



Integrated Pest Management Innovation Lab (IPM-IL)

Introduction

The Integrated Pest Management Innovation Lab (IPM-IL) is a USAID-funded, multi-year investment to develop, implement, and scale integrated pest management (IPM) in developing countries around the world. IPM-IL is led by Virginia Tech University. In Nepal, International Development Enterprises (iDE Nepal) leads the implementation of IPM-IL and is one of three countries supported by IPM-IL in South Asia.



Drip is an IPM technology reducing plant stress and weeds that are vectors for disease/pests

IPM-IL has been working to minimize pesticide use on high value crops, while also promoting the private sector distribution of IPM technologies through service providers in Lalitpur, Kaski, Rupandehi, Palpa, Banke and Surkhet districts. Phase 1 (2006-2009) focused on testing and validating diversified IPM products and techniques, including pheromones, solarization, plastic mulching, and bio-pesticides. Phase 2 (2009-2014) focused on developing and testing full-season IPM packages for key vegetable crops. Research activities included on-farm field experiments with tomato, eggplant, cauliflower, cucumber and bitter gourd. USAID Nepal has provided additional funds under an associate award for IPM IL to support the Feed the Future Initiative.

The current program, Asian Vegetable Integrated Pest Management Innovation Lab (2015- 2019), was awarded to undertake adaptive research with existing and new environmentally sustainable IPM practices, new vegetable IPM packages (chili, onion, french bean and okra) appropriate to local conditions and smallholder farmers, work with public and private sector partners to diffuse IPM practices, evaluate outcomes and impacts of the IPM program and packages among farmers, identify policies and regulations that affect the viability and spread of IPM and inform officials of policy changes that would be socially, economically, and environmentally viable. The current project is also responding with IPM approaches to the crisis created by the new *Tuta absoluta* infestation in Nepal.

Project Goal

The IPM-IL goal is to develop economically competitive and environmentally sustainable IPM packages for smallholder farmers that help to reduce agricultural losses, damage to ecosystems, and contamination of food and water sources caused by chemical fertilizers. The program is ongoing in these areas with the objectives to:

- ❖ Undertake adaptive research in each of the countries to tailor existing and new vegetable and mango IPM practices and packages to local conditions.
- ❖ Work with public and private sector partners to diffuse IPM practices and packages to farmers.
- ❖ Evaluate outcomes and impacts of the IPM program.
- ❖ Identify policies and regulations that affect the viability and spread of IPM in the target countries and inform officials of policy changes that would be socially, economically, and environmentally beneficial.

Nepal Implementation Team

International Development Enterprises (iDE Nepal) is responsible for establishing a supply chain for IPM products, identifying partnerships with local wholesalers and dealers, and linking with USAID and other donor supported projects and the GoN.

Center for Environment and Agriculture Policy Research, Extension and Development (CEAPRED) is responsible for developing, validating, demonstrating and promoting IPM technologies. Additionally, CEAPRED provides capacity building to other partners and assists in developing market linkages.

Himalayan College of Agricultural Sciences and Technology (HICAST) conducted the baseline survey for IPM-IL and provides ongoing assessment of project impact.

Nepal Collaborating Partners

Department of Agriculture (DOA) conducts demonstrations of IPM technologies with District Agriculture Development Offices (DADO) to promote the adoption and scaling of IPM technologies.

Nepal Agriculture Research Council (NARC) links outreach programs and organizes capacity building and training.

Agricare Nepal Pvt. Ltd., a company that manufactures and markets bio-pesticides and bio-fertilizers. iDE has an MOU with Agricare for the promotion of IPM IL packages, component technology recommendations and to provide technical support to develop a network of local service providers marketing Agricare products.

IPM Packages

IPM packages consolidate a holistic set of best practices, including the following:

Seed treatment: Treating seeds with bio-agents (such as *Trichoderma viride*, *Pseudomonas fluorescens*, and *Bacillus subtilis*) protects seedlings from fungal, bacterial and nematode attacks; increases seedling vigor; and induces plant defense against pests.

Soil Solarization: Preparing raised seed beds using solarized soil and bio-fertilizers (combined with *Trichoderma* spp and neem cake) reduces the incidence of disease, weeds and nematodes.

Nursery net in seedbed: Nets protect against aphids, and prevent or delay early virus infection via thrips.

Rouging: Removing diseased or virus infected plants within 45 days of transplanting prevents disease spread.

Tomato grafting: Grafting preferred tomato scions on wild eggplant (*Solanum sysimbifolium*) significantly reduces bacterial wilt and increases yields.

Bio-Fertilizers: Application of well-decomposed compost inoculated with *Trichoderma* spp and other bio-fertilizers (N, P, K) reduces disease incidence, builds up beneficial soil microbes, and improves nutrient absorption.

Insect Traps: Sticky traps are an effective control for aphids, whiteflies and thrips. Pheromone traps installed early in the season are effective control for *Helicoverpa armigera* and *Spodoptera litura*.

Bio-control agents: There are highly specific guidelines for need-based application of bio-pesticides, depending on the crop, the pest or disease, and the timing within the crop cycle and the pest life cycle.

iDE IPM IL has just started to extend IPM packages and technologies with the USAID Feed the Future Initiative. Technologies and impacts of the IPM IL to date include:

- ❖ 1027 HHs have adopted IPM IL technologies in and around the sites where IPM IL has developed the technologies including 470 HHs using trichoderma, 720 HHs using pheromone traps, and 105 farmers are using tomato grafted seedlings from nursery operators established by IPM IL.
- ❖ IPM IL technologies extended thru other FtF and iDE other projects including the USAID's Initiative for Climate Change Adaption (ICCA) include 3,500 farmers using solar solarization, and 2,500 farmers using jholmol (locally produced bio pesticide/fertilizer) and USAID's/KISAN projects includes 21,004 farmers (M/F:7461/13543); USAID's/MAWTW project includes:5,929 farmers (M/F: 1384/4545).
- ❖ iDE primarily with USAID support has facilitated sales of 44,000 Nepal manufactured drip systems. Drip reduces plant stress and weeds which are vectors for disease and insects.
- ❖ In FtF districts the project staff was trained on IPM components and packages by IPM IL. On those projects, in which households were trained on IPM components and packages by the staff of those projects (not by IPM IL staff) approximately 32% applied IPM technology (42% in KISAN project, 29% in MAWTW and 27% in the IAPAC project).



Nursery protected by net, Bank District



Grafting training by NARC with IPM IL support.