

PLANT HEALTH MANAGEMENT DIVISION

Objectives & Goals of Training Programmes

I. CROP-SPECIFIC AGRO-ECOSYSTEM ANALYSIS (AESAs) BASED PLANT HEALTH MANAGEMENT IN CONJUNCTION WITH ECOLOGICAL ENGINEERING FOR PEST MANAGEMENT IN RICE/VEGETABLES

➤ Aim of the course

- ✓ Promote AESA based Plant Health Management in conjunction with Ecological Engineering for Pest Management to reduce reliance on the use of agrochemicals.

➤ Course Outline:

- ✓ Living soil concept & Rhizosphere engineering;
- ✓ Principles of Integrated Nutrient Management;
- ✓ AESA based PHM
- ✓ Good Agricultural Practices (GAP)
- ✓ Ecological engineering for Pest Management;
- ✓ Principles of Integrated Weed Management;
- ✓ Role of semiochemicals in pest management;
- ✓ Principles of pesticide application technology;
- ✓ Integrated rodent pest management;
- ✓ Plant parasitic nematodes and their management;
- ✓ Role of Entomopathogenic nematodes in pest management
- ✓ FFS methodology, characteristics, structure and process;
- ✓ P:D ratio in rice / vegetable ecosystem & AESA chart preparation
- ✓ On-farm mass production of biocontrol agents, microbial biopesticides and biofertilizers.

➤ Duration of the programme: 30 days

➤ Methodology adopted:

- a) Theory: 35%
- b) Case studies/Exercises: 10%
- c) Practicals: 40%
- d) Field visits: 15%

➤ Hands on Skills acquired:

During the training course the participants will acquire skill /hands-on practices in the following areas:

- ✓ Agro Ecosystem Analysis based Plant Health Management
- ✓ Ecological Engineering for pest management
- ✓ Integrated Rodent Pest Management
- ✓ Organization of FFS.
- ✓ Safe and judicious use of pesticides
- ✓ Seed treatment & biopriming
- ✓ On-farm production of Biocontrol agent (predators & parasitoids)
- ✓ On-farm production of Microbial Biopesticides
- ✓ Production of vermicomposting and biofertilizers including mycorrhiza
- ✓ Production of low cost fruit fly traps.

➤ F. Utility of skills learnt:

On completion of the training course the participants will be able to

- ✓ Organize AESA based PHM in conjunction with Ecological Engineering for Pest Management
- ✓ Organize FFS for promoting safer crop production technologies and non-formal education methods in educating the farmers
- ✓ Promote Soil health management, Seed treatment & biopriming
- ✓ Promote On-farm production and use of microbial biopesticides at farm level

- ✓ Promote Vermicomposting and biofertilizer production including VAM
- ✓ Popularize use of low cost fruit fly traps
- ✓ Promote Safe and judicious use of pesticides (as a last resort)

II. FUNDAMENTALS OF PLANT HEALTH MANAGEMENT FOR PLANT HEALTH DOCTORS:

➡ A. Aim of the course:

- ✓ To enhance skills of trainers Plant Health Doctors in promotion of AESA based plant health management in conjunction with Ecological Engineering for Pest Management

➡ B. Course outline:

- ✓ Identification and management of plant health problems (abiotic & biotic),
- ✓ AESA based PHM in conjunction with Ecological Engineering (EE) for Pest Management (PM).
- ✓ Living Soil Concept, Rhizosphere Engineering for enhancing Soil Health,
- ✓ Principles and Concepts of Biological control, and application techniques
- ✓ FFS methodology, characteristics, structure and process
- ✓ Integrated rodent pest management,
- ✓ Safe and judicious use of chemical pesticides (as a last resort)
- ✓ On-farm mass production of biocontrol agents and microbial biopesticides,
- ✓ Good Agricultural Practices (GAP)

➡ C. Duration of the programme: 21 days

➡ D. Course Design & framework:

- a) Theory: 45%
- b) Practicals/Exercises: 40%
- c) Field visits: 15%

➡ E. Hands on Skills acquired:

During the training course the participants will acquire skill /hands-on practices in the following areas:

- ✓ Ability to identify plant health problems (abiotic & biotic)
- ✓ Agro Ecosystem Analysis based Plant Health Management
- ✓ Ecological Engineering for pest management
- ✓ Integrated Rodent Pest Management
- ✓ Organization of FFS
- ✓ Safe and judicious use of chemical pesticides (as a last resort)
- ✓ Seed treatment & biopriming
- ✓ On-farm production of Biocontrol agent & microbial biopesticides
- ✓ Production of verimicomposting and biofertilizers including mycorrhiza and
- ✓ Low cost fruit fly traps.

➡ F. Utility of skills learnt:

On completion of the training course the participants will be able to deliver the duties in the following areas:

- ✓ Organize AESA based PHM in conjunction with Ecological Engineering for Pest Management
- ✓ Organize FFS for promoting safer crop production technologies and non-formal education methods in educating the farmers
- ✓ Promote GAP principles and practices
- ✓ Promote Integrated Rodent Pest Management
- ✓ Promote rhizosphere engineering, seed treatment & biopriming for sustainable agriculture
- ✓ Promote on-farm production of Biocontrol agents and microbial biopesticides
- ✓ Promote verimicomposting and biofertilizers including mycorrhiza,

- ✓ Promote use of use of low cost fruit fly traps
- ✓ Promote safe & judicious use of chemical pesticides.

III. ON-FARM PRODUCTION OF BIOCONTROL AGENTS AND MICROBIAL BIOPESTICIDES TO PROMOTE AESA BASED PLANT HEALTH MANAGEMENT IN CONJUNCTION WITH ECOLOGICAL ENGINEERING FOR PEST MANAGEMENT

➤ A. Aim of the course:

- ✓ Promote production and utilization of biocontrol agents and microbial biopesticides to reduce reliance on the use of chemical pesticides in sustainable crop production.
- ✓ Promote AESA based Plant Health Management in conjunction with Ecological Engineering for Pest Management

➤ B. Course outline:

- ✓ Biological Control, Principles and concepts, classification of biocontrol agents,
- ✓ AESA based PHM in conjunction with Ecological Engineering (EE) for Pest Management (PM)
- ✓ Good Agricultural practices
- ✓ On- farm production of
 - a. *Corcyra* - host-insect for production of biocontrol agents
 - b. Parasitoids – *Trichogramma*, *Chelonus*, *Goniozus*, *Bracon*.
 - c. Predators – Reduviids, Spiders, *Chrysoperla*, *Coccinellids*
 - d. Biopesticides – *Trichoderma*, Entomopathogenic fungi, *Pseudomonas*, *Bacillus* NSKE, etc.
 - e. Biofertilizers – Mycorrhizae ,
- ✓ Vermicomposting.
- ✓ Low cost fruit fly trap production

➤ C. Duration of the programme: 10 days

➤ D. The course contains

- a) Theory: 30%
- b) Practicals/ Exercises: 60%
- c) Field visits: 10%

➤ E. Hands on Skills acquired:

During the training course the participants will acquire skill /hands-on practices in the following areas:

- ✓ Agro Ecosystem Analysis based Plant Health Management
- ✓ Ecological Engineering for pest management
- ✓ Rhizosphere engineering for sustainable agriculture
- ✓ Seed treatment & biopriming ,
- ✓ On-farm production of Biocontrol agent (predators & parasitoid) and microbial biopesticides and application of biocontrol agents and biopesticides
- ✓ Production of verimicomposting
- ✓ On-farm production of Mycorrhiza
- ✓ Low cost fruitfly trap production

➤ F. Utility of skills learnt:

On completion of the training course the participants will be able to:

- ✓ Organize AESA based PHM in conjunction with Ecological Engineering for Pest Management
- ✓ Organize FFS for promoting safer crop production technologies and non-formal education methods in educating the farmers
- ✓ Promote soil health management, seed treatment & biopriming for sustainable agriculture

- ✓ Promote on-farm production of Biocontrol agents and microbial biopesticides
- ✓ Promote vermicomposting and biofertilizers including mycorrhiza,
- ✓ Promote use of low cost fruit fly traps

IV. INTEGRATED SOIL NUTRIENT AND WEED MANAGEMENT (ISNWM)

- **Aim of the course :**
 - ✓ To promote skills in sustainable soil health and weed management.
- **Course outlines:**
 - ✓ AESA based PHM in conjunction with Ecological Engineering for Sustainable Agriculture,
 - ✓ Living soil concept & Rhizosphere Engineering,
 - ✓ Principles of Integrated nutrient management & PGPRs
 - ✓ GAP with focus on soil health management,
 - ✓ Weed dynamics in crop fields, vegetation analysis, and IWM techniques
 - ✓ Weed survey & Surveillance- Collection and identification of weeds species,
 - ✓ On farm production and application of bio inoculants including mycorrhiza for soil health
 - ✓ Demonstration of on-farm production of biocontrol agent and microbial biopesticides.
 - ✓ Vermiculture
 - ✓ On farm soil testing,
- **Duration:** 7 days
- **Methodology:**
 - a) Theory: 40%
 - b) Practicals/Exercises: 45%
 - c) Field visits: 15%
- **Skills to be acquired by the participants :**

On completion of the course participants will acquire skills in

 - ✓ Techniques for increasing microbial population in soil to enhance nutrient availability
 - ✓ On farm production of mycorrhiza, PSB (*Pseudomonas* & *Bacillus*) and *Trichoderma*
 - ✓ On farm soil testing with the help of soil testing kit
 - ✓ Identification of weeds and weed vegetation analysis
 - ✓ Adoption of Agroecosystem Analysis for plant health management in conjunction with Ecological Engineering for pest management
- **Utility of the skills learnt :** Participants will be able to
 - ✓ Train farmers to harness the potential role of living organisms in soil fertility management
 - ✓ Train farmers to use non chemical approaches for sustainable agriculture
 - ✓ Develop skill of farmers for on farm production of microbial soil inoculants.

V. RHIZOSPHERE ENGINEERING

- **Aim of the course :**
 - ✓ To impart skills in rhizosphere engineering for promoting sustainable agriculture.
- **Course outline :**
 - ✓ AESA based PHM in conjunction with Ecological Engineering for pest management,
 - ✓ Rhizosphere Engineering & concept of Living Soil, & PGPRs
 - ✓ GAP with focus on soil health management
 - ✓ On farm soil testing using soil test kit,
 - ✓ Mass multiplication of fungal biopesticides,
 - ✓ Mass Production of Biocontrol agents
 - ✓ Vermicomposting

- **Duration:** 6 days
- **Methodology:**
 - a) Theory classes – 40 %
 - b) Practical sessions- 50 %,
 - c) Field and lab visits – 10 %.
- **Skills to be acquired by the participants**
 - ✓ Techniques for increasing microbial population in soil to enhance nutrient availability.
 - ✓ On farm production of mycorrhiza, PSB (*Pseudomonas* & *Bacillus*) and *Trichoderma*
 - ✓ Developing skills in improving below ground biodiversity through Ecological Engineering
 - ✓ Agroecosystem Analysis based decision making
- **Utility of the skills learnt :** Participants will be able to
 - ✓ Train farmers to harness the potential role of living organisms in soil fertility management
 - ✓ Train farmers to use non chemical approaches for sustainable agriculture
 - ✓ Develop skill of farmers for on farm production of microbial soil inoculants.

VI. GOOD AGRICULTURAL PRACTICES:

- **Aim of the course :**
 - ✓ Impart skills to promote Good Agricultural Practices.
- **Course outline :**
 - ✓ Introduction to India GAP- BIS,
 - ✓ Introduction to AESA based PHM and Ecological Engineering for pest management,
 - ✓ Biopriming,
 - ✓ Soil test based INM, Cultural practices,
 - ✓ Sanitary, Phytosanitary, Food Safety issues in relation to GAP,
 - ✓ Pesticide application & Storage techniques,
 - ✓ On Farm multiplication and application of biological control agents,
- **Duration:** 6 days
- **Methodology:**
 - a) Theory classes – 50 %,
 - b) Practical sessions- 30 %,
 - c) Field and lab visits – 20 %.
- **Skills that will be acquired:**
 - ✓ Skills in on farm production of biocontrol agents, biopesticides and biofertilizers and their use in GAP.
 - ✓ Skills in Agroecosystem analysis based decision making for pest management.
 - ✓ Ecological Engineering for pest management
- **d. Utility of skills learnt** – Participants will be able to
 - ✓ Motivate farmers to harness the potential role of GAP in sustainable agriculture and market access.
 - ✓ Train farmers in adoption of Good Plant Health Management practices.
 - ✓ Develop skill of farmers to promote sustainable agriculture production through AESA based PHM in conjunction with Ecological Engineering for Pest Management.

VII. FARMERS FIELD SCHOOL (FFS) METHODOLOGY

- **Aim of the course :**
 - ✓ To impart skills for organizing Farmers Field Schools.
- **Course outline :**
 - ✓ FFS Methodology, Characteristics and structure,
 - ✓ Organization and management of FFS, Group Dynamics,

- ✓ Role of AESA based PHM in conjunction with EE for Pest Management,
- ✓ Facilitation skills,
- ✓ Ballot Box Test.
- ✓ Designing FFS Curriculum,
- ✓ On farm production biocontrol agents, biopesticides and Mycorrhiza,
- ➡ **Duration : 6 days**
- ➡ **Methodology:**
 - a) Theory classes - 40 %,
 - b) Practical sessions- 40 %,
 - c) Field and lab visits - 20 %
- ➡ **Skills that will be acquired:**
 - ✓ Skills in Organizing FFS as a tool for broad basing extension activities
 - ✓ Agroecosystem analysis and decision making based on the field observations.
 - ✓ Skill for designing FFS curriculum
 - ✓ Skills for conducting Ballot Box Test.
- ➡ **Utility of the skills learnt -** Participants will be able to
 - ✓ Organize FFS as a season long training programme.
 - ✓ Train farmers in use of non-chemical approaches for sustainable agriculture
 - ✓ Develop skill of farmers for on farm production of biocontrol agents, biopesticides and biofertilizers.