Easy to spot in Filipino backyard gardens is the typically elongated eggplant (Solanum melongena L.), the only purple among a sea of greens. This vegetable, locally known as ‘talong’, is essential to dishes like pinakbet, torta, sinigang, ensalada and kare-kare.

Not a lowly crop by any means, it is a good source of vitamins, minerals and fibers, as well as an important agricultural commodity in the country.

Eggplant farming involves 30,243 small-resource farmers, with average holdings of 0.7 hectare (ha). It is the dominant vegetable in terms of areas cultivated and output.

In 2011, the Bureau of Agricultural Statistics (BAS) recorded that the area harvested to eggplant totaled 21,377 hectares, with Pangasinan, Nueva Ecija, Isabela, Cebu and Quezon as top producers. The volume produced was 207,994 metric tons, valued at P 4.22 billion at current prices.

**PROBLEMS IN EGGPLANT PRODUCTION**

Even as a common vegetable, eggplant still has problems that hobble its growers. Its yield per hectare was even ranked as one of the lowest in Asia.

Eggplants are battered by pests, diseases and extreme environmental conditions. The most damaging pest is the fruit and shoot borer (FSB; scientific name, Leucinodes orbonalis Guenee). FSB could ruin up to 90 percent of output, wrote Dr. Sergio Francisco, Chief Science Research Specialist and Program Leader, Impact and Policy Research at the Philippine Rice Research Institute, in his economic impact assessment studies of Bt eggplant—

FSB is so named because it feeds on the leaves and shoots during the early vegetative stage, and feasts on the fruit during the fruiting stage. Eggplants riddled with holes because of FSB cannot be sold anywhere.

**UNHEALTHY, EXPENSIVE, LABORIOUS PEST CONTROLS**

To rid farms of FSB infestation, farmers can use different methods like cultural control, host plant resistance, and judicious chemical control to keep populations of the natural enemies of FSB in the farm.

However, removing infested shoots, trapping insects and applying nettings prove as too laborious and ineffective for farmers. Thus, most farmers rely on heavy use of insecticide sprays, which are effective only against newly-hatched FSB caterpillars that have not yet tunneled into the plant.

The problem with this is improper use and abuse of such pesticides.

According to a study entitled “Value of Environmental Benefits of Bt eggplant in the Philippines” by Dr. Francisco, Mr. Jason Maupin and Dr. George Norton in 2009, farmers spray about 42 times per production period (others even spray as frequently as 80 times, or every other day), using approximately more than 65 liters of chemicals per hectare.

In three of the top eggplant-producing provinces in Luzon alone, the use of chemical pesticides is prevalent. Based on a presentation by Dr. Cesar Quicoy, Assistant Professor at the College of Economics and Management, University of the Philippines Los Baños (UPLB), on his research titled “Productivity and Technical Efficiency of Eggplant Production in Selected Provinces in the Philippines: Stochastic Production Function Approach”, it was found that all eggplant farmers (100 percent) in Quezon use chemical pesticides, while 96 percent use it in Pangasinan and 97 percent in Batangas.

Apart from being dangerous, pesticides are also expensive—its use is a burden for farmers. Based on the survey by Dr. Francisco’s team, pesticides for FSB take up almost 30 percent of the production cost, or about P28,000 per hectare per cropping season.
VEERING AWAY FROM PESTICIDES: THE FSB-RESISTANT BT EGGPLANT

With an FSB-resistant eggplant, farmers would no longer be worried about pests and the harmful and costly chemical insecticides needed to control it.

Through modern biotechnology, an FSB-resistant variety, known as BT eggplant, was developed by the Maharashtra Hybrid Seeds Co., Ltd. (Mahyco) in India. By introducing a gene from the *Bacillus thuringiensis* (BT), a non-pathogenic, naturally-occurring bacterium found in the soil, the eggplant was rendered immune to FSB. It works in such a way that when an FSB ingests any part of the BT eggplant – fruit, shoot, or leaf, the pest would die due to the BT protein.

The FSB-resistant eggplant lines developed by Mahyco have been used as source of the resistance trait of biotech eggplants in India, Bangladesh and the Philippines.

In the Philippines, BT eggplant technology has been made available by Mahyco to the University of the Philippines Los Baños (UPLB), royalty-free, through a sublicense agreement. This agreement allows UPLB to develop and commercialize varieties and hybrids containing BT technology.

Currently, several promising FSB-resistant eggplant lines are being fully evaluated in India, Bangladesh and the Philippines.

The Department of Agriculture (DA), Bureau of Plant Industry (BPI), the National Committee on Biosafety of the Philippines (NCBP) and the Department of Science and Technology (DOST) Biosafety Committee, worked together to impose strict regulatory controls on BT eggplant to ensure that it is safe to people and the environment before it is commercialized. An independent body of assessors called the Scientific and Technical Review Panel (STRP), composed of scientists and experts from different fields, also ensures the biosafety of the product.

This Philippine biosafety scheme is considered as a model framework by many countries.

In their study about its environmental benefits, Dr. Francisco’s team found that BT eggplant reduces not only pesticide use, but also risks to human and animal health. They found that BT eggplant could cut the amount of pesticide application by nearly half of what is normally used. The study showed that a 48 percent reduction in pesticide use is expected from adopting BT eggplant. Specifically, BT eggplant would only require 6.2 liters of pesticide per hectare, which is half of what is used for its non-BT counterpart (12 l/ha). Moreover, the environmental impact quotient (EIQ), or the collective measure of risks related to active ingredients in pesticides, went down 19.5 percent with BT eggplant.

Dr. Francisco said that the environmental benefits brought by reduced pesticide use would save about P2.5 million in health costs and about P6.8 million in other environmental categories covering farm animals, beneficial insects and avian species.

LESS INFESTATION, MORE YIELD AND PROFIT

An economic study also conducted by Dr. Francisco in 2007 drew up BT eggplant’s potential economic benefits and effects in the farm and market.

With the BT eggplant’s resistance from FSB infestation, marketable eggplant harvests were expected to increase by 40 percent. At the same time, farmers could save P13,959 from their pesticide expenses alone. They would then have the option of using the savings for other yield-enhancing inputs.

Overall, cultivating BT eggplant could raise farmers’ income by about P50,000 per hectare, as production cost is cut by 16 percent.

Moreover, consumers would also enjoy cheaper eggplants with lower insecticide residue.

BT EGGPLANT ADOPTION: A WIN-WIN SITUATION

Dr. Francisco described BT eggplant adoption as a “win-win situation” for the environment and farmers as it has “few (if any) unintended environmental effects,” better marketable yield and a lower production cost. This makes the BT eggplant a profitable and safer (due to reduced pesticide use) alternative for eggplant farmers.

As a public sector product, BT eggplant would be an advantage for the whole community. If the high value eggplant will no longer be vulnerable to FSB through this technology, people will realize the positive economic, environmental and health impacts of this biotech product.

References:


