



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

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

**Collaborators:** Ram Pukar Thakur, Animal Health Division  
Nepal Agricultural Research Council, Khumaltar, Lalitpur, Nepal  
Amleshwar Singh, CARE-Nepal, Lalitpur, Nepal

RB-02-2012

February 2012

## Research Brief

Adapting Livestock to Climate Change Collaborative Research Support Program

### Abstract

*Forest resources, soil productivity, crop production, and farm labor are intricately linked with livestock production systems in Nepal. These systems are deteriorating due to massive deforestation and forest degradation, declining soil productivity, climate change, and insufficient food and human nutrition. We began a comprehensive study of a livestock production system in the Thulokhola watershed in Nuwakot district, Nepal to document livestock production system and its adaptability to climate change. We formed nine community livestock groups (CLGs) whose members assess community assets by monitoring water quality, recording livestock production, collecting livestock fecal samples to test for parasites and fodder samples for nutritional determination. Members attend trainings and workshops about adapting livestock production systems to climate change. Preliminary findings show that the watershed's livestock system has experienced forest degradation, the disappearance of natural springs, poor animal health, and impaired water quality.* 

### Adapting Livestock Production Systems to Climate Change: Community Capacity-Building for Better Animal Health, Feed, Soil and Water

#### Background

Livestock production systems in Nepal are intricately linked with forest resources, crop production, soil fertility, water sources and human health. Livestock contribute to cropland and families through manure, milk and meat production and as a source of household income. Poor animal health, lack of fodder and forage supplies, and increasing incidence of disease and parasites are major concerns in Nepal.

We began this collaborative livestock research study to better understand the magnitude and the urgency of the problem of global climate change and the need for immediate adaptation of livestock production systems in Nepal. The study is initially funded by the Livestock–Climate Change Collaborative Research Support Program (LCC CRSP) for one year. The study's aims are to identify factors that are responsible for the decreasing productivity of livestock systems, identify impacts of climate change on livestock production, assess opportunities and challenges for community capacity-building and climate change adaptation and to disseminate our project findings.



*Thulokhola watershed in Nuwakot district, Nepal.  
(Photo credit D.D. Poudel)*

#### Our Study Area

Our study area is the Thulokhola watershed located 2.5 km south of Devighat in the Nuwakot district of Nepal. The elevation of the watershed extends from less than 440 at the Trishuli river to 1648 meters above sea level. The watershed has an estimated area of 10 km<sup>2</sup>.

**Adapting Livestock to Climate Change Collaborative Research Support Program**

website [lcccrsp.org](http://lcccrsp.org) email [csucrps@colostate.edu](mailto:csucrps@colostate.edu)

Colorado State University

Fort Collins, Colorado 80523-1644

An interdisciplinary team visited the Thulokhola watershed on June 25, 2011 to form nine informal CLGs that directly involve local farmers in understanding their community assets and the capacity-building for climate change adaptation. CLG participants include 26 men and 25 women, consisting of nine students, two part-time teachers and part-time students, two teachers, and 38 farmers. The CLG members participate by collecting fecal samples, recording livestock data and measuring water quality for our study.

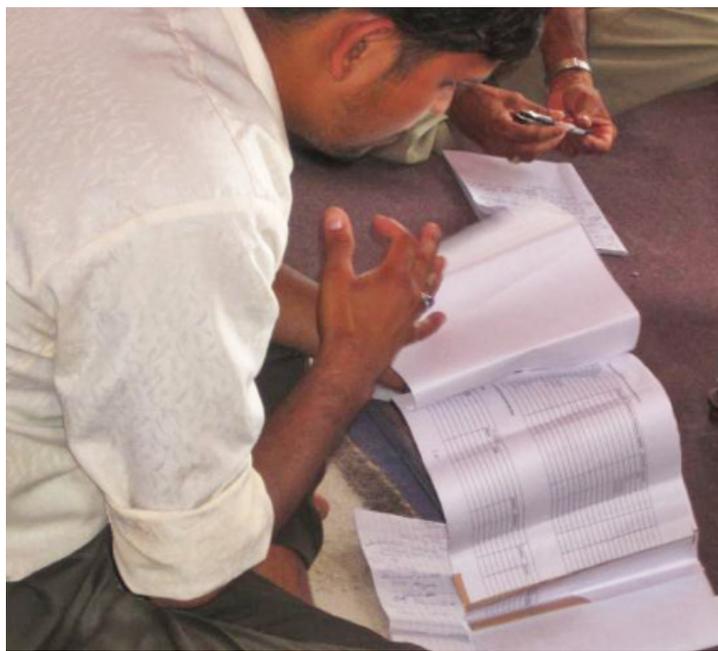


*Community Livestock Group (CLG) members in Thulokhola watershed. (Photo credit Dhruba Bhattarai)*

CLG members collect fecal samples from local livestock on a monthly basis. The samples are analyzed by the Central Animal Health laboratory at the Nepal Agricultural Research Center (NARC) in Kathmandu. Through this analysis, we expect to establish the prevalence and the seasonality of livestock parasites in this watershed and evaluate the incidence of parasites across elevations and animal species.



*Dr. Ram Pukar Thakur investigates parasitic helminthes eggs in a fecal sample. (Photo credit Anita Bhattarai)*



*CLG member going through the record keeping forms. (Photo credit D.D. Poudel)*

CLG members collect data about household profiles, livestock, fodder and fruit trees, animal production, animals and animal products sold, feeding and grazing, farmland, feed supply, animal health and vaccinations, animal reproduction, crop production, manure use, and crop sales. Using forms we developed, CLG members record this data daily. These datasets will be used to create a holistic picture of the watershed's livestock production system.

After training, CLG members monitor local water quality using LaMotte GREEN Water Monitoring Kits with test modules for coliform bacteria, pH, turbidity, dissolved oxygen, phosphate, and nitrate. Fecal coliform will be monitored by every CLG on a monthly basis, while a subset of CLGs will monitor all the parameters every two weeks. The CLG members will also monitor the volume of their water source to document water availability in the watershed.

## **Early Results**

### ***Animal health***

While visiting the watershed, we learned that parasites including liver flukes, round worms, and tapeworms are a major problem affecting livestock production. Skin diseases appear the most common form of infection followed by diseases such as pneumonia, respiratory disease, mastitis and foot and mouth disease. The research team observed poor livestock living conditions and animal health. In general, animals were found to be very thin and appeared hungry.

Our first batch of fecal analysis showed infections with strongyles, trichuris, moniezia, and coccidian eggs in fecal samples across the watershed. It is important to understand the extent and timeframe of parasite infestations in order to adapt effectively to climate change impacts. Our next step will be determining the monthly and seasonal prevalence of these parasites.

## *Feed and water supply*

Livestock production in the watershed is greatly constrained by the disappearances of pasture, grazing restrictions, and lack of animal feed. The two community forests, the simpani and the petarpakha, are both quite degraded. There are few fodder trees and the forest floor lacks brush vegetation and leaf litter. Some of the issues to be addressed in this study may include restoring forest soil fertility, controlling

walking hours to attend trainings and workshops. CLG members will continue to attend training, workshops, and field trips events organized by the LCC-CRSP project. They will learn how to collect fodder samples, soil samples, and improve the nutritive value of their animal feed. CLG members will also interact with various entities including banks, NARC, and other policy-making bodies.

*“Our successful formation of nine CLGs clearly indicates that the farmers have a great degree of motivation for sustainable livestock production and adaptation to climate change.”*

overharvesting, controlling leaf litter use, and introducing forage species in the forest.

The dwindling of water resources has been confirmed by the drying of natural springs over the past several years. An analysis of water quality at the outlet of the Thulokhola watershed showed very high levels of fecal coliform, turbidity and phosphate, suggesting the possibility of poor surface water quality due to sediments, nutrients, and pathogens. High levels of phosphate and fecal coliform concentration may be caused by poor manure collection.



*CLG members are keenly listening to the PI and taking notes during the CLG workshop. (Photo credit Dhruba Bhattarai)*

## *Community capacity-building*

The successful formation of nine CLGs clearly indicates that the farmers have a great degree of motivation for sustainable livestock production and adaptation to climate change. Their support and commitment to the project are visible in activities like becoming a group leader, completing livestock data forms, monitoring water quality, and



*CLG members determine water quality in the Thulokhola watershed. (Photo credit D.D. Poudel)*

## **Preliminary Conclusions**

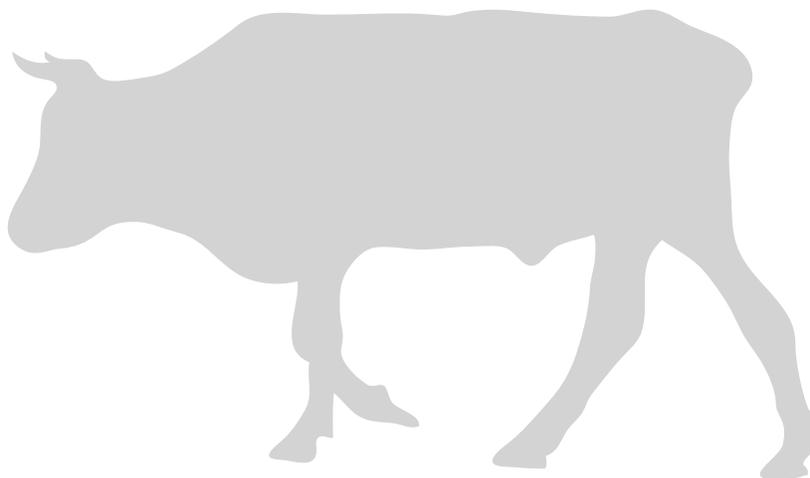
Community leaders have expressed their full support and commitment to the success of the project to address the watershed's major problems in livestock production. We expect that CLGs will develop, implement and monitor their own livestock climate change adaptation projects which will build community resilience to climate change impacts. These projects may include forest management, planting fodder trees, erosion control, soil fertility improvement, rainwater harvesting, manure management, livestock grazing management, and other activities. We also hope CLGs will develop partnerships with various governmental and non-governmental agencies to streamline the necessary technical, financial and logistical supports for livestock climate change adaptation.

We would like to acknowledge the LCC-CRSP Nepal Seed Grant Program, for providing funding support to this project. Our special thanks go to the CLG members in the Thulokhola watershed including our field coordinators Mr. Sitaram Rimal and Ms. Anita Bhattarai and livestock record monitoring team members Mr. Prakash Nepal and Mr. Ram Prasad Pudasaini. 🐄

## Further Reading

Poudel, D.D. 2011. Challenges of climate change and sustainable livestock production in Nepal, Telegraphnepal, Available at <http://www.telegraphnepal.com/national/2011-08-17/challenges-of-climate-change-and-sustainable-livestock-production-in-nepal.html>; accessed on August 29, 2011.

Poudel, D.D. 2011. The Asta-Ja management capacity-building framework (Asta-Ja MCBF) for sustainable development in Nepal, International Journal of Sustainable Development [In Press].



### *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 identified a representative watershed in Nuwakot district for this study. An interdisciplinary team is 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.*



**The Adapting Livestock Systems to Climate Change Collaborative Research Support Program 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.**

*This publication was made possible through support provided to the ALS-CC CRSP by the Bureau for Economic Growth, Agriculture, and Trade, U.S. Agency for International Development, under the terms of Grant No. EEM-A-00-10-00001. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development or the U.S. government.*

