Improving the Sustainability of Malian Sheep and Goat Farming

Browse & Grass Growers Cooperative
Farmer-to-Farmer Mali
March 23, 2015 - March 22, 2016

CASE STUDY

Contact Name: Judith Moses
Contact Email Address: jmoses@pacer.org
Contact telephone: (715) 265-7637
Mailing Address: N12835 County Road Q, Downing, WI 54734
Website: www.commonpastures.org

Background:

Meeting feed and forage requirements of small ruminants is the most urgent need for livestock smallholders in the agro-pastoral systems of Mali according to a meta-analysis of documentation associated with 36 USAID-funded F2F volunteer assignments and **involved input from over 1,100 smallholder farmers** (Cibils et al. 2015, *Challenges and Opportunities for Agro-pastoral Livestock Smallholders in Mali*. Outlook on Agriculture 44: 69-80)**.**

Challenge:

The small ruminant paradox: In the rural villages crop cycles dictate access to grazing resources for small ruminants in contrast to the migrating, grazing patterns of traditionally herded flocks. During the rainy season, when quality and quantity of forages are the highest and grazing would be the most nutritious, the smallholder's sheep and goats are generally confined or tightly controlled to prevent crop loss. Conversely, during the dry season when forages are dormant and scarce, small ruminants are allowed to freely scavenge among crop residues and native forage that have over-matured with resultant low-nutrient value. Young, growing, pregnant and lactating animals suffer the most under these methods and their genetic potential is seldom reached. This system results in high levels of abortions, delayed puberty and long intervals between parturitions, high pre-weaning and adult mortality, and low offtake rates. This paradoxical mismatch of nutrition to small ruminant life cycle needs severely undermines food security.

Initiative:

Grazing provides basic nutrition for ruminants and is a critical asset for low-resource farmers. The common but often false assumption, that small ruminant's nutritional requirements can be fully met through grazing is probably based on pastoralism traditions. In this model the flock is constantly moving forward across the sahel and savanna, away from manure harboring parasites and to fresh forage. As long as their movement is unobstructed, and the animals can pick and choose, nutrition is likely to be adequate. In contrast, smallholder flocks are confined to common grazing lands that are frequently overgrazed, contaminated by manure harboring parasites, and have limited fresh browse options. In this system supplementation is critical. GPS tracking technologies were used to better understand the quality and quantity of available forages, and the likely amount of energy expended harvesting it. Farmers were educated on overgrazing, inadequate grazing, and erosion threats. Improving pastoral land use and identifying local feed supplementation options are important first steps to improving food security.

Results:

By merging satellite and geospatial technologies, grazing locations and activities were visually displayed and showed potential nutritional gaps. Whereas cattle harvested about 90% of their daily dry matter requirements, small ruminants harvested a much lower, 25-30%. Cattle were herded to distant locations, whereas small ruminants were herded on common lands adjacent to the village. Cattle left the village to graze approximately 2 hours earlier, returned later and grazed for over 7 of the 12.6 hours they remained in the field each day, whereas small ruminants grazed for less than 3 of the 8.8 hours of their daily herding route. Adults herded the cattle whereas children controlled the small ruminants. Discovering children were the gatekeepers for

nutrition improvements and were making grazing decisions based not on nutritional factors but on the location of the common water source and walking distance from the village resulted in a training emphasis that more directly targeted youth.

Knowledge Generation and Sharing

Livestock GPS telemetry was utilized to capture information. The data was downloaded using freeware developed by the Minnesota Department of Natural Resources, given the correct geographic projection (WGS84 and UTM zone 29N) and mapped on a Google Earth satellite image. The data was also imported into Microsoft Excel and analyzed to calculate distance traveled by each collared animal and to explore daily activity patterns.

The discoveries that this technology will allow is important in developing strategies to use high protein supplements (e.g. legume browse trees, cassava, urea byproduct silage) in the most cost effective and efficient manner. This knowledge will allow understanding: 1) the kinds and amounts of feed that small ruminants in agro-pastoral villages are likely harvesting while grazing; and 2) the amount of energy that they expend in doing so.

Social media blogs on this activity has resulted in inquiries from India, and Botswana researchers and NGOs. The information will be presented at an international rangeland conference. "*Rainy season herding patterns of agro-pastoral livestock smallholders in southwestern Mali: A preliminary GPS-based assessment*" and was accepted for a poster session and publication in the 2016 International Rangeland Congress Proceedings. The information will also be made available through online resources.

Photos

Youth gathering the flock for trek to water hole during the rainy season
Flocks from many villages may congregate at the water holes daily. Drinking water for livestock is a challenge for many villages even during the rainy season. In many instances the only water source available is a close-by river or seasonal water hole.

Collection Place for Trek to Water Hole
During the rainy season youth control the flocks to prevent crop damage. Youth appear to be the gatekeepers for nutrition improvements and tend to make grazing decisions based on the location of the common water source and walking distance from the village--not quantity or quality.

Bringing lunch.

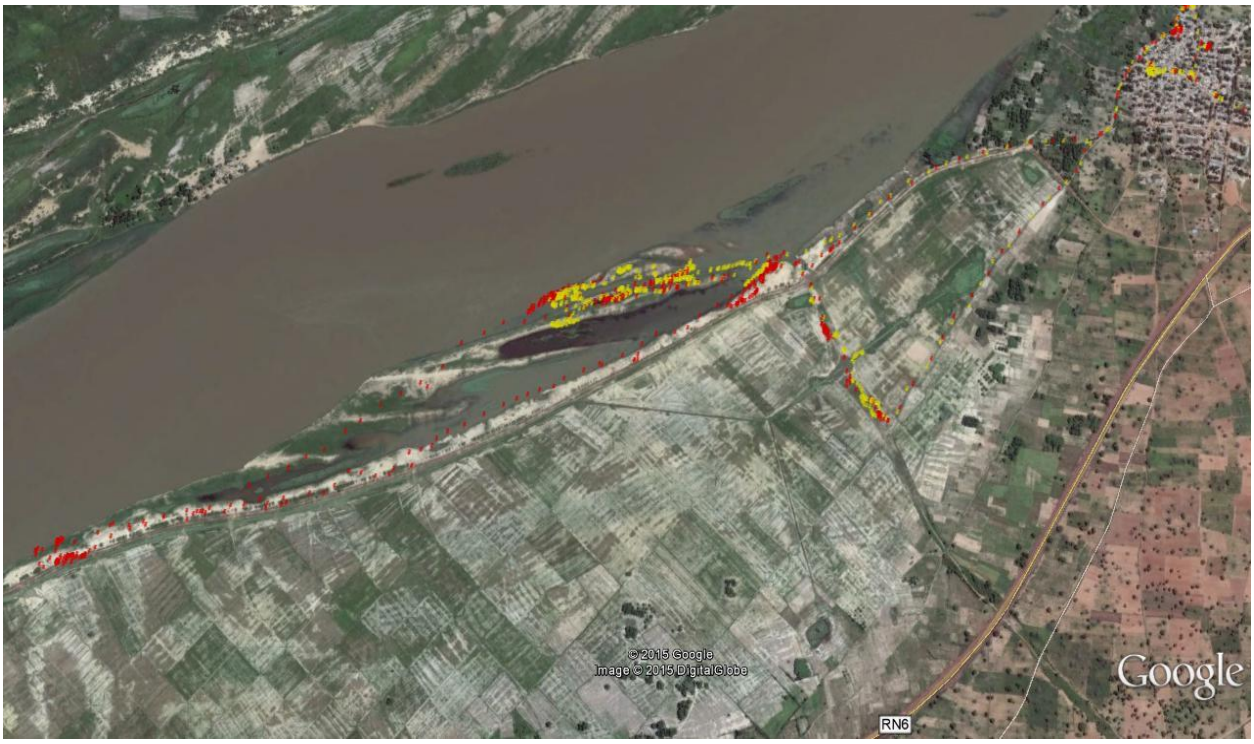
Water hole during the rainy season

Confinement: Small ruminants are dependent upon cut-and-carry methods or restricted grazing usually monitored by youth lacking adequate information on nutritional needs. This requires a different kind of management kills than traditional nomadic or semi-nomadic herding.

Dry season free to scavenge. Frequently filling their rumens with plastics that will slowly stop the ability to digest food. Lactating, pregnant, and the young suffer the most under this sytem.

GPS was used to better understand grazing patterns, dry matter intake potential and to educate farmers on overgrazing, inadequate grazing, and erosion threats.

GPS Research of Grazing Patterns: Grazing is basic nutrition for ruminants and is a critical asset for low-resource livestock farmers.



GPS Data Points Plotted on Google Earth
Help to improve current feeding practices by understanding:

- The kinds and amounts of feed that small ruminants in agro-pastoral villages are likely harvesting while grazing; and
- The amount of energy that they expend in doing so