

# CIAT in Asia

## Progressive Science to Improve Rural Livelihoods

Despite major improvements in agriculture as well as dynamic economic growth during recent decades, Southeast Asia continues to bear a heavy burden of poverty. A majority of the region's poor live in upland rural areas, many of which are economically and politically marginalized. Thus, a major challenge for countries across the region is to develop effective strategies and programs for improving rural livelihoods in uplands while also protecting the important soil, water, and biodiversity resources of these areas.

This document gives an overview of the work of the International Center for Tropical Agriculture (CIAT) in Asia and explains how our scientists are opening up new options for the rural poor in upland areas.

### The Upland Challenge

The term *upland* in Asia refers to cropland other than that suited to irrigated or rainfed, lowland rice, together with the steep uplands where CIAT mainly works and the more mountainous areas. Rural communities in the steep uplands tend to have deficient infrastructure; limited access to education, health, and other services; as well as weak links with external markets, giving rise to unfavorable terms of trade.

Moreover, many inhabitants of the steep uplands belong to ethnic groups whose minority status and separate identity may further distance them from regional centers of economic and political power.

For a lack of better options, many rural communities in the steep uplands depend on largely subsistence livelihoods, based on shifting agriculture and the use of nontimber forest products. Under low population pressure, a livelihood based on this system is sustainable. But as upland populations have increased and as

government policies across the region have restricted access to land, shifting agriculture has begun to unravel. Farmers have had to shorten fallow periods, prompting a decline in soil fertility and a sharp drop in crop yields. These problems, in turn, have led to food insecurity, deepening poverty, and natural resource degradation.

In a serious effort to address these problems, governments in various Southeast Asian countries are implementing policies and programs designed to replace shifting cultivation with more permanent but diversified production systems that are well linked to markets. In support of such initiatives, governments are also improving roads, communications generally, and other public services. The idea behind these measures is to boost incomes in upland areas, so that rural communities can start to afford the services that have largely remained beyond their reach.

In order for this basically sound strategy to work, though, upland farmers require appropriate technologies and information that will enable them to produce competitively while maintaining the health of fragile agroecosystems.

### Advances in Crop Research

Since 1983, CIAT (which is headquartered in Colombia) has been working to achieve that aim in close collaboration with national institutions in Southeast and East Asian countries. Center scientists first embarked on a major program to achieve genetic improvement and better management of cassava, a root crop of Latin American origin. Then, in the early 1990s, CIAT also embarked on projects aimed at integrating improved tropical forages (many of them from Latin America and Africa) into upland farming systems, using farmer participatory methods. An important hallmark of the Center's work on cassava and tropical forages in Asia is its commitment to working closely with small farmers.



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### ***Sustainable cassava production***

Cassava offers significant potential for linking small upland farmers to growth markets. The crop's starchy roots are mainly sold for use as animal feed or in industrial processing but also serve as a secondary staple food. In addition, cassava leaves can be used for animal feed.

Through a collaborative cassava breeding program supported by the Japanese government, CIAT has helped create a new generation of high-yielding, high-starch cassava varieties. And these have had a significant impact on cassava farming systems and on Asia's cassava processing industry. According to estimates from government agencies, improved varieties derived from germplasm originating at CIAT are planted to about 1.3 million hectares, or about 40 percent of Asia's total cassava area, including nearly all of Thailand's cassava area and about 25 percent of the area in Vietnam.

A major drawback to cassava, though, is that more or less continuous cultivation of the crop on sloping soils may lead to a sharp decline in soil fertility and to serious erosion problems, undermining the sustainability of cassava-based systems. To help ward off this threat, CIAT scientists and numerous national partners, with funding from Japan's Nippon Foundation, have developed and are widely disseminating improved soil management practices for those systems.

Using farmer participatory methods at dozens of pilot sites, national teams of researchers and extension officers are successfully integrating these technologies into upland cassava-based systems on a large scale. New cassava varieties offer farmers a powerful incentive to improve soil management. In Vietnam, for example, an estimated 2,000 farmers have adopted practices such as better fertilizer management, intercropping, and the use of hedgerows for erosion control. In several Vietnamese villages that have taken part in the work since 1995, gross farm income has increased four- to fivefold.

### ***Tropical forages for more intensive livestock production***

Livestock are vitally important for many of Asia's poorest rural communities. Small- and medium-sized animals in particular provide significant sources of food and cash. Medium-sized and large animals also form a central part of the social safety net, since they can be sold to meet major household needs or in case other components of the farming system fail.

As farmers expand livestock production, though, they quickly discover the limits of naturally occurring forages and recognize the need for better feed resources. As a first step toward meeting this need, CIAT staff evaluated at numerous sites a wide range of tropical grasses and legumes for diverse agroecosystems and uses. Based on the results, they selected about 40 broadly adapted forages from an original collection that included 400 samples of numerous species.

Next, using participatory methods with farmer groups, CIAT scientists began identifying multiple uses for forages in upland farming systems and developing practices for improved forage management. In this work they created strong partnerships with national institutions and embarked on ambitious training programs, complete with attractive printed materials on forage technologies and participatory methods, available in English as well as major languages of the region. The training and networking activities resulted in the formation of national teams skilled in participatory methods and in exchanging information about their experiences in forage technology development.

As a result of their efforts, some 4,000 farm families in six countries have adopted new forages and management, and the number is increasing rapidly each year. According to a recent study on the





economics of the new forage technologies, they significantly boost livestock production and incomes. They also significantly reduce labor requirements, since farmers, especially women and children, spend less time tending to animals and collecting native vegetation for forage.

CIAT's collaborative work on tropical forages in Asia is funded by the Australian Agency for International Development (AusAID) and the Asian Development Bank (ADB), with supporting research funded by the Australian Centre for International Agricultural Research (ACIAR).

### **An Integrated R&D Program for Asia**

In addition to producing relevant technologies that improve rural livelihoods, CIAT's work on key crops in Asia has resulted in innovative, participatory approaches to agricultural research and extension that show large potential for impact across the region. Building on this experience, the Center is creating a broader, integrated R&D program for Asia, aimed at helping rural people build sustainable livelihoods, based on competitive agriculture, healthy agroecosystems, and rural innovation.

Toward this end CIAT staff now work with rural communities to develop or improve small and medium-sized agroenterprises, based on better marketing or value-added processing of current agricultural products and identification of new products. In this work, which is funded by the Swiss Agency for Development and Cooperation (SDC), we recognize that development impact depends, not just on appropriate technologies, but on market opportunities. In addition, we are developing local expertise to assess the impact of agricultural production on the natural resource base and on rural livelihoods.

Under a major new initiative, CIAT is contributing importantly to integrated rural development with support from the International Fund for Agricultural Development (IFAD). In collaboration with current and new projects financed through IFAD loans, the initiative promotes the use of participatory methods for fusing new technologies with local knowledge, for better enabling rural communities to manage their own development, and for making institutions more responsive to farmers' needs and more effective in meeting them.

While striving to generate short-term benefits through its work, CIAT also seeks longer term improvement in rural livelihoods through capacity building in rural communities and research and extension institutions.

### **CIAT Expertise in Asia**

CIAT's Asia team operates from our regional office at Vientiane, Lao PDR, and from other offices in Bangkok, Thailand, and Los Baños, the Philippines. Our staff work mainly in the humid, subhumid, and semiarid areas of Southeast Asia, specifically in Cambodia, southern China, Indonesia, Lao PDR, the Philippines, Thailand, and Vietnam. We also have activities in India, Nepal, and East Timor, with some developments in Myanmar. The Center will most likely establish additional project offices as our work for the region expands.

Members of the Asia team offer expertise in cassava and forage agronomy, soil science, farming systems, land management, participatory research and extension, anthropology, resource economics, impact assessment, spatial analysis, and agroenterprise development. The team can also rely on support in other disciplines from Center staff around the world. Thus, the total range of CIAT expertise available for our work in Asia is as follows:

- Genetics and agrobiodiversity
  - *Cassava*
  - *Common bean*
  - *Tropical forages*
  - *Tropical fruits*

- Soil ecology and management
  - *Soils*
- Land management
  - *Hillside resource management*
  - *Land use analysis*
  - *Climate change analysis*
- Ecology and management of pests and diseases
  - *Integrated pest and disease management*
- Rural innovation
  - *Participatory research*
  - *Agroenterprise development*
  - *Impact assessment*
  - *Information systems*

Through its work in Asia, CIAT has developed close ties with many national agricultural research and extension organizations as well as international research centers across the region. For example, the Japanese International Research Center for Agricultural Sciences (JIRCAS) will post one of its staff with CIAT's Asia team early in 2003. We also collaborate regularly with other Future Harvest centers supported by the Consultative Group on International Agricultural Research (CGIAR), including:

CIMMYT: International Maize and Wheat Improvement Center, Mexico  
 CIP: International Potato Center, Peru  
 ICRAF: International Centre for Research in Agroforestry, Kenya  
 ICRISAT: International Crops Research Institute for the Semi-Arid Tropics, India  
 ILRI: International Livestock Research Institute, Addis Ababa, Kenya  
 IRRRI: International Rice Research Institute, the Philippines  
 IWMI: International Water Management Institute, Sri Lanka

Some of this collaboration is channeled through global CGIAR undertakings, particularly the Participatory Research and Gender Analysis (PRGA) Program and the Tropical Whitefly Integrated Pest Management Project (TWF-IPM), both of which CIAT coordinates.

Through all the work described in this document, we trust that growing numbers of rural people in Asia will be able to claim their share of the benefits from economic growth while safeguarding the natural resources on which both urban and rural livelihoods depend.

## Solutions That Cross Frontiers



*The International Center for Tropical Agriculture (CIAT) is a not-for-profit organization that conducts socially and environmentally progressive research aimed at reducing hunger and poverty and preserving natural resources in developing countries.*

*CIAT is one of 16 food and environmental research centers working toward these goals around the world in partnership with farmers, scientists, and policy makers. Known as the Future Harvest centers, they are funded mainly by the 58 countries, private foundations, and international organizations that make up the Consultative Group on International Agricultural Research (CGIAR).*

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### Contact

Rod Lefroy  
 Regional Coordinator  
 CIAT in Asia  
 P.O. Box 783  
 Vientiane, Lao PDR  
 Phone: +856 (21) 770090  
 Fax: +856 (21) 770091  
 E-mail: [CIAT-Asia@cgiar.org](mailto:CIAT-Asia@cgiar.org)