

# ***Vegetable Research and Development in Southeast Asia: The AVNET Final Report***

## **Executive Summary**

In recent years, the need for collaboration among national agricultural research systems (NARS) of Southeast Asia became evident. This need to tap each other's resources and strengths gave birth to the Collaborative Vegetable Research Program in Southeast Asia—known as the Asian Vegetable Network (AVNET). The network includes Indonesia, Malaysia, the Philippines and Thailand.

AVNET aimed to enhance the research capability of the participating NARS and, at the same time, avoid duplication of research effort. The three-year program supported by the Asian Development Bank (ADB) began in May 1989. With AVRDC as a partner and catalyst, vegetable research has since moved in accord with a regional master plan.

In three years, AVNET blazed new trails in vegetable research and development. Two subnetworks were created to realize the network's goal: the germplasm improvement and disease elimination subnetwork, and the integrated pest management (IPM) of diamondback moth (DBM) subnetwork. These subnetworks addressed the production of regionally important crops: yard-long bean, cucumber, tomato, chili pepper, shallot (onion), bulb onion, garlic and crucifers.

Under the germplasm subnetwork, activities included the assembly, multiplication, exchange and evaluation of the germplasm of priority vegetables; and screening for resistance to bacterial wilt, anthracnose and pepper viruses. In the management of diamondback moth, activities focused on the mass rearing of parasitoids and their release in pilot sites as biological control.

In a final workshop held in September 1992 in Lembang, Indonesia, scientists involved in the program came together to assess and review AVNET's achievements and impact. In the project's three years of implementation, national research capabilities of the four NARS were strengthened. Cost-effectiveness was promoted through the sharing of resources, better use of information and reduced duplication of research.

Research methodologies and skills were improved. Information and materials collected collaboratively and exchanged among the four countries enhanced the spirit of cooperation. Also, by observing research management in one country, scientists were able to improve their respective research efficiency.

The identification of promising new varieties with better yield and consumer acceptability through the assembly, multiplication, exchange and evaluation of vegetable germplasm among the NARS proved that improved varieties from one country can be equally adapted to another country within the region. Adoption of new vegetable varieties will increase production and improve farmers' income. This, in turn, will make available high-value produce to solve hunger and malnutrition, especially among children.

In screening for diseases, tomato and pepper accessions found resistant to bacterial wilt, anthracnose and viruses can be recommended to farmers to solve production constraints caused by these diseases. These new sources of improved materials are also valuable for breeding for resistance and other desirable characters.

The identification of different pathogen strains through extensive surveys conducted in all four countries could be very helpful in future disease management programs.

To improve researchers' skills, trainings on germplasm evaluation, anthracnose and bacterial wilt screening, pepper viruses, and IPM of DBM were organized. New equipment and accessories were acquired to complement the research capability of the four participating countries. To strengthen screening for diseases, insect-proof screenhouses were constructed and the necessary equipment provided. Mass-rearing facilities for the IPM of DBM were, likewise, installed.

Meanwhile, the adoption of the IPM of DBM technology—using parasitoids and biological insecticides—by participating farmers from the collaborating coun-

tries resulted in a significant reduction in pesticide use and reduced production cost considerably in cabbages.

In Indonesia, an average of 51% reduction in insecticide application in nine pilot sites was noted using IPM. Likewise, the yield of crucifers increased by 5%. In the highlands of Malaysia, an 86% reduction in insecticide spray was observed, as well as a 5% marginal increase in production and a 15% increase in net returns. In the lowlands, there was a 57% savings in spraying cost and a 50% increase in yield due to IPM with a 35% increase in mean net returns. In Thailand, a 23% savings in spraying cost was observed among collaborating farmers. And in the highlands of the Philippines, a 61 % reduction in insecticide application was noted, with a savings of US\$503/ha/cropping season.

In all four countries, IPM has become a national policy as a result of the success of the project.

To bring the fruits of research to the doorsteps of the end users, AVNET also worked with the NARS to disseminate relevant vegetable research results, with AVRDC serving as the clearinghouse for information.