



Feed The Future India Triangular Training Programme (FTF ITT)
“Plant Health Management Technologies and Approaches”
(04 – 18 September, 2017)

Report



NATIONAL INSTITUTE OF PLANT HEALTH MANAGEMENT
Rajendranagar, Hyderabad - 500 030, Telangana, INDIA

Mandate

Capacity Building

Adaptive Research

Projects

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Education

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PREFACE

Greetings from NIPHM -National Institute of Plant Health Management, Hyderabad

NIPHM is a National level premier institute under Department of Agriculture, Cooperation & Farmer Welfare (Ministry of Agriculture & Farmers Welfare), Government of India established in the year 1966 at Hyderabad. It became an autonomous body in the year 2008 with the expanded scope of promoting environmentally sustainable Plant Health Management practices in diverse and changing agro-climatic conditions through capacity building programmes, besides providing inputs for policy formulation on Plant Health Management, Plant Biosecurity and international market access, Pesticide Management *etc.* at national and international level.



Feed The Future India Triangular Training (FTF ITT) International Training Program on “Plant Health Management Technologies and Approaches” held at NIPHM 4 – 18 September 2017, is an Inter-Institutional event organized in collaboration with MANAGE, Hyderabad. . This unique programme was attended by 24 executives representing three Asian and seven African countries of wide range of cultural diversity. The learning process was designed by integrating interactive lectures, field visits and hands-on experiences coupled with cultural exposure.

The main objective of the Training Program was to introduce the concept of Agro Eco System Analysis (AESAs) and Ecological Engineering based Plant Health Management, impart skills on new and innovative soil and plant health management strategies for sustainable agriculture leading to conservation of natural resources in different cropping systems, impart training on pest risk analysis for quarantine pest and to identify country specific pest problems and their management options under selected cropping systems of Afro-Asian countries.

The feedback from the participants, and the presentation of their Back at work plan reflected the skills and insights of learning gained by the participants and their commitment to bring a change in the agricultural practices in their immediate geographical jurisdiction. This FTF ITT has created a platform for frequent exchange of information and materials for developing sustainable livelihoods with the participating nations. I congratulate the organizing team led by Dr. K. Vijaya Lakshmi, Programme Coordinator and her team for effective planning and execution of the programme. This report is a reflection of sincere, commitment and dedicated initiatives of NIPHM and MANAGE and I wish that this collaboration to grow to new heights in the near future. I congratulate all the committee members who had made this event very successful.

G. Jayalakshmi, I.A.S.

Director General, NIPHM

CONTENTS

1. Introduction	1
1.1 Background	1
1.2 Objectives of the training programme	4
1.3 Key Focus Areas of Training Module	4
1.4 Selection of Executives	4
1.5 Profiles of the Executives	5
2. Methodology	6
2.1 Training methodology	6
2.2 Study Material	7
2.3 Resource Persons	21
2.4 Field visits	22
2.5 Visit to places of Historical and Cultural importance	27
2.6 Cultural Evening	28
2.7 Collective action and participatory learning	30
2.8 Life Membership to Professional Bodies and Journals	30
2.9 Back-At-Work-Plans	30
3. Training Evaluation	31
3.1 Evaluation of Technical Sessions	31
3.2 Pre and Post-Training Test	31
3.3 Evaluation	31
3.4 Post-Training Monitoring	31
4. Valedictory & Feed Back	32
4.1 Feedback	32
4.2 Valedictory	32
Annexure I:	Programme Schedule
Annexure II:	List of Committee Members
Annexure III:	List of Executives
Annexure IV:	Back to Work Plan
Annexure V:	Feedback from Executives
Annexure VI:	Pre and Post Course Evaluation Report

1. INTRODUCTION

1.1 Background

A new Agriculture Partnership between US and India to achieve ever green revolution to address global food security was announced during the state visit of US President Mr. Barak Obama to India in November 2010. The effort included Triangular Cooperation adapting technological advances and innovative solutions to address Food Security Challenges in Africa. This pilot stage focused on three African Countries *i.e.*, Kenya, Liberia and Malawi with potential to expand throughout the African continent in future. Consequently, National Institute of Agricultural Extension Management (MANAGE), Hyderabad and National Institute of Agricultural Marketing (NIAM), Jaipur conducted 7 training programs covering 219 executives from Kenya, Liberia & Malawi. Participants surveys were conducted in Kenya, Liberia & Malawi to assess the impact of training programs. Results were beyond expectations. Due to the success of first seven training programs, there has been considerable enthusiasm from the prospective executives from Africa and Asia to participate in the training program.

As a result, USAID and Ministry of External Affairs (MEA), Govt. of India identified 17 additional countries and designated as Feed the Future India Triangular Training (FTF ITT) program is a joint effort of USAID and Govt. of India for fostering triangular cooperation for adapting technological advances and innovative solutions to address food security challenges in Africa. The programme is expected to enable India and the U.S. to share improved agricultural technologies worldwide, helping countries in Africa and Asia revolutionize their agriculture practices and ultimately, improve global nutrition levels. The FTF-ITT program was launched on 25th July, 2016 at New Delhi. Flagged off in 25th July 2016, this program aims to build capacities of 1400 agricultural professionals from 17 partner countries of Africa and Asia by 2020. The National Institute of Agricultural Extension Management (MANAGE), Hyderabad is implementing the program in collaboration with various Subject Matter Institutions.

NIPHM is a National level institute under the administrative control of the Department of Agriculture and Cooperation, Ministry of Agriculture and Farmer's welfare, Government of India established in the year 1966 at Hyderabad. It became an autonomous body in the year 2008 with the expanded scope of promoting environmentally sustainable plant health management practices in diverse and changing

agro-climatic conditions and plant biosecurity management and pesticide management through capacity building programmes, besides providing inputs for policy formulation on plant health management, plant biosecurity, invasive alien species, market access, pesticide management *etc.* at state and national level.

The International Training Program on “Plant Health Management Technologies and Approaches” was scheduled during 04-18 September, 2017 at NIPHM (National Institute of Plant Health Management). The 15 days international training program on “Plant Health Management Technologies and Approaches” was attended by 24 participants representing three Asian and seven African countries. All the trainee executives who participated in the training program are practitioners in the field of plant protection methodologies, quarantine & pesticide residues. The inauguration was held on 4th September 2017 and Smt. G. Jayalakshmi, IAS, Director General of NIPHM graced the occasion.



The registration committee comprising of Dr. G. Bindu Madhavi, Dr. Yella Goud, Dr. Neha Singh and Mr. P. Srikanth welcomed all the participants with garlands during registration for the training program on “Plant Health Management Technologies and Approaches”. Online Pre course evaluation exam was conducted for the participants which comprised of 50 objective questions on various topics related to Plant health management, Plant biosecurity and Pesticide management.

Dr. O.P. Sharma, Course Coordinator initiated the introductory session with all the participants. Participants were introduced with Director General and faculty of NIPHM. Director, PHM briefly explained the objective and significance of the training programme and the DG, NIPHM explained about various activities of NIPHM, followed by Director PMD and Director -PBD explained about the

registration formalities and respective division activities. The session was ended with vote of thanks by Registrar, NIPHM.



Inaugural speech by Director General,

In the afternoon session, the trainees were made into two groups comprising of twelve each and they were exposed to various laboratories to make them acquaint with the various activities carried out by different laboratories viz Bio-fertilizer lab, Nematology lab, Bio-control lab, Bio-pesticide lab, Pesticide residue lab and Plant quarantine lab of NIPHM. The schedule of training program and daily activities is furnished in Annexure I & the committee members list is enclosed in Annexure-II.



Hand Book and Brochure

1.2 Objectives of the training program

- a. To introduce the concept of Agro ecosystem analysis (AESAs) and Ecological Engineering based Plant Health Management.
- b. To impart skills on new and innovative soil and plant health management strategies for sustainable agriculture leading to conservation of natural resources in different cropping systems.
- c. To impart training on pest risk analysis for quarantine pests.
- d. Visit to National, International Institutes and farmers' fields to get exposure on issues and strategies related to plant health management.
- e. Identify country specific pest problems and their management options under selected cropping systems of Afro-Asian countries.

1.3 Key focus areas of training module

- a. Agro ecosystem analysis (AESAs) based PHM in conjunction with Ecological Engineering;
- b. Integrated Soil Health and Nutrient Management and Integrated Pest Management (IPM) using biocontrol agents, bio pesticides & bio fertilizers in agricultural practices
- c. Pest surveillance for early detection, identification and timely control of pests,
- d. On farm production of Biocontrol agents, bio pesticides, bio fertilizers, Entomopathogenic fungi & nematodes, *etc.*
- e. Biosecurity and incursion management, stored grain pest management and phytosanitary measures,
- f. Safe and Judicious use of pesticides, pesticide application technology, pesticide residue analysis,
- g. Vertebrate pest management, urban integrated pest management *etc.*

1.4 Selection of Executives

The program was formally announced by the National Institute of Agriculture Extension Management (MANAGE), Hyderabad, India. The Program Management Unit (PMU), FTF-ITT, at MANAGE prepared the program brochure, initiated the process and provided good publicity in partner countries through their Point of Contact (POC), Indian Embassies, USAID Missions of respective countries, National Governments and previously trained executives. The partner country has nominated the executives working in agriculture and allied departments and the PMU-FTF ITT of MANAGE has finalized the nominations.

1.5 Profile of the Executives

Twenty four executives from ten countries (4 from Afghanistan, 1 from Botswana, 3 from Ghana, 4 from Kenya, 4 from Malawi, 1 from Mongolia, 1 from Mozambique, 2 from Myanmar, 2 from Sudan and 2 from Uganda) have attended and successfully completed the programme. The selected executives belonged to diverse working areas *viz.*, Agriculture and Rural Development Officers, Agricultural Economists, Agricultural Extension officers namely Livestock, Fisheries, Nutrition and Agribusiness *etc.*, representing public, universities and Govt organizations in partner countries. Out of 24 executives, half of the group consists of women executives. Complete list of Executives is enclosed in Annexure-III.

2. METHODOLOGY

2.1 Training methodology

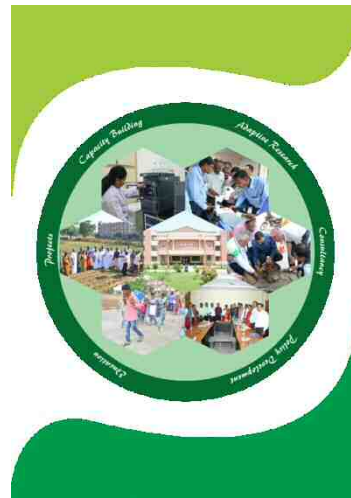
The training program was participatory in nature, which included lectures, panel discussions, group discussions, case studies, hands on experience and field visits. Each participant was expected to contribute ideas and take part in group activities thereon forming small groups to undertake various tasks allotted under the training. Although, experiential learning methodology was effectively incorporated in the program, the participants were expected to emulate learnings through group interaction, field visits and interactions with domain experts. A Back at Work Plan was in-built to ensure the transformation of learning into action at their workplace. The effectiveness of the training is proposed to be monitored after conducting pre and post tests to understand the impact of the training on the knowledge of the participants. A learner-centered approach was followed to orient the participants on “Plant Health Management Technologies and Approaches”. Methodology adopted for the program was as follows:

- a. Participatory approach.
- b. Participants expected to contribute ideas and work in groups.
- c. Experiential learning methodology (Cross learning, field experiences) Interactive session with the faculty of Institute and Guest Speakers.
- d. Lectures, group discussions, panel discussions and field visits to National and International institutions, agricultural university and export pack house like Sam Agritech.
- e. Special lectures/interactions with eminent personalities from the field were invited.
- f. Grow task assignment
- g. Participants were made to present “Back-at-Work-Plans”.
- h. Daily yoga sessions were organized.
- i. Regular feedback on the program was collected.

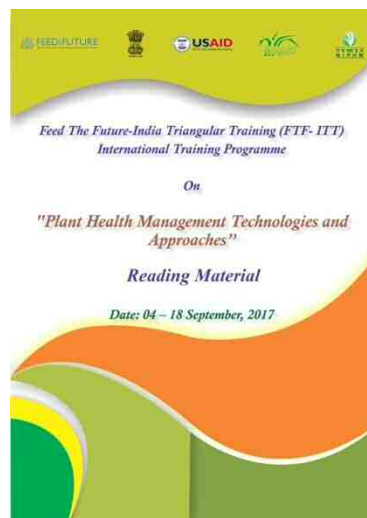
About 30% time was devoted to lecture-cum-interaction sessions, 40% time on hands on practices in laboratories and field demonstrations, 30% time for institutional visits and interaction.

2.2 Study material

- a. Study material, prepared by the Course Director, faculty and experts of NIPHM on all the major themes were provided to the executives. The soft copies of all the presentations made during the sessions were also provided to the executives. More than 150 of photographs of lectures, field visits and other important activities of program were also provided to the Executives. The executives had full access to NIPHM laboratories and Library which is well equipped in the area of plant health management.
- b. In order to increase access to information and share knowledge on continuous basis, Wi-Fi as well as desk tops with Internet facility were provided during the entire course period.



Training Manual



Reading Material



*INTERACTIVE
LECTURE SESSIONS*



Day wise lecture sessions:

Day 1: 04-09-2017

After the inaugural function and pre-course evaluation the trainees were taken to various labs to see the ongoing activities of various divisions, trainees have visited Pesticide Formulation and Residues Analytical Center (PFRAC) where the major analytical activities with respect to Capacity building programs, Pesticide Formulation Analysis, Bio product/Herbal Analysis, and Pesticide Residues



Analysis Laboratory were explained. The trainees also visited Proficiency Testing Center. The trainee officers were taken to various analytical instrument labs such as GC-FID, HPLC, UV-Spectrophotometer, FTIR, LC-MS/MS, GC-MS/MS, GC-TOF, LC-TOF and HPLC PDA.

Day 2: 05-09-2017

Dr. K. Vijaya Lakshmi, Director, PHM division, delivered a lecture on “Overview of Plant Health Management techniques and approaches”. The Director highlighted the impact of green revolution on plant health and introduction of High Yielding Variety resulting in increased susceptibility to pests and diseases, role of soil health and water management in plant health management. She also



explained the objectives of sustainable crop production, intensification with reference to integrated management of insect pests, diseases and weeds.

One of the participants also highlighted the importance of soil health playing a major role in maize crop. She emphasized the impact of indiscriminate use of chemical fertilizers on depletion of beneficial microbes particularly earthworms. She explained components of IPM viz., trap crops, use of bio fertilizers, nutrition management, cultural practices, taking examples of important insect pests like rice stem borer, Brown plant hopper, and ecological engineering, biological control. Problems in Plant Health Management in African agriculture were also discussed. Suggestions were given on different

aspects viz., Soil and land management, crop management, livestock management, agroforestry, fisheries and aquaculture, water management, climate and insurance etc.

Certain queries from participants were also answered in various aspects like management of crop under drought conditions, growing of red gram by using the technology developed by PJTSAU and ways to explore market potential, Tithonia as a green manure crop, Impact of climatic conditions on crop growth were discussed.

In the evening session, group formation and group task assignment was conducted by technical committee.

The following eight group tasks were presented by concerned scientists of NIPHM-

1. Ecological Engineering for Pest Management:
Dr. K. Vijaya lakshmi
2. Entomopathogenic nematodes as a tool for IDM- Dr. Sunanda
3. Detection and management of Plant Parasitic nematodes- Dr. Sunanda
4. Use of parasitoids as biological control agents against important crop pests- Dr. E. Sree Latha
5. Use of predators as bio control agents against important crop pests- Dr. Jesu Rajan
6. Use of Trichoderma and Pseudomonas as bio control agents against important crop diseases- Dr. G. Bindu Madhavi
7. Isolation and identification of important soil micro-organisms for production of bio fertilizers by Dr. M. Ramesh
8. Establishment of vermicompost and vermiwash production unit by Dr. P. Shaktivel.



Expected outcomes from the executives from the group assignment:

The purpose of the project study is to enable the trainees to develop deeper knowledge, understanding, capabilities and attitudes in the context of the programme of study. This offers the

opportunity to develop more deeply into and synthesise knowledge acquired during training so that they can emphasis on the technical/scientific aspects of the subject chosen. The overall goal of the project work is to display the knowledge and capability required for independent work in their country.

Trainees selected the field of specialization as project study based on the need of their country to get more in-depth knowledge.

- a. Every trainee Involved with subject specialists in their respective labs in all the aspects of chosen subject and mastered the techniques with deeper insight
- b. With their enhanced knowledge back at work plan is prepared based on their project
- c. In detailed discussions and close interactions in labs between trainees and subject matter specialists helped in better understanding of problems associated in their counties and tried to work out solutions in their back at work plan critically and systematically with integrated knowledge.
- d. It is expected that the trainees will get continuous support from respective subject matter specialists in implementing the back at work plan in their country.

Day 3: 06-09-2017

Dr. P. Jeyakumar delivered a lecture on Agro Eco System Analysis based plant health management. He explained the origin and impact of pesticides on plant, human and animal health viz., Pest Resurgence, Pest Resistance and Pesticide residues, He also explained Agro Eco System analysis based plant health management covering basic components of AESA keeping in view economic, environmental social and cultural sustainability in PHM.



Dr. Sunanda delivered a lecture on “Diagnosis and management of plant parasitic nematodes”. She narrated importance of plant parasitic nematode in different crops and diagnosis of plant parasitic nematodes. She also explained the occurrence of different nematodes in poly houses particularly in horticultural crops.

Day 4: 07-09-2017

Dr. K. Vijaya Lakshmi, Director, PHM delivered a lecture on “Ecological Engineering for Pest Management” and explained various aspects of ecological engineering as a tool for pest management for adoption of this technology without any additional cost to the farmers. She also emphasized the scenario of increased pest population due to indiscriminate use of pesticides. Video clips were displayed on successful stories in Vietnam including push and pull technology, a basis for African green revolution and highlighted the role of *Desmodium* as an intercrop with maize.

Dr. C. Chinnusamy, Professor, TNAU delivered a lecture on “Recent advances in weed management strategies. He emphasized the impact of increased weed problem in modern agriculture and their causing impact on yield, economic importance of weeds in different crops and management practices including soil solarization, mulching and use of herbicides *etc.*



Dr. Trimurthulu, Principal Scientist (Microbiology), ANGRAU delivered a lecture on “Role of Biofertilizers in plant health management”. He explained the deleterious effects of excess use of chemical fertilizers leading to depletion of beneficial microbes fixing NPK etc., which are used as bio fertilizers. He categorically narrated functional groups of plant growth promoting microorganisms, their importance, mass production techniques and yield benefits as a component of INM with low cost technology and also use of liquid formulation of potassium fertilizers, first of its kind in the country released from Andhra Pradesh. Replying to queries from some of the participants, different

media used for microbial inoculants, compatibility with chemical fertilizers, *Azolla* as a nitrogen fertilizer were also discussed.



Day 5:08-09-2017

Executives visited International Crops Research Institute for the Semi-arid Tropics.

Day 6:09-09-2017

Visit to places of cultural and historical importance in Hyderabad.

Day 7:10-09-2017

Sunday: Homework and reading.

Day 8: 11-09-2017

Dr. Krishan Chandra, Director, National Centre for Organic Farming, delivered a talk on “Plant Health Management Strategies under organic farming”. He highlighted the importance of organic farming which started in the year 2004. He stressed that to ensure better Plant Health Management, soil health is a prerequisite. He explained about the production of liquid



formulations of bio fertilizers viz., *Azospirillum*, phosphate solubilizing bacteria and potash mobilizing bacteria developed in the year 1998 and now recent developed liquid formulation of NPK. Dr. Chandra highlighted the new innovation of waste decomposer which has a shelf life of 2 years.

This formulation can be effectively used to control all pests, diseases, nematodes besides decomposing weeds *etc.*

Mogoti (Kenya): How to multiply this culture?

Dr. K Chandra: Take one bottle of the liquid culture, mix it in 200 liters of water + 20 Kg jaggery mix it and keep it for one week. This can be applied to the field. Take 20 liters of this solution as stock solution and repeat the procedure.



Afghanistan: How to get registration for organic certificate?

Dr. K Chandra: Open the portal of our office, fill online your particulars and the certificate will be generated on line which can be downloaded.

Ms. Bonolo (Kenya): Which kind of organisms are there, which are used in fruit ripening?

Dr. K Chandra: This is a confidential secret and cannot be disclosed at this juncture. If this is disclosed, private persons will commercialize the same and they enhance the cost of product.

Dr. K. Vijaya Lakshmi: What is the nutrient content of the compost prepared by using waste decomposer and how is it different from that of compost prepared from earth worms?

Dr. K Chandra: The compost prepared by using decomposer is different, it makes soil highly friable and loose, the action is fast. Even the hardest soils can be made loose by using this decomposer.

The session came to end with the vote of thanks proposed by Dr. K. Vijaya Lakshmi.

Day 9: 12-09-2017

Dr. Chandish R Ballal, Director, National Bureau of Agriculturally Insect Resources (ICAR), Bangalore delivered a lecture on “Biological control for pest management an ecological approach”. She gave a detailed account on conservation biocontrol, classical bio control and augmentation bio control. She also dealt



about egg parasitoid, larval parasitoid and predators for the management of insect pests.

Dr. K. Vijaya Lakshmi, Director informed that *Zygogramma* a biocontrol agent on *Parthenium* is also attacking rice leaves and cutting the leaves at edges.

Dr. CRB: Normally it cannot happen, if it is happening, please take the help of IIRR, Hyderabad

Dr. KVL. Felt that bio control agents are not successful because we have to raise the insect host first, followed by bio control agents, which is laborious, instead she sought the information on whether we can grow these bio control agents directly on artificial media, which saves lot of time and money and energy.

Dr. Chandish R Ballal: informed that it is not that difficult to grow host first followed by bio control agent, it requires only some skills and all contractual persons are doing lot of work at Bangalore.

Mr. Charles from **Ghana** asked whether any bio control agent is available for *Sitophilus* an insect pest of maize, which is common in Africa

Dr. Chandish R Ballal: No it is not available

Ms. Bonolo from **Africa** asked to give detailed methodology for rearing of all bio control agents.

Dr. Chandish R Ballal: As the information asked is voluminous, she has agreed to spare the detailed methodology for a specific bio control agent.

Ms. Nyakwea of **Kenya** asked whether any bio control agents are available for striga and water hyacinth.

Dr. Chandish R Ballal: For water hyacinth, three bio control agents are available, they are *Neochetina eichorniae*, *N. bruchi* and she can get these agents by contacting Dr. Dilipan from Australia who is growing these agents.

Students asked whether for *Striga* and *Orabanche* are the major problems in tobacco fields in Andhra Pradesh and Telangana, any bio control agents available to control.

Dr. Chandish R Ballal: No, one must write for projects to work on these aspects and come out with development of good bio control agents for such parasites.

Dr. Vasudeva Rao, Project Coordinator, All India Coordinated Network Project on Ornithology (ICAR) and Principal Scientist and Head, Department of Ornithology, Prof Jayashankar Telangana State Agricultural University, Hyderabad delivered a talk on strategies for reducing man animal conflict in agricultural land scape. Dr. Rao highlighted the importance of vertebrate and mammalian

pests, provisions of Wild Life Act 1972 of Govt of India. He gave management strategies for rodents, birds, elephants, wild boar, neelgai (blue bull) and monkey menace. He has given the details of bio acoustics equipment, which produces distress sounds for the animals as a result of which animals are afraid that enemies are there and they do not come and damage our field crops. He has shown a video clipping on installation of bio acoustic equipment which runs on A/C or on solar power using solar panel also.

Participant from Kenya asked that how to control Quirk birds - a color full small birds which make lot of sounds in Africa and whether the bio acoustics equipment developed here works in Kenya.

Dr. V V Rao: No, The equipment developed here works here only as the sounds were collected from the birds of India. The sound pattern of quirk bird is different, we have to collect sound pattern, study and develop equipment suiting to the needs of the region.

Day 10: 13-09-2017

Dr. Alice Sujeetha, Director, Plant Biosecurity Division delivered a lecture on plant biosecurity to the participants. Concepts, global threats for food security, components, sectoral approaches, and International regulations were covered.

Ms. Mungai Teresia Wambui from Kenya shared about the recent incursions in Kenya. She also expressed her interests in knowing the pathways for Pest Risk Assessment. It was explained to her.

Dr. C S Gupta and Dr. Alice Sujeetha, Director, Plant Biosecurity Division gave a detailed account on the importance of stored grain pests in international trade and explained various detection techniques for detection and monitoring of stored grain insect pests belongs to Order Coleoptera and Lepidoptera. Further, he elaborated the identification key characters of stored grain insect pests with good quality insect images. During the presentation, participants were keen to know more about monitoring traps and



advanced techniques for monitoring the stored product insects and the same was discussed. After completion of theoretical part, participants were given hands on practice to identify the insects in well-equipped diagnosis laboratory. Dr. Alice, Director, Plant Biosecurity explained the use and effectiveness of LED light trap, which was developed by her.

Mr. A. Mariadoss, Asst. Director (Ento/RPM), Plant Biosecurity Division delivered lecture on Fruit Fly Surveillance. Fruit flies are responsible for 20-40% of loss in fruits and vegetables both in the field and post-harvest scenario. In some cases the damages are caused even up to 90-100%. Tephritid fruit flies are responsible for post-harvest losses in fresh fruits and vegetables. In addition they are also major impediments for export of fresh fruits and vegetables. Fruit fly surveillance aids in successful area wide management of fruit flies to reduce the populations of fruit flies in fruits and vegetable crops.

Usage of standard traps with appropriate lures, placing required number of traps, trap mapping, servicing traps, observation and recording of fruit flies trapped will lead to successful fruit fly surveillance program and helps in deriving effective management measures to control fruit flies.

A game on the techniques for fruit flies management in fruit orchard and vegetable garden was performed during the class. Videos on life cycle of fruit flies and management was shown to trainees.



Questions asked by Trainees

1. Why female fruit flies are not attracted to methyl eugenol lures?

Ans: In order to attain higher mating success the male fruit flies feed on methyl eugenol (para-pheramone) which are available in nature. The female flies do not require it. Hence once the male flies emerge from pupa, it is directly attracted to lures containing synthetic methyl eugenol.

2. Is the sex lures are species specific?

Ans: Yes. The lures are species specific and differ with different species.

Phytosanitary Treatments – Visit to Sam Agri Tech, Medchal, Export Pack house

Phytosanitary Treatments often serve as one stop solution at the end point of export. Phytosanitary treatments are helpful in safeguarding biosecurity and also in gaining market access. In view of this, a visit of Pomegranate arils exports pack house (Sam Agritech Pvt. Ltd, Medchal, Hyderabad) was organized to provide information about the cold treatment and export procedures. Participants were learnt about export mechanism and cold chain treatment system for export of Pomegranate arils to various countries.



Visit to SAM Agritech

Day 11: 14-09-2017

Dr. K Susheela, Scientific Officer (PRA) delivered a lecture on Pest surveillance and recent incursions of pest and diseases – Case studies. At the outset, participants were educated on the emerging challenges and the Biosecurity risk pathways with respect to trade. They were introduced to the past plant pest incursions into India which caused major economic damage and also to the recent incursions and their potential impacts on immediate future. Trainees actively interacted with the faculty putting forward the occurrence of plant pest incursions in their respective countries such as tomato leaf miner, coconut eriophyid mite, Papaya mealy bug, water hyacinth etc. and how they are affecting their crop production and the exports. Role of International regulatory framework and, National regulations and standards in minimizing the risk of entry of pests was explained to the trainees. Importance of Post border actions *viz.*, Emergency preparedness and response plans in tackling the pest incursions were also described. Further, Participants were educated on the concept

and significance of Biosecurity surveillance in early detection/eradication/containment/suppression of the exotic pests with the support of case studies. Participants expressed their interest to attend ‘Regional Plant Health System Analysis’ programme to be organized from 4-18 December, 2017 at NIPHM. However, they were enquiring about the funding opportunities for the travel cost. Faculty informed that the programme is offered on payment basis and travel costs have to be borne either by their Government or to be explored from the external funding agencies such as USAID etc.



Dr. T. Yella Goud, AD and Mrs. R. Madhubala, ASO have conducted a practical session on “Seed Health Testing” to the trainees. He briefly explained the importance, characters and importance of different seed health testing methods, followed by demonstrated the blotter method with different seed samples viz., Paddy, green gram, chickpea, groundnut, cowpea and sunflower. All the trainees individually practiced the isolation of seed mycoflora followed by blotter method with different seed samples.

Day 12: 15-09-2017

Dr. Ch. Sreenivasa Rao, Director Pesticide Management Division, delivered a lecture on “Pesticide Regulations in India & Quality Control of Pesticides”. The topic covered regulation of pesticide and Quality control of pesticide in India, and briefed about Insecticide Act, 1968 which regulate the import, manufacture, sale, transport, distribution and use of



insecticides with a view to prevent risks to human beings and animals and for other matters connected. Dr. Rao also explained about functions of Central insecticides Board and Registration committee (CIBRC), and the registration procedures. Second part of the lecture was more focused on

important aspect of quality control of pesticides which included Standard specifications, Sampling procedures, Analysis of samples. Discussion about the International Code of Conduct on the Distribution and Use of Pesticides and classification of pesticide on the basis of Adulterated Pesticide, Counterfeit Pesticide and Substandard Pesticide. In India, there are 68 State Pesticide Testing Laboratory with a capacity of 71,000 p.a., 3 Regional Plant Quarantine Station with a capacity of 2,200 p.a. and one referee laboratory *i.e.* Central Insecticide Laboratory with a capacity of 1,600 p.a. for quality control of pesticide under Insecticide Act. He also explained about sampling of pesticide, pesticide packaging and duties of Insecticide Analyst and Inspector. The lecture was concluded with the role of BIS (Bureau of Indian Standard) and CIPAC (Collaborative International Pesticides Analytical Council) on test method for sample analysis.

Dr. Rao made a brief presentation on “International and National Regulations for Food Safety – Pesticide Residues and Issues”. The topic covered pesticide residues issues and Food safety regulation in India. India is among the top ten consumer of pesticide as per the latest data of annual pesticide consumption worldwide (2007-2012). India is leading in export growth rate over the past decade which revealed that quality of export agriculture commodities are increasing. Dr. Rao also presented about the function of WTO on trade between nations, Sanitary and Phytosanitary Measures for food safety, animal and plant health standards. The Codex Alimentarius Commission, (FAO and WHO in 1963) work to develops harmonized international food standards, guidelines and codes of practice to protect the health of the consumers and ensure fair trade practices in the food trade, also promotes coordination of all food standards work undertaken by international governmental and non-governmental organizations. Risk analysis is the fundamental to the scientific basis of Codex food safety standards. It provides advice on the acceptable levels of pesticide residues in food moving in international trade. FSSAI (Food safety and Standard Authority of India) regulates standard for food safety in India. They set tolerance, which are the maximum amount of a pesticide allowed to remain in or food, as part of regulating pesticide. He also presented information on National Residue Monitoring Project,



and the lecture was concluded with Good Agriculture Practices (GAP) which was evolved in recent years in the context of a rapidly changing and globalizing food economy and as a result of the concerns and commitments of a wide range of stakeholders regarding food production and security,

food safety and quality, and the environmental sustainability of agriculture. GAP approach aims at applying available knowledge to addressing environmental, economic and social sustainability dimensions for on-farm production and post-production processes, resulting in safe and quality food and non-food agricultural products. The lectures were presented for 80 minutes, and various issues related to pesticide regulation and residues were deliberated and discussed taking the information from every country.

Hands on Practical on Pesticide Residues Analysis in Tomato sample was conducted for trainee officers, and the scientists explained the protocol of Pesticide Residues Analysis in Tomato before starting the analysis. Extraction of pesticide from the sample was carried out based on the AOAC, QuEChERS method (Quick, Easy, Cheap, Effective, Rugged, and Safe) using GC-MS/MS and LC-MS/MS which is validated as per the PFRAC (Pesticide Formulation and Residue Analytical Center) laboratory. Sample was fortified with known concentration of reference standard pesticide in control sample and then extracted using ethyl acetate and cleanup of sample before analysis was carried out using Primary secondary amine and anhydrous Magnesium Sulfate to remove some extent of interference presence in the sample which may interfere the compound of interest. Finally, the amount of residues recovered was calculated and at the same time one market sample was also analyzed to check the presence of residues.

Day 13: 16-09-2017

Visit to Indian Institute of Rice Research in the forenoon, and in the afternoon session executives presented the Back at work plan.

Day 14: 17-09-2017

Sunday

Day 15: 18-09-2017: Visit to Indian Institute of Oilseeds Research and MANAGE, followed by post course evaluation and valedictory session.

2.3 Resource Persons

Besides NIPHM faculty members, resource persons were invited from reputed organizations across the country. The list of organizations that contributed resource persons to the program is as follows:

- **Dr. P. Jeyakumar,**
Principal Scientist,
Indian Institute of Rice Research (IIRR), Hyderabad, Telangana
- **Dr. C. Chinnusamy,**
Professor, Tamil Nadu Agricultural University (TNAU), Coimbatore, Tamil Nadu
- **Dr. Trimurthulu,**
Principal Scientist, ANGRAU, Hyderabad, Telangana
- **Dr. Krishan Chandra,**
Director, National Centre of Organic Farming (NCOF), Ghaziabad, Uttar Pradesh
- **Dr. G. Pratibha,**
Principal Scientist (Agronomy)
Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad, Telangana
- **Dr. Chandish R. Ballal,**
Director, National Bureau of Agricultural Insect Resources (NBAIR), Bangalore, Karnataka
- **Dr. Vasudeva Rao,**
Principal Scientist, PJTSAU, Hyderabad, Telangana
- **Dr. L.M. Suresh**
(GL CIMMYT), Nairobi, Kenya



FIELD VISITS



2.4 Field visits

The executives were exposed to various field visits i.e. ICRISAT (International Crops Research Institute for the Semi-arid Tropics), CRIDA (Central Research Institute for Dryland Agriculture) IIRR (Indian Institute of Rice Research), IIMR (Indian Institute of Millets Research), IIOR (Indian Institute of Oilseeds Research), Farm Machinery Workshop PJTSAU.

International Crops Research Institute for the Semi-arid Tropics:

The International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) is an international organisation which conducts agricultural research for rural development, in Patancheru (Hyderabad, Telangana, India) with several regional centres (Bamako (Mali), Nairobi (Kenya)) and research stations Niamey (Niger), Kano (Nigeria), Lilongwe (Malawi), Addis Ababa (Ethiopia), Bulawayo (Zimbabwe)). It is founded in 1972.

There are 8 research centers in sub Saharan Africa with the global headquarters in Hyderabad.

The participants were taken to ICRISAT, Patancheru on 8th September, 2017. Participants were shown presentation about ICRISATs work in Asia and Africa about creating smart foods, watershed crop production, agriculture that benefits farmers and consumers. These techniques are being implemented in more than 5000 villages in India. Kothapally, one of the villages in AP is also one of the places where farmers are profited by ICRISATs work. Then Mr. Murali M Sharma took the participants to visit the farms and briefed them about the various crops grown, biotechnology used and processes involved. The 6 major crops grown are pearl millet, finger millet, groundnut, chickpea, sorghum and pigeon pea. Mr Murli stressed on the need to conserve water. He told us about the 2nd green revolution that is growing 2 crops in a year to feed the future generations.



Visit to ICRISAT

Mr. Murali explained about watershed management, rain water harvesting systems, different breeding programs for drought tolerance in sorghum, early maturity in chickpea etc., visited solarized field to control nematodes, farm machinery unit, Model villages of Africa and India, Soils of India models, soil sterilization unit, Crop work area, Insect museum and poster area. Participants showed interest in some germplasm collections and took his advises to get the germplasm to their country and he ended by taking email IDs of all participants to post ICRISAT happenings in future.

Central Research Institute for Dryland Agriculture:



Visit to CRIDA

The Central Research Institute for Dryland Agriculture is an institute under the Indian Council of Agricultural Research. It was formed in 1985 as the Project Directorate of the All India Coordinated Research Project for Dryland Agriculture. Dr. G. Pratibha, Principal Scientist (Agronomy) explained the various activities going on at the Institution and was taken to the field visit around.

Indian Institute of Millets Research:

Participants were visited Indian Institute of Millets Research, Rajendranga, Hyderabad wherein they were exposed to different millets grown in India.

Dr. Rajendra R Chapke, Principal Scientist, Agricultural Extension gave a brief introduction of millets, their ecological conditions, edaphic factors, climatic conditions suitable for millets, nutritional content, varieties, different food products etc.

Dr. Venkatesh Bhat Principal Scientist, Breeding highlighted the importance of different millets grown in India viz., sorghum, pearl millet, fox tail millet, finger millet, kodo millet, small millet, proso millet, tef and fonio. Under low rain fall conditions, high temperature conditions and erratic

climatic conditions millets can be grown judiciously. He gave information about production and productivity of these millets, nutritional content especially the dietary fiber, protein contents and their role in diabetic patients. He described the methodology of testing of varieties and hybrids of millets through All India Coordinated Millet Improvement Programmes of the Country involving different State Agricultural Universities. He also stressed the importance of health benefit and called them as nutraceutical millets. He highlighted the bio fortification of Iron and zinc to ameliorate the malnutrition in the world, he also stressed on fortified food products, ready to eat and ready to cook products from sorghum and other millets, farm mechanization, breeding strategies including apomixes and mutagenic techniques to improve yield and resistance to herbicides. He dealt with biotic and abiotic stress management in millets, Agribusiness incubation. He highlighted the important research activities of the Centre including germplasm conservation, utilization, crop improvement programmes including development of hybrids, and varieties in millets, crop production technologies, management of various biotic stresses including pests and diseases of millets, various abiotic stresses like salinity, drought etc.

Discussions:

How to increase amount of biomass in dual purpose sorghums, finger millet and small millets?

VB: A separate program is there for high biomass increase in the case of sorghum, but in other millets this program is not there as it is not a major problem.

How to reduce aflatoxin problems in finger millet sprouts?

VB: It is very difficult as many fungi are associated with grains of finger millet, kodo millet and sorghum grains which produce aflatoxins. Removal of these aflatoxins is very difficult.

In Africa millets are grown in small areas, can the small cottage industry be developed with women who look after crop?

VB: Yes it can be done as it is grown in smaller areas in Africa, women entrepreneurs can be developed.

Dr. T. G. Nageshwar Rao proposed vote of thanks to the speakers for their excellent presentation.



Visit to IIMR

Indian Institute of Rice Research:

All the participants under leadership of Dr. O. P. Sharma, Course Coordinator have visited Indian Institute of Rice Research (IIRR) Rajendranagar, Hyderabad. During the visit participants were received by Dr. Seikh Meera, Sr Scientist and taken to Rice Museum. Participants were exposed to various research achievement of the institute by displaying pictorial charts and models.



Visit to IIRR

Dr. Anand Kumar, Director, IIRR also interacted with participants and replied the queries. Dr. Brajendra, Soil Scientist, displayed a low cost soil testing kit developed by IIRR. Participants have liked the kit and desired to use such kit in their country. Later, participants have also visited entomology glass house, pathology lab, etc. facilities at IIRR. Many of the participants have desired to take up the technologies developed by IIRR to their country through MoUs at high level.

Indian Institute of Oilseeds Research:

The executives visited Indian Institute of Oilseed Research (IIOR), Hyderabad on 18th September, 2017 and interacted with scientists of institute to know about the oil seed crops. The executives visited the Oil seed crop museum and also fields of groundnut, sunflower, castor and safflower. Dr. S.N. Sudhakara Babu, Principal Scientist, Agronomy explained about oil seed crops related to cultivation of different varieties and crop protection measures. Dr. A. Vishnuvardhan Reddy, Director of IIOR interacted with executives and asked about oil seed crops growing in their countries and also encouraged the executives to promote these technologies in their countries.



Visit to IIOR

Professor Jayashankar Telangana State Agricultural University

Farm Machinery Workshop:

The executives visited farm machinery workshop located at, Professor Jayashankar Telangana State Agricultural University (PJ TSAU) on 12th September 2017 and interacted with Er. Sudhakar Reddy. He explained about various farm machineries and their working principle.



Visit to Farm Machinery (PJ TSAU)

National Institute of Agricultural Extension Management:

The executives have visited the National Institute of Agricultural Extension Management (MANAGE) campus on 18.09.2017 and interacted with Smt. V. Usha Rani, Director General and Dr. P. Chandrashekara, Director (Agri. Extn.) MANAGE.



2.5 Visit to places of Historical and Cultural importance

Visiting historical places of cultural importance is an essential component of any training programme of international importance. The travel to places is not only refreshing the minds and body of executives, but also releases a vast amount of mental pressure accumulated through intensive learning process. As a part FTF ITT at NIPHM, the executives visited the following places on 09/09/2017 (Saturday), Shilparamam, Golconda, Ramoji film city.



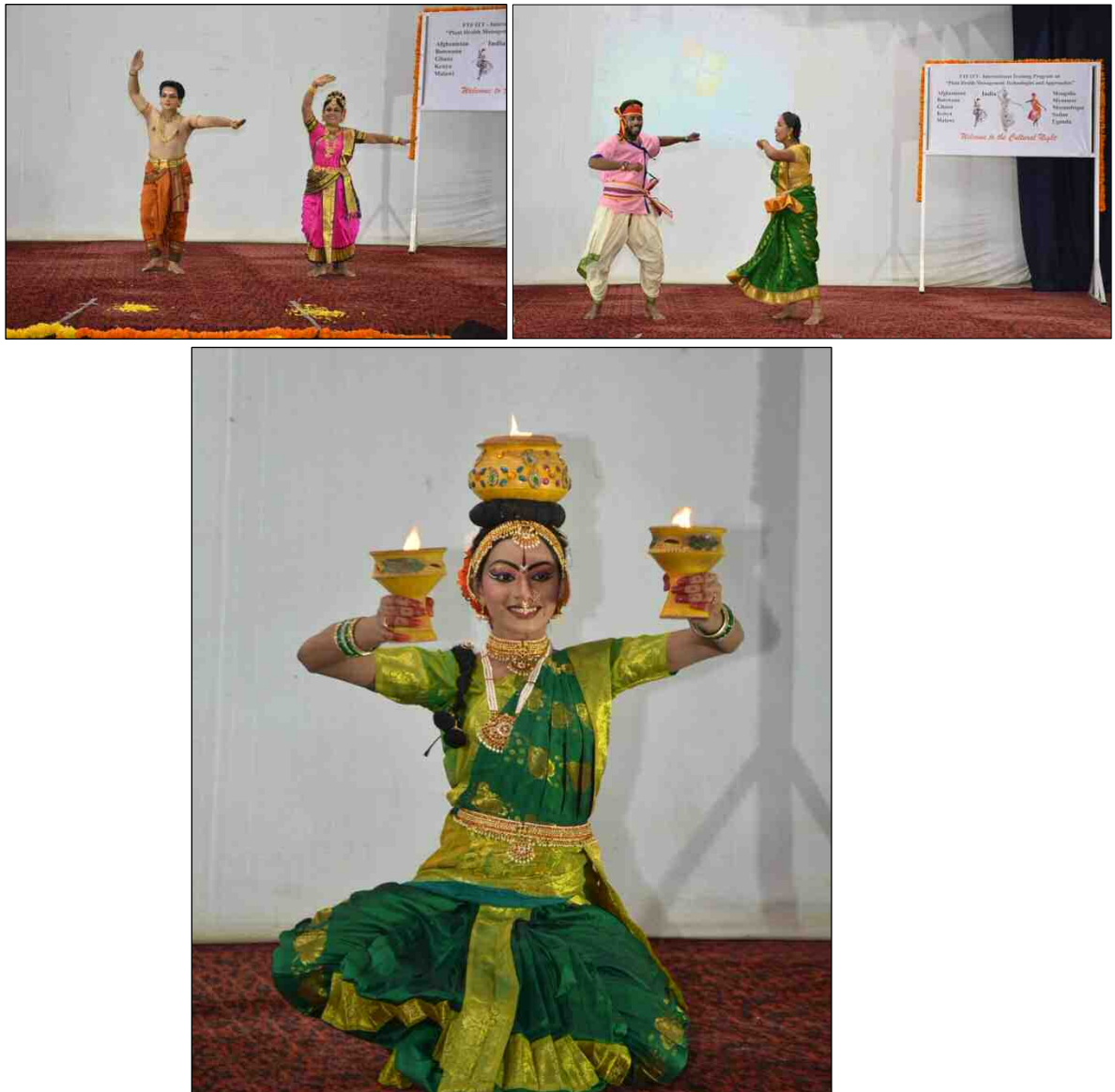


CULTURAL EVENING

2.6 Cultural Evening (14th September 2017)

The evening was made more colorful at NIPHM. The main objective was to expose Indian culture to partner countries, at the same time each country executives were encouraged to present their cultural heritage to other partner countries including India. Organizing committee of NIPHM informed all executives well in advance about cultural evening and facilitated them with required items and preparation. Official Dinner was hosted by Director General, NIPHM.

Culture for Global Harmony



Cultural Event by the Executives



Asian African Scenario

2.7 Collective action and participatory learning

All the executives were divided in to groups to enhance learning in small groups throughout the training program including field/ Institutional visits and prepare for cultural programme. The groups were given responsibility for learning from interactions, collection of literature, photographs, contact details, use of library and identify useful technology to their respective countries. The group also participated and managed cultural programme successfully.

2.8 Life Membership to professional bodies and journals

All the executives were made life members of National Institute of Agricultural Extension Management (MANAGE) Journal of “Agricultural Extension Management” (Formerly MANAGE Extension Research Review), which is bi-annual covering latest developments in the extension sectors published by MANAGE. As life members, they will receive Journal time to time.

2.9 Back-at-work-plans

The present program aimed at “Plant Health Management Technologies and Approaches”. Hence, the expected outcome is a professional commitment by each executive to try new initiatives learnt during the training programs at their work place after the training program. In the backdrop of orientation, inputs, interactions, study material and experiences received during the program, the executives prepared and presented individual “Back-at-work-plans” which would help operationalize the relevant concepts learned during the program in their respective countries. Back at work -plan also trace the connectivity between Indian experience and back home extension issues. Details of individual Back-at-work-plans are given at Annexure-IV

3. TRAINING EVALUATION

3.1 Evaluation of Technical sessions

Feedback of Executives was collected on all technical sessions taken by resources persons, and field visits on a scale of 0 to 10 *i.e.* ‘1 being the least and 10 being highest. In addition, their suggestions on other areas such as boarding and lodging were obtained in order to bring necessary changes. The executives expressed their satisfaction level by rating the program on an average score of 9.10 on a 10 point continuum indicating the overall impression on the program was excellent. The feedbacks received from executives are tabulated.

3.2 Pre and post-training test

Pre and Post Training test were conducted for the executives at the beginning and at the end of the training respectively. Fifty thematic questions on Plant Health Management with a maximum of 50 marks were administered for pre and post-training test and obtained answers of the executives to assess their change of knowledge levels and effectiveness of the training programme. The average score of executives



in the pre-training test was 22.54, whereas the average score of post-training was 42.92. Thus, it was found that the level of knowledge of executives was increased by 20.38 percent after the training programme. Details of pre and post-training test are given at Annexure-VI.

3.3 Evaluation

Executives rated the overall training program with a score of 9.10 on 10 point continuum *i.e.* Excellent.

3.4 Post-training monitoring

Post-training impact evaluation in respective countries by NIPHM and Program Management Unit (PMU) is an integral part of the programme. PMU will be regularly in touch with executives through emails to monitor the progress of their “Back-at-Work-Plans” and it will help in effective monitoring and impact evaluation which is one of the important aspects of Program Monitoring & Evaluation (M & E).

4. VALEDICTORY AND FEED BACK

4.1. Feed Back: Feedback information was received from the executives about the training programme. Feedback given by the executives is enclosed in the Annexure V

4.2. Valedictory

Valedictory session was conducted on 18th September, 2017, The valedictory session was attended by Guest of Honour Ms. Upma Srivastava, IAS, Additional Secretary DAC&FW, Government of India, Mr. Mustapha Hamzaoui, Director, Food Security, USAID, India Mr. Ziaulhaq Akhondzada Second Secretary Embassy of the Islamic Republic of Afghanistan, Smt V. Usha Rani, IAS Director General, MANAGE, Smt. G. Jayalakshmi IAS, DG, NIPHM, Dr. P. Chandra Shekara Program Director, MANAGE, Mr. Vamsidhar Reddy T.S. Project Management Specialist, Food Security Office-USAID India and Dr. K. Vijaya Lakshmi Director (PHM), NIPHM. A Introduction of “FTF-ITT” was given by Dr. P. Chandra Shekara Program Director, MANAGE.

Brief report of the training program was given by Dr. K. Vijaya Lakshmi Director (PHM), NIPHM. The executives were asked to give their valuable feedback on the training program, which was followed by the opening remarks by the Director General, NIPHM.

Special address by guests of honour of the program were delivered, followed by the valedictory address by chief guest Ms. Upma Srivastava, IAS Additional Secretary DAC&FW, Government of India. Certificates were distributed to the participants by the guests. Vote of thanks was delivered by Dr. E. Sreelatha, Assistant Director (PHM), NIPHM. The valedictory program was wrapped up by taking a group photograph of the executives along with the special guests of the program.



Valedictory session

ANNEXURE I- PROGRAMME SCHEDULE

Day - 1 : 04/09/2017 (Monday)			
09:00 - 10:00	Registration	Dr. G. Bindu Madhavi, AD (H&F) Dr. Yella Gouda, AD Dr. Neha Singh, SRF Mr. P. Srikanth, Lab Attendant	
10:00 - 11:00	Pre-course evaluation	Dr. O.P. Sharma, (JD-Agro.) Dr. E. Sree Latha (AD-PHM)/ ICT Division	
11:00 - 12:00	Interaction of the participants with Director General, NIPHM		
12.00 - 13.00	About the Institute	Director General, NIPHM	
13:00 - 14:00	Lunch Break		
14:00 - 16:30	Institutional lab visit		
	Group A PMD, Biocontrol lab & VPM lab Visit	Group B Biofertilizers, Nematology & Biopesticides lab visit	Group A: Dr. OP Sharma, (JD-Agro.) Group B: Dr. Sree latha (AD-PHM)
	Group B Biofertilizers, Nematology & Biopesticides lab visit	Group A PMD, Biocontrol & VPM lab Visit	Group A: Dr. OP Sharma, (JD-Agro.) Group B: Dr. Sree latha (AD-PHM)
16.30-17.30	Medical and Legal formalities, Group formation	Dr. Syed Ali Shah Hussaini Visiting Medical Officer, NIPHM Dr. O.P. Sharma, JD (Agro.) & Dr. E. Sreelatha, AD (PHM)	
Day - 2 : 05/09/2017 (Tuesday)			
09.00 - 09.30	Recap	PD/PC/AC	
09.30 - 10.30	Inauguration	1. Smt. G Jayalakshmi, IAS Director General, NIPHM 2. Smt. V. Usha Rani, IAS Director General, MANAGE 3. Dr. P. Chandra Shekara Program Director, MANAGE	
10.30 - 11.00	Hi-tea and Group Photograph		
11.00 - 12.00	Overview of Plant Health Management techniques & approaches	Dr. K. Vijaya lakshmi (Director-PHM)	
12.00 - 13.00	Group formation and Group task assignment	PD/PC/AC	
13.00 - 14.00	Lunch Break		
14:00- 17.30	Group A: Mass production of insect parasitoids (Practical)	Group B: Entomopathgenic nematodes (EPN) (Practical)	Group A: Dr. E.Sree Latha (AD-PHM) Group B: Dr. B. Sunanda, (ASO-Nem.)
	Group A: Entomopathgenic nematodes (EPN) (Practical)	Group B: Mass production of insect parasitoids (Practical)	Group A: Dr. B. Sunanda, (ASO-Nem.) Group B: Dr. E.Sree Latha (AD-PHM)

Day - 3 : 06/09/2017 (Wednesday)			
09.00 - 09.30	Recap	PD/PC/AC	
09.30 - 10.30	Agro-ecosystem Analysis (AESA) based plant health Management	Dr. P. Jeyakumar, Principal Scientist, IIRR, Hyderabad	
10.30 - 13.00	AESA field observations and chart preparation	Dr. Sree Latha (AD-PHM) Dr. M. Narsi Reddy, ASO (Ento)	
13.00 -14.00	Lunch break		
14.00 - 15.00	Use of Vermicompost for sustainable agriculture (practical)	Dr. P. Sakthivel, ASO-VPM	
15.00 - 16.00	Group A: Mass production of insect predators (Practical)	Group B: Entomopathogenic Fungi and NPV (Practical)	Group A: Dr. S. JesuRajan (ASO-Ento) Group B: Dr. Narsi Reddy, ASO Biopesticides lab
16:00 - 17:30	Group A: Entomopathogenic Fungi and NPV (Practical)	Group B: Mass production of insect predators (Practical)	Group A: Dr. Narsi Reddy, ASO Biopesticides lab Group B: Dr. S. JesuRajan (ASO-Ento)
Day - 4 : 07/09/2017 (Thursday)			
09.00 - 09.30	Recap	PD/PC/AC	
09.30 - 10.30	Ecological Engineering for pest management	Dr. K. Vijaya lakshmi (Director-PHM)	
10.30 - 11.45	Recent Advances in Weed Management strategies	Dr. C. Chinnusamy, Prof.TNAU	
11.45 - 13.00	Group A: Mass production of <i>Trichoderma</i>	Group B: Mass production of <i>Psuedomonas</i>	Group A: Dr. Girish AG, AD (PD) Group B: Dr. G. Bindu Madhavi, AD (H&F)
	Group A: Mass production of <i>Psuedomonas</i>	Group B: Mass production of <i>Trichoderma</i>	Group A: Dr. Girish AG, AD (PD) Group B: Dr. G. Bindu Madhavi, AD (H&F)
13.00 - 14.00	Lunch Break		
14.00 - 15.00	Role of bio-fertilizers in plant health management	Dr. Trimurthulu, Principal Scientist, ANGRAU	
15.00 - 17.30	Group A: Mass production of <i>Mycorrhiza</i>	Group B: Mass production of Bio-fertilizers	Group A: Dr.O.P.Sharma, (JD-Agro.) Group B: Dr. M. Ramesh, ASO(Micro)
	Group A: Mass production of Bio-fertilizers	Group B: Mass production of <i>Mycorrhiza</i>	Group A: Dr. O. P.Sharma, (JD-Agro.) Group B: Dr. M. Ramesh, ASO(Micro)
Day - 5: 08/09/2017 (Friday)			
09:00 - 17:30	ICRISAT Visit	Dr. E.Sree Latha (AD-PHM)	
Day - 6 : 09/09/2017 (Saturday)			
9:00 - 17:30	Visit to places of cultural and historical importance in Hyderabad /Ramoji Film City	Dr. M. Narsi Reddy, Dr. P. Naveen, Mr. P. Murali	
Day - 7: 10/09/2017 (Sunday)			
9:00 - 17:30	Homework and Reading		
Day - 8: 11/09/2017 (Monday)			
09.00 - 09.30	Recap	PD/PC/AC	

09.30 - 10.30	Plant Health Management strategies under organic farming	Dr. Krishna Chandra, Director, NCOF
10.30 - 11.30	Executives presentation	JD (Agro.) and AD (PHM)
11.30 - 13.00	Advances in soil nutrient management	Dr. O.P.Sharma, JD (A&AM)
13.00 - 14.00	Lunch break	
14.00 - 15.30	Climate change: Adaptation and mitigation strategies for sustainable agriculture	Dr. G. Pratibha, Principal Scientist (Agronomy) (CRIDA)
15.30 - 17.30	CRIDA - Institutional Visit	Dr. G. Pratibha, Principal Scientist (Agronomy) (CRIDA)
Day - 9 : 12/09/2017 (Tuesday)		
09.00 - 09.30	Recap	PD/PC/AC
09.30 - 10.30	Biological control for pest management-An ecological approach (Theory)	Dr. Chandish Ballal Director-NBAIR, Bangalore
10.30 - 11.30	Visit to Farm machinery workshop	Er. Sudhakar Reddy, PJTSAU
11.30- 13.00	Stratergies for reducing man-animal conflict in agriculture land scape	Dr. Vasudeva Rao, Principal Scientist, PJTSAU
13.00 - 14.00	Lunch break	
14.00 - 15.30	Diagnosis and management of Plant Parasitic Nematodes (P)	Dr. Sunanda, ASO-Nem.
15.30 - 17.30	Integrated disease management strategies in changing world	Dr. L.M. Suresh (GL CIMMYT), Nairobi, Kenya
Day-10: 13/09/2017 (Wednesday)		
09.00 - 09.30	Recap	PD/PC/AC
09.30 - 10.30	Introduction to Plant Biosecurity	Dr. Alice Sujeetha, Director, PBD
10.30- 11.30	Detection and diagnosis of stored pests in International trade (P)	Dr. Alice Sujeetha, Director, PBD & Dr. C.S. Gupta - ASO
11.30 - 13.00	Fruit Fly Surveillance (Theory)	Sh. Mariadoss - AD (VPM)
13.00 - 14.00	Lunch break	
14.00 - 17.30	Phytosanitary treatment system for internation trades (Practical)	Dr. Girish A.G - AD (PD) and Dr. C.S. Gupta - ASO
Day-11: 14/09/2017 (Thursday)		
09.00 - 09.30	Recap	PD/PC/AC
09.30 - 10.30	Pest Risk Analysis-Asian and African scenario (Practical)	Dr. C.S. Gupta - ASO
10.30 - 11.30	Pest surveillance and recent incursions of pest and diseases - Case studies	Dr. K. Susheela - SO (PRA)
11.30 - 13.00	Seed Health Testing (P)	Dr. T.Yella Goud & Smt. R. Madhubala - ASO
13.00 - 14.00	Lunch Break	
14.00 - 15.00	International and National Regulations for Food Safety - Pesticide Residues and Issues	Dr. Ch. Sreenivasa Rao, Director -PMD
15.00 - 16.30	Protocols for Pesticide Residues Analysis	Dr. Nirmali Saikia, Smt. Sridevi T, Shri. Satish Yadav & Dr. Baby Rani
16.30- 19.00	Cultural programme and DGs Dinner	






Day-12: 15/09/2017 (Friday)		
09.00 - 09.30	Recap	PD/PC/AC
09.30 - 10.45	Pesticide Regulations in India & Quality Control of Pesticides	Dr. Ch. Sreenivasa Rao, Director -PMD
11.00 - 13.00	Protocols for Pesticide Formulation Analysis	Shri. CV Rao, Dr. Jaya Devi M, Shri Om Pal Singh
13.00 - 14.00	Lunch Break	
14.00 - 16.00	Protocols for Pesticide Formulation Analysis	Shri. CV Rao, Dr. Jaya Devi M, Shri Om Pal Singh
16.00 - 17.30	Discussion on Back at Work Plan	PD/PC/AC
Day-13: 16/09/2017 (Saturday)		
09.30 - 11.00	Advanced technologies in rice production - Visit to IIRR	Director, IIRR
11.00-13.00	Promotion of Millet production in agriculture – Visit to IIMR	Director, IIMR
13.00 - 14.00	Lunch break	
14.00 - 16.00	Oil seed production technology	Director, IIOR
Day - 15: 18/09/2017 (Monday)		
09.00 - 11.00	Back at Work Plan - Presentation by executives	
11.00 - 13.00	Postcourse evaluation and feedback	JD (A& AM) & ICT division
13.00 - 14.00	Lunch break	
14.00 - 16.00	Valedictory	DG, NIPHM & Faculty

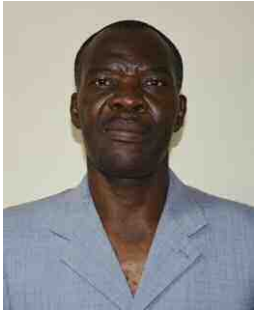
- Participants will take part in Yoga practice every day during 6:00 - 7:00 am.
- Visit to Temple/Church/Mosque will be arranged on Sundays based on request.

ANNEXURE-II (ORGANIZING COMMITTEE)

I. Organizing Committee:	
G. Jayalakshmi I.A.S. Director General, NIPHM Tel: 040-24011633 Email Id: dgniphm@nic.in	
Dr. K. Vijaya Lakshmi Director (Plant Health Management) & Programme Director Tel: 040-24015932 Mob: +91 9948099640 Email: dirphmniphm-ap@nic.in	Dr. Om Prakash Sharma Joint Director (Agro) & Programme Coordinator Tel: 040-24015346 Mob: +91 8978778701 Email: op.gorkhana@gmail.com
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II. Help line contact:	
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III. Emergency contact	
Dr. Girish A.G. Assistant Director (P.D) Mob: +91 8978778704 Email: adpdniphm ap@nic.in	Dr. Chandra Shekhar Gupta Assistant Scientific Officer (PP) Mob: +91 8978778719 Email: asoppniphm2 ap@nic.in
IV. Hostel contact	
Shri. Mariadoss. A Assistant Director (RPM) & Warden Mob: +91 9100207342 Email: adrpmniphm ap@nic.in	Shri. K. Jeethender Assistant Finance & Accounts Officer and Financial Advisor I/c & Associate Warden Mob: +91 9030080287 Email: faniphm ap@nic.in

ANNEXURE III- LIST OF EXECUTIVES

	<p>Mr. Jahed Jamhoor Agha Plant Protection Manager, Directorate of Agriculture, Irrigation and Livestock Parwan, Afghanistan Tel No: +93744354067; +93765314662 Email: abdulk.farzam@yahoo.com</p>
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ANNEXURE -IV- BACK TO WORK PLAN

Group task: 1. Biofertilizers

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Name of activity:	On-farm production of Mycorrhiza to Enhance Soil Fertility and Food Production	
Problem in the service area	<ul style="list-style-type: none"> • Moyo Children Centre endeavours to rehabilitate street children so that they can be able to live a normal life as their counterpart children living with their biological parents. • The Centre depends on well-wishers for support to provide basic needs of the children. • However, donations from such entities are not always reliable especially when food is to be provided in enough quantity and quality. • The Centre has 0.75 acres of land that is currently not producing enough vegetables and other foods for the children because of lack of information on the importance of soil fertility management and existence of on-farm making of bio-fertilizers. 	
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • Isolate Mycorrhiza to be used for improving soil fertility at Moyo Children Centre's 0.75 acres • Use of the Mycorrhiza to boost soil fertility and hence food production 	
Place	<ul style="list-style-type: none"> • Thika Sub County, Kiambu County, Kenya 	
Target group	<ul style="list-style-type: none"> • Moyo Children Centre housing 28 former street children 	
Duration	<ul style="list-style-type: none"> • 6 months (October 2017 to March 2018) 	
Expected results	<ul style="list-style-type: none"> • Improved soil fertility of the 0.75 acre of land • The Moyo Children Centre will be able to produce vegetables and other foods on 0.75 acres in order to feed 28 children hence reduced dependence on donor funds • Restore dignity of the children • Healthy children that can compete with others in all spheres of life • Hope of Moyo children achieving their future dreams because they have no worries of what to eat • The technology to be replicated to other similar settings 	
Any other information	<ul style="list-style-type: none"> • Upscaling to preparation and other bio-fertilizers to be undertaken. 	


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Name of activity:	On farm production of Rhizobium with farmers at Mayera-Accra
Problem in the service area	Low Nitrogen soil fertility for pulses farmers at Mayera in the Greater Accra Region
Indian experiences	<ul style="list-style-type: none"> • Isolation and Production of Biofertilizers • Mass production of Rhizobium using low cost technology developed by NIPHM
Place	• Mayera in the Greater Accra Region
Target group	• 5 Extension staff and 15 farmers
Duration	• One year
Expected results	• Extension staff and farmers should be able to produce rhizobium in mass quantity at a cheaper cost.

<p style="text-align: center;">Ms. Altan Ochir Munguntsatsal Department of Crop Production Policy Implementation and Coordination Department Government Building - IX B, Peace Avenue- 16A, Ulaanbaatar, Mongolia Tel No: +976 88083545; +976 Email: tsatska_a@yahoo.com</p>		
Name of activity:	On farm production of Phosphate Solubilizing Bacteria	
Problem in the service area	<ul style="list-style-type: none"> • In Mongolia, most of the cultivable soil decreased soil fertility, the farmers not using of bio fertilizers 	
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • Learning about the different soil microorganisms used as bio-fertilizer and their production technique • Isolation techniques of Microorganisms from the soil • Growing of microorganisms in specific media • On-farm mass production of bio-fertilizers 	
Place	<ul style="list-style-type: none"> • Agricultural university in Mongolia 	
Target group	<ul style="list-style-type: none"> • Students, teachers, and scientists of Agricultural university and farmers in Mongolia 	
Duration	<ul style="list-style-type: none"> • One year /October 2017 - September 2018/ 	
Expected results	<ul style="list-style-type: none"> • To organize trainings, seminars and awareness programs researching to increase soil fertility • On-farm mass production of bio-fertilizers 	

Group task: 2. Bio pesticides



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Name of activity:	On-farm mass production technique for <i>Trichoderma</i> using NIPHM white medium and Sorghum grains	
Problem in the service area	<ul style="list-style-type: none"> • Low Common bean (<i>Phaseolus vulgaris</i> L;) and Sunflower Productivity in West Nile as a result of root rot (<i>Pythium</i> root rot) and Damping off (<i>Pythium</i> spp) respectively using <i>Trichoderma</i> spp. 	
Place	<ul style="list-style-type: none"> • Yumbe District 	
Target group	<ul style="list-style-type: none"> • District Production and Marketing Department Staff of the district • Sub-county Agricultural Officers of the two districts • Commercial Farmers in the district. 	
Duration	<ul style="list-style-type: none"> • February-September, 2018 (October to December is the harvesting season and dry season after second rain season) 	
Expected results	<ul style="list-style-type: none"> • Enhanced beans and Sunflower productivity • Improved income dues increased crop yields and use of low cost Bio-pesticides • Enhanced food and nutrition security in the households • Increased awareness in regard to IPM which includes bio-pesticide use 	
Any other information	<ul style="list-style-type: none"> • The stakeholders will not only be trained on mass production and utilization of bio-pesticides but also on other technologies learnt from FTF-ITT like <i>Ecological engineering for pest Management, Mass production and Application of Nuclear Polyhydrolysis Virus as a form of bio-pesticide</i> among others 	

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Name of activity:	Mass production of <i>Trichoderma</i> as biological control agents against important crop diseases
Problem in the service area	<ul style="list-style-type: none"> • In Nay Pyi Taw, farmers grow mainly rice, maize, pulses (green gram, black gram) and vegetables. • one of the main constraints to high grain yield is susceptibility to several diseases • Among them, diseases caused by soil borne fungi are known to cause a serious threat to these crops <p>Most occurrence soil borne diseases</p> <ul style="list-style-type: none"> • sheath blight of rice, blast of rice • banded leaf and sheath blight of maize, • dry root rot, stem rot of black gram/green gram, • stem rot of tomato and chilli <p>At present, long term and indiscriminate use of chemicals</p> <ul style="list-style-type: none"> • existence of resistance of pathogen to some chemicals, • non-target effects on microbial population present in the ecosystems • hazardous to nature • depletion of soil quality,
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • Mass production of effective <i>Trichoderma</i> as biological control agents • <i>Trichoderma</i> is becoming increasingly popular as bio-control agents in many countries for soil borne diseases on many crops, • Myanmar has a few study on recommendations for describing under which species of <i>Trichoderma</i> are effective, what their effect on common soil borne diseases is and how they should best be used.
Place	• Nay Pyi Taw Council Area, Central Myanmar
Target group	<ul style="list-style-type: none"> • Farmer channel (TV) • Farmers • Extension workers
Duration	• One year (During 2017 November - 2018 December)
Expected results	• Many farmers not only for the service area but also

	<p>the whole of Myanmar growing areas, will know how to make mass production of <i>Trichoderma</i></p> <ul style="list-style-type: none">• Also they can apply effective <i>Trichoderma</i> spp. through multiplication in large scale
Any other information	<ul style="list-style-type: none">• The most suitable application in terms of economically cost effective and environmentally sound aspects to control many soil borne diseases


<p align="center">Mr. Saifullah Abdulali Plant Pests and Diseases Diagnostics Specialist Parwan Directorate of Agriculture, Irrigation and Livestock, Parwan, Afghanistan Tel No: 0744354067 Email: abdullk.farzam@yahoo.com; sarwarisaifullah@yahoo.com</p>	
<p align="center">Mr. Jahed Jamhoor Agha Plant Protection Manager, Directorate of Agriculture, Irrigation and Livestock Parwan, Afghanistan Tel No: +93744354067; +93765314662 Email: abdulk.farzam@yahoo.com</p>	
Name of activity:	Provision of Training and promotion of trichoderma
Problem in the service area	<ul style="list-style-type: none"> • Various fungal diseases attack crops in Afghanistan • A solution has to be found • The training was a good opportunity to learn about the control of fungal disease by trichoderma
Place	<ul style="list-style-type: none"> • The activity will be carried out in Parwan, Afghanistan
Target group	<ul style="list-style-type: none"> • The target group include extension workers, plant protection officers and farmers • Their capacity will be build to control fungal diseases.
Duration	<ul style="list-style-type: none"> • The activity is supposed to take around 8 months
Expected results	<ul style="list-style-type: none"> • The training is supposed to enhance the capacity of the target group • The trainees will be able to successfully control fungal disease • The yield lost due to fungal disease will be saved


Group task: 3. Ecological Engineering:

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Name of activity:	Establishment of Ecological Engineering Based Management Tactics for Rice insect pests	
Problem in the service area	In Rice crop: <ul style="list-style-type: none"> • Brown Plant Hopper: (<i>Nilaparvata lugens</i>) • Yellow stem borer : (<i>Scirpophaga incertulas</i>) • Golden Snail :(<i>Pomacea canaliculata</i>) 	
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • Training is the most effective way of technology transfer 	
Place	<ul style="list-style-type: none"> • Department of Agricultural Research, Entomology Field, Yezin : Nyapyitaw: Myanmar 	
Target group	<ul style="list-style-type: none"> • Extension workers • Small farmers 	
Duration	<ul style="list-style-type: none"> • 2 years 	
Expected results	<ul style="list-style-type: none"> • Capacity of the target group will be enhanced • Rice yield will increase • Brown plant hopper will be controlled successfully 	

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Name of activity:	Implementation of push pull technology in two sub counties of Busia county in Kenya	
Problem in the service area	Problems of maize in our Area <ul style="list-style-type: none"> • Maize staple food crop in Kenya • Pest challenges reduce yields greatly and include: <ul style="list-style-type: none"> • Maize stem borer • Striga weed • Fall army worm • Poor soil fertility-low OM 	
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • The training on the ecological engineering has shown the possibility of minimal usage of pesticides in the control of pests in the field. • Bio-conservation • Healthy food production 	
Place	<ul style="list-style-type: none"> • 10 farmers in Nambale and Matayos sub-counties of Busia County, Kenya. • 5 Agricultural Extension Officers capacity built on push -pull technology in Busia county, Kenya 	
Target group	<ul style="list-style-type: none"> • agriculture extension officers and farmers 	
Duration	<ul style="list-style-type: none"> • two seasons (1 year) 	
Expected results	<ul style="list-style-type: none"> • Capacity built of agricultural extension officers and farmers 	

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Name of activity:	Ecological Engineering based insect pest management tactics of Maize	
Problem in the service area	<ul style="list-style-type: none"> • PROBLEMS OF MAIZE IN OUR GROWING AREA <ul style="list-style-type: none"> • Maize stem borer • White grub • Aphid • Fall Army worm • Hairy caterpillar • Army worm • Termites 	
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • My great experience will be training on push and pull technology • Training on Biofertilizers as an alternative of chemical fertilizers • Training on the use of predators as a biological control agents against important crop pest. • Learning about the importance of vermiwash and vermicompost for improving the soil and plant health 	
Place	<ul style="list-style-type: none"> • Lilongwe East Agricultural Development Division- Chiwamba EPA- Chiponde B section 	
Target group	<ul style="list-style-type: none"> • Extension workers • Lead farmers • Small holder farmers 	
Duration	<ul style="list-style-type: none"> • 2 years 	
Expected results	<ul style="list-style-type: none"> • Capacity building of extension workers and smallholder farmers on use of Agro-ecological engineering approach to control insect pests. • Decrease in the use of pesticides 	
Any other information	<ul style="list-style-type: none"> • Use of ecological engineering method will be enhanced as one way of controlling crop pests 	

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Name of activity:	Pest Management in Maize	
Problem in the service area	<ul style="list-style-type: none"> • Pest occurrence (more than 30% losses) • Lack of tolerant/improved varieties • Miss use of pesticides • No ecological approaches 	
Place	<ul style="list-style-type: none"> • Mozambique 	
Target group	<ul style="list-style-type: none"> • Farmers and with collaboration of extension officers 	
Duration	<ul style="list-style-type: none"> • 2 (two years) 	
Expected results	<ul style="list-style-type: none"> • 4 extension workers and 100 farmers coached about EE • Pest damages/losses on maize reduced from 30% to 20% in first year • EE disseminated throughout the working area 	

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Name of activity:	Establishment of ecological engineering based pest management on Tomato	
Problem in the service area	Tomato insect pests : <ul style="list-style-type: none"> • Red spider mites (<i>Tetranychus</i> spp) • Tomato leaf miner (<i>Tuta absoluta</i>) • Cut worm, (<i>Spodoptera exigua</i>) • African boll worm/ Tomato fruit borer (<i>Helicoverpa armigera</i>) • Whitefly:(<i>Bemisia tabaci</i>) • Root-knot nematode: (<i>Meloidogyne</i> sp) • Serpentine leafminer :(<i>Liriomyza trifolii</i>) 	
Place	<ul style="list-style-type: none"> • All the training will be done at Botswana in various districts where tomato production is high 	
Target group	<ul style="list-style-type: none"> • Farmers and Field officers 	
Duration	<ul style="list-style-type: none"> • The exercise is expected to run for six months because most of the farmers plant indeterminate varieties 	
Expected results	<ul style="list-style-type: none"> • To see farmers changing from heavy use of chemicals and adopting other pest control methods aimed at promoting a balance in agro ecosystem. 	
Any other information	<ul style="list-style-type: none"> • Farmers should be made to: <ul style="list-style-type: none"> • Learn how to observe the crop • Analyze the field situation • Make proper decision for crop management 	

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Name of activity:	Establishment of Ecological Engineering based management tactics for Maize insect pests
Problem in the service area	<ul style="list-style-type: none"> • Maize insect pests <ol style="list-style-type: none"> 1. Fall Arm Worm 2. Maize stalk borer 3. Aphids
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • Training in Agro- Ecological Engineering that promotes the use of Trap plants, use of Repellent plants in a Push pull technology. • A Strategy for controlling pests by using repellent push plants and trap pull plants in cereals like maize and sorghum are often attacked by Stalk borer, grasses like Napier are used to tract and trap the pest while Desmodium is planted in a roll together with the maize to repel the pest. • I will conduct demonstration plots regarding the technology the Technology stated above in different allocation of my working area.
Place	<ul style="list-style-type: none"> • Lilongwe districts,Nyanja EPA,Malawi
Target group	<ul style="list-style-type: none"> • Smallholder farmers • Government Extension
Duration	<ul style="list-style-type: none"> • 2 years
Expected results	<ul style="list-style-type: none"> • Reduced use of chemical pesticides • Improved crop yield • Availability of chemical free foods • Making the farm land more attractive and beneficial for insects and less favourable for pests

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Name of activity:	Establishment of Ecological Engineering Based Management Tactics for Tomato Pest Complex and Capacity Building of Target Groups in Kabul, Afghanistan
Problem in the service area	<ul style="list-style-type: none"> • Major pests of tomato in Afghanistan: <ul style="list-style-type: none"> • Fruit borer • Cutworm • Aphids • Thrips • Whitefly
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • Establishment and promotion of the ecological engineering based management tactics for tomato pest complex • Capacity building of the target group • Minimizing tomato yield losses • Minimizing the application of toxic chemicals
Place	<ul style="list-style-type: none"> • Kabul, Afghanistan
Target group	<ul style="list-style-type: none"> • Extension workers • Plant protection practitioners • Farmers
Duration	<ul style="list-style-type: none"> • 9 months (Feb. to Oct. 2018)
Expected results	<ul style="list-style-type: none"> • Environmentally safer control measures for tomato pests complex • Tomato yield increase • Reduction in application of toxic insecticides • Increase of the farmer income • Enhancement of the capacity of those involved in plant protection and farmers

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Name of activity:	Ecological Engineering Based insect pest Management Tactics of Ground nut
Problem in the service area	<ul style="list-style-type: none"> • Problems in our Groundnut growing area <ul style="list-style-type: none"> • Aphids • White grubs • Jassid • Defoliators • Thrips • Rodents
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • The training on agro-ecological engineering pest management that promotes use of cultural techniques to effect habitat manipulation and enhance biological control. • The biosecurity measures to enhance food security and food safety
Place	<ul style="list-style-type: none"> • Nkhotakota District ,Nkhunga extension Planning Area, Kaongozi section
Target group	<ul style="list-style-type: none"> • 1. Agricultural officers • 2. Small holding farmer
Duration	<ul style="list-style-type: none"> • 2 years
Expected results	<ul style="list-style-type: none"> • Making the farm land more attractive for beneficial insects and less favourable for pest • Reduced use of chemical pesticides

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Name of activity:	Ecological Engineering based Pest Management for Pine Apple Pest
Problem in the service area	<ul style="list-style-type: none"> • Major insect problem: <ul style="list-style-type: none"> • Pineapple mealybug (<i>Dysmicoccus brevipes</i>) • Pineapple scales: (<i>Diaspis bromeliae</i>) • Pineapple fruit fly: <i>Melanoloma canopilosum</i> • Thrips: <i>Holopothrips ananasi</i> • Pineapple red mite: <i>Dolichotetranychus floridanus</i>
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • Experience includes the use of attractant plants, that attract natural enemies. • The use of repellent plants; Repel crop pests. • The use of barrier/ border plants; Prevents entry of pests. • Trap plants; Trap the crop pests.
Place	<ul style="list-style-type: none"> • Training will be held in various parts of Ghana
Target group	<ul style="list-style-type: none"> • Extension Officers & Farmers
Duration	<ul style="list-style-type: none"> • The activity will run for a period of two years because cultivation takes thirteen months from planting to harvesting and thereafter suckers are harvested for six months or more.
Expected results	<ul style="list-style-type: none"> • To see farmers reducing the use of excessive chemicals and adopting ecological engineering concept.
Any other information	<ul style="list-style-type: none"> • Farmers should be made to: <ul style="list-style-type: none"> • Learn how to observe the crop • Analyze the field situation • Make proper decision for crop management


Group task: 4. Nematodes:

<p style="text-align: center;">Mr. Baboori Abdul Ghafoor Head of Plant Pests and Diseases Diagnostic Lab Plant Protection and Quarantine Directorate, Kabul, Afghanistan Tel No: 00937 00259618 Email: abdghafoor.babori@yahoo.com</p>		
Name of activity:	Plant Parasitic Nematodes: Provision of training to extension workers, plant protection officers and farmers	
Problem in the service area	<ul style="list-style-type: none">• Various plant parasitic nematodes infestation in horticultural crops in Afghanistan• A solution has to be found• The training was a good opportunity to learn nematode disease diagnosis and their management techniques	
Place	<ul style="list-style-type: none">• The activity will be performed in Badambagh, Kabul, Afghanistan	
Target group	<ul style="list-style-type: none">• The target group include extension workers, plant protection officers and farmers• Their capacity will be build to identify and control nematode diseases.	
Duration	<ul style="list-style-type: none">• The activity is supposed to take around 6 months	
Expected results	<ul style="list-style-type: none">• The training is supposed to enhance the capacity of the target group• The trainees will be able to successfully control nematode disease• The yield lost due to nematode disease will be saved	


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Name of activity:	Banana demonstration farm
Problem in the service area	<ul style="list-style-type: none"> • nematode infestation in bananas
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • Use of Nematode free clean suckers • Hot water treatment of the suckers (52-55)c for 20 minutes. • Carbofuran treatment • Apply neem cake in the Banana plantation,1 kg per plant • FYM application, (3-5) kg per plant, twice a year • Use of Pseudomonas/Trichoderma • Planting the marigold
Place	<ul style="list-style-type: none"> • Nkokonjeru town council
Target group	<ul style="list-style-type: none"> • Extension workers and farmers of nkokonjeru town council
Duration	<ul style="list-style-type: none"> • one year (october2017-september2018)
Expected results	<ul style="list-style-type: none"> • Formulation of management practice • Reduced prevalence of the banana nematodes in the banana plant • Increased crop yield • Improved quality of the yield


<p align="center">Ms. Nagawa Sid Ahamed Mohamad Elkhadir Plant Quarantine Inspector Ministry of Agriculture- Plant Protection Directorate, Plant Quarantine Directorate- Plant Quarantine Unit- Khartoum International Airport Tel: 00249 153999968; 122256940 Email: pqairport@gmail.com; nagwasid@hotmail.com</p>		
Name of activity:	Biological Control of Soil Pests Using Entomopathogenic nematodes (Beneficial nematodes) in Citrus	
Problem in the service area	<ul style="list-style-type: none"> • Small farmers are using huge pesticides for the control of Soil insects in Citrus 	
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • Isolation of Plant Parasitic Nematodes • Mass Production of Entomopathogenic nematodes • Prevention of Quarantine nematodes 	
Place	<ul style="list-style-type: none"> • Sulait District Sudan 	
Target group	<ul style="list-style-type: none"> • Extension workers and Small farmers 	
Duration	<ul style="list-style-type: none"> • One year 	
Expected results	<ul style="list-style-type: none"> • The small farmers can use the entomopathogenic because this method utilizes low cost inputs 	


Group task: 5. Insect parasitoids:


<p>Ms. Manal Hussein Mohamed Omer Plant Quarantine Inspector Ministry of Agriculture- Plant Protection Directorate Plant Quarantine Directorate- Plant Quarantine Unit- Khartoum International Airport Tel: 00249 153999968; 129590070 Email: pqairport@gmail.com; hmanal30@hotmail.com</p>		
Name of activity:	Mass multiplication of parasitoids	
Problem in the service area	<ul style="list-style-type: none"> • Invasion of <i>Tuta absoluta</i> of tomato and heavy usage pesticides chemical and crop losses has increased 	
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • To use parasitic parasitoids to control <i>Tuta absoluta</i> on tomato in Sudan • To multiply and maintain parasitic parasitoids • To train farmers on best practices of IPM and multiplication of parasitoids for control of <i>Tuta absoluta</i> 	
Place	<ul style="list-style-type: none"> • Plant protection directorate, Sudan 	
Target group	<ul style="list-style-type: none"> • Green house and small scale farmers 	
Duration	<ul style="list-style-type: none"> • One year 	
Expected results	<ul style="list-style-type: none"> • Sustainability of tomato production • Reduce crop losses • Reduced used of chemical pesticide use to <i>Tuta absoluta</i> • To establishment using bio control on common pest in Sudan 	
Any other information	<ul style="list-style-type: none"> • In Sudan we us the hybrid tomato seed but also infected by <i>Tuta absoluta</i> 	

<p style="text-align: center;">Ms. Magoti Rahab Nyakwea Research Officer Kenya Agricultural and Livestock Research Organization P. O. Box 27-60100, Embu, Kenya Tel No: +254 728599728; 727444638; 727444608 Email: rahabmagoti@gmail.com; kalro.embu@kalro.org</p>		
Name of activity:	Mass multiplication of parasitoids	
Problem in the service area	<ul style="list-style-type: none"> • Invasion of fall army worm (FAW) <i>Spodoptera frugiperda</i> in Kenya has resulted into heavy usage of crop losses and use of chemical pesticide has increased 	
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • To use parasitic parasitoids to control fall Army worm in Kenya • To multiply and maintain parasitic parasitoids at KALRO for use • To train farmers on best practices of IPM and multiplication of parasitoids for control of FAW 	
Place	<ul style="list-style-type: none"> • Kenya Agricultural Livestock Research Organization (KALRO EMBU) 	
Target group	<ul style="list-style-type: none"> • KALRO staff, extension officers and small scale farmers 	
Duration	<ul style="list-style-type: none"> • One year 	
Expected results	<ul style="list-style-type: none"> • Small scale farmers to reduce maize losses due to FAW • Reduced used of chemical pesticide use • To establish small bio-pesticide units at village level for control of common pests 	
Any other information	<ul style="list-style-type: none"> • KALRO Embu will be a learning Centre on IPM technologies and multiplication of parasitoids will be available on demand 	

Group task: 6. Vermitechnology:

<p style="text-align: center;">Mr. Chamanza Franceton Davis Agricultural Extension Development Officer (AEDO) Nkbotakota District Agricultural Office, P.O.Box41, Ministry of Agriculture, Irrigation and Water Development Nkhotakota, Malawi Tel: +265 999296815 Email : fdchamanza@gmail.com</p>		
Name of activity:	To establish low cost Vermicompost & vermiwash type of fertilizers in Malawi	
Problem in the service area	<ul style="list-style-type: none"> • In Malawi most of the soils have been eroded and have lost fertility. Hence the soils are not giving the farmers enough productivity of crop yield. • Most of the farmers applying chemical fertilizers and pesticides to grow the crops like vegetables, cucumber, cabbage, tomatoes, okra etc. • As a result there is persistence, resistance and reoccurrence of serious pest and diseases problems in our area. 	
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • Vermicompost and vermiwash is one of the organic manure which can be replacing the chemical fertilizer usages and manage the pest and disease. • Further, it improves the soil fertility. The same technology I have learnt here I would like to implement in my home country (Malawi) 	
Place	<ul style="list-style-type: none"> • Mtosa Extension Planning Area, Masewe Section, Mdalireni Village. 	
Target group	<ul style="list-style-type: none"> • Mtosa EPA Extension Staff (9) and all Mdalireni village households.(44) 	
Duration	<ul style="list-style-type: none"> • One year(from October 2017 to September 2018) 	
Expected results	<ul style="list-style-type: none"> • By adopting this technology many farmers will benefit by managing the pest and disease incidences in the field crops • The vermicomposit and vermiwash will reduce the dependency of chemical fertilizers usage • Improve the good quality, quantity of food production and improve economy of the farmers in the country • Improve the soil fertility 	

<p style="text-align: center;">Mr. Donkoh Alex Ankomah Senior Agricultural Officer Plant Protection and Regulatory Services Department Post Box KD 08, Koforidua, Ghana Tel No: 0243437534 Email: donankolex@yahoo.com</p>		
Name of activity:	Vermitechnology in GHANA	
Problem in the service area	<ul style="list-style-type: none"> • Although the Eastern Region is endowed with rich agricultural prospects, most of the vegetable farmers are confronted with low soil fertility and disease challenges hence, the excessive use of chemical fertilizers as a means to improving soil condition. • This has resulted in soil and disease built up which contributed to high production has cost poor crop yield and low income. • It has also lowered the export gains of the vegetable farmers 	
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • The new skill acquire will go long way to assist farmers to improve their soil condition, reduce pest and disease incident due to crop vigor. 	
Place	<ul style="list-style-type: none"> • Eastern region of Ghana. 	
Target group	<ul style="list-style-type: none"> • Extension Officers • Farmers Group • Educational Institutions • Any other interested group 	
Duration	<ul style="list-style-type: none"> • One year 	
Expected results	<ul style="list-style-type: none"> • Improve soil fertility • Reduce the overdependence on chemical fertilizers and pesticides • Improve product quality ,quantity • Increase export market of crop produce • Improve economic gains 	
Any other information	<ul style="list-style-type: none"> • Thanks to the organization of the programme. Improve our skill and technical know-how. • It helps farmers to improve crop produce and educe pest and disease infestation. • It will help farmers to improve their economic gains. • It lower and reduce indiscriminate use of pesticides environmental pollutions. 	

<p>Ms. Mungai Teresia Wambui Head, Pathology Weed & Pesticide Advisory Section; Ministry of Agriculture Livestock and Fisheries (MOALF) State Department of Agriculture (SDA), Plant Protection Services P.O.Box 14733- 00800, Nairobi, Kenya Tel No: +254 722267909 Email: ppsdoffice@ymail.com; trzkaranja1@gmail.com</p>		
Name of activity:	Promotion of low cost Vermitechnology in Kenya	
Indian experiences/solutions/innovations	<ul style="list-style-type: none"> • Vermitechnology is affordable, easy to use by small scale farmers • Identification of suitable earthworm e.g. African night crawler- <i>Eudrilus eugeniae</i> is easy 	
Place	<ul style="list-style-type: none"> • Agricultural Training Centers 	
Target group	<ul style="list-style-type: none"> • Group/Individual greenhouse vegetable producers • Small scale private Agro forestry / flower Nurseries 	
Duration	<ul style="list-style-type: none"> • One year -November 2017 to October 2018 	
Expected results	<ul style="list-style-type: none"> • Improved Food and Nutrition security especially among the vulnerable farmers • Improved income and livelihoods among rural and peri-urban farmers due to higher sales of vegetables • Creation of jobs among the youths • Improved public health at the homesteads • Less use of pesticides and improved food safety of vegetables grown from compost • Enhanced hands on skills for Vermitechnology 	

Annexure - V

Feedback Report

Evaluation of Presentations

Presentation Topic	Rating
Overview of Plant Health Management techniques & approaches	9.66
Agro-ecosystem Analysis (AESA) based plant health Management	9.26
Ecological Engineering for pest management	9.50
Recent Advances in Weed Management strategies	8.84
Role of bio-fertilizers in plant health management	9.66
Plant Health Management strategies under organic farming	9.66
Advances in soil nutrient management	9.34
Climate change: Adaptation and mitigation strategies for sustainable agriculture	8.92
Biological control for pest management-An ecological approach	9.50
Strategies for reducing man-animal conflict in agriculture land scape	8.58
Diagnosis and management of Plant Parasitic Nematodes	9.26
Integrated disease management strategies in changing world	8.92
Introduction to Plant Biosecurity	9.16
Fruit Fly Surveillance	9.08
Pest surveillance and recent incursions of pest and diseases - Case studies	8.76
International and National Regulations for Food Safety - Pesticide Residues and Issues	9.58
Pesticide Regulations in India & Quality Control of Pesticides	8.92

1. List of Presentations Suggestions

- The presentations had enough pictorials that assisted the trainees. The flip side was the time taken per session tended to be short thus more allocation of time would be good
- The presentations were very good and I have gained a lot. I will make sure that I relay the message to the targeted groups so that we join hands in implementation of the activities where possible.
All the presentations I rated 5, there contained exactly what I expected and most of the material or concepts can be tried especially on upcoming farmers to see how the reception will be like. Those rated low were a bit out of my line of assignments, they are mandated to a different department (wild life, so it might not be easy for me to directly impose or sell the technologies to farmers unless we plan for a joint effort.
I liked most the presentation on Diagnosis and management of Plant Parasitic Nematodes, Role of bio-fertilizers in plant health management and Biological control for pest management-An ecological approach. I liked least about the presentation on Strategies for reducing man-animal conflict in agriculture land scape because I am not totally concentrate on this presentation. I think some parts of presentations cannot be followed for us.
- I LIKED THE PRESENTATION WORK PLANS
- Biological control for pest management-An ecological approach, Plant Bio-security and use of
- Vermi compost for sustainable agriculture as they can be easily adopted by farmers because they are not
- expensive. All the topics were very important only that they need more time as much of the work is done in the Laboratory.
- I have liked most the overview of plant health management techniques and approaches presentation
- because it sharpens the knowledge acquired through education and provides skills essential to perform a particular task like the push pull technology
- 1 Good for capacity building
- 2 Its all good
- 3 I am pleased about the whole programme THANK YOU
- The overall presentations were simple to follow. However some required more time and application to field situations
- Some presentations were discussed word by word as per the slides and this limited the participants' input especially when the slides were above 25. At the end of such presentations the participants were off!
I like ASEA.

Evaluation of Exercise

Exercise Topic	Rating
Mass production of insect parasitoids	8.92
Mass production of Entomopathogenic nematodes (EPN)	9.26
AESA field observations and chart preparation	9.26
Use of Vermicompost for sustainable agriculture	9.50
Mass production of insect predators	9.50
Mass production of Entomopathogenic Fungi and NPV	8.92
Mass production of Bio-fertilizers	9.26
Mass production of Trichoderma	9.00
Mass production of Psuedomonas	9.08
Mass production of Mycorrhiza	9.34
Detection and diagnosis of stored pests in International trade	8.66
Pest Risk Analysis-Asian and African scenario	8.08
Seed Health Testing	8.42
Protocols for Pesticide Residues Analysis	9.26
Protocols for Pesticide Formulation Analysis	8.50

1. List of Exercise Suggestions

- More allocation of time on practicals
- the ones rated 5 and 4 were fully demonstrated and could even practice it hands on ,therefore what is remaining is for us to be given manuals of protocols so that we can try them back home and the ones rated 1 and 3 were not either done or not properly understood.
- I liked most on Mass production of Entomopathogenic Fungi and NPV, Mass production of insect predators and Protocols for Pesticide Residues Analysis. I liked least about Seed Health Testing. I think some practicals are not enough time and also some are very rough for us to know completely all.
ITES VERY GOOD
- All topics were very useful but there is need but those topics the require laboratory experiment should be given more time because the time was very limited and to grasp each and every step it was very challenging. I liked the field visits as well
- 1 Good and worthwhile
- 2 All is well
- 3 Time enough for practical work
- All practicals were easy to follow and implement with minimal resources back in my country
- Procedure manuals should be availed to participants prior to practical lessons.
- Adequate time should be provided for the participants to adequately work on the individual tasks.
- I like Mass production of insect parasitoids
- I liked the presentations on vermi compost and vermi wash, and mainly lab exercises that were done and needed no much external equipment to be carried out. The time allocations to the lab exercise was very short and could not manage to finish the required lab exercise procedure hence most were done in a hurry.

Evaluation of Field Trip

Evaluation Topic	Rating
NIPHM field visit	9.42
Visit to International Crops Research Institute for the Semi-arid Tropics (ICRISAT)	9.58
Visit to Central Research Institute for Dryland Agriculture (CRIDA)	9.34
Visit to Indian Institute of Rice Research (IIRR)	9.00
Visit to Indian Institute of Millet Research (IIMR)	9.16
Visit to Indian Institute of Oil Research (IIOR)	8.92
Visit to Farm machinery work shop at PJTSAU	8.50
Visit to Phytosanitary treatment at Medchal	8.84
Visit to National Institute of Agricultural Extension Management (MANAGE)	9.76

1. List of Field Trip Suggestions

- The trips were relevant and well thought out.
- The field visits helps one visualize the field conditions on technology use
- All the visits were very fruitful and we got the real feel of what agriculture is all about in India. For example,
- we never knew before that there are so many varieties of millet and rice but through these visits, I got

- learned. As for the machinery visit, the observation has been that most of them cannot work in our cropping environment but i got the concept anyway that some can be modified to suit our case.
- The visits at some point were rushed. At the Mechanization station, there was no much to learn.
- I gained a lot from IRRI on rice. I was very impressed to learn that we can collaborate on rice research and improve Basmati rice varieties with high yielding lines. Our Basmati rice is most preferred by farmers with very low yields and its very prone to Blast. I was also impressed on ICRISAT and the art of collecting insect along with the research work. I was very impressed. There are many unemployed graduates from Kenya who can do the collections and the art in for income generating. Today's vist to ICAR was an eye opener and we can introduce castor in my country. Welldone
- I Like NIPHM field visit
- I liked most all the trips only that the time allocated to these trips seem to be not enough, the camera crew was disturbing the learning of participants taking most of the time their attention shading participants to learn and concertrate.
- what i liked about the trips is that it has an eye opener for me.
- I like most on visit to International Crops Research Institute for the Semi-arid Tropics (ICRISAT). I like least on the visit to Visit to Farm machinery work shop at PJTSAU.
- the field trip VERY GOOOD
- ALL VISIT WERE VERY USEFUL TO MY FIELD WORK
- 1 Very interesting and encouraging
- 2 Time to interact with personnel
- 3 There should be enough time to interact I LOVE INDIA AND THANK YOU VERY MUCH

Evaluation of Presenters

Presenter Name	Topic	Rating
Dr.K Vijaya Lakshmi	Overview of Plant Health Management techniques & approaches	9.84
Dr. Vijaya Laxmi	Ecological Engineering for pest management	9.66
Dr. Edpuganti Sree latha	Mass production of insect parasitoids	8.34
Dr. B.S. Sunanda Patil	Mass production of Entomopathogenic nematodes (EPN)	9.50
Dr. B.S. Sunanda Patil	Diagnosis and management of Plant Parasitic Nematodes	8.26
Dr.P. Jeyakumar	Agro-ecosystem Analysis (AESA) based plant health Management	9.16
Dr. Narsi Reddy/Dr. Edpuganti Sree latha	AESA field observations and chart preparation	9.00
Dr. Sakthivel	Use of Vermicompost for sustainable agriculture	9.34
Dr. Jesu Rajan	Mass production of insect predators	9.42
Dr. Ramesh, ASO	Mass production of Entomopathogenic Fungi and NPV	9.00
Dr. Ramesh, ASO	Mass production of Bio-fertilizers	8.26
Dr. G. Bindu Madhavi	Mass production of Trichoderma	9.08
Dr. G. Bindu Madhavi	Mass production of Psuedomonas	8.26
Dr. N. Trimurthilu (ANGRAU, Amaravathi)	Role of bio-fertilizers in plant health management	9.00
Dr. O.P. Sharma	Mass production of Mycorrhiza	8.26
Dr. O.P. Sharma	Advances in soil nutrient management	9.34
Dr. Chandish Ballal Director-NBAIR, Bangalore	Biological control for pest management-An ecological approach	9.34
Prof. V. Vasudeva Rao	Strategies for reducing man-animal conflict in agriculture land scape	9.34
Dr. J. Alice R.P. Sujeetha	Introduction to Plant Biosecurity	9.34
Dr. C.S.Gupta/Dr. J. Alice R.P. Sujeetha	Detection and diagnosis of stored pests in International trade	9.00
Dr. C.S.Gupta/Dr. J. Alice R.P. Sujeetha	Phytosanitary treatment system for internation trades	8.26
Shri. A. Mariadoss	Fruit Fly Surveillance	8.26
Dr. C.S.Gupta	Pest Risk Analysis-Asian and African scenario	8.66
Dr. K. Susheela	Pest surveillance and recent incursions of pest and diseases - Case studies	8.92
Ms. Madhubala /Dr. T. Yella Goud	Seed Health Testing	8.58

Dr. Cherukuri Srinivasa Rao	International and National Regulations for Food Safety - Pesticide Residues and Issues	9.42
Dr. Cherukuri Srinivasa Rao	Pesticide Regulations in India & Quality Control of Pesticides	9.34
Dr. Nirmali Saikia/Mrs. Sri Devi/Mr. Satish Yadav/Dr. Baby Rani	Protocols for Pesticide Residues Analysis	9.16
Mr. C.V.Rao/Dr. Jeya Devi/Shri. Om Pal Singh	Protocols for Pesticide Formulation Analysis	9.00
Dr. C. Chinnusamy, Prof.TNAU	Recent Advances in Weed Management strategies	8.84
Dr. Krishna Chandra, Director, NCOF	Plant Health Management strategies under organic farming	9.16
Dr. G. Pratibha, Principal Scientist (Agronomy). CRIDA	Climate change: Adaptation and mitigation strategies for sustainable agriculture	8.26
Dr. L.M. Suresh (GL CIMMYT), Nairobi, Kenya	Integrated disease management strategies in changing world	9.34

FEEDBACK FROM EXECUTIVES

S.No	Name of the participants	Feedback
1.	Mrs. Cho Cho San	This training is very valuable for me because I got a lot of methodology for mass production of bio-control agents that are very cost effective and available for our farmers. They can apply these technologies with their own facilities.
2.	Ms. Htat Htat Nay Win	This training is very effective for my country. In my opinion, I live alone at my home the whole year. I meet my family one time one year. So, this training gives to me not only technologies but also friendships, communication and happy times. Thanks NIPHM and MANAGE.
3.	Ms. Mulomole Janet	The training has been an eye opener for me personally. Being a front line officer I will make sure that farmers and my fellow extension workers work together for the betterment of our country.
4.	Mr. Mensah Victor Kofi	The training was very educative. We learnt a lot of TECHNOLOGIES we have learned and sure to implement them back home.
5.	Ms. Lechina Joyce Sheila Bonolo	I was very lucky to have been chosen for this training because it has filled a lot of gaps which were there at our division (Plant Protection).I never had much knowledge in aspects like ecological engineering, therefore with that I will assist our small holder farmers to desist from extensive use of chemicals and adopt this cheap and safe method. I hope the relationship will be cherished so that we are called of training of this kind in future
6.	Ms. Mtsendero Mercy Natasha	The training was very educative. I have learnt a lot of technologies and am sure am going to deliver the technologies to my smallholder farmers.
7.	Ms. Altan Ochir Munguntsatsal	The training was very important. Because health management, soil is my county big issue. I had learn a lot of technologies and other things. I have very happy.
8.	Mr. Zablon James Opapah	The focus of the training on low cost and biological relevant technologies is appropriate to Kenya. These were delivered with a lot of emphasis on practical skills, hence will share the acquired skills as planned.
9.	Mr. Chamanza Franceton Davis	The training has given me a lot of experience and skills mainly in the area of crop production and am very much encouraged and committed to deliver whatever has been learnt here will be implemented back home and good results will be shown and shared for the betterment of Malawi.

10.	Mrs. Nyirongo Fumanikire	Thank you NIPHM for the job well done .The training has equipped me with more knowledge that will make a change to my famers and my country. I will share the knowledge to my fellow officers for better implementation and sustainability.
11.	Ms. Nagwa Sidahmed Mohamed Elkhadir	The training has given me a lot of experience and skills mainly in the area of crop production and am very much encouraged think you for your generosity and I have benefited lot for.
12.	Mr. Appiah-Nti Charles	The training programme that I undertook has given me knowledge and skills on plant pest management and hope to implement the back to plan task that I specialized in NIPHM in Ghana.
13.	Ms. Manal Hussein Mohamed Omer	The training has given me good expiries and skills manila in the bio control when we using bio agent to control some pest or diseases. I Hobe to introduce this technics.
14.	Mr. Jahed Jamhoor Agha	The training was very good. I learned a lot of issues.
15.	Mr. Babori Abdul Ghafoor	The training was very good. I gained a good knowledge related of my field of work. I will try to use the experience in my country.
16.	Mr. Saifullah Abdulali	The training was a very good opportunity for me to learn new things in plant protection.
17.	Mr. Nawakht Noor Agha	The training of plant health management technologies and approaches was an excellent opportunity to enhance my knowledge and expertise. I have learned techniques that can be easily applicable on-farm level. Overall, the training has really helped me gain more knowledge and skills in my related field so enabling me to properly implement my duties and responsibilities back in my home country.

ANNEXURE – VI - PRE & POST EXAM REPORT

Pre Exam Average : 22.54
Post Exam Average : 42.92
Pre Exam Total Questions : 50
Post Exam Total Questions : 50

Sl.No	Name	Pre Exam Marks
1	Mr. ZABLON JAMES OPAPAH	33
2	Mr. NAWAKHT NOOR AGHA .	31
3	Mr. LUSWETI CHARLES MAMATI	28
4	Mr. APPIAH-NTI CHARLES	27
5	Ms. SAN CHO CHO	27
6	Ms. MUNGAI TERESIA WAMBUI	27
7	Mr. EZATI CHARLES PALMS	25
8	Mr. JOAQUIM CRIMILDO	25
9	Ms. ALTAN-OCHIR MUNGUNTSATSAL .	25
10	Ms. MAGOTI RAHAB NYAKWEA	24
11	Dr. OMER MANAL HUSSEIN	24
12	Ms. LUWEDDE MARIAM .	23
13	Ms. LECHINA JOYCE SHEILA BONOLO	23
14	Dr. BABOORI ABDUL GHAFOOR	23
15	Mr. CHAMANZA FRANCETON DAVIS	21
16	Dr. SARWARI SAIFULLAH	21
17	Dr. MTSENDERO MERCY	20
18	Ms. HTAT HTAT HTAT NAY	17
19	Ms. NYIRONGO FUMANIKIRE NONE	17
20	Mr. MENSAH VICTOR KOFI	17
21	Mr. DONKOH ALEX ANKOMAH	17
22	Mr. JAHED JAMHOORAGHA	16
23	Ms. MULOMOLE JANET	15
24	Ms. SIDAHMED NAGWA MOHAMED	15

Post Exam Report

Sl.No	Name	Post Exam Marks
1	Ms. LECHINA JOYCE SHEILA BONOLO	50
2	Ms. SAN CHO CHO	50
3	Ms. MULOMOLE JANET	50
4	Ms. LUWEDDE MARIAM .	49
5	Dr. MTSENDERO MERCY	49
6	Mr. CHAMANZA FRANCETON DAVIS	49
7	Ms. MAGOTI RAHAB NYAKWEA	49
8	Mr. LUSWETI CHARLES MAMATI	49
9	Ms. NYIRONGO FUMANIKIRE NONE	49
10	Ms. HTAT HTAT HTAT NAY	48
11	Mr. ZABLON JAMES OPAPAH	48
12	Ms. MUNGAI TERESIA WAMBUI	48
13	Ms. ALTAN-OCHIR MUNGUNTSATSAL .	46
14	Mr. DONKOH ALEX ANKOMAH	46
15	Mr. MENSAH VICTOR KOFI	45
16	Mr. EZATI CHARLES PALMS	44
17	Dr. OMER MANAL HUSSEIN	43

18	Mr. JOAQUIM CRIMILDO	41
19	Mr. APPIAH-NTI CHARLES	41
20	Ms. SIDAHMED NAGWA MOHAMED	40
21	Mr. NAWAKHT NOOR AGHA .	36
22	Dr. BABOORI ABDUL GHAFOR	27
23	Dr. SARWARI SAIFULLAH	18
24	Mr. JAHED JAMHOORAGHA	15



NIPHM Field Visit



Group photo with the participants



रा व स्वा प्र सं
N I P H M

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