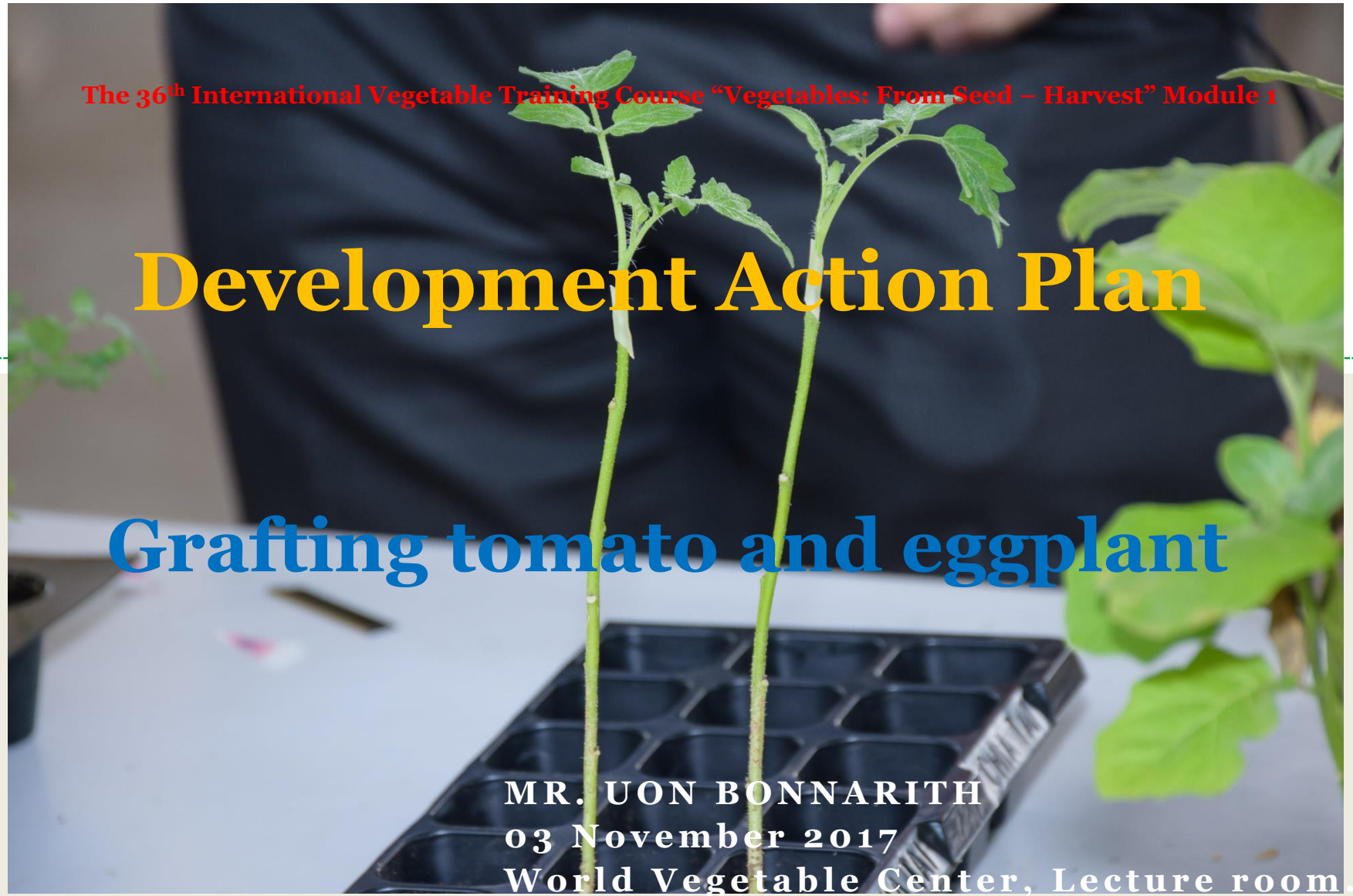


Development Action Plan

Grafting tomato and eggplant

MR. UON BONNARITH

03 November 2017

World Vegetable Center, Lecture room. KU-KPS

World Vegetable Center

Content

Part I

- Introduction
- Bio Data
- Work experience
- Project Overview
  - Variety trial
  - ToT to NGO Partner staff on horticulture and nutrition
  - Home garden demonstration site
  - Nutrition awareness
- The three interested topics

Part II

- Development Action Plan
- Why grafting is selected?
- Result
- Objective
- Methodology
  - How to do? Where and When?
  - Materials and treatments
  - IPM and GAPs technical package
- Potential challenges
- Activity planning
- Budget planning

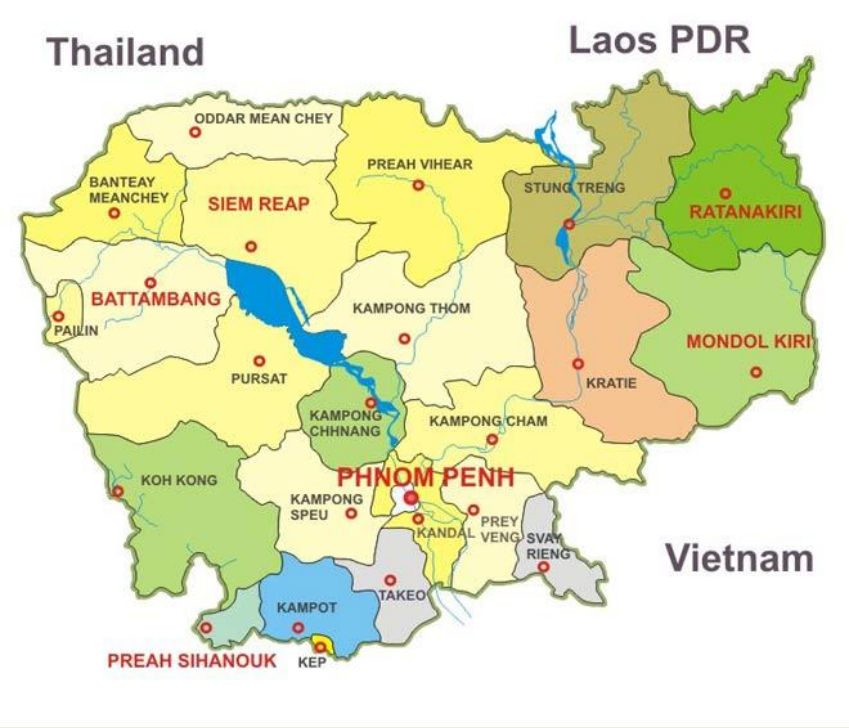
I- Introduction

- Bio Data
  - Name: Mr. Uon Bonnarith
  - Education:
    - Bachelor Degree of Agriculture Science
    - Master of Business Administrative (MBA) of General Management
  - Work Experience:
    - Worked as Vegetable Technician for MAFF
    - Worked for projects funded by EU, IFAD, ADB and USAID
    - Current career: staff of WVC for project calls "Deploying Vegetable Seed Kits to Tackle Malnutrition in Cambodia"

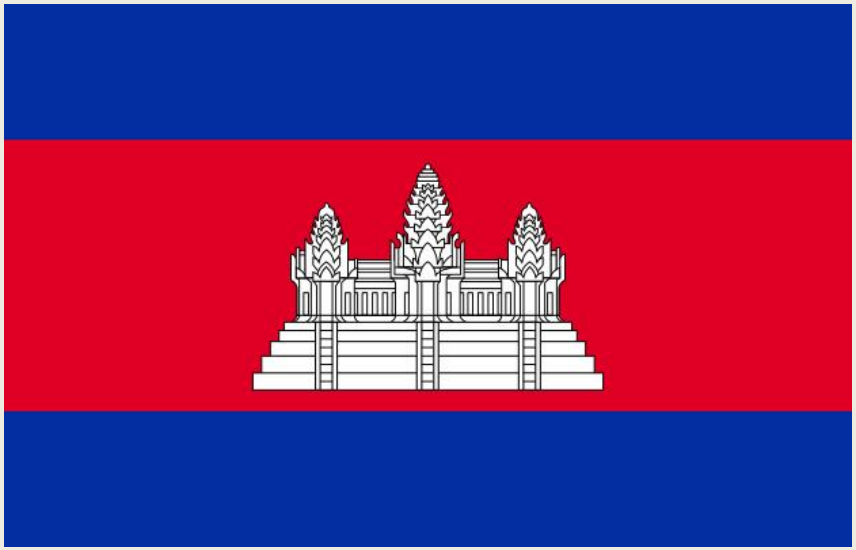
I- Introduction (Con)

Where is Cambodia?

- Population: 16, 085,769 (UN Estimates)
- 80% is doing agriculture
- Area: 181, 035 square kilometers



Flag of Cambodia



I- Introduction (Con)
Project Overview

- Funded by USAID (Burau Food Security, Washington DC)
- Four staff (PM, PC and 2 agriculture specialists), WVC
- Six local NGO Partners
- Households reach: 3,537
- Vulnerable households: 3,537

I- Introduction (Con)
Project Overview

- Child<5 years old supported: 4,576 (2,230 females)
- Individual receive agriculture training: 4,581 (3,689 females)
- Individual applied technologies: 6,301 (3,868 females)
- Private/community organization supported: 43

I- Introduction (Con)
Project Overview

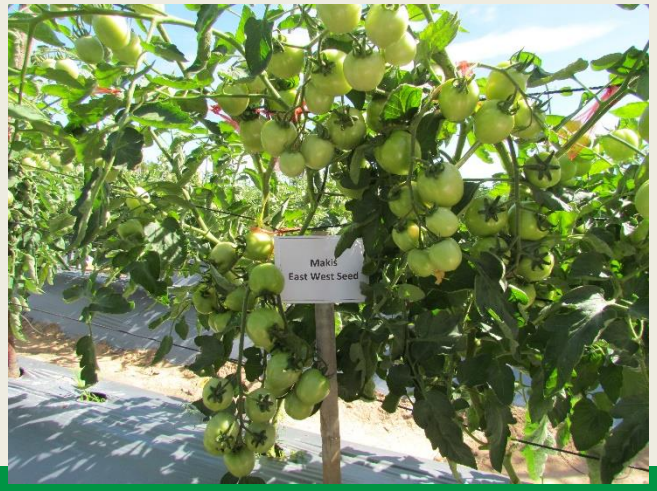
1- Vegetable Trail

- 12 commodities and 70 varieties were tested in Siem Reap 2016-2017
- 19 promising varieties were selected

Technical Supervision

I- Introduction (Con)
Project Overview

1- Vegetable Trail

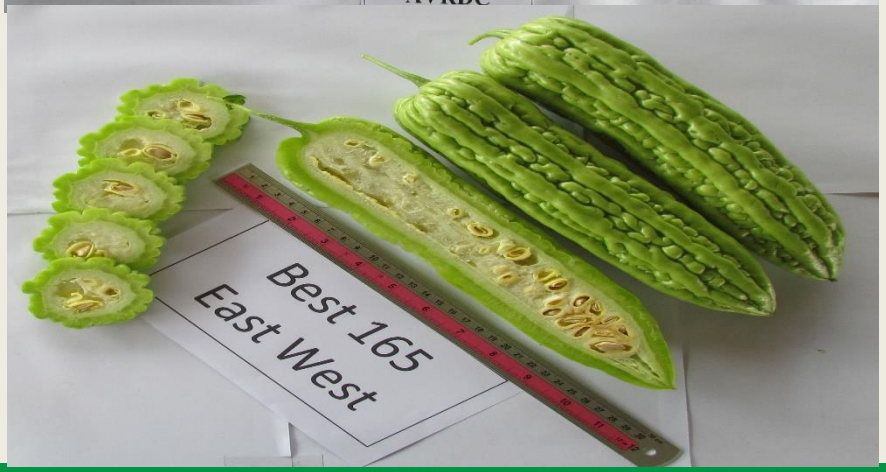


Promising variety

I- Introduction (Con)
Project Overview

1- Vegetable Trail

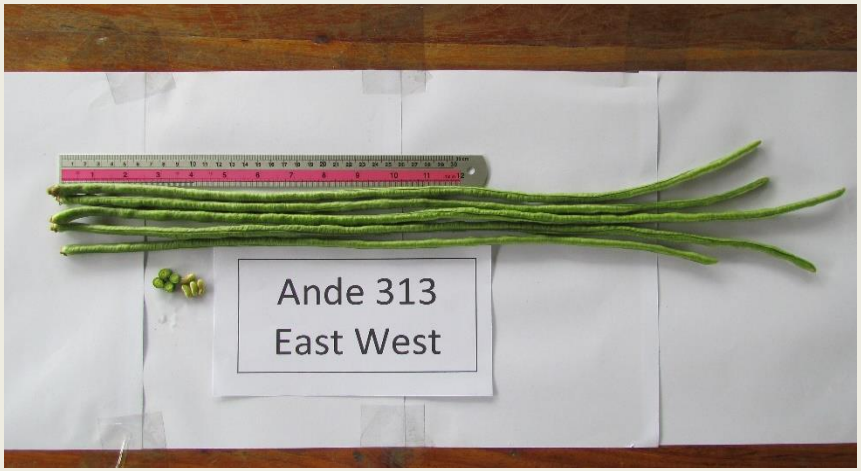
Promising variety



I- Introduction (Con)
Project Overview

1- Vegetable Trail

Promising variety



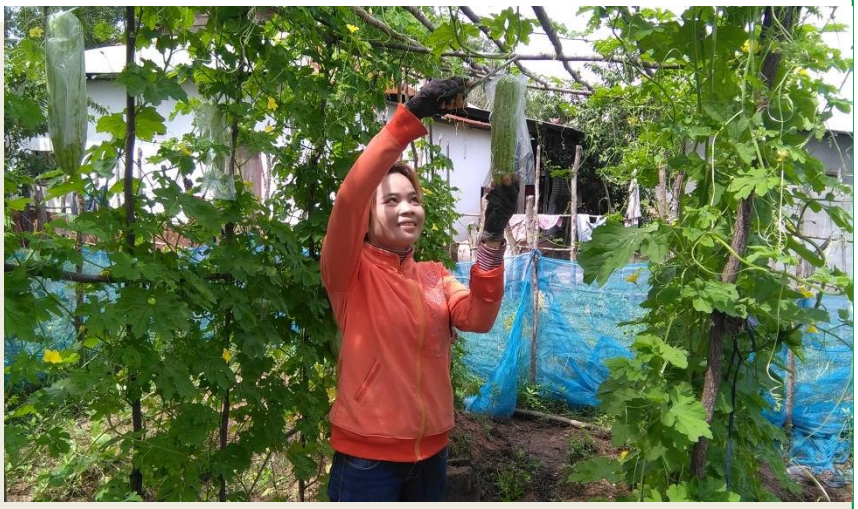
I- Introduction (Con)
Project Overview

2- Capacity building to NGO partner staff on horticulture (4 days)

Training to NGO partners staff on nutrition (2 days)

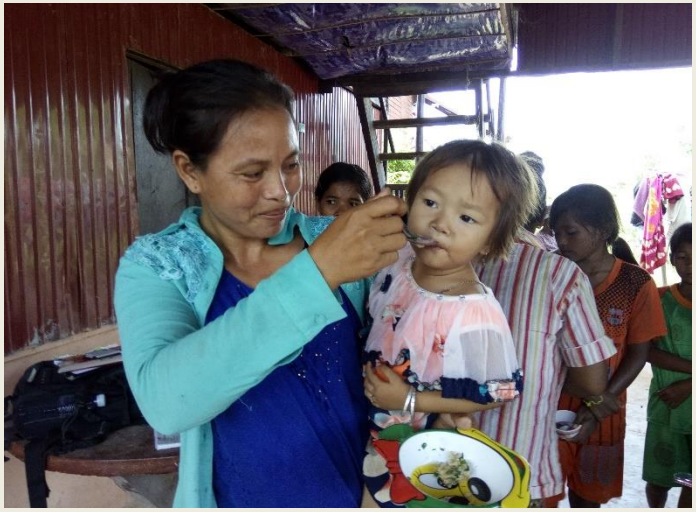
I- Introduction (Con)
Project Overview

3- Home garden demo site



I- Introduction (Con)
Project Overview

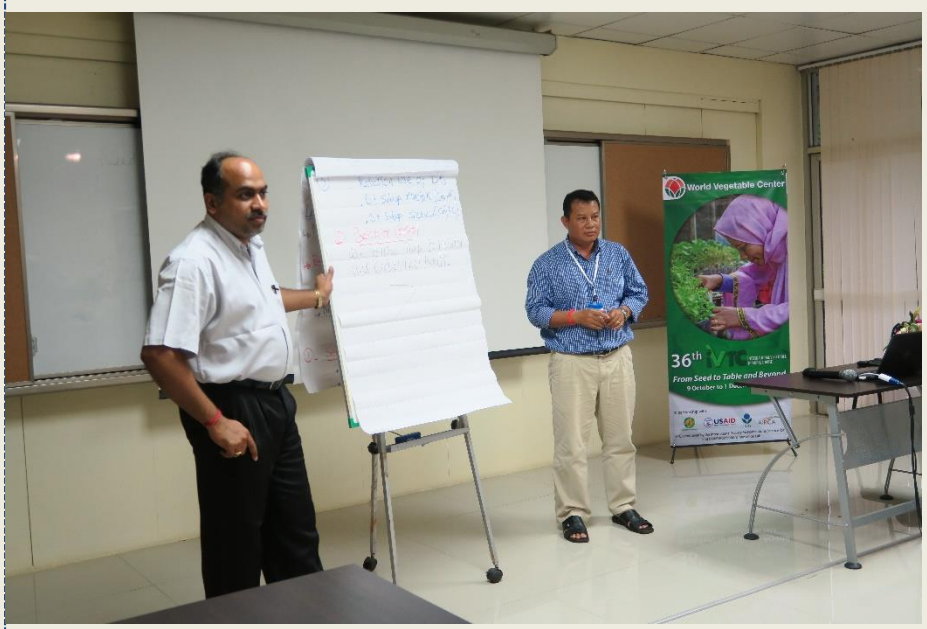
4- Nutrition Awareness



Three topics in Module I found

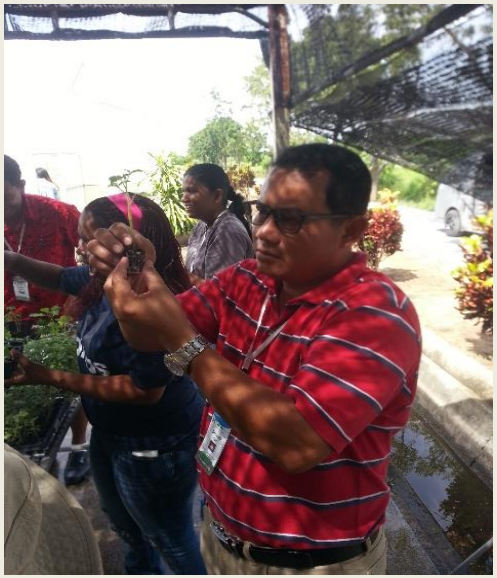
1- Conservation of plant genetic resource

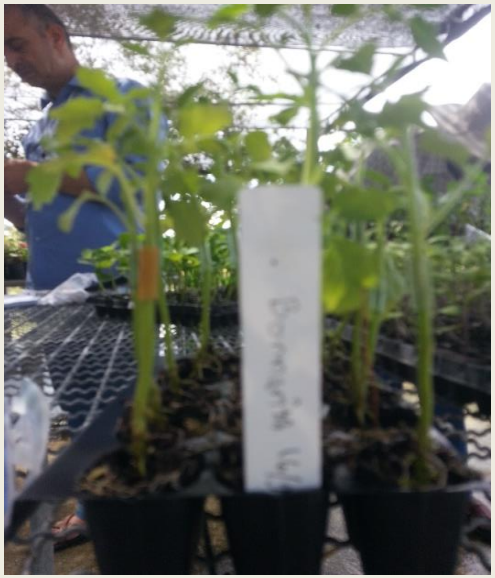
2- Developing IPM Packages for Major Vegetable Crops



Three topics in Module I found (Con)

3- Vegetable Grafting





Practice: 15 plants/14 plants are survival

Problem statement

Problem

- The local tomato production is not met the demand **(low yielding) ranges from 17-23t/ha**
- Cambodia has been importing vegetables such: Pepper, Tomato, Carrot, Onion, Cabbage, Potato, cauliflower from Vietnam every day ranges 200-400 tons (37 tons is tomato)
- ~150-200 million dollars lose every year

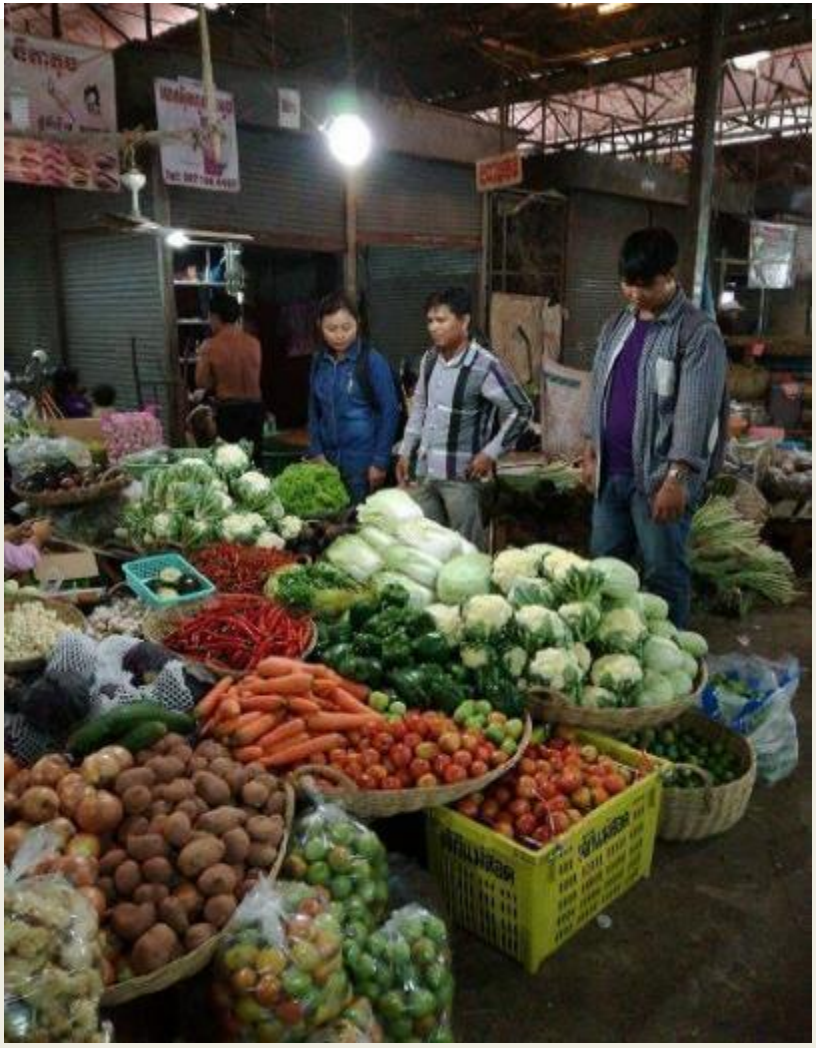
Source: *Presentation Chan Sophal, Center for Policy Study 2017*

- Land covered with vegetable production ranges from 43,000-47,000 hectares, tomato is 1,100 hectares

Source: Agriculture Census 2013

- Farm gate price of tomato 1kg is $0.41, net return is $0.07/s.q.m, high production cost

Source: Culculated based on crop budget data from iDE/Lors Thmey PADEE 2017



Problem statement

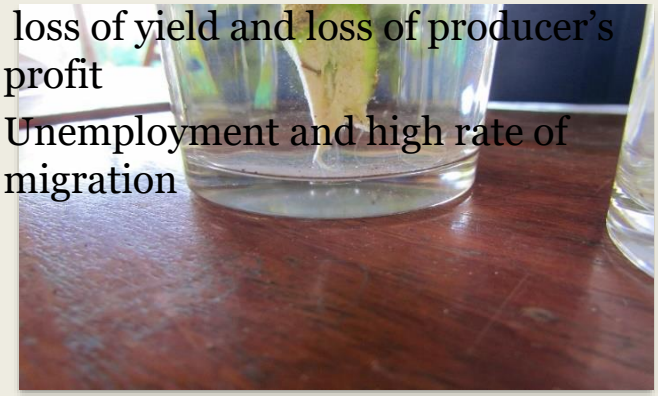
Why tomato yield is low?

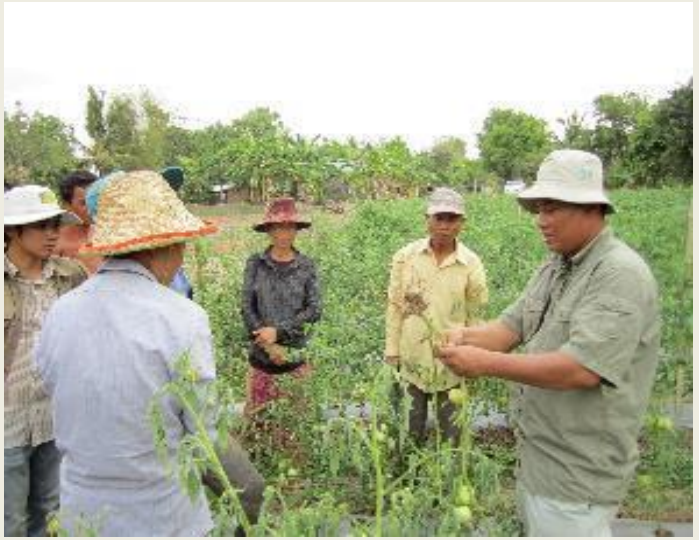
- Weather condition
- Infected by soil-born diseases, water logging and nematodes
- Lack of cultivation technology (improved variety, IPM technical package and GAPs)
- Lack of research and extension of tomato crop

➢ Negative Effect

➢ If the problem is not solved it will effect

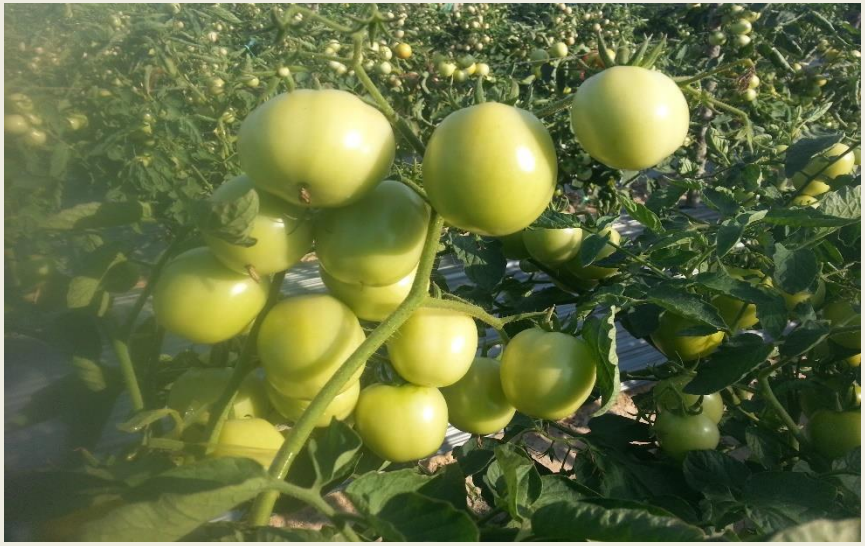
- loss of yield and loss of producer's profit
- Unemployment and high rate of migration





Result

- Enlarge of tomato production area
- The safe tomato yielding is consistently increased and get better profit by selling tomato
- Documentation on tomato grafting will be published and shared to relevant agencies



Objective

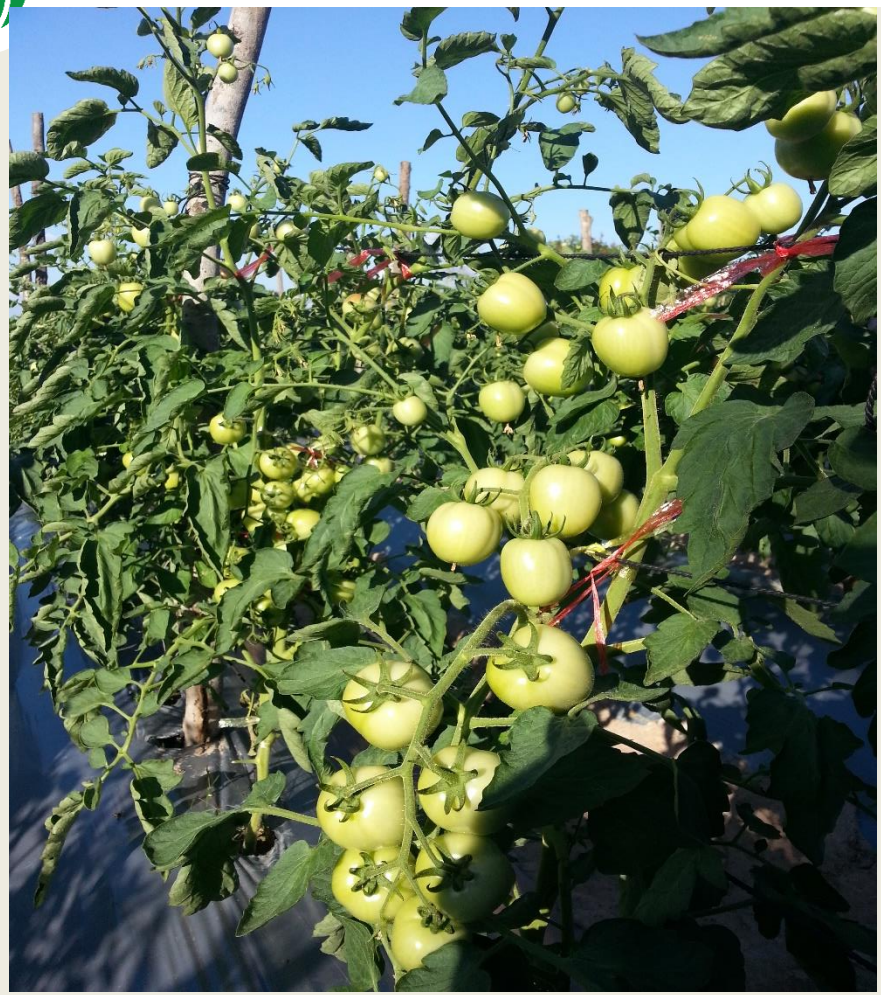
- To improve tomato yielding through applying tomato and eggplant grafting technique, Integrated Pest Management (IPM) and Good Agricultural Practices (GAPs) techniques.

- Where?

1- University of Battambang

2- Shinta Moni farm, Siem Reap

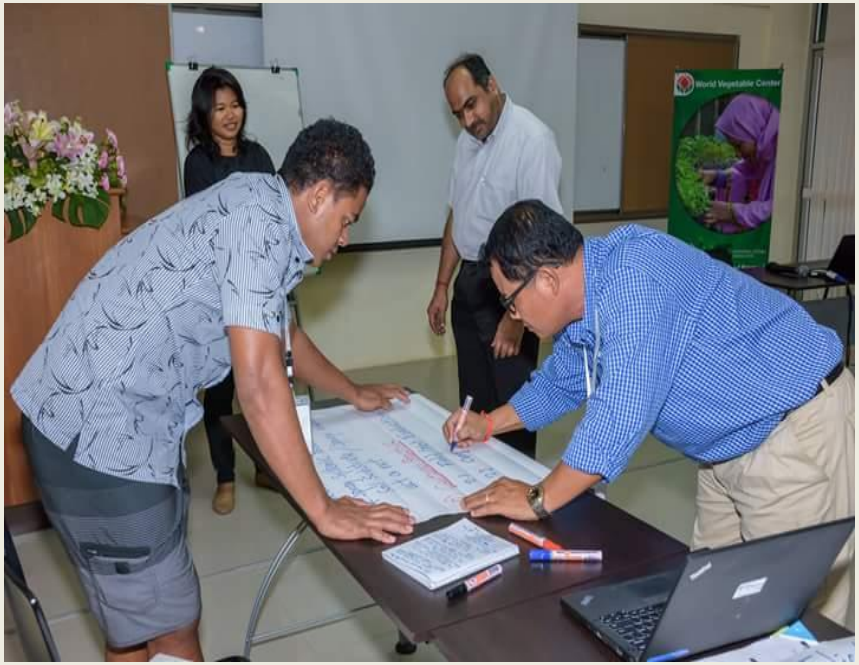
- When? December to May 2018



Methodology

A- How to do?

- Establish the tomato's IPM and GAP technical package
- Organize the training on tomato and eggplant grafting to 150 students
- Practice on grafting
- Carry out the demonstration field (extension and promotion)
- Organize the field day



Methodology

B- Who will do?

- Technical Support team

  1- Mr. Uon Bonnarith, Provincial Coordinator

  2- Mr. Pong Samnang, agriculture specialist

- Field Implementing

  1- Staff and students of University of Battambang

  2- Staff at Shinta Moni farm, Siem Reap province

Methodology (Con)

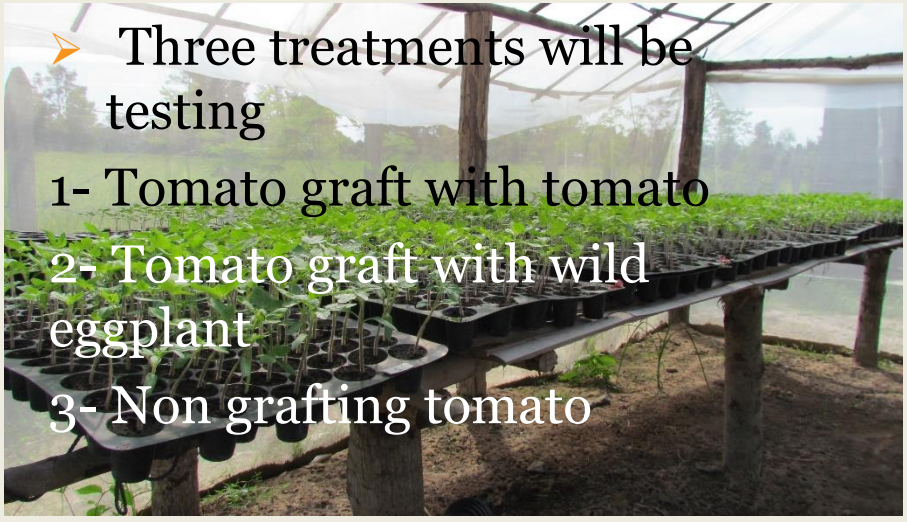
C- Materials

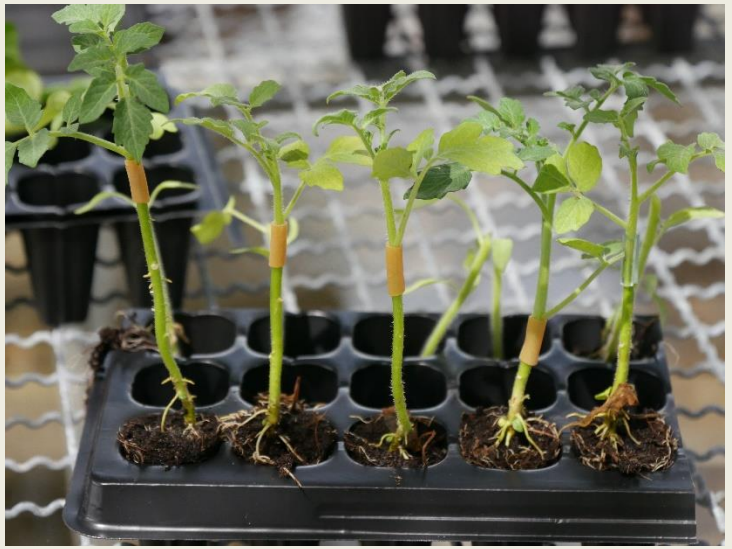
- Tomato variety (scion) Makis F1 and Hawaii (rootstock)
- Eggplantroot stock): wild eggplant
- Peat moss for seedling
- Materials for chamber
- Three treatments will be testing

1- Tomato graft with tomato

2- Tomato graft with wild eggplant

3- Non grafting tomato

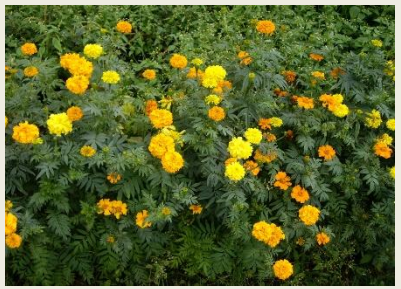


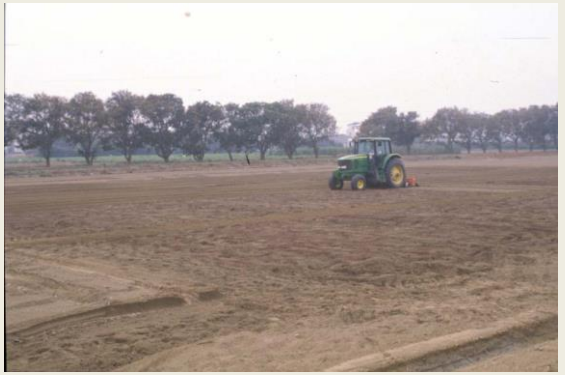


D- IPM and GAP Technical Package

D1- Physical and cultural control

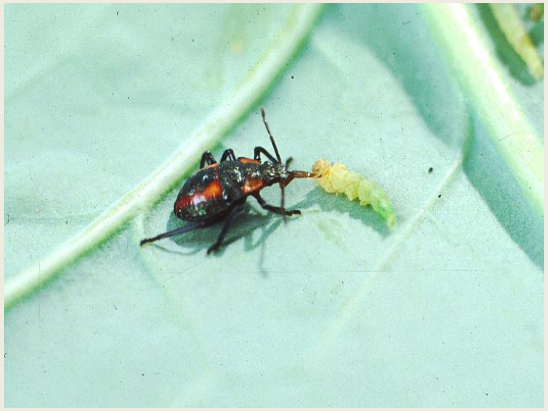
- Use good planting materials, for example healthy seedling
- Cover UV light plastic & insect proof netting
- Eliminate the alternative hosts at surrounding the plot
- Plough, raise the bed cover the plastic mulching and good drainage
- Crop rotation and crop trap (corn for livebearer) and (solanum viarum, white eggplant) to control tomato fruit worm, *Helicoverpa armigera*
- *Inter cropping of tomato and marigold to control root-knock nematode via crop rotation with sun herm (crotalaria)*
- *Staking, pruning and weeding*

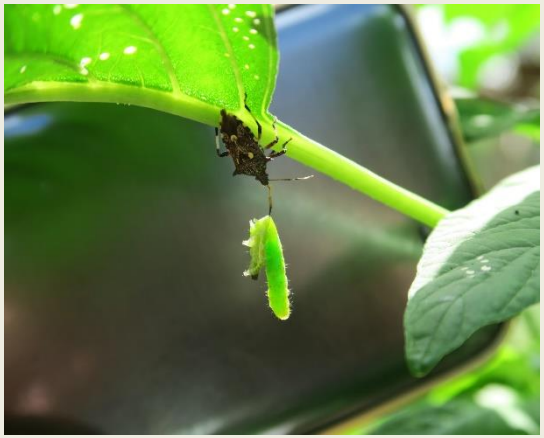




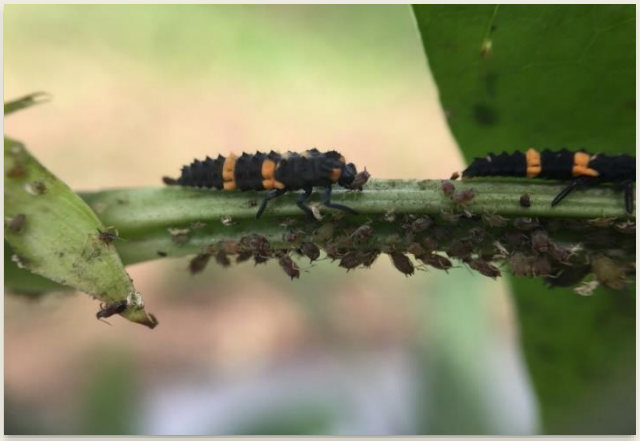
D- IPM and GAP Technical Package

D2- Natural Predator





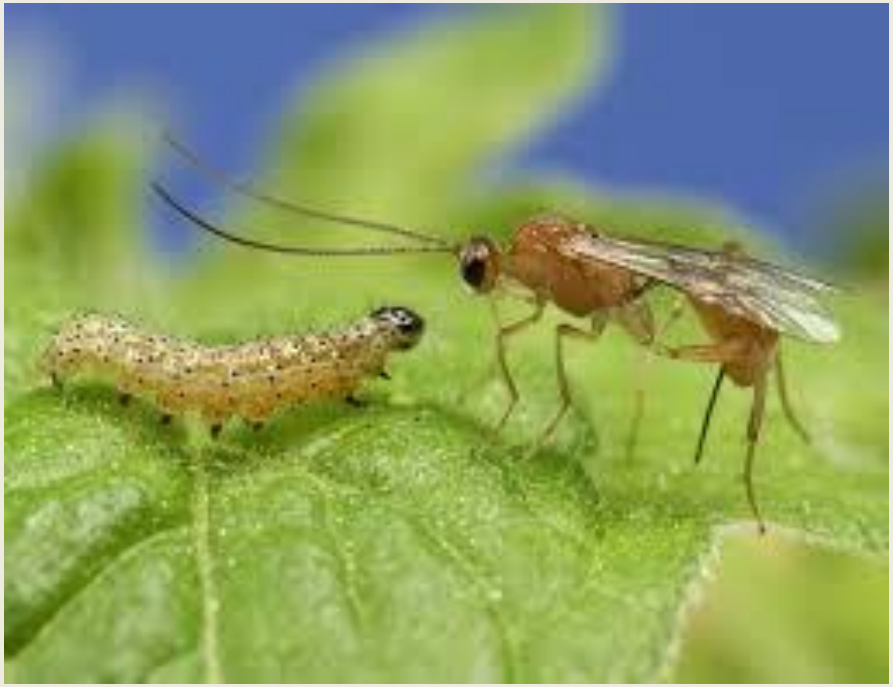
Predatory bugs can feed on caterpillar pests on various vegetables

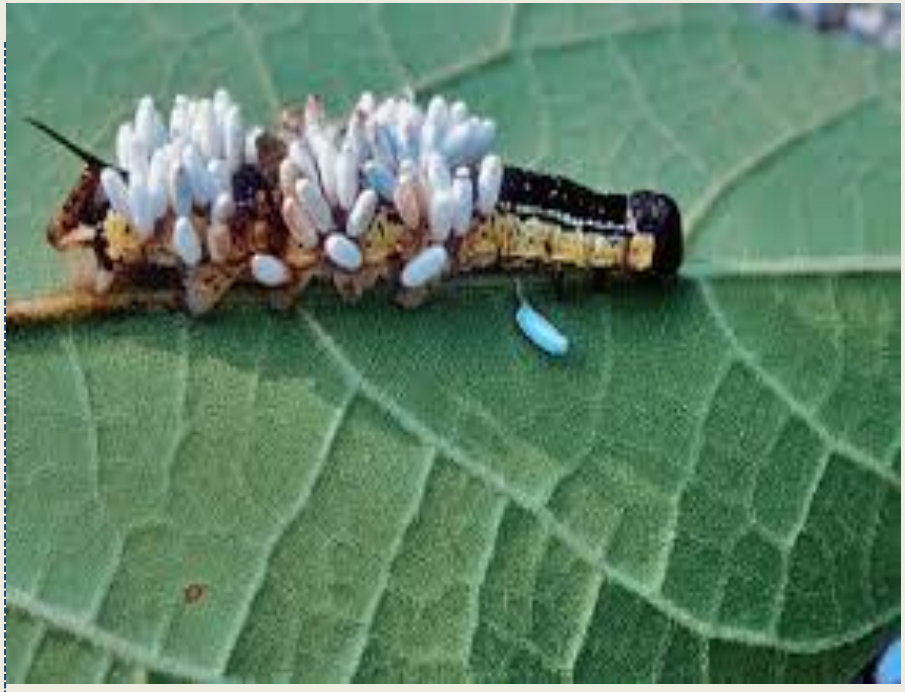


An effective predators for controlling aphids

D- IPM and GAP Technical Package

D3- Parasitoids



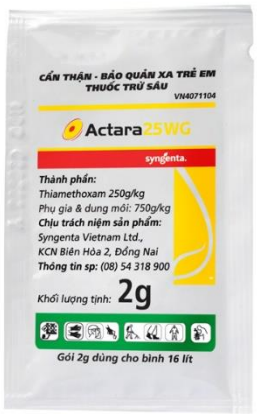


Parasitoid can feed on caterpillar pests on various vegetables

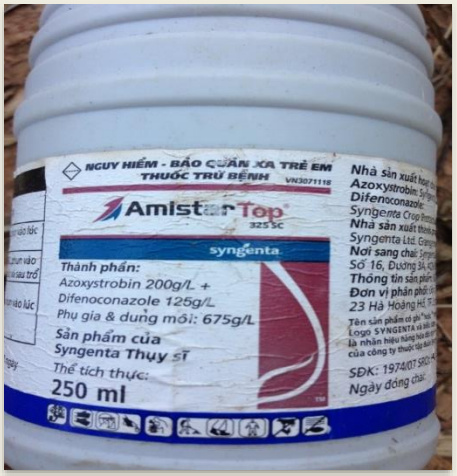
D- IPM and GAP Technical Package

D4- Chemical control

- Use botanical pesticide such need bark extract
- Use chemical pesticide such Thiametoxam to prevent the insects
- Use fungicide such Azoxystrobin to control Fusarium



- Active ingredient: Thiametoxam
- Trad name: Aktara
- PHI: 2 days after spraying



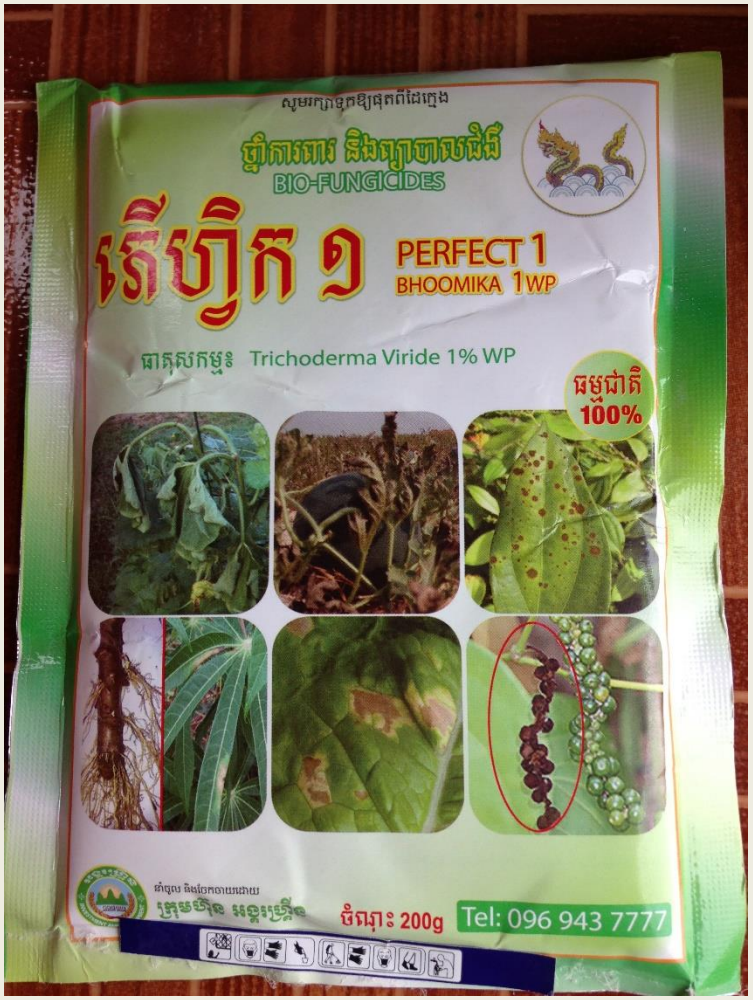
- Active ingredient: Azoxystrobin
- Trad name: Amistar
- PHI: 1-2 days after spraying

D- IPM and GAP Technical Package

D5- Bio-pesticide control

- Bio-fungicide:

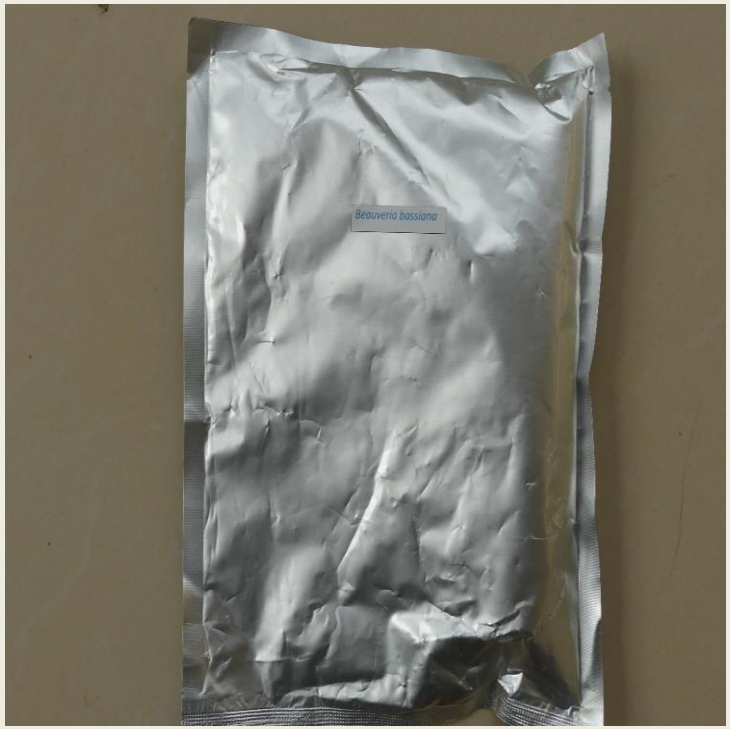
✓ Trichoderma used to prevent soil-born diseases, especially "Damping off"

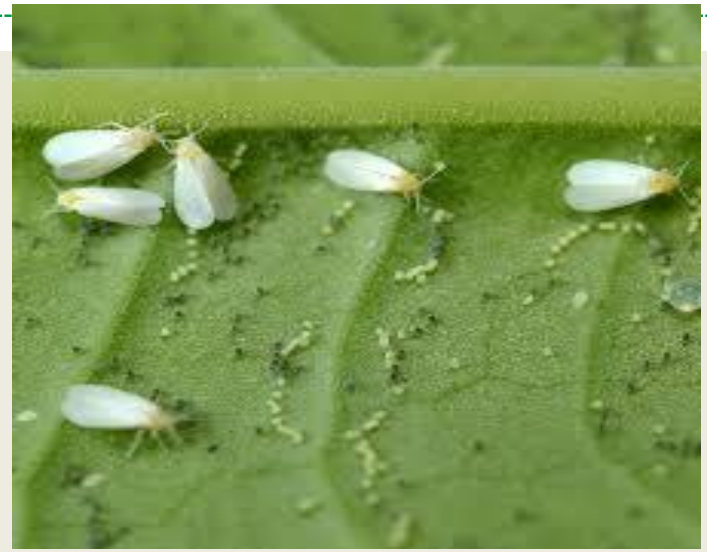


D- IPM and GAP Technical Package

D5- Bio-pesticide control

- ✓ Beauveria bassiana used to control sucking insects such aphid, white fly, Thrips



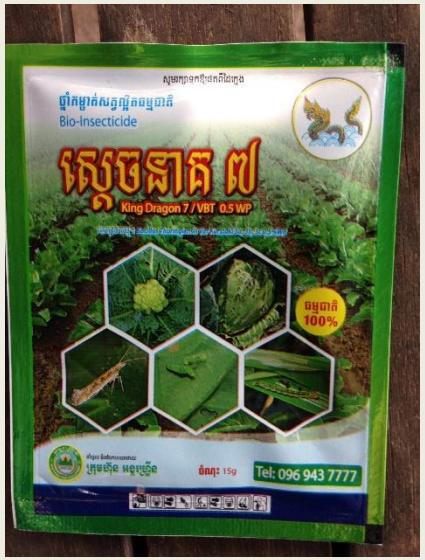


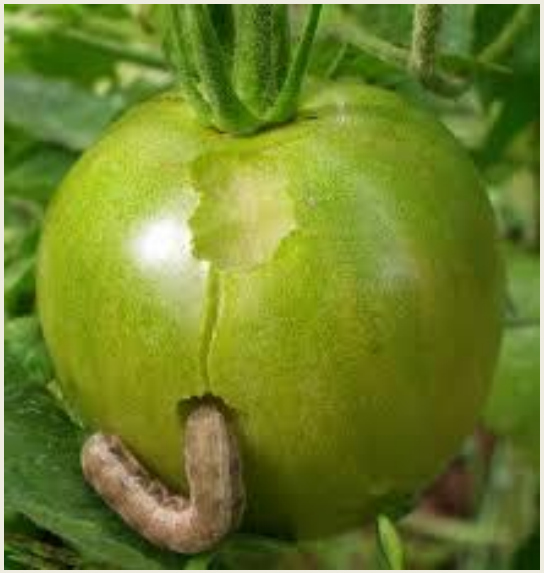
D- IPM and GAP Technical Package

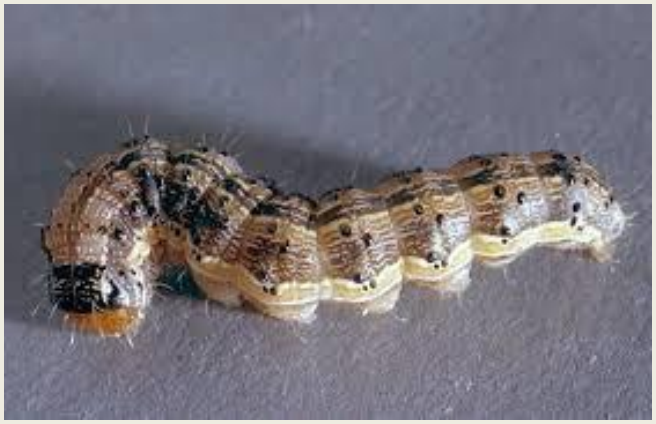
D5- Bio-pesticide control

- Bacteria

✓ Bacillus Thuringiensis (Bt) used to control Lepidoptera Larvae, for example: fruit worm: *Helicoverpa zea*.







Potential challenges

- Insufficient financial support
- New technology will take time for grower's adaptation (Extension Approach????)

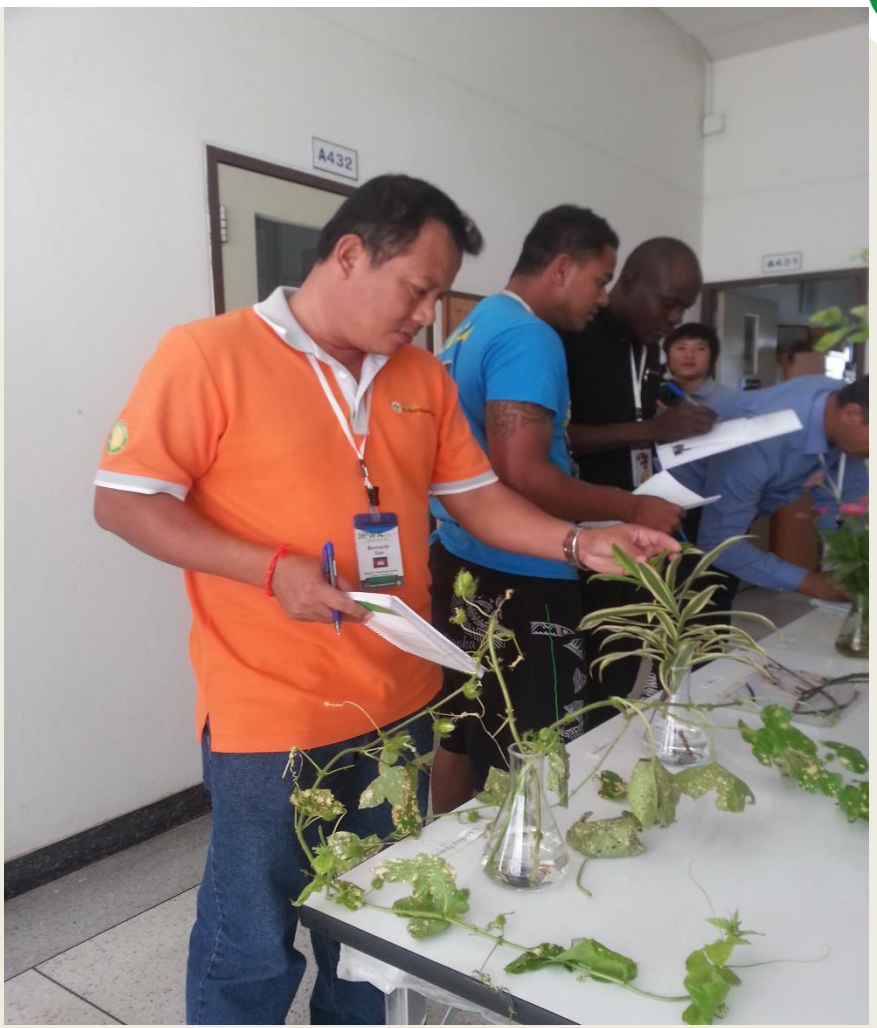
Activity Planning

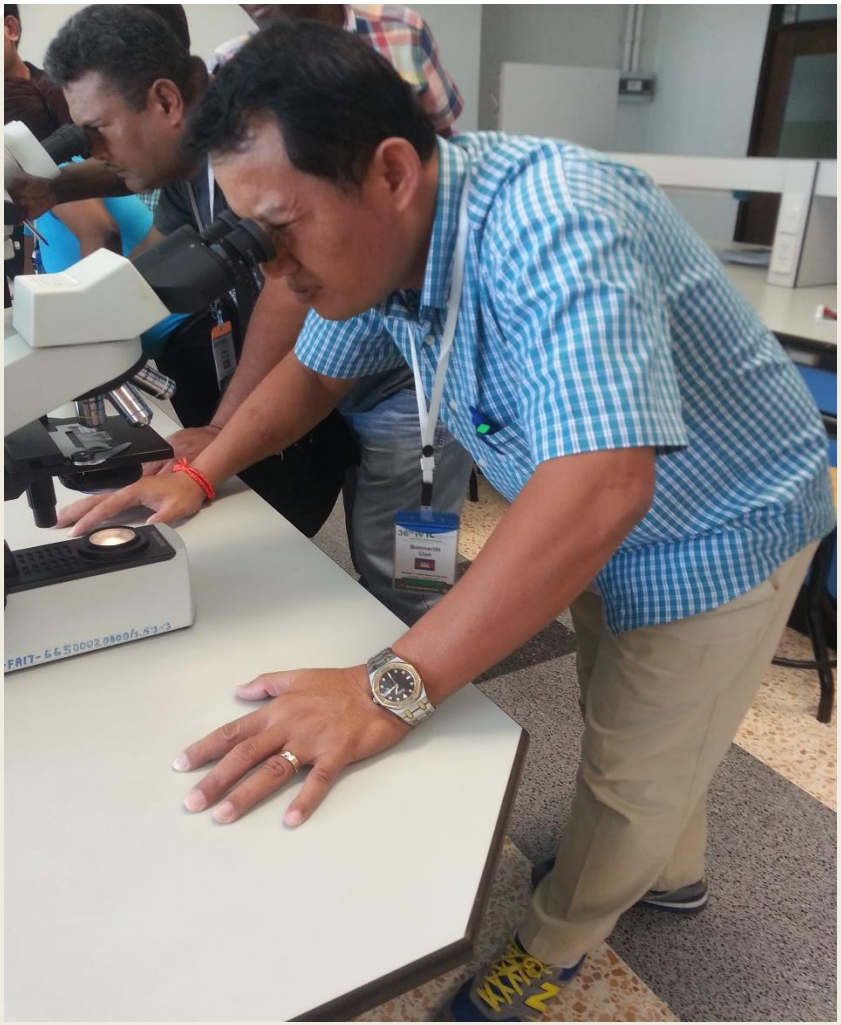
Activity	Implementation period 2018					
	Dec	Jan	Feb	Mar	April	May
Consultation with PM and develop the technical package	XX					
Train student of grafting & IPM	XX					
Seedling and grafting	X	XX				
Demonstration and trial		XX	XXXX	XXXX	XXXX	
Field mentoring and data collection	XX	XXXX	XXXX	XXXX	XXXX	
Organize the field day					X	
Analyze data and report writing					XXX	XXXX

Budget Estimation

Items to be spent	Amount	Estimated $
Supporting for seedling and grafting	01	400.00
Training on grafting technique	01	650,00
Demonstration and field management	02	1,000.00
Organize the field day	02	1,000.00
Unforeseen	Lumpsum	150.00
Grand total		**3,200.00**

Laboratory Activity





Thank you for your attention!