



# Enhancing Livestock Production Systems in Tajikistan to Mitigate Potential Impacts of Climate Change

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## Research Brief

Feed the Future Collaborative Research Innovation Lab: Adapting Livestock Systems to Climate Change

### Abstract

*Because of political instability, drought and deforestation, livestock feed availability has declined by as much as 60% in Tajikistan over the last 20 years, while more Tajik households have turned to raising livestock as an income source. The result is a serious deficit in feed quality and availability in the country. In our study, we hope to address this issue by creating four community-based interventions to increase livestock fodder and forage availability in different regions in Tajikistan. We conducted a stakeholder meeting in March 2011, established regional demonstration sites and devised a research and education plan for each. Our research identified forage crops and fertilizer rates that produced maximum livestock nutrition in each region measured by crop yield and animal weight. We helped train more than 80 Tajik farmers about good agricultural practices like pasture rotation and re-seeding of pastureland.* 

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### Background

Tajikistan, the poorest nation in Central Asia, has been identified as a country in critical need of international aid by the United States' Feed the Future food security initiative. Agriculture plays an important role in Tajikistani life. More than two thirds of the population is involved in farming or raising livestock, which contributes 30% of the country's gross national product.

While it was a member of the former Soviet Union, farming in Tajikistan was centralized and focused on wheat and other grain crops, although farming yields were modest. After the collapse of the U.S.S.R and a subsequent civil war, agriculture in Tajikistan has become more individualistic. Instead of raising crops, more people are turning to raising livestock for their livelihood, even as the country is producing 60% less livestock feed.

Regional temperatures in Central Asia are predicted to rise far more than global average temperatures, according to the Intergovernmental Panel on Climate Change. High temperatures and shrinking glaciers will cause severe threats to agricultural and livestock systems in Tajikistan. It is our purpose to help educate farmers about the threat of climate change so they might strengthen their agricultural practices.

In addition to warming temperatures and a growing livestock industry, Tajikistan has also experienced severe deforestation. The lack of plant fuel means more and more animal manure is used for heat and cooking fuel instead of fertilizer, which further degrades the quality of pastures and increases the need of supplemental feed for livestock.



*Sheeps and goats on the summer pasture. (photo: Nanda Joshi)*



## Our Study

In order to address the growing need for availability and quality of livestock feed, we began an exploratory project to identify production issues that will be essential for the improvement of livestock production in each of the four regions of the country.

In March 2011, we held a workshop to identify issues in the country as a whole and in each of the four administrative regions. Representatives from Michigan State University (MSU), the International Center for Agricultural Research for Dry Area (ICARDA), the University of Central Asia, and the USAID Family Farming Program attended alongside participants from the four administrative regions of Tajikistan. During the workshop, our collaborators made plans to engage local farmers and develop regional experimental pasture sites.

*“In order to address the growing need for availability and quality of livestock feed in Tajikistan, we began an exploratory project to identify production issues that will be essential for the improvement of livestock production.”*



*Farmers meeting, Muckoy Jamoat, June 15, 2011 (photo: Nanda Joshi)*

These representatives identified pasture degradation as the most significant problem affecting livestock production in the country. They suggested that our efforts should focus on educating local farmers about crop rotation, pasture management, reseeding of pastures and establishing pasture user groups.

At each demonstration site we took a census of native plants and calculated their population per hectare and wet and dried weight per hectare. We then, with the help of local farmers, planted locally adapted,

high yielding Nitrogen-fixing forage crops including leguminous crops to test their ability to enrich pastureland and increase the livestock feed supply without disturbing the local food systems. We also ran trials to establish optimal fertilization practices for local hay fields.

The demonstration sites also served as a focal point for teaching local farmers and NGO representatives about the benefits of planting forage crops and shrubs as both livestock forage and household fuel. The sites will help us to develop more comprehensive training programs, in both Tajik and Russian, to communicate with more local stakeholders about good livestock management and agricultural practices, including seeding pasture land with forage crops and seasonal pasture rotation.



*Cultivated Oats. Khatlon, Tajikistan (photo: Nanda Joshi)*

## Our Results

*“Our experiments demonstrated to farmers that local pastures were significantly degraded by overgrazing. We strongly recommended they adopt rotational grazing plans.”*

We measured pasture productivity by taking wet and dry measurements of grasses in the demonstration sites and comparing them to village pastures. In each of our hay trials, we were able to demonstrate increase in amount of available forage by applying nitrogen-rich fertilizer. We also identified the forage crop or crop combinations that provided the highest forage yield at each of the sites. Our preliminary results showed that forage crop production could be increased by as much as 40% through good crop management practices.

Our local collaborators measured the comparative weight gain of animals taken to summer pastures versus those that were kept on



Region	Optimal fertilizer rate for hay fields	Crops with best yield	Productivity of demonstration site versus control	Average weight gain from summer pasture (for sheep and goats)
Republic of Regional Subordination	30-40 kg/ha	Alfalfa with oats and barley; corn, sunflower in winter	Alfalfa 30% Esparcet 22.7%	8-10 kg
Khatlon	30-35 kg/ha	Alfalfa with oats and barley	30%	7-8 kg
Gorno-Badakhshan Autonomous Region	60kg/ha	Barley, oats, maize, rye, alfalfa, clover, esparcet	25-30%	8 kg
Sogd	30-40 kg/ha	Soya, green mass maize, alfalfa, esparcet	28-34%	6 kg

Table 1: Study results showing data collected.

*“Through our demonstration sites, we were able to train more than 80 local farmers in good forage production practices with the goal of enhancing their livestock productivity, nutrition and health management of their livestock.”*

village pastures as an experimental control. Sheep and goats that were moved to summer pastures gained up to 6kg compared to those that remained on village pastures. Our experiments demonstrated to farmers that local pastures were significantly degraded by overgrazing and we strongly recommended they adopt rotational grazing plans after the study was completed.

Through the demonstration sites, we were able to train more than 80 local farmers in good forage production practices with the goal of enhancing their livestock productivity, nutrition and health management of their livestock. We also reached out to female farmers, 16 of whom participated in our study.

We aim to publish the results of this study in the coming months. In

the future, we hope to include data on the affects of shrub planting as a food and fuel source so that animal manure can be used as fertilizer. Because of shrubs' longer growth and establishment periods, this information was not available during our study.

Our education efforts will continue through local representatives and NGOs. There are several ongoing and new initiatives under USAID in the country. The Research Institute of Livestock (RIL) under TAAS has partnered on the project and is attempting to leverage resources from this LCC CRSP project to continue the farmer outreach and education programs. The demonstration sites will become part of the regular work of the RIL. 🐮



Alfalfa trial. Jirgatol, Tajikistan (photo: Nanda Joshi)

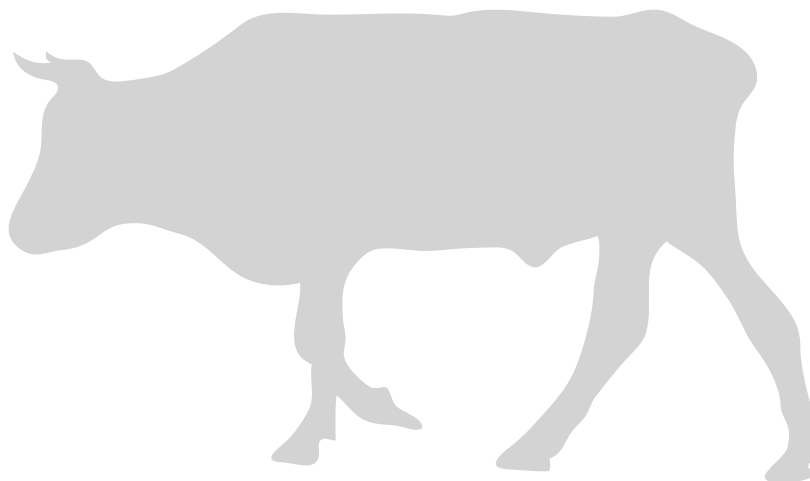
## Further Reading

Sedik, D., 2009 The Feed-Livestock Nexus in Tajikistan: Livestock Development Policy in Transition, FAO Regional Office for Europe and Central Asia, No. 2009-2, Pp 1.

Brent, L. 2007. Report on ICARDA Project “Community Action in Integrated and Market Oriented Feed-Livestock Production in Central and South Asia.” Pp 34

FORT: Enhancing livestock production systems in Tajikistan to mitigate potential impacts of climate change

<http://lcccrsp.org/research/asia/fort/>



## *Capacity-building and Strengthening of Livestock Production Systems While Adapting to Climate Change in Nepal (SLPS)*

*Principal Investigator: Durga D. Poudel, University of Louisiana at Lafayette*

*The SLPS project was initiated to: (1) identify factors responsible for the downward spiral of the livestock production system, (2) identify impacts of climate change on livestock production and the adaptation measures practiced, and (3) assess opportunities and challenges for capacity-building at the national, district, and local level.*

*Rapid land use changes, forest degradation, soil erosion, climate change, policy deficits, and community inability to handle these challenges have caused a downward spiral of the livestock production system in Nepal. We hypothesize that the livestock production system in Nepal is intricately related to forest resource, soil quality, and crop productivity, and its development and adaptation to climate change requires capacity-building and strengthening of the production system. We have tentatively identified a representative watershed in Nuwakot district for this study. An interdisciplinary team will be involved in reconnaissance surveys, household surveys, group interviews, field visits, and round table discussions for a comprehensive understanding of the livestock production system and its adaptation to climate change. Assessment of challenges and opportunities for capacity-building at the community level will be done by forming Community Livestock Groups in the watershed and conducting various activities in relation to skills development such as feed storage, feed quality improvement by enriching rice straw with urea, and livestock monitoring. Similarly, capacity-building at the national, district and local levels will be assessed through institutional analyses, policy reviews, and office visits. Research results will be disseminated through various media outlets including scientific journals, newspapers, meetings, workshops, conferences, and community organizations.*



**Feed the Future Collaborative Research Innovation Lab: Adapting Livestock Systems to Climate Change** is dedicated to catalyzing and coordinating research that improves the livelihoods of livestock producers affected by climate change by reducing vulnerability and increasing adaptive capacity.

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