

Capacity Building Initiatives
The Network has developed and implemented a program of activities that incorporates both technical and regulatory capacity building. Initially, workshops on biosafety and food safety assessment were conducted for Network scientists to gain expertise in addressing safety issues involving genetically-enhanced crop.

The Network also supported fellowships for scientists from member countries to enhance their capabilities in practically all aspects of modern agri-biotechnology applications, including regulatory system for biosafety and food safety assessment and intellectual property management. Advanced training on molecular biology techniques were also supported by the Network through its research internship program. Network scientists gain technical expertise through the process of “learning by doing”.

Activities and Progress
ISAAA successfully brokered the donation and transfer of proprietary technologies for PRSV resistance from Monsanto and delayed ripening from Syngenta (formerly Zeneca Plant Science). Royalty-free license agreements between the Network and these private companies allow the free use of these proprietary technologies by member countries.

Genetically-enhanced papaya lines developed by the respective national institutes are being evaluated for PRSV resistance using local isolates of the virus. MARDI and IPB are currently into contained (screenhouse) field evaluation of transformed lines. PGEU and IBT are already into open field testing.

The first contained field trial of transgenic Eksotika papaya with DR trait is underway at MARDI. Transformed DR papaya lines are also undergoing greenhouse evaluation at both PGEU and IBT.

- Anticipated Benefits**
- Together, PRSV resistance and delayed ripening could lead to a significant increase in papaya production in the region. Majority of those who will directly benefit from increases in production and productivity are smallholder papaya farmers.
 - Strengthened capability of national programs in crop biotechnology, as well as increased absorptive capacity of national programs to acquire, transfer, and adopt agri-biotechnology products in each member country.
 - Establishment of regulatory systems that allow safe and effective deployment of agri-biotechnology products.
 - Enhanced regional cooperation in knowledge sharing, technology transfer, joint development, and adoption of agri-biotechnology applications.

Expected time for commercialization of GM papayas in member countries.

Country	PRSV-resistant	Status	Delayed ripening	Status
Indonesia	—	—	2008-2010	greenhouse
Malaysia	2009	contained field trial	2009	contained field trial
Philippines	2005	contained field trial	2006	greenhouse
Thailand	2004	open field trial	2006	greenhouse
Vietnam	2005-2006	open field trial	2005-2006	greenhouse

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**The Papaya Biotechnology
Network of Southeast Asia**

*Enhancing Lives Through
Technology Sharing*



The Problem

Papaya is a major tropical crop in the Asian region. While the crop is an essential part of the household diet, it is also a significant source of income for resource-poor farmers. Unfortunately, papaya production in many Asian countries is constrained by several pests and diseases, the most significant of which is the papaya ring spot virus (PRSV). The disease is widespread in many parts of Asia and conventional method of control have had limited success. Annual losses in the region is placed at 175,000 tons valued at US \$75 million.

Another major problem is the significant post-harvest losses due to spoilage. These problems have led to a significant reduction in papaya production in many Asian countries causing substantial losses of income to farmers, a relative scarcity of the fruit in the market, and higher costs to consumers.

Responding to the Problem

ISAAA established in March 1998 the *Papaya Biotechnology Network of Southeast Asia* to address papaya production problems in Southeast Asia through the partnerships and collective efforts of five member countries — Indonesia, Malaysia, Thailand, the Philippines, and Vietnam — and two private sector companies—Monsanto and Syngenta. The Network concentrates on developing genetically-enhanced papayas with PRSV resistance and delayed ripening (DR) trait.

Program Strategy

This initiative follows an integrated approach to biotechnology development and works within the framework of North-South and South-South cooperation tailored to respond to the respective research and absorptive capacities of the member countries. North-South partnership involves the donation, transfer, and sharing of proprietary technology from a private sector company to the national research institute of the partner countries. Collaborating companies also provide training for capacity building of Network scientists. South-South cooperation entails intra-regional sharing of knowledge, technology, information, and experiences in all aspects of biotechnology.

The project gives Network scientists the opportunity to participate in product development activities with private sector companies that have the most advanced agricultural biotechnology operations and with national centers of excellence for biotechnology research in the region.

Objectives

The primary mission of the Network is to improve the quality of life of resource-poor farming families in Southeast Asia by enhancing income generation, food production, nutrition, and productivity through the integration of proven biotechnology applications into their agricultural practices. In the near term, the Network seeks to positively impact the lives of resource-poor and small-scale farmers in Southeast Asia by increasing the availability of papaya for both direct food consumption and for sale in local markets, thus supplementing farm incomes.

- Develop and adapt large-scale papaya biotechnology transformation protocol at the national level through collaborative efforts between national programs in the region and international public and private sector institutions.
- Create a critical mass of Southeast Asian

scientists knowledgeable about papaya biotechnology.

- Expand the biotech capacity of network members through knowledge sharing and transfer of proprietary technology from the private sector of developed countries to national research institutes of member countries.
- Strengthen capacity of the region to absorb future biotechnology applications that will provide even greater agricultural benefits.

Collaborators and Donors

Among others — the Rockefeller Foundation, East-West Seed Company, Monsanto, Syngenta (formerly Zeneca Plant Science), University of Hawaii, Cornell University, University of Nottingham, Monsanto Fund, ISAAA, USDA, US FDA — provide technical/technology support; as hosts for fellows/interns; and/or research funding and training/fellowship support.



National Institutes in Network Member Countries

In-country support for national research activities are provided by national research institutes in member countries. Each country has a team leader who coordinates with the Network and respective country team members. Malaysia and Thailand serve as regional hubs of the Network providing advance technical assistance and support to other members of the Network.

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