

Impacts of Economic Reform on the Livestock Sector of Central Asia

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Narrative Summary

The project has two objectives. First, to provide policy makers with information that will help them facilitate the transition from state-controlled agriculture to new types of ownership, use-rights, institutional organization, and supporting economic and social services that engender a stable, democratic society. Second, to develop technical options that increase the productivity of the livestock sector in environmentally sound ways, specifically, increasing the meat productivity of local sheep.

Under the first objective, fieldwork has begun in three Central Asian countries: Kazakhstan (two teams in the Southern and Western parts of the republic), Kyrgyzstan (in the Chuiskaja oblast), and Uzbekistan (in the Nurata district of the Navoi region). These research sites were selected because of the importance of livestock production in the region after consultations with local scholars and government officials.

In this initial year, data were collected by use of a detailed survey questionnaire, which is supplemented by open-ended interviews. Most members of the research teams are local scholars, who possess the necessary language and cultural skills to win the trust of informants, and thus increase the reliability of the data received. In addition, legislation was collected concerning privatization of land and other resources in the Kazakh agricultural sector.

Results of the surveys are now being analyzed. Papers will be presented at our conference in Almaty, Kazakhstan January 9-10, 1999. Preliminary reports from the field teams underscore the diversity of new forms of organization that are emerging. They also document the large, rapid changes that are occurring in the rural sector. The field teams' preliminary reports also confirm that the three countries studied display a continuum in the change process from Uzbekistan, where Soviet forms of organization still predominate to Kyrgyzstan which has changed the most, with Kazakhstan occupying an intermediate position.

With regard to the second objective, focusing on increased lamb production from Kazakh Finewool flocks, in this initial year, the research focused on three areas, including (1) improving the genetics of lamb production, (2) improving lamb survival and (3) improving diluents for the freezing of ram sperm.

With regard to improving genetics for lamb production, semen was collected in Madison from Rambouillet and Polypay rams, frozen in pellets and shipped to Kazakhstan. From November 19 to December 2, 1997, 602 Kazakh Finewool ewes at the Aksengerskoe experimental farm in Almaty oblast were inseminated with the frozen-thawed semen from Wisconsin and with fresh semen from Kazakh Finewool and Kazakh Prolific rams. Forty-five percent of ewes inseminated conceived. However, due to a very harsh winter and poor condition of ewes, only 31% (184 ewes) of inseminated ewes produced lambs.

A total of 232 lambs were produced, of which 104 were ewe lambs. If mortality and

culling of individuals for defects results in a loss of 20%, there will be 80 to 85 ewe lambs to be retained for a comparison of Kazakh Finewool, Kazakh Prolific, Rambouillet (FecB+), and Polypay breeding for lamb production under Kazakhstan conditions. The matings will be repeated again in October-November 1998 and, if needed, in 1999. The goal is to have at least 50 ewes in production sired by each of the four breeds of rams.

With regard to improving lamb survival, M. E. Gessert, DVM, visited Kazakhstan in April 1998 during the lambing season to assess the level and cause of lamb mortality in non-research flocks, to advise on health and management practices to improve lamb survival, and to train Kazakh veterinary staff in lamb necropsy techniques, so they could assess the levels of lamb loss in the research flocks.

Estimates of lamb mortality in the non-research flocks were 15 to 30%, which was higher than normal and attributed to the poor nutritional status of the ewes. In the research flocks, the lamb mortality rate was lower (12%). Necropsies of dead lambs revealed that the major causes of lamb deaths were navel ill and starvation/hypothermia. In Dr. Gessert's opinion, incidence of both conditions could be lessened with better feeding of pregnant ewes. The incidence of navel ill could be further reduced through treatment of navels of newborn lambs with 7% tincture of iodine. While iodine is available in Kazakhstan and was used by the shepherds at Aksengerskoe, the cost, which is 2 to 3 times that in the U.S., limited their supply.

In August 1998, Steven Sharrow, Professor of Range Management from Oregon State University, and David Thomas of the University of Wisconsin-Madison visited Kazakhstan with the main purpose of viewing the research sheep on the summer mountain pastures to determine the quantity and quality of lambs that are expected to result from the crossbred ewes. They found striking similarities between the desert steppes and mountain plant communities of Kazakhstan and the western US. The structure of the communities is similar and they share a large number of the same plant species. Technology transfer between the two should be relatively straight forward. In fact, USDA plant breeders have used many plants from Kazakhstan in their search for improved species suitable for our cold desert steppe areas in the Intermountain West. However, the flow of improved hybrids and exotic species back to Kazakhstan appears to be relatively small.

With regard to improving semen diluents, a study was conducted in Kazakhstan to evaluate the effect of adding amino acids to a standard diluent on motility of frozen-thawed sperm. The four amino acids added were arginine, betaine, glutamine, and proline. Each amino acid was found to improve the motility of frozen-thawed semen. Work will continue to determine the optimum amount of amino acid to be added to the diluent, and promising diluents may be used in an A.I. trial to determine conception rates.

Research

Activity One: New Forms of Economic Organization

Problem Statement

For centuries, extensive livestock breeding played a very important role in Central Asian economies. In Kazakhstan, Kyrgyzstan, and Turkmenistan, the majority of the population was involved in nomadic or semi-nomadic pastoralism. The decay of this branch of agriculture had started with the imposition of Russian colonial rule, which deprived the pastoralists of part of their rangelands for the needs of Russian peasant colonization. In a different form this process continued in the Soviet period, when the pastoralists were

forced to sedentarize and become sovkhozniki and kolkhozniki, i.e., laborers on the collective and state-owned farms. Excessive cotton-growing and grain production on the so-called virgin lands, dubious from environmental and economic points of view, further contributed to the deterioration of livestock breeding. It is true that by the early 1980s the Soviets, for a short time, succeeded in maintaining a rather large number of livestock in Central Asia, but this number was not based on sound economic considerations and did not take into account the costs of production. It was achieved by providing huge state subsidies and by a complete neglect of environmental factors, which resulted in serious deterioration and desertification of natural pasturelands. Significant damage has also been done to the biodiversity, ecosystem, and habitat in the especially vulnerable semi-and arid zones. Thus, livestock production in Central Asia has never been organized on the principles of capitalist-type private ownership and market economy.

In the Soviet period, significant attention was paid to the selection of new species of livestock. However, the deficiencies of the Soviet economy to a large extent divorced the selection work from practical demands and prevented it from really improving livestock production. The introduction of new breeds had a very limited effect on the livestock sector; this work had been done mainly for its own sake. If one adds to these problems the specific, essentially pre-modern, sociopolitical, demographic, and occupational structures of Central Asian societies, in which more than half of the population still lives in rural areas and is involved in agriculture, one may conclude that nowhere in the former Soviet Union is the transition to a market economy as difficult as in this region.

The post-Soviet development in the livestock sector of Central Asia is contradictory. One witnesses a deterioration of animal agriculture, especially a serious decrease in the number of stock, which in many countries of the region continues to spiral downwards. This situation has aggravated the human nutrition problem and endangered the preservation of wild ungulates (because of the weakening of state preservation agencies and the increase in poaching).

Our preliminary findings have identified several factors that have caused the decline in livestock production in the region. To put it bluntly, with regard to agriculture the Central Asian states are strong where they should be weak, and are weak where they should be strong. Although agricultural policy in the different Central Asian countries varies significantly, it remains in every one an essentially top-down business in which immediate producers have little, if any, voice. As a result, their problems and interests are far from always taken into account by the policy makers. At the same time, the Central Asian states prematurely retreated from their former roles as providers of subsidies, credits, services, and input-supply systems (such as fuel, equipment, veterinary service, feed, et cetera), and in Kazakhstan and Kyrgyzstan as purchasers of agricultural production. The states still remain the main owners of food-processing enterprises, however, many of these enterprises are in debt or have gone bankrupt. In Uzbekistan, the state still controls or even dictates the purchasing price on the most important agricultural products. In Kazakhstan and Kyrgyzstan, marketing suffers from significant mafia penetration and by the rampant corruption of many local administrators.

It is no wonder that so far only a small percentage of primary producers have opted for, or have been provided with, the opportunity to start their own small farms. The rest, especially in Uzbekistan, remain dependent on the former kolkhoz and sovkhos (collective and state-owned farms), which underwent only quasi-privatization, and which continue to operate under different names (e.g. cooperatives, joint stock companies, and others) in essentially unreconstructed forms. Although the amount of services and payments that, at present, are provided to primary producers has drastically decreased in comparison with the Soviet period, the power of their managers has increased in the post-Soviet period. Thus, there is a danger of repeasantization of the former kolkhozniks and sovkhozniks.

Instead of becoming small-scale but efficient market-oriented producers, these people, not habituated to economic choice and wary of taking it for granted, may be locked into the role of subsistence-oriented, non-capitalist small holders, or even worse, to that of laborers in large agricultural enterprises that have been captured by the former kolkhoz and sovkhoz managers and other entrepreneurs.

In spite of this grim picture there are some positive elements in the most recent developments, which indicate possibilities for serious reconstruction of the livestock sector. First, a growing number of policy makers in Central Asia are coming to the conclusion that the only way to improve the situation is to proceed further and more consistently with market-oriented reforms. Thus, various blueprints for these reforms and the ways of their implementation are currently under discussion.

Second, despite all obstacles and around the edges of inertia, new forms of organization are beginning to emerge within, among, and outside the former collective farms; some of them hold the seeds of a more promising future for the region's livestock economy. These new, voluntary, decentralized and horizontal forms of organization and cooperation may become a substitute for the old forms based on a pyramid-shaped chain of command.

Third, a decrease in the numbers of livestock, however deplorable it is, allows the pastures to regenerate and to restore their carrying capacity. This is not an insignificant factor in conditions when primary producers do not have access to an affordable feed supply and must rely upon traditional, extensive methods of grazing.

Numerous interviews with government officials, experts, managers, and primary producers, as well as our personal observations made during repeated visits to the region, have persuaded us to focus on the following priorities: (1) the need to understand the great diversity of new types of collective, cooperative, and individual farms that are emerging in the region and the many different processes that produced them; (2) the underdevelopment of marketing and credit services for the livestock sector and the slow emergence of new providers; (3) the interface between national laws on privatization of land ownership and the administration of the privatization process at the local level; and (4) the transformation of the critically important sheep sub-sector toward much greater reliance on meat as the key to profitability.

Progress

This section deals with the first three goals stated above. The fourth is elaborated and discussed in the section entitled Activity Two. To pursue the first three goals of the project in this initial year we have paid particular attention to data collection, mainly through field surveys based on the use of a detailed and structured questionnaire and supplemented by open-ended interviews. Our purpose was to identify emerging new forms of farm organization and to define the sociopolitical, economic, cultural, and psychological factors obstructing, or, on the contrary, facilitating development of an independent farm economy in the livestock sector. In addition, our project assistant, John Loncle, visited Kazakhstan in August 1998 to collect copies of relevant land laws and to interview local officials about the implementation of those laws (copies of land title grants have also been collected during field surveys).

Professor Masanov (Kazakhstan) completed the first draft of the questionnaire by May 1997. It was further elaborated upon in October 1997 during Masanov's meeting at Madison with the U.S. researchers. Key questions on sheep production were developed with Thomas during the October 1997 meetings. During the next few months Shapiro and Khazanov continued to work on elaborating the questionnaire. The final draft of the core

questionnaire was agreed upon in January 1998 during Khazanov's visit to Kazakhstan. Later on in the same month, the three team leaders for the field research in Kazakhstan and Kyrgyzstan met with Khazanov to adapt the core questionnaire for each country and region. Adaptations for the Uzbek survey were made in Spring, 1998 in meetings with Zanca.

The prolonged work on the questionnaire, in which the American investigators collaborated with Central Asian participants in the project, was inspired by the necessity to develop optimal ways of collecting comprehensive and reliable information in a relatively short period of time while taking into account local cultural and social realities. The American investigators and their local collaborators have tested the feasibility of some questions during their preliminary visits to the regions of future research. The research areas and field sites were selected because of the importance of livestock production there after consultations with local scholars and government officials.

The first surveys in southeastern Kazakhstan were from April through July in the Almaty and Chimkent oblasts (administrative provinces) located in the steppe and semi-desert zones. Altogether 140 questionnaires were completed. The surveys in Kyrgyzstan were conducted in June and July in the plains and high mountain regions of the Chuisk oblast (seventy questionnaires have been completed). In Uzbekistan, the surveys were conducted in July and August in the Nurata district of Navoi oblast, located in the steppe zone. Eighty-two questionnaires were completed. The surveys in the West Kazakhstan oblast located in the dry steppe zone in northwestern Kazakhstan were conducted in August and September. Ninety-two questionnaires were completed. (See Figure 1).

Figure 1: Central Asia: Project research sites.

The Central Asian scholars, with extensive experience in sociocultural research, have conducted the bulk of the field research. They possess the necessary language and cultural skills to win the trust of informants and thus increase the reliability of the data received. For the same reasons, many interviews were conducted not in Russian but in the native languages. The relevant research experience of our co-investigators and their understanding of local culture has allowed them to gather considerable information on the emerging new forms of farm organization. As planned, this will be the main focus of our analysis of this first year's data.

Even though our collaborators have considerable experience with social science research and an understanding of local cultures, it was evident to them (in part, because of their experience) that farmers were under reporting key data such as livestock numbers and income. Thus, while analysis of the different forms of farm organization can proceed with some confidence, we do not intend to go beyond our original plan of providing only a general, indicative picture of physical and economic production relationships. The data would not support detailed input/output analysis, and that has never been our objective.

Immediately after their field research, the leaders of the field teams were asked to submit a brief preliminary note documenting their accomplishments and offering general observations. (Their first detailed papers analyzing the survey results will be presented at our conference in January, 1999.) Extracts from the preliminary notes are presented below to provide the reader with first hand accounts of two key aspects of the Central Asian livestock sector: (a) diversity and (b) disequilibrium.

(A) Diversity. Numerous new forms of farm organization are emerging. Most of them do not fit common definitions of "firms," "economic units," or "farm households;" not only as those definitions are used in developed countries but even as they have been adapted for use among, for example, African farmers and pastoralists. Considerable study is needed to

understand such key dimensions of Central Asian farms as the following: (1) the nature of the control that these units have over resources; (2) the kinds of decisions that can be made at different levels by different actors; (3) the social, kinship, and economic relationships among farm personnel (in the same farm and across farms) and the impacts these have on production and marketing decisions; (4) the farm's access to and relationships with input and output marketing channels; (5) cooperation across farming units; and (6) the role of local and national governments in controlling the farm's resource allocations, production decisions, and marketing opportunities. Understanding these issues will help us understand the future evolution of Central Asian farming and the factors that will promote different kinds of change. Furthermore, until we understand these dimensions of Central Asian farming, we cannot predict with precision how farmers will respond to changes in the biological and economic contexts in which they operate.

(B) Disequilibrium. It is almost trite to say that Central Asian agriculture is in transition, and the term "in transition" seriously understates the kinds of change that are occurring. Thus, our analysis of the above dimensions of farming must be cast in a dynamic mode. We are not attempting to describe a static situation, but rather to understand the above dimensions of farm organization as they are manifest in farms that are still very much in the process of changing. Our understanding of the current situation will help us understand the change process; and our return to the same farms over time will expand that understanding. In addition to major changes in the farms themselves, there are also changes, of perhaps greater magnitude, in the external forces affecting farmers and the decisions they make. Farmers face extreme uncertainty, not only about the prices they will face, but more basically about their ability to sell their produce or to buy inputs. Furthermore, since the legislative and administrative bases of property rights are also in considerable flux, farmers even face uncertainty about their future rights to control land and animals. The word "uncertainty" is used advisedly instead of "risk" since the farmers are facing situations in which it is impossible to assign probabilities to different outcomes.

Extracts of the field researchers' notes follow. Some are presented in rough translation from the Russian, but they still provide useful illustrations of the above points.

From Olga Naumova's Notes on her Research in Western Kazakhstan Region (Formerly West Kazakhstan Oblast)

The research team, which included Olga Naumova (Moscow), Saniya Sagnaeva, Yank Lukpanova and Ayan Kospanov (West Kazakhstan), worked from August 4 to September 4, 1998 in the Zapadno-Kazakstanskaya Oblast' (Western Kazakhstan Region, formerly West Kazakhstan Region; hereafter referred to as: ZK Region) of Kazakhstan.. The team visited 14 settlements and 10 "points" (i.e., separated farms) in 5 districts: Kaztalovka, Urda, Akjaik, Jangala and Terektinskii. In total, 92 questionnaires were completed on the following types of farms: 56 on peasant farms; 16 on agricultural production cooperatives (SPKs); 8 on personal farms; 4 on production cooperatives (PKs); 4 on private-owner farms; 3 on limited partnerships associations (TOOs); and 1 on a sovkhov (state farm). This division is not very exact. For example, about 8 farms among those classified as peasant and personal ones are in reality private-owner farms. We also gathered statistical data from the regional and district statistical boards.

Types of Contemporary Farms. During the last two years, the organization of rural husbandry [livestock raising] in the ZK Region has been undergoing change. Up to 1997, there had been large agricultural farms (i.e., SPKs, TOOs, AOs (Joint-stock companies) and so on), which were the successors of the kolkhozes (collective farms) and sovkhovs (state farms). In addition, some kolkhozes and sovkhovs have been preserved. The majority of the rural population has belonged to these large farms. But, at the same time, people have had their own livestock and plots of land. Thus, this system has reproduced

the organization of the Soviet rural economy, which combined common husbandry and personal husbandry.

In addition, in 1990-1991, so-called farmers began to separate from the then existing kolkhozes and sovkhozes. They received their land and livestock shares and became independent owners. Their number was very small - 1 or 2 per district. We refer to these types of farms as "private-owner farms" in this report.

Beginning in 1997, SPKs, TOOs and AOs began to break up distributing livestock, land and agricultural machinery shares among those members wishing to separate. In comparison with 1990, the number of livestock in the ZK Region presently has declined: sheep and cattle by 2 times, and horses by 10 times. The quantity and quality of equipment also have deteriorated. In connection with this decline, the present shares are so small that the peasants are forced to unite: 5, 10 or 20 shareholders form one krest'yanskoe khozyaistvo (peasant farm, PF). The number of PFs has grown abruptly. For example, in Urda district there were 5 PFs in 1990, 81 PFs by the beginning of 1998, and 181 PFs by August 1, 1998.

The disbanding of SPKs, TOOs and other large farms has been carried out according to the authority's instructions. Yet, this does not mean that this action was conducted contrary to the SPK members' wishes. Some of our respondents wished to leave the state farms even in the beginning of the 1990s, but they succeeded in separating only in 1997-1998.

Thus, today there are the following types of farms: (1) kolkhozes (collective farms) and sovkhozes (state farms); (2) SPKs, TOOs, AOs and others (non-state organizations, successors of the state farms); (3) private-owner farms; (4) PFs; and (5) personal farms.

Currently, the share of livestock held on private-owner personal and peasant farms is the largest and still growing. In the opinion of the chief of the Regional Agricultural Board, there are practically no "common" cattle in the ZK Region. All livestock are passing into private hands.

Peasant Farm. The organization/structure of PF leaves the impression that the system of "common personal" husbandry is broken, although the principles of this system are preserved. The members of PFs combine the livestock, which was received as a share from SPKs or TOOs [into a common herd], but they do not combine their own personal livestock. A large number of PFs are unprofitable. During the short period of their existence (1-2 years), the number of their livestock has declined appreciably. Some PF probably are formed only to support their members' personal livestock raising. As a rule, the "common" livestock are used for buying fuel, for laying-in of fodder and for spare parts for equipment. Sometimes, PF members take back a part of their livestock share for urgent large expenses. One more problem for PFs is the labor discipline of their members, who do not consider themselves to be masters of PFs. Many of the PF leaders suppose that in 2 or 3 years the PF will fall to pieces because they will not have any livestock. We heard the same opinion from the chief of the Regional Agricultural Board. He considers PFs to be a transitional type of farm: little by little the real farmers will appear on PFs, the others will become hired workers or leave for the cities.

A small number of strong PFs (1 or 2 for each settlement we visited) stand out against this background. Their leaders are energetic and educated persons (former managers, bookkeepers and those who have business relations with suppliers, purchasers and so on). Many of them failed to separate from state farms in 1990-1991. Today, they do not have enough livestock or agricultural machinery to manage their own farms, and they are forced to unite with rural people. They manage not to sell off livestock, because of

involvement in other economic sectors, mainly commercial activity, as well as their ability as good salespeople. In contrast to unprofitable PF leaders, these individuals make plans for further development, including leasing land for grain farming, opening produce processing shops and so on. For these PFs, many things depend on the [near] impossibility of getting credit.

A Few Notes on Private-Owner Farms. As a rule, large-scale farmers created their large farms not by livestock-breeding. They make a profit on the resale of goods, cultivating grains, meal [feed] production and so on. For them, livestock are a kind of capital, some part of which can be sold to buy goods, which are in great demand, and make a profit.

Mid-size farmers cannot secure large-scale reproduction [of livestock]. They manage only to maintain the number of their livestock and to provide for the moderate needs of their families.

Personal farmers (those having 1-3 cows, [and/or] 10-20 sheep) can provide for the minimum needs of their families. In the absence of other sources of income, such a family could find itself living in poverty.

From Sergei Kliashorny's Notes on his Research in Chuiskaja Oblast in Northern Kyrgyzstan

Sites of Fieldwork. All work in the first year took place, as planned, in two regions of Chuiskaja oblast' (in North Kyrgyzstan): Chui-Tokmoksii and Keminskii regions. Chui-Tokmoksii is a foothill region with well-developed agriculture and vast pastures. Near Bishkek in Tokmok (65 km away) there is a traditional livestock market, one of the largest in North Kyrgyzstan; a relative advantage in the management of trade of rural farms in the region. The research base was established in the village of AAAA, which is close to the rest of the foothill pastures adjacent to four small villages, at no time (since 1993) entered into the state farm AAAA, and also near to Tokmok, rural Zhany-Zhol and Ak-Beshim. In Keminskii region, the high mountain valley area of Chon-Kemin (1800 meters above sea level at the central part of the valley) was selected for research, an area bordering the Tian'-Shania glacier. Vegetation here appears a month later than in Chui-Tokmoskii region, and natural and climatic conditions (a combination of valley and alpine pastures and an abundance of natural springs) assist in the management of stock raising with seasonal vertical migration. In summer, herds from all parts of North Kyrgyzstan are driven to the outstanding pastures of the adjoining Chon-Keminskii Valley (50-60 km from the center of the valley). The team's research took place in the Chon-Keminskii Valley, on both riverbanks and in proximity to one or another of eight villages.

Work in AAAA Aul (Rural district, formerly called a village soviet). The liquidation of state farms and the start of new agricultural enterprises took place between 1993-1996. At present three types of farms have been established: OKX (Association of Peasant Farms, a type of cooperative farm which preserves the rights for its members the right of ownership of their land. The rules of OKX "AAAA" have their origin in Kyrgyz tradition and the Russian period (full information will be attached to the final report), agricultural farms, and individual peasant farms. The boundary between the latter two is highly indistinct and theoretical. The exceptions are the not infrequent small family cooperatives, which are not always stable, which follow the relatively marketable peasant-individual farms, which satisfy only family needs in goods, with minimal amounts available for market. It follows to stipulate that existing structures are not definite and are unstable; their long-term future depends on foreign circumstances, mostly in the form of fiscal and credit policies of the government and different forms of foreign support.

OKX "AAAA". *OKX "AAAA"* appears to be the successor of the fragmented ruins of the extensive and powerful state farms, which consisted of five villages until 1993. Now the *OKX* is composed of one half of the village of *AAAA* (1280 people), with each person allotted 0.6 hectares per person, that is, 3-4 hectares per family; composing a general irrigated field of *OKX* land. Dry agriculture and pastureland is controlled by the village soviet, and is used at far from its total capacity, by all inhabitants of the village. Due to a sharp decrease in the number of head, less than 30% of this land is being utilized. Irrigated fields of the *OKX* total 769 hectares and hayfields - 442 hectares. At the time of incorporation (February 1996) to the possession of the *OKX* 224 head of large horned cattle was transferred, but due to winter starvation this was reduced to 127. In absence of cash, cattle were used for payment of debt, and in this year only 43 head remained. All small stock (goats and sheep) was parceled out in 1993. The machinery of *OKX* consisted of 10 tractors and four combines, all inherited from the state farms and require constant maintenance. *OKX* inherited 1.5 million in debt.

In the *OKX* 47 full time workers and mechanics work, the rest of the members of *OKX* do not take part in production activities and their connection with the farms is limited to the receipt of a share of wheat. In 1997 every family received 126 kg of wheat for every hectare of their land. At the time of urgent seasonal work several rural dwellers or people from far away get jobs in a variety of seasonal work. This is especially practiced in the harvesting of sugar beets and in sugar refineries, and workers are paid not with cash, but with ground sugar. The main part of family income for members of *OKX* is generated from a) harvesting of personal plots; b) cattle raising; c) seasonal earnings in sugar beet production; d) trade, transport, construction services, hired work, and pension and insurance funds. All members of *OKX* are not immediate producers for the collective, but are peasant-individual farmers practicing irregular and supplementary farming. Some of these have formed family cooperatives, which combine labor efforts but not ownership.

Farming Homesteads. These are farms on which the general majority of cattle are concentrated and are engaged in reciprocal trade. Some of these farms appear to be family cooperatives under control of heads of families or by members who possess business "know how." In general the heads of families were also directors of the official state farms; they have agrarian, veterinary, zoo technological, and economic education and practical experience, or were mechanics/operators on state farms. The partition of the property of the state farms means that they managed to freely or cheaply acquire technology and cattle. Not one of these created farms appears specialized, however they sometimes appear to be trying. Attempts to create specialized sheep farms were undertaken by the administration of Chui-Tokmokskii region. This service consisted of rendering consultative assistance for farmers who have a specific number of sheep and sheep enclosures. The exception is the planning of veterinary services, reclamation/improvement of pastures and food resources, and improvement of marketing systems for sheep products.

Below are presented 2 examples of farms where stock raising (in one case - sheep herding; in the other - large horned cattle) is predominant. In the first case, it is a family cooperative; the second is an individual farm.

Example 1. Respondent XXXX (survey #18) separated himself along with his 2 brothers from the *OKX* and created what is called combined arable farming "stock raising peasant farm," which is composed of 3 families. They own 17 hectares of irrigated fields, with lengthwise distribution of crops and income from the sale of grain. Stock is held in common; two families take care of the harvest while the third raises the livestock. All are producers, and fiscal expenses are shared.

Stock is put on the pasture at a distance of 30 km, where they have yurts (traditional nomadic dwellings) for the stock raising family and enclosures for the animals; there are no other structures. The livestock spend all day on the pasture and are brought into the enclosure for the night. The animals remain here until autumn, when it is time to return to the farm (the home of the respondent). The main stock of the farm is sheep and large horned cattle, which provide livelihood for the third family by means of meat, wool, and milk production for the market and for their own use and for the 2 families which tend the fields. In turn, the crop farmers provide feed for the cattle in winter.

Example 2. Respondent YYYY (survey #19) separated from OKX and created his own farm: 13 hectares of irrigated fields for grain and feed, which he works together with his children. They also have 13 large horned cattle and several sheep. Though part of the production is sold at market, the respondent did not say how much he received for it. Though the respondent is considering the prospects of the raising of large horned cattle and the production of goods for market, he does not have the means for the expansion of his farm, such as the upkeep of cattle stalls (and pasture enclosures). As with other respondents, he considers it more beneficial to keep livestock on pasturelands for the entire growing period, bringing them into the cattle sheds and sheepfolds in winter. This is hindered by two factors: the multiplication of the number of wolves in recent years and especially by the almost universal theft of livestock, in which entire herds or flocks have been taken.

Virtually none of the respondents are driving their stock for market sale of meat. Stock is sold live due to the necessity for cash currency. Stock that is driven in is primarily for domestic consumption. The types of stock maintained are primarily for meat, which in the opinion of stock raisers are more suited to the current demand than fine-fleeced and semi fine-fleeced sheep. The wool of mutton sheep does not meet the demand of the market because of the domestic demand for felt.

Nevertheless, there are farms which have more than 90% semi fine-fleeced sheep.

Chon-Kemin. Chon-Kemin is a traditional stock-raising region. After the collapse of state farms and the general decline of livestock production, potato farms first appeared, started with materials purchased through an Israeli firm in Holland. As opposed to AAAA, which is 20 km from the major market in Tokmok, Chon-Kemin is 150 km away. The proportion of all stock production in the valley is 40% in the estimates of the economists of AO "Chon-Kemin." Virtually all stock, with the exception of small herds of yak and horses, are found on private farms. Nomadic herding is dominant in the region. Weak utilization of distant pastures is based on these conditions: a) large fields of free pasture in the near country and decreases of state farm stock using it; b) the abundance of wolves; c) theft of entire herds.

Example 1. Respondent ZZZZ (survey 52), formerly of the "BBBB" farm in the village of CCCC, now owns 7.15 hectares of irrigated fields - 5.15 for potatoes (for sale) and 2 hectares for feed. On his farm are 200 fine-fleeced sheep, 100 mutton sheep, 14 large horned cattle, and 27 horses. A hired shepherd and his family tend his stock on year-round pastures (with sheep enclosures), only cattle are driven to the country in winter. Migration is up to 18 km. Problems are the absence of trading establishments, and of artificial insemination centers needed for the support of animal pedigree.

Example 2. Respondent KKKK, along with his family and 2 brothers, has 11 hectares of plowed fields; of these 5.4 hectares are used for wheat and potatoes. They also have 100 hectares of pasture hay growing land. Land and animals (with the exception of personal plots) are owned jointly by the 3 brothers; one of who, along with his family, drives the

herds. These consist of 54 fine-fleeced sheep, 46 mutton sheep and goats, 16 large homed cattle, and 10 horses. They intend to increase the number of fine-fleeced sheep. He and his wife gain additional income by teaching at a school in the village of Tegirment.

From Russell Zanca's note on his research in Navoi Province in Uzbekistan

Contemporary farm organization continues to reflect Soviet patterns of collectivized agriculture. What distinguishes post-1991 collective farm organization (coinciding with Uzbekistan's declaration of political independence) from the Soviet period amounts to a series of reforms designed to make the farms less dependent on state subsidies and more dependent on their own financial accountability, which in turn means that farm leaders and bureaucrats must find buyers or traders for their products. The individual shepherds are permitted to freely buy and sell their own livestock, but not those owned by the farms. In the overwhelming majority of cases, shepherds and their families own a minor proportion of the sheep they care for with ratios rarely going beyond 1:10; 1:15-1:20 ratios are most often the case.

The state leaders, in the interests of reflecting what they think are core cultural values of local agricultural labor and village organization, have broken down the size and administrative apparatuses of the collective and state farms (kolkhozes and sovkhoses, respectively) into cooperatives, known in the Uzbek language as shirkat/s. In theory, these shirkat/s are supposed to encourage private enterprise and capitalist development by making each cooperative more and more independent of state planning, requisitioning, etc. Shirkat leaders and constituents are supposed to negotiate with one another to figure out best how to care for the well-being of the farm as well as to ensure the welfare of the people who make it work that is, the shepherds and their families. Today, in fact, the only true demand of the state regarding agriculture output, therefore targets, is grain specifically wheat production.

The state still provides shepherds and the farms with a number of important subsidies, including veterinary services, water supplies, maintenance of farm buildings and family housing, retirement benefits, education, and triage and primary care medicine. The farm leaders must ensure that feed is stocked for the animals during the winter and early spring and that adequate supplies for pedigree artificial insemination are on hand. In addition, special clothing for severe winter conditions on the pastures are made available to those directly employed by farms.

The Qoraqul primarily serve to supply Uzbekistan with meat. The secondary, and previously very lucrative, aspect of Qoraqul (QQ) rearing is the production of pelts for the creation of luxury garments, such as hats and coats. One of the most serious problems facing all the people involved in this industry today involves not only the terrible decline in official prices paid for these pelts but the general inability to work out any new consumer domestic or export markets for this highly specialized industry. With the state, primarily through a production plant in Bukhara, continuing to dominate almost all aspects of this industry, there seems to be little development of small-scale privatization in rural areas of direct production.

Decision-making abilities and powers remain a privilege and bastion of the elite, although individual shepherds will certainly attempt to deceive the kolkhoz administrators from time to time by under reporting their own livestock holdings (acquired via purchase, barter, or as part of property descent within a family), or by claiming that a number of the farm's sheep perished when the shepherd themselves either killed and ate them or used the animals for their own economic advancement. Shepherds see such acts as no more criminal or unethical than the methods of deceptions and cheating they believe the state administrators practice upon them.

Overall relations between local farm administrators and the shepherds may hardly be considered harmonious. The administrators claimed inability to pay these people their salaries, their removal of kolkhoz sheep from individual shepherd care (also a part of each shepherd's income), the ability of farm managers to "fire" shepherds who perform poorly, and the assigning of bad pastures (attar) to particular shepherds are among the reasons for a more or less antagonistic management-worker state of affairs. On this last issue concerning pasture assignment, more must be said.

The entire process of deciding who receives the best and worst attars is hardly a matter of chance or impartiality. Sometimes determinations stem from family history (continual lines of descent in a given spot) or the decisions may be based on bribery, other family connections to members of the local leadership and similar types of favoritism. Ideally, a more just system would provide for rotation of families living or working on kolkhoz attars. Obviously, the rule of thumb is that the poorer one is the less are his abilities to make decisions or to be treated fairly in terms of this all-important distribution system.

At the kolkhoz administrative offices procedures appear to take place in a very Soviet manner. The working day is started by an endless round of meetings between the director and his chief support staff, including economists, accountants, agronomists, and animal managers, and then lower level meetings between the director and chief support staff with those of lower rank, include tractor and truck drivers, brigade leaders, senior shepherds, etc. Some meetings focus on production figures, potential sale of animals or the working out of barter agreements with other regional enterprises, or the purchase of needed supplies. Many meetings are tense, desperate affairs with administrators chastising or bullying the lowly because of failures, lack of productivity, etc. and the proverbial begging for permission slips to obtain gasoline and repairs for decrepit vehicles and machinery. Despite the number of men engaged in meetings at these centers, there are almost always twice as many sitting around outside the buildings. Many do nothing day after day until orders come down from the administrators, who in turn wait for orders from Nurota district headquarters, who in turn await orders from Navoi and so on. Life in general is still something that is commanded.

The shirkats do worse, economically, than the kolkhozes, as shirkat leaders simply take sheep away from their shepherds, those sheep owned not individually, of course, but by the cooperative. In the end, the shepherds simply have less sheep to pasture, which greatly harms their livelihood. In terms of the upkeep and improvement of these shirkats, the decision-making input of shepherds is basically nil. It should come as no shock that most shepherds I interviewed and spoke with informally would like the return of the old Soviet system, for reasons that have little to nothing to do with political ideology.

Land privatization is almost a non-issue in Nurota. Some crop lands have been returned with the farm administration taking a percentage of the harvest. We knew of exactly one case of full privatization of land, sold by a farm to an individual, but the said individual told us that farms will not sell good quality land but only useless land. It is his idea to set up some kind of "business enterprise" on this bought land.

From Nurbulat Masanov's notes on his research in Almatinskaja Oblast and Chimkentskaaja Oblast in southeastern Kazakhstan

The following different types of farms were visited: (1) Individual Farms; (2) Production Cooperatives; (3) Agricultural Cooperatives; (4) State Public Agricultural Enterprises; (5) Private Agricultural Cooperative; (6) Member Farms; (7) Joint Stock Companies; (8) Private Peasant Households.

Masanov comments as follows on the problems of data collection:

The main problem of the investigation lay in the fear of the population regarding repression by tax inspectors, tax police, KNB, and other law enforcement organs. Every interviewer received 2-3 refusals, minimum, creating the greatest difficulty for the investigation.

Another problem lies in that the information communicated by informants regarding their income was obviously low. The data on expenditures in virtually all surveys exceeds reported income.

Practically all respondents gave low data on the number of cattle they have. The neighbors of the respondents pointed out that the number of livestock was actually more than the respondents reported. Even in this event, when parents and associates were interviewed, the number of reported livestock was considerably lowered.

Activity Two: Increased Lamb Production from Kazakh Finewool Flocks

Problem Statement

The sheep population of Kazakhstan has drastically decreased in recent years from approximately 30 million head in 1990 to approximately 13 million head in 1998. The emphasis on wool sheep and privatization of livestock are both causes for the decrease in sheep numbers. After World War II, the local meat sheep of Kazakhstan were largely replaced with Finewool sheep of Merino-type in order to provide raw wool for the Russian textile industry. The Kazakh Finewool was a new breed developed in the 1950's and 1960's for its wool production. Finewool sheep are superior to the local sheep for wool production but inferior for meat production. Economic collapse in Russia and a glut of wool on the world market has left Kazakhstan with few markets and unprofitable prices for its fine wool. There was little incentive to keep wool sheep since they were unprofitable. When sheep were privatized in the early 1990's, they were the major liquid assets of many farmers and were sold or bartered in order to obtain other agricultural inputs and household necessities. Many sheep were also consumed as food by the farm families.

An increase in the number of lambs raised per ewe in Finewool flocks can result in an increase in both the amount of lamb meat produced per ewe and an increase in the number of replacement females produced in order to help rebuild national flock numbers. With a higher reproductive rate, fewer ewes are required to produce the same amount of lamb meat. This results in less feed required to produce a kilogram of lamb meat and less pressure on range lands and other feed resources.

In collaboration with Kazakhstan's Center for Sheep Selection and Genetics (CSSG), a study was designed to evaluate the effectiveness of Kazakh and U.S. breeds of sheep to increase lamb production of Kazakh Finewool flocks through an increase in the number of lambs born per ewe. A flock of Kazakh Finewool ewes are being inseminated with semen from rams of the Kazakh Finewool, Kazakh Prolific, U.S. Polypay, and U.S. Rambouillet breeds. The Kazakh Prolific was developed by crossing Kazakh Finewool with the prolific breed of Finnish Landrace. The Polypay, also, is very prolific and is a four-breed cross containing both finewool breeds and the Finnish Landrace. The Rambouillet is the major finewool breed in the U.S., and the particular Rambouillet used in this project carry the FecB gene for increased ovulation rate. All two-way cross ewes resulting from these matings should have a greater prolificacy than the Kazakh Finewool ewes, but the

Rambouillet crosses should have comparable fleeces to the Kazakh Finewool whereas the Kazakh Prolific and Polypay crosses should have poorer fleeces.

More basic studies aimed at improving diluents for freezing ram semen were also planned in order to improve conception rates from frozen-thawed semen. Artificial insemination of sheep with fresh semen is common in Kazakhstan. The development of improved diluents that give high conception rates with frozen-thawed semen will allow the semen from desirable rams to be used at locations throughout Kazakhstan.

Progress

Improved Genetics for Lamb Production

Semen was collected at the University of Wisconsin-Madison from four Rambouillet rams with a high probability of carrying the FecB gene for high ovulation rate and from two Polypay rams in October-November 1997. Semen was extended, frozen into pellets (enough for approximately 500 breedings), and shipped to Kazakhstan. From November 19 to December 2, 1997, 602 Kazakh Finewool ewes at the experimental farm Aksengerskoe in Almaty oblast were inseminated with the frozen-thawed semen from Wisconsin and with fresh semen from Kazakh Finewool and Kazakh Prolific rams.

Ewes are generally mated in October -November in this region of Kazakhstan. However, since the project did not start until October 1997, it was not possible to get the frozen semen from the U.S. to Kazakhstan until mid-November, 1997. Therefore, the inseminations were conducted under very harsh conditions of extreme cold and heavy snow. However, it was felt that performing the inseminations under less than ideal conditions in 1997 was preferred over waiting until 1998 to perform the first inseminations.

Forty-five percent of ewes inseminated conceived. However, due to a very harsh winter and poor condition of ewes, 7% of pregnant ewes died prior to lambing, and 7% of ewes aborted prior to lambing. Therefore, 31% (184 ewes) of inseminated ewes produced lambs. Results of the insemination are presented in Table 1. The frozen-thawed semen from the U.S. was administered with two methods: placed in the cervix or surgically in the uterus. The intra-uterine method resulted in a greater conception rate than the cervical method for frozen-thawed semen. Fresh semen resulted in a higher conception rate than frozen-thawed semen.

Table 1: Conception rates of artificially inseminated Kazakh Finewool ewes.

Table 2. Lamb production of Kazakh Finewool ewes inseminated with semen from rams of the Kazakh Finewool, Kazakh Prolific, Rambouillet, and Polypay rams

The number of lambs produced from each breed of sire and the average birth weight of the lambs are presented in Table 2. Lamb birth weights are 25 to 30% less than normal, reflecting the poor state of the ewes prior to lambing. Lambs sired by U.S. breeds had birth weights that were approximately .2 kg heavier than the birth weights of lambs sired by Kazakh breed rams suggesting greater growth potential of the U.S.-sired lambs. There were 104 ewe lambs born from the four breeds of sire. If mortality and culling of individuals for defects results in a loss of 20%, there will be 80 to 85 ewe lambs to be retained for a comparison of Kazakh Finewool, Kazakh Prolific, Rambouillet (FecB+), and Polypay breeding for lamb production under Kazakhstan conditions.

The matings will be repeated again in October-November 1998 and, if needed, in 1999. The goal is to have at least 50 ewes in production sired by each of the four breeds of rams.

Improved Lamb Survival

Levels of lamb losses were determined at Aksengerskoe by Dr. E. Gessert in non-research flocks during April 7-14, 1998 and by farm and CSSG research personnel in the research flocks from April 15-May 8, 1998.

When Dr. Gessert arrived at Aksengerskoe, lambing had been in progress for approximately two weeks. Estimates of lamb mortality were 15 to 30% which was higher than normal and attributed to the poor nutritional status of the ewes. Necropsies of dead lambs revealed that the major causes of lamb deaths were navel ill and starvation/hypothermia. In Dr. Gessert's opinion, incidence of both conditions could be lessened with better feeding of pregnant ewes. The incidence of navel ill could be further reduced through treatment of navels of newborn lambs with 7% tincture of iodine. Iodine is available in Kazakhstan and has been used by the shepherds at Aksengerskoe. However, the cost is 2 to 3 times that in the U.S. and there was none available to the shepherd's for financial reasons.

In the two research flocks used for artificial insemination, 285 ewes lambed and gave birth to 355 lambs from April 15 to May 8, 1998. During the lambing period, 42 lambs died (12%); which is a lower mortality percentage than for the non-research ewes which lambed earlier in the season. As in the non-research flocks, navel ill was the major cause of lamb death.

Excerpts from Dr. Gessert's Report

Data Collection. The location of the study was the Aksengerskoe Farm outside of the village of Aksenger west of Almaty. The farm has six different flocks of approximately 400 ewes each. They are a mixture of purebred and crossbred animals including Kazakh finewool, Kazakh prolific and native fat tail breeds. The mature body weight of the ewes is approximately 55 kg. The shepherds were asked to collect lambs that had died within the previous 24 hours. Necropsies were performed on the lambs and the following data was collected -lamb ID (from ear tags or paint brands), age at death, body weight, litter size and cause of death. Information on age and body condition of individual dams was not available as the ewes were turned out to pasture during the day.

The shepherds were interviewed to determine estimates of lamb mortality rates as well as their impressions of the causes of lamb loss. The two veterinarians who work on the farm were also interviewed about routine disease preventive practices and nutritional management of the flock. Inspections were made of the pastures, lambing facilities and the livestock. Fecal samples were collected for two flocks for parasite examination.

All agreed that the mortality was much higher than normal this year due to a difficult winter and lack of feed for the ewes. There was more snow cover than usual, the spring grass was three to four weeks late and they had difficulty getting supplemental feed. This resulted in the ewes going into lambing in poor body condition and with reduced milk supply. The average body weight of lambs necropsied was 2.0 kg. with a range of 1.0-2.5 kg, for one to ten day old lambs. As a reference, birth weights in the experimental Merino flock kept at the institute were 3.5-4.5 kg. This flock received adequate supplementation all winter. British studies report optimum birth weights for maximum survival to be from 3.7-5.5 kg. Low lamb birth weights are usually due to inadequate nutrition during late gestation. The body condition scores of ewes due to lamb within the next two weeks were in the range of 1.5-2.5 on a five point scale (0=emaciated, 5=obese). Ideal condition at lambing is 3.0-3.5.

Necropsy Results. Causes of lamb deaths were categorized as stillborn (0), starvation/hypothermia (3), pneumonia (2), trauma (0), omphalophlebitis/navel ill (5), enteritis (1), unknown (1). Diagnoses were based on gross findings and were not confirmed by laboratory analysis.

Disease Prevention Programs. Routine vaccination of the ewes includes enterotoxemia given one month before lambing as well as brucellosis and anthrax annually during the summer. However, due to financial constraints, the flocks were not vaccinated for enterotoxemia this year. Other disease prevention measures include post-shearing treatment for external parasites and an annual treatment using 1% copper sulfate for internal parasites.

Two state run veterinary pharmacies located in Almaty were visited to determine the availability of livestock health supplies. A wide variety of antibiotics, anthelmintics, external parasiticides and other miscellaneous drugs are stocked. Most are imported. Enterotoxemia vaccine was not available the day we visited but we were assured it could be ordered for delivery the following day. Prices were similar to or less than U. S. prices for commonly used products. The exception to this was 7% iodine which was two to three times more expensive.

Lambing Time Procedures. Ewes close to lambing are kept near the barns and give birth either in nearby pastures, in pens or, during bad weather, in the barn. The lambing season starts during the last week of March and lasts about six weeks. After she lambs, the ewe and her lambs are placed in an individual pen (jug), her udder is checked for milk and the lamb's umbilical cord is dipped in strong iodine. The importance of this practice is widely known but few lambs examined had been treated with iodine. They are kept in for about two days before being turned out with the flock of lactating ewes. If the weather becomes cold and wet during this time, the flock is brought into the barn where the lambs are sorted off into group pens and the ewes turned back out to graze. They are brought back to nurse the lambs in the middle of the day and again at night. If the weather is good the lambs go out with the ewes.

Housing and Facilities. Barns were in use primarily for the storage of grain for the ewes as well as for sheltering the young lambs. Lambing jugs were clean and of adequate size, however, no bedding, feed or water were observed in the jugs or in pens where young lambs (1-2 days old) were kept while the ewes were grazing. Floors were of cement or packed dirt. Ventilation was poor and the air damp on wet days when the doors were kept closed. Pens were of adequate size and the flocks were kept outdoors as much as possible.

Recommendations. Overall knowledge of sheep husbandry is very good. The observation of lamb necropsies by farm personnel served to reinforce the importance of disease prevention practices already recommended. The failure to follow good management practices appears to be due to a lack of necessary supplies rather than lack of knowledge.

In my opinion, the major cause of the high lamb mortality is poor nutrition of the ewes during late gestation. It will be essential to insure that emergency feed supplies are available for use at this time. Making trace mineralized salt available would help prevent mineral deficiencies without requiring the use of mixed concentrates. Locally grown grains could then be used for energy supplementation, minimizing the need for processing. Lucerne could be used as a protein supplement as needed depending on the quality of native grass hay. Forage analysis is not currently performed and would be necessary for the determination of a balanced ration.

The most commonly observed cause of lamb mortality was omphalophlebitis, a septicemia

that develops from the migration of bacteria into the umbilical cord at birth. Prevention of this disease is through adequate colostrum consumption within two hours of birth, excellent sanitation in lambing areas and dipping of the umbilical cord in 7% iodine at birth. As was mentioned earlier in the report, iodine is quite expensive in Kazakhstan and the shepherds had already run out of their supply. Finding an economical and dependable source of iodine will allow them to use it on a regular basis to help prevent this problem.

Good colostrum management is essential to the prevention of neonatal lamb loss. Colostrum provides energy to prevent starvation and hypothermia as well as antibodies to protect the lamb from infectious disease. Some of the lambs necropsied had never nursed. In these cases it is important that the shepherd provide colostrum to the lamb within the first two hours of life. Demonstrations of tube feeding were done at each flock location and feeding supplies were left with the shepherds. Recommendations were made to tube feed any weak lambs, those whose dams did not have adequate colostrum, underweight lambs (< 3 kg.) and any from litters with more than two lambs. Cow colostrum can be used if ewe colostrum is not available. The amount given is 20 ml./kg, and should be repeated two hours later if the lamb is not nursing on its own.

Separation of lambs and ewes during the first few days of life may lead to poor maternal bonding and eventual lamb starvation. While this practice is necessary when stored feed supplies are limited, I would prefer to see the ewes with newborn lambs fed and watered in the barn during bad weather. This would require the availability of stored feed at lambing time. Ewes in lambing jugs should have feed and water available at all times and bedding should be used to keep the lambs clean and dry.

Summary of recommendations for reducing lamb mortality:

1. Ensure proper nutrition during the last month of gestation by having emergency feed supplies available.
2. Dip each lamb's umbilicus in iodine at birth to prevent infection
3. Provide colostrum to lambs that are too weak or small to nurse at birth as well as to those in large litters (>2).
4. Provide feed and water ad lib to ewes that have recently lambed.
5. Use bedding in pens to improve sanitation and keep the lambs dry.

Supplies were left with Dr. Nurlan Malmakov to continue monitoring of lamb mortality and for use in the project flock during lambing time.

Forage Availability

Dr. Steven Sharrow, Department of Range Science, Oregon State University, accompanied Dave Thomas in Kazakhstan from Aug. 8-15 to assess forage availability in mountain pastures and on semi-arid and arid range lands. In order for the prolific crossbred ewes to be more productive than Kazakh Finewool ewes, there must be sufficient nutrition available to support their increased production. Increased nutrition is necessary during late pregnancy (winter), lactation, (spring), and for lamb growth (summer). We viewed the mountain pastures the experimental ewes and lambs were grazing and found them to have a large amount of forage of great diversity and of high quality. The excellent appearance of the 1998-born lambs was evidence of the high quality of the pastures. The winter and spring pastures where ewes spend their pregnancy and lactation periods are of lower quality and are the major limitations to sheep production. Strategic supplementation of ewes for one month prior to lambing and for two months after lambing while on the semi-arid and arid winter and spring range will be necessary in most years to realize the full potential of the prolific cross ewes.

Excerpts from Dr. Sharrow's Report

The sheep industry in Kazakhstan is predominately forage based. Sheep spend the winter in the desert steppe where their lambs are born. As snow begins to melt in the late spring, herds of livestock are moved up into the mountains to take advantage of green feed. Livestock follow the progression of vegetation up into the mountains, eventually reaching alpine pastures at elevations above 3000 m. This migratory pattern probably mimics traditional grazing strategies present long prior to Soviet times. Similar patterns were common in the Intermountain West of the United States prior to the Taylor Grazing Act of 1934. The migratory sheep bands in the U.S. were also kept predominately for wool. Many of these bands contained a high proportion of weathers.

The similarity of vegetation within the desert steppes and mountain plant communities of Kazakhstan and the Western U.S. is striking. The structure of the communities is similar and they share a large number of the same plant species. Technology transfer between the two regions should be relatively straight forward. USDA plant breeders have used many plants from Kazakhstan in their search for improved plant species suitable for our cold desert steppe areas in the Intermountain West. Introduced *Agropyron* species such as *A. desertorum*, *A. cristatum*, *A. sibericum* (collectively called crested wheatgrass) are widely planted in the western U.S. Other past imports, such as *Kochia prostrata*, have quite a bit of unrealized potential. The importation of sagebrush (*Artemisia* sp.) which are palatable to livestock could also be very useful to U.S. livestock producers. However; the flow of improved hybrids and exotic species back to Kazakhstan appears to be relatively small.

Past grazing practices have resulted in some over exploitation of vegetation. This is especially true of the desert winter ranges, which are inherently less resilient than the more mesic summer mountain rangelands. Of Kazakhstan's 125 million hectares of arid and semi-arid rangelands, 60 million are degraded. The mountain meadows which we visited in the Raimbek District also showed signs of past overgrazing. Although livestock numbers in general have declined substantially since 1991, those livestock which remain are concentrated on a smaller resource base. In the case of the flock we visited, the sheep do not reach as high an elevation as was previously the practice, now spending more of the grazing season on lower elevation meadows. Lack of adequate roads and vehicles to service encampments high up in the mountains was given as the reason for the abbreviated grazing zone. Since the collapse of the Soviet Union, lack of adequate maintenance of roads and water developments has restricted the distance livestock can be grazed from the farm headquarters.

Although our project is focused upon sheep production, sheep share forage resources in the mountains with cattle and in the desert winter range with both cattle and camels. Range managers in the U.S. calculate forage demand in animal unit months (AUM). The amount of forage consumed by one cow or 5 sheep in a month is one AUM. Although sheep and cattle numbers have dropped precipitously since 1991, cattle numbers have not dropped as drastically as sheep. Therefore, the total numbers of AUMs have not dropped as much as sheep numbers might suggest. There were approximately 168 million sheep+cattle AUMs in 1991 compared to 96 million AUMs in 1997. When one considers the general tendency of sheep to be herded farther from headquarters than cattle, the potential for overgrazing of easily accessible areas is substantial. So, one might expect that the lower livestock populations will result in distant, less accessible areas, and arid areas without water remaining ungrazed while grazing on accessible areas with water, near to towns and villages, will increase. This will produce a large scale landscape pattern of undergrazed and overgrazed areas.

In the case of small ruminants, such as sheep, the forage issue is often one of quality as

much as quantity of forage available. Forage on the summer range in the mountains is generally of high quality. However, desert rangeland in the winter has problems of both quality and quantity of forage available. The main source of forage from fall until spring green-up is dry grass and evergreen shrubs. Unfortunately, this is a time when high nutritional demands of late pregnancy must be met by ewes from a diminished stomach volume because of the abdominal space occupied by a rapidly growing fetus. It is especially important that the forage consumed at this time be high in nutrients and rapidly digestible. Dry grass meets neither of these criteria, making evergreen shrubs very important dietary components of the winter range. *Agropyron* species green up relatively early in the spring and will regrow if grazed prior to their initiating flowering culms. This so called "two crop" grazing system is used in the U.S. to extend the high quality period of crested wheatgrass stands until late spring.

Suggestions. To a large extent, the rangeland resources being used, the general nature of the livestock industry, and land tenure issues in Kazakhstan today strongly parallel the range-livestock situation in the U.S. Intermountain West prior to the Taylor Grazing Act of 1934. It might prove useful to look at this past experience in considering social, political, and economic implications of the changes underway in Central Asia.

It is generally agreed by herders, livestock breeders, and range/pasture managers in Kazakhstan that the single most limiting forage resource for sheep production is the winter range in desert and semi-desert steppes. The Kazakh Forage Production and Range Institute has done some work on improvement and management of the winter range. They assert that the technology now exists to double the carrying capacity of the desert range by establishing and managing for shrubs such as *Kochia prostrata*, *Ceratoides lanata*, and palatable *Artemisia* species. However, some of the research plots showed signs of significant soil loss. This work should be built upon by establishing reciprocal trials in Oregon and Kazakhstan of improved varieties of these shrubs together with the importation of additional shrubs such as *Atriplex* species for evaluation in Kazakhstan. Improved desert grass and shrub varieties, which could prove useful in Central Asia, exist in the U.S. and Canada. Work on management of improved desert and semi-desert grass shrub steppe pastures also needs to be expanded so that production systems can be adjusted to do a better job of protecting the soil from erosion.

Although the mountain summer ranges are currently perceived as being adequate to meet current needs, they are a fundamental part of the forage base and should not be neglected. It is on the mountain range, with its abundant high quality forage, that ewes and lambs gain most of their weight for the year. Relatively little work has been done on the subalpine and alpine zone vegetation since the 1930s. At the very least, a quick survey should be undertaken to ascertain their current condition and apparent trend to see if problems are apparent. Overgrazing not only reduces forage quantity, but reduces forage diversity, interfering with the ability of sheep to choose a highly nutritious diet and increasing the possibility of them eating poisonous plants such as *Hypericum perforatum*. Some evidence of photosensitization, probably from consumption of *Hypericum perforatum*, was evident in the flock of sheep grazing in the mountains in the Raimbek District.

A broader geographic and historic overview of Kazakh pasture resources is provided in the paper prepared for this project this year by Leonid Serebryanny and Igo Zamotaev, "The Pastures of Kazakhstan: Natural Background, History, and Present State." The paper draws on their own earlier work and the literature to provide a valuable context for more detailed field work.

Semen Diluents

A study was conducted at CSSG to evaluate the effect of adding amino acids to a standard diluent on motility of frozen thawed sperm. The four amino acids added were arginine, betaine, glutamine, and proline. Each amino acid was found to improve the motility of frozen-thawed semen. Work will continue to determine optimum amount of amino acid to be added to the diluent, promising diluents may be used in an A.I. trial to determine conception rates.

Gender

Three of our regional collaborators are women, the two who lead the northern Kazakhstan survey team and the regional coordinator. The veterinarian who did the lamb mortality study and conducted related training is a woman. The two survey researchers participate in all the short-term training that the male survey researchers do.

The three UW-funded research assistantships were advertised widely on campus and the three best candidates were awarded the positions. They are all male. One female applied and seemed a strong candidate, but she subsequently received another offer that she found more attractive.

With regard to female producers: 26 of the 114 producer-respondents in the southern Kazakhstan survey were women, 3 of 91 in northern Kazakhstan, 6 of 72 in the Uzbekistan survey, and 4 of 60 in the Kyrgyzstan survey. This a region where female-headed households are not common and where the pattern of male migration to cities has not yet become a widespread phenomenon. One section of the questionnaire deals specifically with male/female decision-making responsibilities.

Policy

Although new forms of agricultural organization in the region are still a matter of ongoing debate and experimentation, most of the decisions on the livestock sector are top down. Not infrequently such decisions are inspired by political considerations more than by sound economic considerations. Besides, we have discovered a discrepancy between decisions made on governmental levels and their implementation by local administrators and managers. Under the situation, various governmental bodies have incomplete and insufficient information of the problems, attitudes and initiatives of immediate producers. However, the continuing deterioration of the livestock sector pushes, at least, some policymakers to indicate an interest in our data and recommendations, inasmuch as our field surveys seek to identify viable new forms of agricultural organizations as well as policies and practices that put constraints on their development.

In planning the research, we consulted with the ministries of agriculture in Kazakhstan, Kyrgyzstan, and Uzbekistan. In Kazakhstan, the Minister of Science has taken a special interest in our research.

We are holding a conference in Almaty, Kazakhstan on January 9-10, 1999, to present results from our research and from work by others on related topics. Kazakh policy makers have been invited to the conference. In addition, depending on who can and cannot come to the conference, we may hold individual meetings with policy makers in the new capitol, Astana, after the conference.

Outreach

The outreach target for part of our project is the group of relevant policy makers in each

country, as discussed above. In addition, the sheep reproductive efficiency research is aimed at producers. Our collaborating institution, the Kazakh Center for Sheep Selection and Genetics, has well established mechanisms for distributing improved animals throughout the country.

The experimental work is conducted on the cooperative farm Aksengerskoe and favorable results from the study will be incorporated into their sheep management system. If any of the crosses prove successful at Aksengerskoe, breeding stock will be offered to other private and cooperative farms. In addition as we focus our socioeconomic research on a subgroup of farms selected for in-depth study, those farms may also be appropriate sites for on-farm trials.

Developmental Impact

As discussed above, the project attempts to improve understanding of emerging forms of farm organization with the intent to identify factors that promote changes that are favorable to evolution of a livestock sector that contributes to economic development and democracy.

This project also attempts to increase lamb production so Kazakhstan can increase its sheep numbers and increase its lamb meat production at the same time. A flock of prolific sheep requires fewer number of ewes to produce a given amount of lamb meat compared to a flock of less prolific sheep. This reduces forage needs and results in less overgrazing and less degradation of range lands.

Results of this experiment have direct application in the U.S. Much of the sheep industry of the western and southwestern states of the U.S. is based on the production of finewool sheep. Due to low world wool prices and loss of a government subsidy program on wool in 1995, wool sheep production is unprofitable, and U.S. sheep numbers are falling. U.S. sheep producers in the western range states need to switch their emphasis from wool to lamb production.

Other Contributions

The focus on the organization of livestock farming bears directly on free markets, broad-based economic growth, concern for individuals, and support for democracy. The so-called "nomenclatura privatization" in which the former communist elite grab productive state assets for their private gain is prevalent in agriculture as it is in industry and banking. In many cases this may condemn former kolkhoz and sovkhos members to lives as poor, landless laborers. To the extent that we can identify mechanisms to help large numbers of families become successful private farmers, the project will contribute to the aforementioned worthy goals.

Leveraged Funds and Linked Projects

The University of Wisconsin contributions nearly doubled the size of the project grant by contributing over \$303,000 through matching, leveraged and other UW contributions. The major portions of the contribution were in the form of faculty and staff time devoted to the project. This time was valued at \$202,770, of which \$114,034 was in addition to the required 25% match. In addition, the Graduate School and the College of Agriculture contributed three half-time Research Assistants (valued at \$81,564); the College of Letters and Science contributed \$6,250 in travel funds; and the Babcock Institute for International Dairy Research contributed the equivalent of \$12,500 in administrative and training support services.

In another related activity, Russell Zanca received a National Council for Eurasian and East European Research grant to produce a study entitled "Uzbeks into Peasants: A Managed Transition Toward A Controlled Market." The \$40,000 grant will allow Zanca to build upon his earlier work in Uzbekistan and the research he completed under this project during July and August. Anatoly Khazanov is serving as Zanca's post doctoral advisor and will assist with synthesizing the Uzbekistan findings into the overall project report.

We have maintained communication with ISNAR as they develop their strategy for involvement in Central Asia. Our experience with the Kazakh Center for Sheep Selection and Genetics would be a useful case study for their work. We are also in close communication with the BASIS CRSP as they develop their plans for the region. We have invited a BASIS representative to attend our Almaty conference, and they have indicated that they will use their own funds to do this. Finally, as the UC-Davis project and the UW-Madison project publish the results of their first year's work, the areas of synergy will become more apparent.

Training

Nurlan Malmakov received training at the University of Wisconsin-Madison in transcervical and intrauterine artificial insemination of sheep from Jan. 4-16, 1998.

Dr. Mary Gessert trained veterinary staff from the Aksengerskoe cooperative farm and from the Kazakh Scientific Research Technological Institute of Sheep Breeding in lamb necropsy techniques, and management of preparturient ewes and newborn lambs in Kazakhstan for a week in April 1998.

Our socioeconomic regional collaborators are accomplished senior scholars. However, they have had limited exposure to western research methods. Thus there is an element of ongoing training as we work closely with them on design of the questionnaire and analysis of the data.

Collaborating Personnel

Central Asia

M. Abuseitova, Director, Institute of Oriental Studies, National Academy of Sciences, Kazakhstan, local coordinator for all operations

K. Medeubekov, Kazakh Scientific Research Technological Institute of Sheep Breeding, lead investigator in sheep breeding component

N. Malmakov, Kazakh Scientific Research Technological Institute of Sheep Breeding, co-investigator in sheep breeding component

K. Kasymov, Kazakh Scientific Research Technological Institute of Sheep Breeding, co-investigator in sheep breeding component

N. Masanov, Institute of Oriental Studies, National Academy of Sciences, Kazakhstan, drafted original core questionnaire for all surveys, drafted revisions for second year, drafted structure for in-depth study of successful farmers, leader of the southern Kazakh survey team

A. Kalyshev, Kazakhstan State University, co-investigator with Masanov in southern

Kazakhstan.

S. Sagnayeva, Western Kazakhstan University of the Humanities, co-leader of the northern Kazakhstan survey team

K. Kokombaev, Bishkek (Kyrgyzstan) Humanities Institute, member of the Kyrgyz survey team

A. Zhaparov, Department of Ethnography at the Kyrgyzstan Institute of History, member of the Kyrgyz survey team

S. Berdikulov, Department of Sociology and Political Sciences , Oshkii (Kyrgyzstan) State University, member of the Kyrgyz survey team

E. Suleimanov, Department of Kyrgyz History, Oshkii (Kyrgyzstan) State University, member of the Kyrgyz survey team

N. Babakulov, Samarkand (Uzbekistan) Karakul Sheep Institute, member of the Uzbek survey team (leader was a US postdoc with experience in Uzbekistan)

I. Alimaev, Deputy Director, Kazakh Scientific Research Institute of Fodder Production and Pastures, has written two commissioned papers for us, has provided consultation on rangelands in different ecological zones

Z. Zhambakin, General Director, KazAgro Co-op (Kazakhstan), Institute of Economics and Organization of the Agro-Industrial Complex, has written two commissioned papers, has provided consultation on the privatization process in agriculture, is reviewing reports by survey teams, is scheduled to come to UW this spring.

Russia

O. Naumova, Institute of Ethnology and Anthropology, Russian Academy of Sciences, co-leader of the northern Kazakhstan survey team

S. Kliashtorny, Institute of Oriental Studies, Russian Academy of Sciences, leader of the Kyrgyz survey team

United States

Yves M. Berger, Spooner Agricultural Research Station, University of Wisconsin-Madison.

Randy G. Gottfredson, Department of Animal Sciences, University of Wisconsin-Madison.

Anatoly Khazanov, Department of Anthropology, University of Wisconsin-Madison.

John Loncle, International Agricultural Programs, University of Wisconsin-Madison.

Kenneth H. Shapiro, Associate Dean, International Agricultural Programs, University of Wisconsin-Madison.

Steven Sharrow, Oregon State University, Dept. of Rangeland Resources.

David L. Thomas, Department of Animal Sciences, University of Wisconsin-Madison

David Weber, International Agricultural Programs, University of Wisconsin-Madison.

Russell Zanca, Anthropologist, Northeastern Illinois University.

Rob D. Zelinsky, Department of Animal Sciences, University of Wisconsin-Madison.

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