat village located about 200 kilometers from Khojand city in Sogd province.
Participants:	Mrs. Naj Karegar, Agriculture and Natural Resources Research Center of Kerman Province and Mrs. Mahtab Mousapour, leader of women cooperative

The theoretical part included

- How to organize a yarn making cooperative for women
- How to make good quality cashmere yarn
- How to make handmade shawl, sock and gloves from cashmere fiber.

In the practical part the Iranian women worked side by side with the Tajik women on all aspects off yarn production, including hand dehairing, washig, carding, electric spinning and knitting.

Upon their return, three yarn production workshops were held for about 60 nomad women in Zarab district of Baft. In these workshops the quality of hand dehaired cashmere and spindle spun yarn was compared with processed cashmere and yarn made by electronic machines. Certificates were issued by the Animal Science Research Institute for all participants. Two other yarn dyeing workshops using artificial and natural dyes were held in Zarab district for 50 nomad spinners (25 participants per workshop).

Yarn production workshops in Baft and Zarab district

In July-August 2012 three yarn production workshops were held in Baft and Zarab district. In all these workshops about 60 nomad women were trained on how to make good quality yarn.

Details on training

Theme: Cashmere yarn production

Date: 4th of July, 22nd of August and 29th of August 2012.

Duration of each workshop: 1 full day

Trainer: Mrs. Mahtab Mousapour and Mrs. Najmeh Karegar

Participants: 60 nomad women from Zarab, Goushk and Baft areas.

Place: one in Baft city and two workshops in Zarab district about 40 km from Baft.

The theoretical and practical sessions included

- how to use electronic machine to make yarn
- how to handle dehaired cashmere
- how to use traditional spindles to make yarn.

Mrs. Mahtab Mousapour (middle) is showing the use of an electric spinning machine to trainees.

Mrs. Mahtab Mousapour (right) showing Mrs. Hajar Mousapour how to use electric spinning machine to make yarn.

Fatemeh Aubsalan is using an electric spinning machine imported from Tajikistan

3.4.2.2 Training workshops on dyeing cashmere yarn

Training workshop on cashmere yarn dyeing using plant (natural) dyes

A workshop on yarn dyeing was held on 17th of December, 2012 for 25 nomad women cashmere producers. Scientific information was presented on how to use different kind of herbs to dye cashmere yarn. Cashmere producers-spinners were trained as how to dye cashmere yarn based on locally available plants. The color that results from dying with plant parts used can fall into a broad spectrum, from auburn, to orange, to deep burgundy, chestnut brown or deep blue-black. The following factors determine the color that results from using plants:

- Original cashmere/wool color
- Freshness of the herbs
- Region of origin of the herbs
- Amount of time the herbs is left on the fiber to process
- Whether it remains wet on the fiber, or is allowed to dry

Details of yarn dyeing workshop

Participants: 25 women mainly from nucleus herds.
Date: 17th of December, 2012.
Instructor: Mr. Reihani from Kerman city.
Place: Zarab village about 30 Kilometers from Baft city in Kerman province, Iran.
Material used for dyeing: Henna plant, Walnut husk and Rubia (Madder) plant
Duration of workshop: One full day.
Future plan: Organize other workshops on cashmere knitting and handicrafts.

The workshop had theoretical and practical session on

- How to process plant parts
- How to make dyes
- How much plant material and yarn should be used for dyeing
- What procedure should followed after dyeing

Some of the nomad women that participated in the dyeing workshop (in the middle Mr. Reihani, the trainer).

Training workshop on cashmere yarn dyeing using chemical (artificial) dyes

A workshop on cashmere yarn dyeing was held on12th of November, 2012 for 25 nomad women cashmere producers. Participation of nomad cashmere producers-spinners in the workshop gives them the opportunity to take advantage of new techniques and to assess and compare their dyeing skills. During the workshop the participants raised questions on utilization of the dyes.

Details of yarn dyeing workshop

Participants: 25 nomad women mainly from nucleus herds.
Date: 12th of November, 2012.
Instructor: Mr. Reihani from Kerman city.
Material used for dyeing: Chemical dyes, cashmere yarn, acidic stone.
Duration of workshop: One full day.

The theoretical part included:

- What is the importance of cashmere yarn to national econonmy?
- How dyed cashmere yarn could affect the livelihood of the farmers?
- What are the dyeing procedures?
- What cashmere quality should be considered when dyeing?
- What kind of dyes should be selected?

The practical part comprised demonstrations of:

- dyeing materials
- quality cashmere yarns
- different dyeing procedures and techniques
- different qualities of dyed cashmere yarn.

3.4.2.3 Training workshops on cashmere knitting

Training on knitting cashmere hats

A workshop on knitting cashmere hats was held in Zarab village on Monday 18th of February, 2013 for 41 nomad women from Baft, Zarab and Gooshk cashmere producers' cooperatives. Information was presented on how to make cashmere hat based on international standards for export using knitting techniques. All participants were provided with two sets of special knitting needles suitable for fine cashmere yarn. They were also provided with knitting instructions for making hats. Cashmere yarn was made by some of the more professional members of the cooperatives to provide all the trainees with enough yarn to make hat. Supplied cashmere yarns were dyed using natural and artificial dyes. Participants were also provided with woolen yarn for practice before using cashmere yarn.

Details of training

Participants: 41 women from three cashmere producing cooperatives.
Date: 18th of February, 2013.
Trainer: Mrs. Mohseni from Technical Training Center of Kerman City.
Place: Zarab village about 30 Kilometers from Baft city in Kerman province, Iran.
Materials used: Knitting needles, dyed cashmere and woolen yarn, knitting instructions.
Duration of workshop: One full day.
Content of workshop: How to make cashmere hats using cashmere yarn of different colors.

Goli Mousapour and Hajar Mousapour from Zarab and Baft cooperatives using knitting instructions for cashmere hats with dyed cashmere yarn.

Training on knitting cashmere shawls

A training workshop on cashmere shawls was held in Goushk village on Monday 4th of March, 2013 for 39 nomad women from Baft, Zarab and Gooshk cashmere producers' cooperatives. Scientific information was presented on how to make cashmere shawl based on international standards for export using knitting techniques. All participants were provided with yarn for knitting. They were also provided with knitting instructions for making the shawl.

Details of training

Participants: 39 women from three cashmere producing cooperatives.
Date: 4th of March, 2013.
Trainer: Mrs. Mohseni from Technical Training Center of Kerman City.
Place: Goushk village about 50 Kilometers from Baft city in Kerman province, Iran.
Materials used: Knitting needles, dyed cashmere and woolen yarn, knitting instructions.
Duration of workshop: One full day.
Content of workshop: How to make cashmere shawl using cashmere yarn of different colors.

Training on knitting cashmere socks

A workshop on knitting cashmere socks was held in Zarab village on Thursday 11th of April, 2013 for 34 nomad women from Baft, Zarab and Gooshk cashmere producers' cooperatives. Information was presented on how to make cashmere shawls based on international standards for export using knitting techniques. All participants were provided with yarn for knitting and with knitting instructions for making shawls.

Details of training

Participants: 34 women from three cashmere producing cooperatives.
Date: 11th of April, 2013.
Trainer: Mrs. Mohseni from Technical Training Center of Kerman City.
Place: Goushk village about 50 Kilometers from Baft city in Kerman province, Iran.
Materials used: Knitting needles, dyed cashmere and woolen yarn, knitting instructions.
Duration of workshop: One full day.
Content of workshop: How to make cashmere socks using cashmere yarn of different colors.

3.4.3 Component 3. Develop sustainable market chains that link fiber producers and processors with buyers

Barbara Rischkowsky, Joaquin Mueller and Hamid Reza Ansari-Renani visited the Sefit Pajan cashmere processing factory in Semnan province factory on 16 May 2012. The Sefit Pajan mills scours and dehairs about 15% of the locally produced cashmere and 10% of Afghanistan clip. At Sefit Pajan raw cashmere is processed in several stages: hand sorting, scouring, machine dehairing, and then packed for export to European countries.

After visiting the different processing lines of factory, a meeting took place with Mr. Jahani, the shareholder and the head of the executive board of the factory. It was decided to collect raw cashmere from the eight project nucleus herds and sent it to the factory for laboratory analysis and testing with the aim to evaluate the cashmere quality from the nucleus herds in direct comparison with the cashmere that the factory receives through its usual channels (middlemen).

3.4.4 Component 5: Linkages (business, scientific and cultural) between the pilot communities and the global communities of producers, processors and consumers of fiber and fiber products

3.4.4.1 Creating linkages between scientific, governmental and cultural communities

Stakeholder meeting to introduce the project to the nomad community with exhibition of handicrafts in May 2010

On 9 May 2010 a Cashmere Production Stakeholder meeting and handicrafts exhibition was held in Baft city. In total 240 cashmere producers from different nomadic communities of Baft city participated in the meeting. One third of the participants were women interested to join the cashmere processing program. All participants expressed great appreciation for the project goals and planned activities. Introductory speeches were given by the Baft religious Friday prayer leader who explained the need for cooperation of authorities to work together and for a more efficient implementation of the Cashmere project program. The City Governor was the second introductory speaker who indicated the great potential for nomadic communities of Baft city in producing cashmere and handicrafts. The Head of Agricultural office welcomed the participants and wished success for the project. Eng. Alipour the Head of Animal production Department of Agriculture Organization then announced the program of the Festival. Dr. Ansari-Renani gave a presentation on Cashmere production in Kerman Province. Dr. Rischkowsky introduced the project concept by showing the value chain for Mohair established by the previous IFAD project in Northern Tajikistan and explained the case of Cashmere production in Badakhshan. Dr. Mueller explained the breeding structures established in the two project sites in Tajikistan.

Invitation to the stakeholder meeting and participants in the City hall of Baft city

International and national participants included:

- Baft city Friday prayer leader, Hojatoleslam Hassani
- Governor of Baft City Dr. Behrooz
- Barbara Rischkowsky, small ruminant specialist and project manager (ICARDA)
- Dr. Joaquin Mueller, community based breeding specialist, INTA, Bariloche (ICARDA)
- Dr. Roozitalab, Head of ICARDA office in Tehran.
- Dr. Panahi, Head of agriculture and Natural Resources Research Center of Kerman province
- Eng. Broumand, Head of Baft Agriculture Organization. Hamid Reza Ansari-Renani, National cashmere project coordinator and Head of fibre andmilk quality, Dept, Animal Science Research Institute, Karaj, Iran
- Eng. Alipour. Head of Livestock Department of Baft Agricultural Organization
- Scientists of ANRRC and members of Baft Agricultural Organization

In the afternoon the project team visited two flocks that were part of the governmental AI program.

Farmers' Day for governmental organizations, research and nomad communities

A Farmers' Day was held in the grazing areas near Baft city on 13 May 2012 with the aim of sharing the goals and achievements of the IFAD-ICARDA project during the last three years.

Details of Farmers' Day program

Date: 13 May 2012
Place: Zarab area, Baft city, Kerman province
Site: Alireza Mousapar and Masoumeh Mousapour farm
Duration: 4 hours

The Farmers' Day was attended by 120 participants including a number of government and agricultural research representatives, such as Provincial and Local Government, National, Provincial and Local nomadic Organizations, Provincial and Local Livestock Departments, Provincial and Local Agricultural Organizations, National and Provincial Animal Sciences Research Institutes, ICARDA and INTA Scientists and Nomad farmers.

Farmer's Day took place at Alireza Mousapour's tent in Nomadic region of Baft, May 13, 2012.

The Farmers' Day was hosted by the Animal Sciences Research Institute (ASRI) and ICARDA. It took place in Alireza Mouapour's tent, one of the eight nomads keeping nucleus herds. Welcoming speeches were made by Dr. Seyed Reza Hosseini, the Baft city Deputy Governor, Dr. Hormoz Mansouri, Head of Animal Sciences Research Institute, and Dr. Alireza Shakeri (Head of Kerman Province Nomad Organization. These were followed by scientific presentations by Dr. Hamid Reza Ansari-Renani, Dr. Barbara Rischkowsky and Dr. Joaquin Mueller.

Group of participants including governmental officials and farmers, May 13, 2012.

Dr. Seyed Reza Hosseini, Deputy Governor of Baft city, giving a welcome speech, May 13, 2012.

A handout was distributed to the participants summarizing the scientific findings, such as:

- Achievements and constraints of cashmere project
- Importance of cashmere processing and production of good quality yarn
- Marketing and processing difficulties of farmers
- Community based breeding programs suitable under nomadic conditions
- Capacity building
- Role of women in the management and production of yarn
- Role of government organizations in enhancing and supporting the production of cashmere by adopting proper policies
- Comparison of cashmere prices in the international and national markets
- Dehairing and processing of cashmere using small scale equipment.

Participants from different national and international organizations included:

1. Barbara Rischkowsky	ICARDA Headquarters in Aleppo, Syria, Project Coordinator
2. Joaquin Mueller	INTA (Instituto Nacional de Tecnología Agropecuaria), Bariloche, Argentina, Cashmere Project Consultant
3. Seyed Reza Hosseini	Baft city Deputy Governor
4. Mansour Bahmani	Provincial Governor consultant
5. ….Mir Amini	Deputy Head of National Nomad Organization
6. Homoz Mansouri	National Animal Sciences Research Institute (ASRI)
7. Sirous Amirinia	Deputy Head of ASRI
8. Hamid Reza Ansari-Renani	ASRI Head of livestock Department and National Coordinator of cashmere project
9. Alireza Shakeri	Head of Provincial Nomad Organization
10. Mohammad Shamsedini	Head of Baft Region Nomad Organization
11. Esmali	Head of Provincial Livestock Department
12. Azam Tajiddini	Provinical Livestock Department
13. Omid Alipour	Head of Baft Livestock Department
14. Kouhzad Soltani	Provincial Nomad Organization
15. Mohammad Pour Changbar	Baft governor organization
16. Mahmoud Jahani	District Governor
17. Forough Ameri	Head of Livestock Department of Kerman Province Agriculture and Natural Resources Research Center (KPANRRC)
18. Seyed Mojtab Seyed Moumen	Scientist from (KPANRRC)
19. Mohsen Ehsani	Scientist from (KPANRRC)
20. Najmeh Karegar	Scientist from (KPANRRC)
21. Sepehr Moradi	Scientist from Zanjan University

Other activities of the national team

A number of other linkages were created by the national project team, e.g. through visits and scientific discussions. These included linkages:

1. with the scientists of the Animal Science Department of Kerman Bahonar University in 2010 through discussions of the IFAD-ICARDA cashmere project;
2. with two main cashmere processing mills in Semnan and Mashad provinces In 2012 to provide dehaired cashmere for yarn making to nomad women; the Sefit-Pajan cashmere processing factory in Semnan was also visited by Dr. Barbara Rischkowsky, Dr. Joaquin Mueller and Dr. Hamid Reza Ansari-Renani;
3. with a dyeing plant in Kerman province in 2012 to introduce natural dyes to the project site;
4. with a small weaving plant in 2012 to make hats, gloves and socks form cashmere yarn;
5. between nomad woman spinners and the Agriculture and Natural Resources Research Center of Kerman Province in 2010;
6. between nomad women cashmere producers who produce and sell cashmere products and experts on yarn knitting from Kerman Training and Technical Center in 2013;
7. between nomad women in Baft who spin yarn and make knitted cashmere products and other Iranian communities that produce knitted products in 2013;
8. between cashmere producers, spinning groups and the knitters in Baft in 2013.

Furthermore the cashmere project coordinator was interviewed twice by Iranian newspapers and the national Radio. In these interviews, cashmere project achievements and future plans were broadcasted.

3.4.4.2 International and national linkages through scientific papers, conference contributions, books and extension leaflets

International Journals

- Cashmere quality of Raeini goats kept by nomads in Iran. 2012. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky, S.M. Seyed Momen, O. Alipour, M. Ehsani, S. Moradi. Small Ruminant Research, 104: 10-16. http://www.sciencedirect.com/science/article/pii/S0921448811004421.
- Nomadic pastoralism in southern Iran. 2013. H.R. Ansari-Renani, B. Rischkowsky, J.P. Mueller, S.M. Seyed Momen, S. Moradi. Pastoralism: Research, Policy and Practice, 3(1): 11. http://www.pastoralismjournal.com/content/3/1/11
- Observations on the efficiency of using different cashmere combs. 2013. H.R. Ansari-Renani, B. Rischkowsky, J.P. Mueller, S.M. Seyed Momen, S. Moradi. Small Ruminant Research, 114: 220-224. http://authors.elsevier.com/sd/article/S0921448813002216

Contribution to National Scientific conferences

- Improving livelihoods of small farmers and rural women through value-added processing and export of cashmere, wool and mohair In Tajikistan, Kyrgyzstan and Iran. 2009. H. R. Ansari-Renani, B. Rischkowsky, J.P. Mueller. National animal fiber conference. Tabriz University. Agriculture department.
- Cashmere quality of Raeini goats kept by nomads in Iran. 2011. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky. First seminar on livestock and poultry management in arid regions. Kerman Bahonar University.
- Effect of migration *(Kouch)* on cashmere characteristics of Raeini goats. 2011. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky. First seminar on livestock and poultry management in arid regions. Kerman Bahonar University.
- Sheep and goat management by nomads in Southern Iran. 2012. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky. 5th Iranian Congress on Animal Science. Isfahan Sharif Industrial University.
- Comparison of two methods of cashmere combing using long and short combs. 2012. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky. 5th Iranian Congress on Animal Science. Isfahan Sharif Industrial University.
- Livestock species of nomadic communities of Southern Iran. 2012. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky. 17th national and 5th international Iranian Biology Conference. Kerman Bahonar University.

Contribution to International Conferences

- Cashmere of nomadic Raeini goat: Assessment of quality, comparative advantage, development options for industry. 2011. H.R. Ansari-Renani, B. Rischkowsky, J.P. Mueller. Tropentag, University of Bonn, Germany.
- Nomadic pastoralism in Southern Iran. 2012. H.R. Ansari-Renani, B. Rischkowsky, J.P. Mueller. Tropentag, University of Gottingen, Germany.
- Sheep and goat nutrition in nomadic society of Kerman province of Iran. 2012. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky. The 1st international conference on animal nutrition and environment. Khon, Kaen University, Thailand.
- Cashmere quality of Raeini goats kept by nomads in Iran. 2012. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky. Second international seminar on animal industry. Animal science department. Bogor University, Indonesia.
- Goat milk production and utilization in nomadic pastoral society of Kerman province of Iran. 2012. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky. 2012. 1st Asia dairy goat conference. Kuala Lumpur, Malaysia.
- Indigenous livestock management among Siahjel Koochi nomads of Iran. 2013. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky. The 4th international conference on sustainable animal agriculture for developing countries (SAADC 2013). Lanzhou University. Lanzhou, China.

- Marketing of cashmere in Iran. 2013. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky. Presented to "11th world conference on animal production. Beijin, China.
- Comparison of two methods of combing using long and short combs on Raeini cashmere characteristics. 2013. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky. The 4th international conference on sustainable animal agriculture for developing countries (SAADC 2013). Lanzhou University. Lanzhou, China.

Handbook

- Cashmere in Iran. 2013. H.R. Ansari-Renani, B. Rischkowsky, J.P. Mueller, S. Moradi. Published by ASRI. http://cac-program.org/fiber/publications

Extension leaflets

Three extension leaflets in Persian and English language were published in January-February 2013 (http://cac-program.org/fiber/publications). Persian leaflets were distributed among cashmere producers of different provinces of Iran.

- Improvement of cashmere from nomadic Raeini goats
- Marketing of cashmere in Iran
- Cashmere shedding and combing

4 Assessment of impact and impact attribution

4.1 Northern Tajikistan

4.1.1 Impact on Angora goat producers

By setting up fiber processing businesses, the project created a new market for kid mohair. Prior to the project, producers sold all kid mohair for a low price of $4.16/kg on the local market. Now they can sell quality kid mohair to the women's groups for $7-7.3/kg. This allows 20 producers to earn approximately $5,840 from mohair sales. Each producer earns on average additional $125.60 from selling mohair to the local processors.

The project imported new genetic material from the USA to Tajikistan and promoted collaboration between Tajik scientists and private producers on Angora goat breeding and selection. The breeding program established with the assistance of the IFAD-ICARDA project will facilitate long-term improvements in the Tajik Angora goat breed and support production of higher quality mohair for sale and for local processing. The introduction of the imported American genetics will also increase fiber productivity per goat: the offspring of Tajik and American Angora goats nearly produced twice as much fiber with decreased fiber diameter at first shearing compared to local goats.

Although currently only a small number of producers benefit from having access to the crossbred goats, the breeding program is ongoing and the number of improved animals will gradually increase. In the coming years, more crossbred bucks will become available for breeding to a greater number of producers and the benefits of increased fiber production and earnings will spread more widely.

4.1.2 Impact on women processors

The project developed a new model of mohair yarn production and created earning opportunities for women processors. The main yarn-making group currently generates earning opportunities for approximately 35 women who dehair, scour, card, spin and dye the fiber. Total earnings and profits for the group will be approximately $2,504 per month and $30,048 per year. The average monthly earnings per processor for part-time work will be $71.54. Another processing group that includes 20

women is being established in Taboshar. The project expects that by the end of the year there will be two groups of 55 women that can earn approximately $47,218 in income and profits from fiber processing per year.

Although the average monthly earnings per processor are not high[6], they represent approximately 1/3 increase in the monthly income of an average rural family in the region, ½ increase in the income of a poor family. The women also have the opportunity to work more and earn additional income.

The women can be paid daily, after finishing a single skein of yarn. They will earn approximately $5.25 for spinning a single 100 gram/375 meter skein. For $5.25 (or 25.4 Tajik somoni) a woman can buy: 1kg of chicken (14 somoni), 1l of milk (5 sonomi), 1 loaf of bread (3 somoni) and 1kg of potatoes (3 somoni). Being able to purchase food for their children will make a substantial difference especially for those women who have no other source of cash.

The project established a weaving group that makes mohair blankets for sale and earns a stable income. A weaver can earn $164 per month from part-time weaving. This represents a substantial contribution to family income. The blankets have a good market at the Hyatt hotel in Dushanbe, and can be exported to the USA. Additional weaving groups can be set up after investment in production or import of additional looms.

The project established a group of 18 knitters. Some of the knitters make mohair socks and some plan to make scarves, shawls and sweaters. A knitter can knit 12 hats per month for $8 each, working part time, and earn $96. A more highly skilled knitter can earn $90 - $150 by knitting 1-2 sweaters.

The project created earning opportunities for six different groups (Table 34).

Table 34. The six women groups for which the project created earning opportunities

Group	Number of women	Average part-time earnings	Average yearly income per producer	Average yearly group income
Goat producers	20	292	292	5,840
Fiber processors I (scouring, dehairing, carding, spinning, dyeing)	35	71.54	858.48	30,046
Fiber processors II	20	71.45	858.48	17,169
Weavers	5	328	3,936	19,680
Knitters	18	120	1,440	25,920
Total	**98**	**972.8**	**8,461.6**	**98,655**

As described in section 3.1.4.2 with some improvements in processing infrastructure, a skilled spinner, knitter or weaver will be able to earn around $100-200 per month from fiber processing. The earnings will be proportional to the artisan's skills and productivity. However, most artisans can become fully productive only once they have an access to a workshop.

4.1.3 Financial and Social Benefits for Women

The project also helped increase women's status by helping women become wage earners. Women reported feeling more valued by family members and experiencing a sense of self-worth as they started to earn income. Having their own source of income helped especially those women whose

[6] The average earnings are low because the distribution of earnings is wide – some women such as yarn dyers will work only a few days per months and their earnings will be low as a result. Other women, such as spinners and dehairers will work more hours and their monthly earnings will be $100 and higher.

husbands are in Russia but cannot find a job and send money home. It also helped divorced or abandoned women who are the sole breadwinners for their families. These women feel much more secure when they can earn income to buy food, clothing and school supplies for their children.

Working in a processing group also gives women the opportunity to socialize, bond and create a cohort that is a source of advice and support for its members. The groups have the option to form a larger association of craftswomen with shared interests. Such associations can become a political force and lobby the government to support women-led businesses and protect the rights of women. They also help the development of civil society as they create new alliances between women and men from different regions and clans.

4.2 Badakhshan, Tajikistan

The project helped increase income from fiber sales for 100 fiber goat producers and 26 women processors in 8 pilot villages in Ishkashim and in Sezd village in Roshkala valley.

4.2.1 Impact on small producers of fiber goats

The project developed a new regional market for combed cashgora fiber that sells for $21/kg. Access to the new market increased yearly income from fiber sales for 80 households in Ishkashim and 20 households in Roshkala by $6,465.00. The project team trained producers to harvest 1st quality cashgora fiber which also helped increase income from fiber sales in the course of the project. The income from the sale of first class fiber in the pilot villages more than trippled from $653 in 2010 to $2,247 in 2013. The number of households who sell 1st quality combed fiber and earn higher incomes continues to increase each year.

The project created competition for Kyrgyz/Chinese buyers and forced them to increase prices for sheared fiber. This doubled the income from sales of sheared cashgora and cashmere for approximately 150 households in Ishkashim pilot villages and in the Sezd village in Roshkala valley. Instead of selling 1.7 tons of sheared fiber for $3kg, in 2013 the households sold sheared fiber for $6kg, earning additional $5,100.

By importing Russian cashgora goats to Badakhshan, the project is helping to increase fiber productivity per goat by at least 50% - from 200g to 400g. This will increase yearly income from fiber for the average Ishkahsim household with 10 goats by $42, and for the average Roshkala household with 70 goats by $294. Approximately 300 households from Ishkashim and Roshkala are expected to participate in combing goats and selling fiber for local processing, earning approximately $33,000 from fiber sales. By introducing imported genetics and setting up a community breeding system, the project contributes to a gradual increase in the percentage of fiber goats in village flocks from 25-30% to 80% and more. This will more than double the income from fiber sales for the average household within the next 5 years.

4.2.2 Impact on women spinners

The project created a processing group of 26 spinners that can earn $28,236/year from spinning cashgora yarn for export, $1,086 per spinner. The yarn spinning business can be scaled up to include approximately 80 women and men from the eight pilot villages, creating $84,000 in earning opportunities. The scaled up processing will generate additional demand for 1,603kg of combed fiber worth $33,667. The developed processing business can thus contribute around $117.667 in yearly income from fiber sales and processing, and is expected to benefit approximately 400 households.

The project also increased social status of rural women by helping them to become income earners, exporters, trainers and entrepreneurs who jointly manage their own fiber-processing business. The

new business gives women control over their work and earnings, expands their skills and capacities, and links them to global markets. It helps increase the women's independence, self-confidence and financial security of their household.

4.3 Naryn, Kyrgyzstan

4.3.1 Impact on sheep producers

The group of small sheep farmers in Lakhol and Min-Bulak involved in the project have become more interested in the production of quality semi-fine wool. In 2011 the world market price for wool increased considerably which led to an increase of about 80% for semi-fine wool and 100% for fine wool on the domestic market. The farmers became aware that even though meat production provides the largest part of the income, the additional income from quality wool is add on and can be quite substantial depending on the world market prices and the quality. Another stimulating factor for wool production in the two target villages is that the wives of some farmers are members of the participating artisan groups and thus are interested in high quality wool from their sheep. The gradual replacement of fat-tailed coarse wool sheep by Tian Shan offspring in Min-Bulak and Lakhol, through systematic monitoring and visual assessment of wool quality, selection by moderate culling of atypical animals, and utilization of pure-bred Tian Shan rams in the flocks, led to improvements in the quantity and quality of semi-fine wool. The envisaged direct supply of semi-fine wool for the artisan groups in Min-Bulak and Lakhol has now been established. Furthermore, the combination of farmers' training, preventive veterinary care, improved rams and culling of unproductive ewes led to about 20-30% increase in fertility (measured as lambs born per 100 ewes) from 2011 in 2013.

4.3.2 Impact of project activities on women's income

The four artisan groups that participated in the project from the beginning generated a gradual increase in their incomes: overall, the total income of the four groups had increased by 2.5 times from January 2010 to September 2013 (see 3.3.4.2). The data for 2013 were not final, as the groups were expected to earn significantly in fall and winter seasons, and the fact that income figures had already exceeded those recorded in 2012 in three groups except At-Bashi, was very encouraging. Half of the total income from sheep wool products obtained by the four groups in the 4 year period originated from products newly introduced by the project. The groups managed to obtain 16 to 20% of family income from wool processing and felt products as of September 2013. Both Acha-Kaindy and Lakhol groups significantly increased the share of income from felt products in the household income from 5 and 1% to 20 and 16%, respectively. Considering willingness and commitment of the groups to improve product quality and increase production as well as their participation in the global fiber product festivals and fairs, felt production provides a good opportunity for rural employment and to achieve better living standards through stable higher incomes obtained from wool products.

4.3.3 Impact of project activities on women's status

The income women earn from the handicraft business considerably improves their social status. Their ability to contribute to the family budget has helped to increase gender equity within the family and the women's capacity to make decisions. Their families, including their husbands and children, have witnessed how the development of the handicraft business has helped to improve their livelihoods. This has motivated them to support the women in multiple ways: the husbands and other relatives of the group leaders helped to maintain the carding and felting machines, assisted with transport and maintenance of the workshop premises and also took part in the discussion of strategic issues.
In addition to its economic impact, the project also helped to train and educate the women – the trainings, exchange visits and local and international travels to fairs and project meetings broadened the women's perspective and helped them develop self-confidence and pride in their craftsmanship.

The women developed a positive outlook regarding their personal growth and the development of their business.

4.4 Kerman, Iran

4.4.1 Impact of project activities on goat keepers

The project worked with 29 nomad families; 8 extended families with about 120 persons running a total of about 3000 goats were intensively involved through the breeding program. As the 29 families are related through tribal links, the improved bucks would eventually be shared with the other families within the tribe. In 2013 the breeding program in the 8 farmer flocks was in its fourth cycle. The nomads participated in the planning and conduction of the breeding plan and shared its benefits through the use of selected bucks and their improved progeny. Genetic progress could not be measured directly but can be estimated from the average selection differentials measured and the heritability of the selection traits. The breeding program focused on decreasing fiber diameter and increasing yield while at least maintaining fiber length, crimp and body weight. As shown above fiber diameter and yields were improved in the nucleus herds. While the higher cashmere yields directly convert into higher income from sales, at present there is no premium for finer cashmere paid to farmers but this may change as the marketing becomes more competitive and objective information is valued along the transformation chain. Although the factory in Semnan would not pay a premium for combed versus shorn cashmere as it has not relevance for the dehairing process, the project showed that combing would reduce the cashmere losses through shedding; thus combing the goats once or twice in the period before shearing has potential to increase the income and should be promoted.
The breeding program generated additional interaction between farmers, local authorities and scientists. The resulting organization and communication allowed discussion and consideration of other important issues such as value adding and marketing. The initial conception when the IFAD-ICARDA cashmere project started "even though the nomads sell cashmere, they gain little from producing such a valuable product and in fact most are not aware of how valuable their cashmere is", is no longer valid. After more than four years of working with the Baft nomadic communities, holding stakeholder workshops, implementing the breeding programs, introducing cashmere combing, and trainings, all value chain actors are more aware of the value and the importance of cashmere.

4.4.2 Impact on nomad women

While no direct impact on livelihoods of women processors could be achieved during the project duration, the project generated the knowledge base for cashmere processing. There is a good basis in the project area for developing small scale cashmere processing. The elder women have some tradition and skills in using spindles for making yarns and use wool for knitting. As in Central Asia it would be an activity that could be done at home not interfering with other chores and the conservative traditions. The women showed a lot of interest to get involved in spinning and knitting. Three women groups were established in the vicinity of nomad farms in a distance of 20 to 30 kilometers from each other which not only gave the chance to nomad women to participate and to benefit from the advantages of different workshops but also enabled them to make cashmere products in a group while maintaining their active role in the management of livestock. Several training workshops were provided to the women groups which made them familiar with cashmere spinning and dying techniques. Although the Iranian team managed to find local support from the Kerman Agricultural Extension Center for training the women groups, to proceed further with a business development, the problem of dehairing of the raw cashmere would have to be solved and clear product lines needs to be developed. Dehairing of cashmere cannot be done manually; the processing factory in Baft had been closed down some years ago. To organize dehairing of their own shorn or combed cashmere in Semnan or Mashad is not feasible as these factories are not set up to handle small quantities separately. The price of scoured, dehaired cashmere is very high; the project bought it for US$ 130 in

Semnan for the trainings. With such a high price of the raw material it is very difficult to add value to it, and it would be more desirable to process the fiber produced in their own herds. With regard to product lines, it can be assumed that cashmere yarn from nomad women should be as marketable as cashgora and Mohair from Tajikistan, however as the raw fiber is very expensive, the craftsmanship of the women has to be very high to be able to sell the yarns at a high price; the same applies to knitted products. The potential of targeting the high end national market would have to be explored.

5 Project costs and financing

The initial project budget stated in the grant design document was revised in May 2012 and a request for re-allocation of funds was requested and granted by IFAD (Table 35). The project had obtained savings in the travel and training/workshop/publications categories, e.g. the costs of the Annual Review and Planning workshops were lower than anticipated; many trainings conducted by the project team were on-the job trainings and thus carried out as integral part of other activities and therefore could the costs could not be separated; and the project was not able to find suitable candidate Masters and PhD students for the proposed research topics. The ICARDA project team also managed to minimize the costs of international and regional travel by coordinated planning; the largest travel costs were incurred by our Principal Investigator, Dr. Liba Brent, for her bi-annual 2-3 month visits to Central Asia.
At the same time, the project had underestimated the costs for equipment and major supplies for the breeding programs and the women processor groups.

Table 35. Re-allocation of funds between budget categories granted by IFAD on 22 May 2012

Category of Expenditure	Original Budget	Reallocation	Changes
Personnel/Consultants/Collaborators	490,000	490,000	0
Travel	362,000	322,250	-39,750
Equipment and Supplies	190,000	280,850	90,850
Training/Workshop/publications	237,000	185,900	-51,100
ICARDA Indirect Costs	221,000	221,000	0

Major project expenses related to:

- Technical support from two experts (long-term consultants) for the breeding programs and the development of the business model for the fiber processing groups in Central Asia, including honorarium and travel costs;
- Purchase of bucks and rams in Texas, Russia and Kyrgyzstan, transport costs of bucks/semen to Tajikistan, technical support and supplies for Artificial Insemination in Northern Tajikistan
- Equipment (carding, spinning and felting machines) and costs of workshop establishment for women groups in Central Asia
- Revolving funds for raw material and product purchases for the women processor groups
- Operational budgets for the four national site teams of about 40,000 USD per year;
- Multi-stakeholder Knowledge-sharing workshop in May 2013 in Bishkek, Kyrgyzstan
- Extension material and websites

Please see the financial report for details.

ICARDA subsidized the project with CRP funds (Livestock and Fish and Dryland Systems) to cover the additional time of the project coordinator (only 10% were covered by the grant) and CRP Livestock and Fish for funding an additional consultancy dedicated to the analysis of data collected on breeding programs. The key NARES partner in the three countries contributed in-kind through allocation of substantial amount of their time to the project, (the project only covered a small monthly

honorarium of key team members), and by using their own means of transport, office space and other facilities.

6 Assessment of grant management and partner's performance

6.1 Grant management

Project coordination, especially at the beginning, was challenging due to different expectations, and diverse institutional practices and cultures of the partners. These initial difficulties were overcome by joint site visits, establishing clear roles and responsibilities of the partners, transparent management practices and the intensive knowledge exchange during the annual review and planning meetings. The project team developed a good team spirit, a shared commitment towards achieving project objectives and joint ownership of results.

The administrative management in Central Asia and Iran through a dedicated site coordinator in Tashkent office and the ICARDA-Iran office, respectively, worked very well. In general, our partners received funds timely in accordance with the approved annual workplans and budgets despite difficulties in money transfers between Central Asian countries and some delays related to ICARDA's problems with international wire transfers caused by international sanctions against Syria.

The Project Steering Committee (PSC) in which all major partners were represented met once a year at one of the project sites to review progress and discuss workplans and budgets. The PSCMs provided a good platform for clarifying management issues, identifying gaps and discussing additional project investments. While the annual budgets for the four sites did not vary much over the years, additional investments for specific equipment, importation of genetic material or the final workshop were supplemented or fully covered by the regional budget managed by the project coordinator.

The project also received a strong support throughout the project duration from IFAD's grant manager, Laura Puletti, and from IFAD's Technical Division through Antonio Rota. For example, IFAD supported the project with a supervision mission dedicated for developing marketing strategies for fiber products which provided useful insights and recommendations.

6.2 Partners' performance

Key partner institutes were listed in section 2.2. However, linkages were created with a number of other organizations mentioned under Component 5. This grant was more innovative and diverse in partnerships than previous grants: it combined partners from national research institutes, local governmental organizations and non-governmental organizations active at the project sites and promoted linkages with smaller scale commercial enterprises in Europe and USA. An interesting example in this regard was the development of the partnership between the Livestock and Pasture Institute and CACSARC-kg in Kyrgyzstan; initially there was a great reluctance of the NARS partners to collaborate with an NGO but in the first project years Dr. Ajibekov and Ms. Balalaeva developed a true partnership with mutual respect for their complimentary expertise and contributions.

Overall, the partnership among the different collaborators was very productive as each partner brought in a specific mix of technical, organizational and practical expertise which allowed the project to work with a number of actors along the fiber value chains at the four project sites.

Despite some delays in financial and technical reporting from the NARS partners in Central Asia (CACSARC-kg was exemplary in timely reporting) and the intensive follow-up on financial reports required in Central Asia and in the beginning in Iran, the partners' performed well with regard to the biannual reporting requirements of the grant.

7 Innovation, replication and scaling

7.1 Innovation in goat and sheep breeding

The project helped Tajik scientists and private Angora goat producers to establish a new breeding program using imported genetics and artificial insemination with frozen semen. The program is focused on improving mohair quality of the Tajik Angora goats, thereby it will help to reorient the Angora goat sector towards current market demand and standards. The breeding program initiated by the project is necessary for the long-term survival of Angora goat breeding and mohair production in Tajikistan that has been a source of livelihood for hundreds of famers and rural women for several decades.

In Badakhshan Tajikistan the project imported live Altai bucks from Russia and established a community breeding program for cashmere and cashgora goat producers in the pilot villages. The breeding program supports the production of quality meat and fiber goats by village households. Households not only earn higher incomes from fiber sales, but are starting to add value to their fiber through local processing.

In Naryn as in Badkhshan, the small farmers had no clear production orientation and kept very heterogeneous flocks of local coarse wool and Tian Shan sheep, focusing on meat production and not taking advantage of the local demand of felting groups for semi-fine wool. The national team helped them to develop their flock towards Tian Shan sheep that produce good meat but also good quality semi-fine wool. To help the farmers to improve their flocks, the project team provided them with high standard Tian-Shan rams and enhanced their practical knowledge and skills on sheep breeding and husbandry through practical demonstrations, in particular through joint selection of female and male animals for mating. The farmers now produce typical Tien-Shan male lambs for breeding and reproduction as well as for introduction in the flocks of the neighbor farmers.

There are few examples of organized breeding programs for pastoralists. Thus, the breeding scheme established in this project is a very useful pilot to further discuss and develop the essentials in the design, implementation and sustained operation of breeding programs in such systems. The formation of the nucleus scheme also provided an opportunity to train operators, consolidate breed or strain genotypes while achieving genetic progress in the desired traits. The program started with a more demanding design that included collection and lab analyses of a large number of fiber samples; this was useful as long as external support was available. However, as it would exceed the capacity and resources, a simplified scheme was developed that operates with a very limited number of fleece samples that could be analyzed in ASRI.

7.2 Innovation in fiber value chains

The project developed new models of fiber processing that can be replicated and scaled up. In northern Tajikistan, the project established a model for processing mohair into high quality yarn for export, and worked with spinners and weavers to develop new technologies of processing the yarn into finished products. In Badakhshan, Tajikistan the project developed a new model for processing locally produced cashmere and cashgora fiber into yarn and products for export. Both yarns are now successfully marketed in the United States through market linkages established by the project. In Kyrgyzstan the project developed a combination of targeted training, investment in equipment and facilities and very importantly support from designers to enable women felting groups to produce more efficiently higher quality and new felt product with appealing designs that can be marketed internationally.

Applying a value chain approach provided a clear direction and structure to the project activities. The model was driven by science and market dynamics, used new breeding and fiber processing technologies, engaged different groups of beneficiaries and delivered comprehensive results in

multiple areas. The focus on income-generating activities was very important for securing active participation of the goat farmers and women processors.

The work on breeding, processing and marketing created positive feedback loops and unleashed incentives that motivated all key participants to invest fully in the value chain. The processing groups generated a new demand for quality fiber and farmers who invested in breeding better goats were able to sell their fiber to the processors for higher prices. Without having the opportunity to earn additional income from better fiber, farmers would have been less willing to invest in breeding and husbandry. The processing component also provided a clear direction for the breeding – experiments in fiber processing revealed specific deficiencies in fiber quality that needed to be improved through breeding, and the project selected and imported breeding animals in view of these deficiencies. The breeding component in turn supported the processing activities by providing producers with a greater volume of quality fiber which helped to decrease production cost. For example the availability of kemp-free mohair lowers the production cost of 1 kg of mohair yarn by at least $14.

The value chain model relied on interdependent, diverse activities all of which had to be developed to a certain degree for the value chain to function. If one of the key activities failed to be developed, progress in other activities would have been affected. For example a failure of the test-marketing experiment would have decreased the market for quality fiber and producers' interest in the breeding program. The model also required collaboration between multiple groups, and thus innovative linkages were created between project administrators, local and international scientists and several groups of goat producers, fiber processors and also international buyers. Efficient collaboration among all these groups required trust, good communication, mutual learning, and a high level of flexibility.

7.3 Scaling

The project set out to test a fiber value chain model that had been developed in Northern Tajikistan in three new sites. The model explores income generating opportunities in marginal areas, where not many alternatives for rural employment, in particular for women, exist. This project focussed on a limited number of beneficiaries to achieve proof of concept and required intensive experimentation. It was time and labour intensive to establish the baseline information required for identifying and planning appropriate interventions for fiber value chain development at the new sites. Even the Mohair value chain in Northern Tajikistan still required intensive development of the individual operations for yarn production, and other value-adding activities like knitting and weaving. The full documentation of activities involved intensive data collection.
In Central Asia the developed solutions for fiber processors can now be replicated and scaled out to create earning opportunities for additional fiber processors. The scaling up will require investment in equipment, infrastructure and training that was beyond the capacity of the IFAD-ICARDA project but is being undertaken by the new AKF project that plans to establish 30 fiber processing businesses in Tajikistan, Afghanistan and Kyrgyzstan.
Another huge opportunity for scaling out the project achievements is to work with Mohair and cashmere producers on organized marketing to achieve higher prices for their high value fibers. The project has provided the base and opportunity for joint action: higher quality fiber is now becoming available through the breeding programs, farmers are much more aware of quality issues and world market prices and they have already started to work together.

8 Sustainability

The project developed technologies, products and market linkages that increased the capacity of fiber producers and processors to improve goat production, develop fiber processing and earn additional

income. Hundreds of goat producers and women processors who participated in developing the project activities witnessed concrete improvements in breeding, processing and marketing and are interested in continuing these activities after the project ends.

The Angora goat breeders in Northern Tajikistan are very interested in improving mohair production and will continue to collaborate with the Tajik scientists on breeding and improved husbandry. The crossbreeding scheme still needs support in the coming years, especially strategic use of the remaining semen and the Texas offspring and the development of the super nucleus of the Institute. The women's groups of spinners, knitters and weavers in northern Tajikistan are highly motivated in continuing fiber processing and earning income from the export of yarn and products. The processing chain and the marketing system have been fully developed but the marketing hub needs to be consolidated and be made fully self-sufficient.

The households that produce cashgora goats in Badakhshan are interested in improving the productivity of their goats in terms of meat and fiber, earning higher incomes from fiber sales, and supporting local women's groups that produce yarn and products for export. The cashgora breeding program established in Badakhshan has been implemented with external technical and economic support in the period 2010-2013 but is expected to be sustainable for several reasons. The program was purposely kept with minimum costs in order to assure a high potential for ongoing development and low risk of discontinuation. A line of command and allocation of responsibilities has been put in place for the critical feature of the program: selection, castration and nucleus mating. Farmers in all villages learned about market oriented selection criteria and would continue to focus on them since the benefit resulted tangible. Ideally castration of inferior bucks should be done by a veterinarian but many farmers were trained to perform this crucial task themselves. Selected, nucleus, animals should mate together; this has been undertaken by responsible nucleus keepers which were identified amongst farmers. These persons were acceptable to villagers and can continue this task. The principle of community based nucleus breeding is understood and can be continued with little external help but, clearly, active involvement of the local extension service would be very beneficial and would reassure continuation of the program, in particular helping participating farmers to discuss upcoming issues and opportunities in the community. The women's groups of spinners and knitters initiated in Badakhshan are also very interested in continuing fiber processing and earning income from the export of yarn and products.

Through the project support the small sheep farmers in Naryn now own a good number of Tian Shan females and males in their flocks that meet the breed standards. This allows them to continue the selection strategies implemented in the past four years to further consolidate their flocks and produce good quality wool for the women processor even without further support The felting groups are highly motivated, have capable leaders and have developed specific product lines in accordance with their skills and preferences. They have been provided with basic equipment and trainings on essential skills that have made them more efficient and able to produce much higher quality products. The groups need continued support in design and marketing and this can be provided through the close linkage developed with CACSARC-kg that will continue to provide support to the groups. Ideally a business model should be developed where the groups can pay for such services to make them fully self-reliant.

Certainly the strong grassroots demand for the activities and their outcomes on the part of the beneficiaries is the strongest guarantee of the project's sustainability in Central Asia. However, despite the achievements and the project's orientation towards low cost self-sustaining solutions, it is doubtful if the remaining steps and consolidation of organizational structures developed by the project could be achieved without some external support. Fortunately, a new IFAD-AKF project is continuing and further developing the activities of the IFAD-ICARDA project in Tajikistan and Kyrgyzstan. The new project continues to work with the fiber producers and processors from 2013 to 2017 and will focus on fully developing the business model for women processors and outscaling it.

In Iran the project team developed a simplified breeding scheme to reduce the labor intensive and expensive taking of cashmere samples for laboratory tests to a minimum. The simplified scheme can be maintained by the local and national scientists with little costs. The breeders were also trained and are able to implement the scheme but will still need support from scientists and extension agents in Baft. Further support is also needed to develop an alternative marketing scheme for cashmere as the current scheme favors middlemen and brokers, does not encourage breeding for cashmere quality or full collection of cashmere through additional combing and does not supply the factories with the best quality available as traders tend to tamper with the raw material. The discussions with the processing facility in Semnan clearly revealed that the factory would be willing to pay higher prices for guaranteed quality and would be willing to directly buy from organized producers.
The activities started with the nomad women groups should only be further developed if the local government would invest in a dehairing facility in the vicinity so that the women get access to dehaired cashmere. At the same time the women would need support of experienced trainers to reach the required craftsmanship to successfully compete on the high end luxury product market. During the field days conducted by the project in Baft, the project activities achieved a lot of verbal support and promises were made by the government representatives to invest in local processing facilities. The national project coordinator also submitted a proposal to the head of the Central Nomad Organization in Tehran to continue and possibly expand the project activities. The authorities of the nomad organization had visited the project site, acknowledged its achievements and had spoken to the farmers and their families. The farmers are very interested to continue the project and expressed their keen interest. However, although the nomad organization was willing to continue the project, apparently they lack financial resources. Another complication is for soliciting support is the change of many authorities in the relevant institutions after the presidential elections.

In May 2013 the project organized a regional knowledge share fare in Bishkek to share the project outputs and experience with a number of interested stakeholders including donors (Annex 10). The meeting also provided an opportunity for a knowledge exchange between the project teams and beneficiaries from the four sites. Besides sharing their achievements with all participants, the site teams discussed what activities need to be continued, what additional strategies have to be pursued and which actors should be involved.

9 Conclusions and lessons learned

9.1 General lessons

1. There are many constraints but also many opportunities in fiber production in Central Asia and in the nomadic systems in Iran. Fiber producers are isolated and lack access to information, knowhow, extension support, improved genetics and financial resources to increase the productivity of their animals. They also lack access to global fiber markets and/or information about quality standards. Their greatest advantage is that the cost of producing fiber goats is generally lower than in more developed countries and the natural conditions for the production of Angora, Cashgora and Cashmere goats and Merino and Tian Shan sheep at the pilot sites are good. Once provided with training, improved genetics, extension support and market linkages, the producers are eager to take advantage of it and work on improving fiber productivity and quality to earn higher incomes.
2. Women and men who try to add value to fiber face similar constraints – poor infrastructure, lack of institutional support and poor access to new technologies, information, product design and markets. Women, in addition, face constrains of gender inequality and barriers in the form of conservative cultural norms that make it difficult for them to work or develop a business. However, Central Asian women can process fiber more cheaply than women in developed countries and earn good incomes if their capacity is improved through training, new technologies, processing infrastructure, product design and market access.

3. The project learned that in order to develop efficient, competitive women-led enterprises in fiber processing, investment in infrastructure is essential. In some cases, even basic infrastructure such as electricity and water is not available. Without infrastructure, the emerging businesses cannot become efficient, and women have to compensate by working harder, and for lower wages. Access to a stable supply of electricity, water, processing equipment and workshop facilities can easily double the women's earnings and make their jobs easier and their products better. Once infrastructure is developed women can work all year round, especially in winter months when they have more free time.
4. The project also learned that it is very important to select capable leaders. Without effective, local leaders who can take charge of project activities on daily basis it is impossible to develop fiber processing groups. It is especially challenging to find women leaders, as Tajik women are not being brought up to think and act independently and lead others. This creates a shortage of candidates who have the capacity to lead the groups, and considerably extends the time needed to prepare women for leadership positions. This problem correlates with unequal education of men and women –most rural women lack secondary education and do not have the skills needed to manage a business. In spite of these challenges, many women are eager to overcome these barriers and learn new skills in processing and business management once given the opportunity.
5. In order to build collaborative ties with fiber producers and processors, the project team had to earn their trust, learn about their culture and find capable collaborators who are willing to experiment with new technologies, learn new skills and take a certain amount of risk. Developing mutual trust and understanding is a process that takes time and requires an ongoing presence and work in the community on the part of the project team. This presence was achieved in Tajikistan and Iran through the local NARS collaborators, but was lacking in Naryn Province as the scientists were located in Bishkek. However, as the site coordinator was born in Naryn, he found it relatively easy to work with the local sheep producers.

9.2 Specific lessons on developing value chain components

Breeding requires time and continuous support

The full benefits of the breeding programs will be realized only on the long-term provided the national scientists can further support the implementation of the developed selection programs. The breeding scheme set up in Badakhshan is probably the most self-sustaining: the cashgora goat production is being pursued by local farmers and households who are highly motivated by increasing demand and higher prices for combed cashgora from the women spinners in their villages. It is also expected that the processing facility in Faizabad/Afghanistan will create more demand for cashmere. For the coming years the goat farmers can achieve genetic improvement by simply selecting for Altai type males and females in their herds and implementing a strict policy on castrating undesirable males. The situation in Naryn is fairly similar: the farmers have now a sufficiently large proportion of Tian Shan rams in their flocks and they have been trained on selection of Tian Shan that meet the breed standard and on visual appraisal of the wool. The support for the Mohair improvement program in Northern Tajikistan will be continued by the local Angora goat experts but ideally they should get some financial support to be able to make best use of the remaining Texas Angora semen and offspring. Interestingly, the difficulties in establishing a nomadic breeding program were the regular difficulties found in most smallholder systems. The problem of communicating with the moving herd owners was solved through a nomad guide and mobile phones. If the Kerman Institute can continue to support the program in the next few years, in the long run a largely self-sustained improved buck supply system for nomad flocks with higher fleece weights and lower cashmere fiber diameter in nucleus and base flocks can be achieved. Nomad farmers are motivated and sensitive to further genetic improvement proposals and other project interventions.

A crucial incentive to select for Mohair, cashmere or wool quality is that farmers get price premiums which has not been the case in either of the sites as no micron premium is paid to farmers. This may

change as marketing becomes more competitive and objective information is valued along the transformation chain. At present the incentive in Tajikistan and Kyrgyzstan is provided by the women processor groups who search for quality raw fiber and can afford to pay better prices. However, this is only a small amount of the overall fiber produced. Thus, it is essential that the producers get organized to sell quality fiber in bulk to interested buyers. In Iran the processing factory in Semnan was interested to support direct a marketing link to the producers in order to get a guaranteed quality and a US company was interested in buying Mohair from Sogd Province. Such market models would benefit a huge number of producers.

Building on tradition
While Tajik and Kyrgyz women have a long tradition in fibre processing for local, and/or regional markets incl. Russia, Iranian nomad women have little experience and no strong tradition in cashmere processing. Thus, in Kerman province small scale fiber processing would have to start nearly from scratch. At present the women are hindered in processing their own fiber by the lack of easy accessible dehairing facilities; without dehairing cashmere cannot be processed into luxury yarns and knitwear. Special efforts would have to be invested in exploring the national market for cashmere yarns or hand-knitted cashmere products because marketing in Europe and the US would add transport costs to the smaller margins achievable by value addition in Iran. International market linkages may also be less reliable in the case of Iran due to the political situation.

Scaling up yarn production requires infrastructure
Producing high quality yarn at the home of each spinner was not sustainable; spinners needed a proper working environment to focus on their work, maintain quality and increase productivity and earnings. Spinning workshops needed to include solar electricity, spinning machines, heating, lighting, tables & chairs and equipment for washing and dyeing yarn. Without investment in infrastructure and equipment fiber processing could not be scaled up or made sustainable. The ICARDA/IFAD project did not have sufficient resources to invest in costly infrastructure and equipment but it clearly established the basic needs for it.

Training demands
It was difficult to find women leaders in Tajikistan and in Kyrgyzstan and it took a long time to train rural women who lacked higher education or work experience in business accounting and management. It was not easy to train spinners to produce yarns or felt products according to export standard, especially if they had no prior experience in spinning. Spinning even, consistent yarn is a skill that many especially older women could not master to the desired proficiency. A similar problem was found with felters, in particular with regard to come up with appealing designs for export. The project offered a wide range of trainings, developed Training of Trainers and assisted local leaders to form groups of talented artisans. Nevertheless, the project could not offer earning opportunities to all interested women but only to those who could become skilled craftswomen, with the project's assistance. The better the conditions for yarn and felt production the project can provide in terms of infrastructure and training, the more women will succeed in producing high quality products. Expanding and diversifying assistance for processor groups under the AKF/IFAD project will open earning opportunities to additional women.

Business plan and financing
A processor group need a business plan, an accounting system and a stable source of financing for yarn and felt production in the amount of $10,000 - $30,000 per group, depending on the number of spinners or felters and the group's productivity. It is difficult for start-up businesses to secure credit on favorable terms in Tajikistan and Kyrgyzstan. This is why initial production financing by the project is very important. It is also important that the groups receive professional assistance when trying to find and approach potential creditors.

Business organization and assistance with access to inputs and markets
Each spinning or felting group can operate as a small, private, fair-trade business but all groups need to collaborate on marketing and particular for yarn production in Tajikistan organize a joint purchase

and dehairing of raw fiber. Until the groups are ready to form an association that could take care of marketing, fiber purchase and dehairing, they need to rely on the assistance of a qualified NGO. Group association is also important for promoting the groups' interests vis-à-vis the government and helping the groups to comply with their tax obligations in agreement with current legislation.

Adding value to yarn

It is possible to add value to the yarns by setting up additional processing businesses in knitting and weaving. In order to do this, the groups require additional assistance with infrastructure, equipment, training, product development and market access. The value-added activities have to be developed very carefully given that the cost of the yarn is very high and any products made from it will have to be sold on luxury markets and will face competition from machine-made, high-end designer products sold under well-known brand names.

10 Major lessons for IFAD

1. The value chain approach used by this project proved very useful as it provided a clear direction and structure to the project activities, was reinforced by market dynamics, engaged different groups of beneficiaries along the value chain and delivered comprehensive results in multiple areas. Value chain projects focus on income-generating activities which are very important for the beneficiaries. However, this type of project is also more demanding in terms of funding, time and expertise as it has to address multiple, often unforeseen problems at different points of the value chain.
2. Activities that have to do with business development are very demanding in terms of time, resources and expertise and may stretch the limits of a 4-year grant that is divided among 4 sites in 3 countries. The focus on marginal areas that are often remote and difficult to access (for political and/or geographical reasons) added to the demand in terms of time and funds. The benefits of adding an additional country into a project should be carefully evaluated as it may constrain resources for all countries to the point that it may be very difficult to successfully complete the activities.
3. It is important to combine research and development activities and create strong linkages between the two. It is also important that at least some of the project activities are directly focused on increasing the incomes of the beneficiaries, especially women. Creating new earning opportunities is one of the most important contributions the project can make to the welfare of poor, women-led households in remote rural areas with very few sources of income.
4. Four years is a minimal time for accomplishing more complex, integrated activities such as those undertaken by the IFAD-ICARDA project. This time span gives the project team and the beneficiaries the necessary time to accomplish the project objectives amidst the multiple challenges faced by poor people in developing countries.
5. It is proposed that value chain development/transformation projects should be planned in different phases – a first phase of piloting a promising model as it was done through this project, followed-up by a consolidation phase adding development partners and a scaling phase through an investment project. In this regard the continued support of IFAD for Central Asia to fully develop the business model for women processing groups is essential and well-timed. However, the new project should ensure to not only support the women processors but to also continue the support of the breeding programs at least in Tajikistan as the supply with quality fiber is essential component of the value chain.
6. It would be desirable for IFAD personnel to visit the project sites to monitor the activities and learn about the specific challenges and the successes "first hand." This would make IFAD a stronger partner in the project. However, the current staff travel policy does not allow them to visit remote sites as the security regulations cannot be met.