

Research and development impact targets:

- Improved forage options for smallholders
- Increased availability of high-yielding, high-quality forages
- Improved ecosystem services in integrated crop-livestock systems
- More efficient forage-based livestock production systems

## Enhancing forage integration and access for smallholder livestock production



### Making the most of livestock assets: improved options

In the upland areas of Southeast Asia, most smallholder farmers keep animals. Buffalo provide a traditional source of draught power for land preparation or transport, and animal manure is often used to fertilize crops. But most importantly for upland smallholder farmers, livestock such as cattle, buffalo, pigs, goats and poultry represent a savings account. When the household needs money to pay for a wedding, for medical bills or school fees, for example, it can sell off a few animals for immediate cash.

Planting highly productive, nutritious forages on small areas of the farm can allow small-holders to increase livestock productivity without relying on increasingly scarce natural resources. If forages are planted close to the homestead and animals kept close-by, labor required to collect feed or herd animals can be reduced.

But because the productivity of these animals is typically low, cattle, buffalo, pigs and goats are customarily not kept for the purpose of maximum income generation and are left to feed on crop residues and graze native vegetation pasture: often of relatively poor nutritional quality. All too often, animals barely maintain or even lose weight during the dry season, while only very slowly putting it back on when more feed is available during the rains.

Additionally, burgeoning human and animal populations are putting pressure on native grazing areas and traditional feed sources, forcing farmers to find feed for their animals far from the homestead. By consequence, smallholders often find themselves caught in a labor-

productivity trap: more labor is needed to improve production, but low animal productivity does not justify the extra time investment to find feed of sufficient quantity and quality.

As a CIAT Asia priority theme, Enhancing forage integration and access for smallholder livestock production addresses the opportunity for smallholder farmers to benefit from increasing market demand for livestock products, in the face of shortages in feed resources due to decreased cultivation area and increased risks in the production environment. It aims to help smallholder livestock producers overcome feed constraints by making available forage options that meet quantity and quality requirements for profitable animal raising. It also seeks to improve productivity of livestock and crop-livestock systems through gains in overall efficiency and access to livelihood-enhancing ecosystem services.



## Regional trends and opportunity

Rapid increase in meat consumption in Asia is driving regional demand for livestock products. Improved infrastructure is also opening market opportunities for previously remote upland areas for smallholders. Those farmers capable of commercializing their livestock production have an unprecedented opportunity to improve and diversify their livelihoods. Yet too often, they lack the necessary information, capacities and resources to take advantage of these potentially lucrative market prospects.

Over the past two decades, CIAT's research, in collaboration with national partners, has focused on boosting livestock productivity through participatory development of improved forage systems, while enhancing market integration for smallholder farmers. Bringing farmers together with other livestock value chain actors, so that each better understands the concerns and demands of the other, has been a central part of this research and development process.

To systematically derive lessons from these experiences while informing future priorities and

targets, CIAT is pursuing evaluation studies to generate impact evidence on asset building for smallholder producers. Gender is central to this assessment framework, in consideration of the key role that women play as livestock keepers in rural households and communities.

## Building on two decades of research achievements in Asia

To support the shift from livestock keeping to more intensive production, regional and international collaboration has enabled researchers to whittle down a selection of locally suitable forage species. Initially screening over 6,400 forage accessions from CIAT's headquarters in Colombia, a process of participatory evaluation with farmers then ensured that they reap economic benefits through improved forage systems and species. Thus, CIAT's research efforts have already increased availability of high-yielding, high-quality forages. Now, the focus is on linking farmers to livestock markets - in particular, commercializing production and positioning forages within whole farm and landscape systems.

This newer, broader research and development scope to stimulate local livestock systems implies building broad coalitions of institutional partners for CIAT - from the longstanding partnership with research institutes and development NGOs to more direct engagement with private-sector firms and support services providers.



## Decreasing costs and increasing productivity

Animal feed makes up a major part of the overall cost of smallholder livestock production. When associated labor costs and resources trade-offs for feed crop production are also considered, raising livestock becomes a less attractive livelihood option for the poor.

Improved fodder varieties are today found in livestock troughs across the region, such as the protein-rich legume *Stylosanthes guianensis* or high biomass

yielding Mulato II grass. While the first was selected from genebank accessions, the latter was developed by CIAT through breeding, in collaboration with local research institutes.

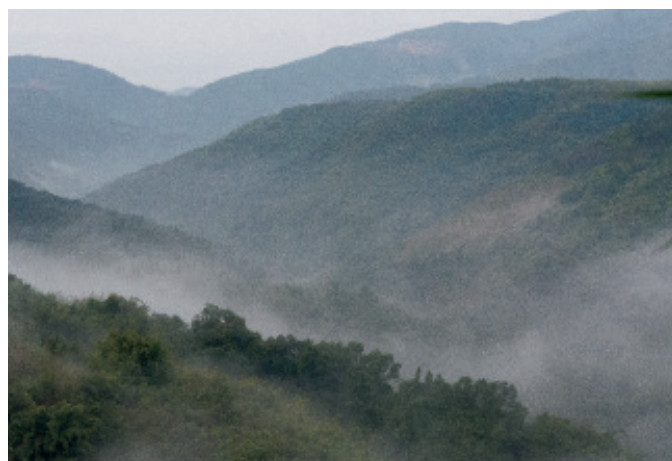
Improved forage varieties can deliver double or even triple weight gain in animals, especially when combined with better animal-keeping practices. Such best practices include keeping animals in a pen rather than leaving them to roam and graze for meagre feed around the village; ensuring well-stocked troughs throughout the day, or providing adequate water and mineral licks.



### Looking at the bigger picture: improved ecosystems

As part of CIAT's global LivestockPlus initiative, our research is aligned with broader goals to produce greater quality of feed, to ensure well-managed sown forages and crop residues improve resource use efficiency at farm level and produce more milk and meat, particularly in the dry season. In Asia, this means learning from past research interventions to bolster resilient, climate-smart and sustainable livestock systems. Cross-country institutional collaboration on improved livestock systems ensures a stronger foundation for wider learning and action towards more sustainable livestock farming systems in future.

For example, a deeper understanding of integrated crop, livestock and tree systems, can generate income from other ecosystems services and reduce the carbon footprint per farm. Our research team is actively investigating ways for integrated crop-livestock-tree systems, to become more resilient, productive and eco-friendly. This includes building capacity among farmers and extension partners, as well as strengthening links to research end-users such as policy, investment and decision makers.



### Improved market linkages

Improvements to forage and livestock management boost livestock productivity and improve cattle, buffalo, chicken, and pig husbandry. In remote areas of northern Lao PDR for example, fast-growing, high-quality, largely disease and pest-resistant forages ensure that steers can double in value from around US\$200 to more than \$400 over just 120 days.

With forages grown near the house, time spent gathering feed is cut from several hours to just 20 minutes per day. Examples from central and eastern Cambodia show that, because children usually collect animal feeds, time saved in collecting such feed directly results in more children getting to school on time, with teachers reporting better progress in school. Enterprising farmers have embraced new opportunities by selling forages, resulting in extra income of up to \$300 a year.

There is more to do: awareness of the premium market potential of a regular supply of healthy animals, in addition to greater participation in dynamic and complex livestock value chains will go a long way to help farmers maximize their livelihood investment. One way to do this is to raise awareness among smallholders about the market opportunities available, connecting up different stakeholders along the livestock production value chain. This involves linking collectors, traders, middle men, retailers, sellers and consumers.



## Healthier animals, healthier people – and profits

Improved animal husbandry has knock-on impacts. For example, pigs are the immediate host of the tapeworm *Taenia solium*, which can cause cysticercosis in humans - cysts in muscles and the brain which can lead to seizures or even death. The tapeworm can be spread by eating undercooked pork, and by roaming animals, which close the cycle of infection by consuming infected human and animal faeces.

Together with institutional service providers for specific animal health support such as a new vaccine, CIAT and national partners have joined forces to improve animal health, management and feeding, consequently producing healthier livestock products. Through capacity building activities, farmers understand the tapeworm cycle and health risks related to poor pig management practices, as well as the potential for boosting profits by producing healthier animals in more hygienic conditions.



## Our team

From its core expertise in forages research, the CIAT Asia team now involves cross-thematic and interdisciplinary linkages with specialists in integrated farming systems and agricultural landscapes, in market access and impact assessment, and also in complementary feed crops such as cassava.

CIAT Asia works hand in hand with the Center's forages cassava team and draws expertise support from global CGIAR research programs. Our lead researchers for forages and livestock include:

**Adrian Bolliger:** Specialist in smallholder livestock and agricultural systems

**Tassilo Tiemann:** Specialist in forages and livestock systems

**The International Center for Tropical Agriculture (CIAT)** – a member of the CGIAR Consortium – develops technologies, innovative methods, and new knowledge that better enable farmers, especially smallholders, to enhance eco-efficiency in agriculture. This means we make production more competitive and profitable as well as sustainable and resilient through economically and ecologically sound use of natural resources and purchased inputs. Headquartered near Cali, Colombia, CIAT conducts research for development in tropical regions of Latin America and the Caribbean, Africa, and Asia.

[www.ciat.cgiar.org](http://www.ciat.cgiar.org)

## Contacts

**Dindo Campilan**  
Director for Asia: [d.campilan@cgiar.org](mailto:d.campilan@cgiar.org)

**Georgina Smith**  
Communications specialist, Asia:  
[g.smith@cgiar.org](mailto:g.smith@cgiar.org)

