



## AVRDC - The World Vegetable Center in Asia

### *A quarter century of achievements*

Since 1982 AVRDC - The World Vegetable Center has had an active research and development program in Southeast Asia, and more recently its work has expanded in South Asia.

Founded as the Asian Vegetable Research and Development Center (AVRDC) in 1971 with global headquarters in Taiwan, we have always had a major presence in Asia, where we work with more than 50 national partners and many international agencies in 11 countries. Today, with Regional Centers in Bangkok and Hyderabad, AVRDC - The World Vegetable Center has expanded its scope to include project offices in Laos, Indonesia, Korea and Uzbekistan, working with over 50 national partners and many international agencies in 11 countries across Asia.

Why vegetables are important to Asia

- Vegetable production has almost quadrupled in Asia over 30 years.
- China now produces almost half of the world's vegetables.

- Almost 20% of China's arable land is under vegetables, providing over a third of per capita food consumption.
- Vegetable production is a high income earner and creator of jobs in production and processing.
- New varieties and practices now make vegetable production in the hot wet tropical lowlands more economic.
- Most vegetables are grown and traded by women, providing a major source of cash to improve family incomes.
- Smallholder farmers tend to benefit from growing vegetables more than larger farmers.
- Misuse of pesticides is causing insect resistance and health problems for farmers and consumers.



### Training and capacity building

Since 2000, almost 4500 farmers, extension workers and researchers have been trained by the Center in a range of short courses on improved vegetable production. Farmer participatory research trials are also being conducted by projects in Indonesia and Vietnam to validate technologies for dissemination. Targeted training for staff of national research and extension agencies from Korea and the Philippines is being done to improve skills in plant breeding and managing national seed collections.

### Disease resistant chili and sweet peppers

Chili is the most important vegetable grown in Asia, and a vital ingredient in many Asian dishes. It is a major source of income for poor farmers, but both chili and sweet pepper suffer from many diseases and are difficult to grow in hot humid conditions. The Center is working in India, Indonesia and Thailand to develop varieties resistant to anthracnose, phytophthora, bacterial wilt, Cucumber mosaic virus, chili vein mottle virus and geminivirus, and to understand the races involved and the molecular basis of plant resistance. Many new varieties have been released. In 2007 the seed of 10 to 15 new lines are being increased for release to 50 collaborators across Asia.

### Tomatoes that survive in the tropics

Tomato is the world's most important vegetable crop and provides a major source of income for the poor, but it suffers from many diseases in the humid tropical lowlands of Asia. The Center has released over 120 varieties leading to major yield increases.

Much the Center's parental material has also been taken up by commercial companies to produce new high-yielding open pollinated and hybrid varieties. A major focus has been on improving disease resistance; current work is focusing on resistance to geminiviruses and bacterial wilt, two of the most important problems facing tomato growers in Asia. The Center is also working to identify races of the organisms that cause bacterial wilt, fusarium wilt, anthracnose and phytophthora blight and the genes in tomato that confer resistance to them.

### Conserving and developing indigenous vegetables

Indigenous vegetables are an important part of Asia's heritage and cuisine, and form a large part of diets in countries such as Thailand. Hardy, easy to grow and usually highly nutritious, these plants are also particularly important for the poorest members of the community. The Center maintains a global collection of over 10,000 indigenous vegetables from South Asia, Southeast Asia and Africa; currently over 500 new accessions are being added each year in cooperation with national agencies. In-situ conservation and selection of superior varieties is being developed in Indonesia and in the Philippines where the Center is working to integrate indigenous vegetables into agroforestry systems.

### The next revolution for mungbeans

Mungbean is one of the region's most important legumes, serving as a source of bean sprouts and noodles as well as a major source of protein when cooked as grain. The Center's work on improving mungbean

varieties led to a revolution in the crop's use in South Asia during the 1990s. Over 100 new varieties were released, and the high yielding short season varieties permitted double-cropping after cereals, improving crop rotations and local diets. New varieties and methods of pest control are now under development, including the world's first hybrid varieties.

Both breeding and two biological control agents discovered by the Center's scientists are being tested to control two major insect pests of legumes: bruchids, which damage stored seed, and the bean pod borer, which destroys flowers and pods.





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## ■ Asia

### Improved and organic fertilizer strategies

Fertilizer wastage is a major problem in vegetable production, particularly in peri-urban areas where there is potential for contamination of groundwater supplies. Organic vegetable production is becoming popular because of increasing demand both from urban consumers and export markets. The effect of new fertilizer starter solutions in increasing yields and reducing fertilizer wastage is being studied. Options for safe organic fertilizers using green manure rotations with crops such as cabbage, tomato, cucumber and chili pepper are also being tested to provide cheap, safe fertilizer options for smallholder farmers.

### Partnerships to provide new varieties to farmers

The Center has had a long and productive partnership with the Asia & Pacific Seed Association (APSA). Seed companies produce, promote and distribute advanced lines developed by the Center or incorporate its lines into their own breeding programs. About three quarters of Asia's seed companies use material provided by the Center, and through them we have had a major impact in improving the incomes of Asia's farmers.

### Postharvest management

Postharvest losses are regularly up to 50% of the crop due to poor handling, inferior varieties and a lack of processing opportunities. In Cambodia, Lao PDR and Vietnam the Center has developed low cost postharvest technologies for tomato and chili pepper, and these are being extended through training programs across the three countries. Leafy vegetables are an important income source for poor farmers, but they wilt quickly, reducing the incomes of farmers far from markets. The Center is working to develop technologies to reduce postharvest losses and raise the incomes of poor farmers.

### Low cost irrigation for small areas

Simple and safe technologies to improve yields and crop quality have been developed by the Center for use by poor farmers. These include simple, low cost drip irrigation systems suitable for different soil types that are currently being tested and extended in Cambodia, Indonesia, the Philippines and Vietnam. These systems are being integrated with other cultural practices such as mulching and grafting to help improve crop yields.



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