FEEDBACK
from the field

AVRDC
The World Vegetable Center

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This bulletin provides information about application of AVRDC's technologies in the field and other topics of interest regarding vegetable production and consumption constraints around the world. It is issued quarterly. We welcome everyone to share any interesting news about vegetables – please send a short article with photos to tech_dissemination@worldveg.org. Thank you!

The expanding impact sphere of Farmer Field Schools in Aceh, Indonesia

The Farmer Field School (FFS) is a group-based, participatory learning approach which builds knowledge and capacity among farmers to enable them to diagnose their problems, identify solutions, develop plans and implement them with or without support from outside sources. Using the FFS approach, AVRDC and the Indonesian Assessment Institute for Agricultural Technology (BPTP) trained 1,650 farmers from 77 villages in 2009 in Aceh, the province that suffered from a devastating tsunami and catastrophic damage in December 2004.

*Farmers learn different plant protection methods for chili and other locally-grown vegetables **(top)** and gain knowledge on making biopesticides (neem solution) **(right)** through this Farmer Field School*

Farmers learn chili integrated crop management in a Farmer Field School in Lamsujen village, Aceh, Indonesia

Among all crops, chili was chosen as the priority crop due to the higher market price, farmers' demand and preference to grow more chili on their farms. Through FFS, farmers learned chili Integrated Crop Management (ICM) practices to restore and enhance the productivity of chili in tsunami-affected areas. In addition, 20 Farmer Field School facilitators and 15 mid-level professionals of government agencies and local community organizations were also trained on managing and facilitating the FFS locally.

Two years after completion of the AVRDC-led FFS program, Aceh Besar, Bireuen, and Gayo Lues Districts, the leading vegetable production districts in Aceh, have incorporated FFS as part of their core vegetable development and extension program. The Ministry of Agriculture funds the FFS, the Agriculture Service (Dinas Pertanian) takes the lead on conducting the FFS, and the Assessment Institute for Agricultural Technology-Aceh (BPTP-Aceh) coordinates the technical aspects of the FFS. BPTP prepares the curriculum and Standard Operational Procedure for Good Agricultural Practices (GAP/GHP), delivering both theoretical and practical training in the field as well as evaluating the activity. FFS-GAP is being implemented in Aceh to secure the vegetable production with improved quality and certification for export. Recently, Bireuen District has shown a strong commitment to using the FFS approach to strengthen Women's Farmer Groups (KWT). The FFS approach is scaling up and expanding its impact sphere in Aceh.

Mr. Ferizal, an Agricultural Economist from BPTP-Aceh reports that most extension strategies and activities in Aceh are now implemented through FFS. Local government has realized that FFS is the most effective way to deliver the technologies with a very limited budget. "The FFS strategy initiated in Aceh in 2009 is really working very well now and it is undergoing full fledged expansion in several districts", said Mr. Ferizal.

Impact evaluation of Farmer Field Schools showed that farmers rated composting as the most beneficial technology for them

Source: *Madhusudan Bhattarai,* Socioeconomics, AVRDC-The World Vegetable Center; *M. Ferizal*, Senior Agricultural Economist, Assessment Institute for Agricultural Technology-Aceh (BPTP-Aceh), Indonesia

Photos: *Madhusudan Bhattarai; Greg Luther*, Global Technology Dissemination, AVRDC-The World Vegetable Center

Screening heat tolerant vegetables in Bahrain

The eggplant leaves were damaged by aphids and no fruit formed under high temperature conditions in May (over 35°C)

Bahrain is an archipelago of 33 islands near the western shores of the Persian Gulf. The total area of Bahrain is 707 km^2 and 92% is desert, generally flat and arid with periodic droughts and dust storms. Summer (May to October) is very hot (average 36°C, maximum 48-51°C in June and July) and humid; winter (November to April) is mild (average 15-24°C, minimum 10°C in January). Rainfall is minimal (annual rainfall 77 mm) and irregular. Arable land constitutes only 2.82% of the total area; however, the degradation of limited arable land results in desertification. Due to such severe environmental conditions, most vegetables are imported. The major consumed vegetables in Bahrain are tomato, common cabbage, eggplant, lettuce, cauliflower, cucumber, sweet pepper, carrot and pumpkin.

To increase the land utilization and productivity, the Ministry of Agriculture works with Taiwan Technical Mission (TTM) in Bahrain on screening heat tolerant vegetables with high consumer acceptability. TTM Bahrain requested 10 accessions of vegetable soybean and 5 accessions of eggplant from AVRDC genebank for selecting the vegetable lines that are suitable to grow under local conditions.

Vegetable soybeans were planted in the open field in November 2010. Unfortunately, all the accessions did not grow normally due to severe bird damage. Although plants bore some small pods, the harvest was very poor. Growing vegetable soybean under the protection of net houses may solve the bird damage problem, however, the air circulation may be poor inside the net houses and the local farmers have no interest to do so. The results showed all the vegetable soybean accessions are not suitable for growing in the open field under Bahrain conditions.

Eggplant is a very common crop in Bahrain and there is no problem for winter production, however, growth is very poor in the summer. TTM transplanted AVRDC eggplant lines

Vegetable soybean was seriously damaged by birds, resulting in very poor growth and fruiting

to the field in January 2011. The leaves were damaged by aphids and only a few small fruits were harvested in April 2011. In May, the temperature reached more than 35°C and no more fruit was formed. In addition, all the plants were seriously infected with root-knot nematode. Introducing AVRDC root-knot nematode resistant rootstocks 'EG203' and 'EG195' for grafting may solve this problem. However, both scions and rootstocks should be heat tolerant. The adaptation trial results showed all the eggplant accessions are not heat tolerant enough to be grown under hot summer conditions in Bahrain. When heat tolerant germplasm is available, grafting technology can be introduced and promoted to local nurseries to produce grafted seedlings for farmers to control eggplant root-knot nematode.

The performance of vegetable soybean and eggplant lines indicates that vegetable growers are facing challenges under extreme climatic conditions in Bahrain.

Source and photos: *Kuo-Hwa Chen*, Taiwan Technical Mission in Bahrain; *Yih-Shiow Chang*, TaiwanICDF Project Manager, Thai Royal Horticultural Project Foundation on R&D

Successful homestead vegetable garden in Jessore, Bangladesh

Ms. Sriti Konapatuk, a farmer from Jessore District in Bangladesh, successfully grows a wide variety of vegetable crops in her homestead area

Nutrient deficiency is a common problem among most Bangladeshis, especially for those living in rural villages. Most households in the villages have at least some land surrounding their home, where they can establish a homestead garden to supplement their diets and help meet the daily requirements of nutrients for their families. In Bangladesh about 75% of the households have a homestead garden where different crops and trees are grown along with livestock and fish. Vegetables can provide various nutrients; however, a low diversity of vegetables are planted in most homestead gardens.

In Jessore District of Bangladesh, one farmer, Ms. Sriti Konapatuk, manages her homestead garden in an exemplary fashion, however. She successfully plants a wide diversity of vegetable crops around her homestead, including pumpkin, cabbage, cauliflower, kohlrabi, ash/wax gourd, Malabar/Indian spinach, chili pepper, bitter gourd, bottle gourd, taro, yard-long bean, papaya, elephant foot plant (konjac jelly), kangkong, and olive. She also has good seedling management practices. Her extended family consumes 60-70% of the vegetables she produces, and she sells the remainder. She is one of the most prolific vegetable homestead farmers in the village, and her fellow village members would do well to emulate her.

Ms. Sriti's homestead garden can serve as a demonstration of diversified vegetables grown in concert, and in fact, she would be an excellent candidate for farmer-to-farmer visits because she is eager to discuss her gardening efforts and has a lot of success stories to share.

Ms. Sriti uses plastic bags to produce bottle gourd seedlings

Source: *Greg Luther* and *Mandy Lin*, Global Technology Dissemination, AVRDC-The World Vegetable Center; *Md. Shaifullah, Kazal Basak* and *Zillur Rahman*, Horticulture Development Officers, Cereal Systems Initiative for South Asia, Bangladesh

Photos: *Greg Luther*

Creating an integrated pest management vegetable garden in the Solomon Islands

An integrated pest management (IPM) vegetable garden is designed to combat pests and focuses on long-term prevention of pest damage through a combination of techniques. It works best when you look at your garden as a small ecosystem.

Many farmers in the Solomon Islands have problems with producing healthy vegetables due to the poor soil, pest damage (from aphids, flea beetles, armyworms, other lepidopteran pests and pod bugs) and limited access to fertilizers and pesticides. Therefore, the concept of an IPM vegetable garden was introduced to the participants (lead farmers, Ministry of Agriculture and Livestock extension staff and project partner representatives) of a Train the Trainer (TOT) course in April 2011 in the Solomon Islands.

The principles for establishing an IPM garden are: **1) Keep the plants healthy**: plants have natural defenses against pests. Problems are more likely to occur when a plant is stressed. Improving plant health can make the crop less vulnerable to pest attacks; **2) Help nature maintain a healthy balance**: plant pests could be kept at acceptable levels without large amounts of chemical pesticides if the biodiversity in and around a garden is increased, resulting in less opportunity for pest populations to reach economically damaging levels; **3) Preventive cultural practices**: pests can be managed effectively by diversifying the crops grown through intercropping, mixed cropping and companion planting. For example, growing tomato with ball cabbage can help keep diamondback moth *(Plutella xylostella)* away. Certain plants can also be grown to attract pests and keep them away from the crop. For example, cosmos attracts thrips and mustard

*An IPM vegetable garden created by Areatakiki community in the Solomon Islands, with basil, vetiver grass and chilli planted on the edges. Crops include yardlong beans and tomatoes (background), pakchoi (foreground) and herbs including dill, rocket and parsley (next to the nursery)**(top)**; marigold was planted near the vetiver grass on the edges of the field to attract beneficial insects **(bottom)***

Participants of a Train the Trainers course discuss the layout of an IPM vegetable garden

attracts brassica pests; ***4) Biological control***: include plants in the garden that provide food (such as nectar and pollen from flowers), shade and refuges for beneficial insects to encourage them to stay and help manage pests in the garden; **5) Botanical sprays**: when a particular pest becomes a problem, it is useful to have plants with repellent (chili, onion, garlic), anti-feedant (neem) or insecticidal properties (derris, papaya) growing in the garden ready to use when needed.

Kastom Garden Association in the Solomon Islands provided some of the plant materials to the TOT participants so that they could create their own IPM gardens. The participants from Areatakiki community decided to turn their demonstration plot into an IPM garden. The group planted vetiver grass (*Vetiveria zizanoides*) around the edges and between the four blocks so that the field was divided and the vegetables can be rotated easily with different green manure crops, such as mungbean, pigeon pea and cowpea. Planting green manure crops helps to supply organic matter to the soil as well as protecting the soil and providing mulching. The harvested pods/seeds can also be eaten. Gliricidia (*Gliricidia sepium*) was planted next to the vetiver grass. It will be cut into a hedge and the trimmings will be incorporated into the soil to add organic matter. Next to these, neem trees (*Azadirachta indica*) were planted for providing ingredients for sprays to manage insect pests. Chilis were planted along the edge of the field for making repellent sprays. Basil (*Ocimum basilicum*) and marigold (*Tagetes* spp.) were planted near the vetiver grass to attract beneficial insects such as hoverflies. Derris (*Derris* spp.) plants were planted next to the nursery area. Its roots contain rotenone, a strong insecticide and fish poison, which can be used to make a botanical spray. Other plants such as cosmos (*Cosmos bipinnatus*), alyssum (*Lobularia maritime*), nasturtium (*Tropaeolum majus*) and fennel (*Foeniculum vulgare*) can also be used for attracting beneficial insects.

Although the IPM garden took several months to establish, the group was very pleased with the results. They found that it was not only easier having materials close by, but it helped them organize the field better and grow healthy crops. Many farmers in the surrounding communities have visited the site and the Areatakiki community is very proud of what they have achieved. They are keen to supply plant materials to other farmers as well as train them to improve their own vegetable gardens.

Source and photos: *Suzanne Neave*, AVRDC-The World Vegetable Center, Project Office, Solomon Islands

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