

## Improving the Preservation and Promotion of Underutilized Crop Species in Southeast Asia®

### **Ricky Bates**

Department of Horticulture, Penn State University, 303 Tyson Building, University Park, Pennsylvania, 16802, USA

Email: rmb30@psu.edu

### **Tom Gill**

Office of International Programs, University Park, Pennsylvania, 16802, USA

### **Abram Bicksler and Laura Meitzner Yoder**

International Sustainable Development Studies Institute, 48/1 Chiang Mai-Lampang Road, Chiang Mai 50300, Thailand

Email: abicksler@isdsi.org

### **Rick Burnette**

ECHO Asia Regional Office, 133 Building F, Kaew Nawarat Road, PO Box 64, Chiang Mai 50000, Thailand

Email: rburnette@echonet.org

### **Yongyooth Srigoifun**

Faculty of Agricultural Production, Maejo University, Sansai, Chiang Mai 50290, Thailand

Email: yysgf@mju.ac.th

## **BACKGROUND**

Seed is a fundamental agriculture input and access to locally adapted, quality seed is an essential component of sustainable crop production. In much of the developing world, informal seed systems are important sources of seed for small farmers (Almekinders et al., 1994). Indeed, planted seed in many regions of the world are not improved varieties, but come from farmer-to-farmer seed exchanges or from farmer self-saved seed and often comprise the majority of planted acreage. This local seed production and distribution facilitates maintenance of crop bio-diversity by preserving in situ locally adapted varieties and by broadening the genetic base of production with multiple varieties adapted to specific production systems and microclimates. These informal seed systems are also critical for seed and food security during periods of instability or natural disaster, including changing environmental conditions (Chapman et al., 1997).

A rich diversity of indigenous germplasm exists in Southeast Asia and represents a valuable resource for the development and improvement of crop species locally, regionally, and globally. Annual and perennial vegetables in this region are grown primarily in mixed home gardens and used abundantly, both raw and cooked in local dishes (Fig. 1). Local vegetable varieties are mostly grown for home consumption, but increasingly over the past decade are also found in urban markets. The high diversity of ethnic groups within a small region has produced extraordinary



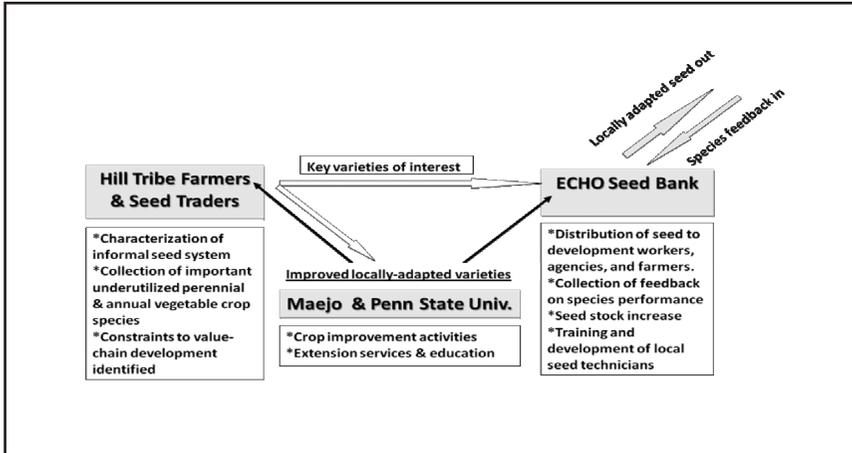
**Figure 1.** Typical northern Thailand hilltribe dwelling utilizing a diverse mix of perennial and annual vegetable species. Little effort has been made to improve upon these locally important species and develop value chains around them to enhance local farmer income.

diversity in indigenous vegetables in northern Thailand, as different groups favor specific culinary and agronomic qualities. The mechanisms and pathways of this informal seed system by which farmers acquire new varieties is not well documented or well understood. This knowledge would facilitate increased exchange and opportunities for indigenous crop improvement. Improved understanding of the local, existing germplasm systems will enable horticultural scientists and extension workers to have more effective collaboration with farmers, as they will be able to identify and work alongside these farmer leaders or “germplasm gatekeepers” in communities. Much of the indigenous germplasm represented in the local informal seed system also has not been sufficiently characterized, improved, preserved, or widely distributed (Sperling and McGuire, 2010). For example, a great deal of genetic variability exists in the perennial vegetable species *Lablab purpureus* and *Psophocarpus tetragonolobus*, but little effort has been made to improve upon these locally important species and develop value chains around them to enhance local farmer income. The local informal seed systems also usually lack the means to disseminate these resources regionally, thus limiting the reach of their benefit. The opportunity to characterize these crops for traits of interest such as drought tolerance or disease resistance, are decreasing as these landraces are lost or replaced in farmer fields and in local diets. It is well documented that current efforts to identify, conserve, improve, and disseminate local, traditional varieties are insufficient (Mazhar, 2000).

### PROJECT PREMISE AND APPROACH

This project is premised on four well-established facts:

- Informal seed systems, such as farmer-to-farmer exchanges and farmer self-saved seed, are critical components of resource-poor farming systems.



**Figure 2.** Conceptual framework of seed system linkages, designed to improve preservation and distribution of underutilized locally adapted crop species.

- A rich diversity of underutilized species function within these systems.
- Current efforts to conserve, improve, and disseminate indigenous species are failing.
- To optimize these informal seed systems we need to better understand their germplasm characteristics, pathways, and gatekeepers — and we need to improve local stakeholder access to seed information.

Our approach to this project was to demonstrate the value of investing in local, indigenous informal seed systems. This was accomplished through the development of an innovative seed bank system linking local farmers and noncommercial seed traders with developing markets, and supported by accessible information made available through a local outreach network (Fig. 2).

## OUTCOMES AND IMPACTS

This United States Agency for International Development (USAID) Horticulture Collaborative Research Support Program (CRSP) project, administered through the University of California, Davis, is realizing immediate impact during the current 12-month implementation phase, but it is also paving the way for longer term benefits which will be regional in scope and could address USAID Feed the Future focus countries in the region. The formation of a partnership between Maejo University, the Educational Concerns for Hunger Organization (ECHO) Asia Regional Office, and Penn State University is resulting in a cohesive strategy to enhance the effectiveness, impact, and reach of Southeast Asia's informal seed system through institutional capacity building and training. Impacts realized within the first year of this project include:

- Identification of key seed traders and farmers functioning within northern Thailand's hilltribe informal seed system.
- Initial inventory of important indigenous crop species.
- Documentation of specific indigenous knowledge surrounding the culture of these key crop species.

- Training of ECHO seed bank manager and key Maejo University and ECHO personnel.
- Seed drying and storage surveys and seed storage trials.
- Village-based seed exchanges and training conferences.

Longer term benefits include:

- Formation of ECHO seed bank-farmer linkages that allow non-commercial seed producers to access new varieties, hybrids, and high-value seed resources not available from traditional sources.
- Development of value chains around key indigenous species.
- Regional distribution of important seed resources to the neighboring nations of Cambodia, Laos, and Vietnam.

By characterizing these indigenous informal seed systems, farmer-to-farmer exchanges can be improved, and researchers can identify more effective ways to communicate with and distribute promising germplasm through these individuals, and thus on to their existing networks. Non-commercial seed traders and farmers in the informal seed markets can also partner with seed banks and universities to improve the seed system in ways not being currently exploited by the formal seed market. This may include the dissemination of new or underutilized species or maintenance of specific regionally valued crops and the indigenous knowledge surrounding these genetic resources.

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