



## Plant Health News Letter

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### From the Director General's Desk



Mrs. V. Usha Rani, IAS  
Director General

Weeds are responsible for significant crop yield losses. They reduce productivity of Agriculture, Horticulture & Forest resources. Alien invasive weeds are gaining attention in recent years due to globalization of international trade. Many plants imported as garden plants and many unsuspecting plant seeds accompanying bulk grain import as contaminants have become invasive in India. Invasion of exotic weeds is a growing concern as they may impact the sustainable Agricultural practices and adversely affect the environment. Various invasive weeds viz., *Parthenium*

*hysterophorus*, *Phalaris minor*, *Chromolaena odorata*, *Lantana camara*, *Prosopis juliflora*, *Mikania micrantha*, *Eichhornia crassipes*, *Cabomba caroliniana* etc. gained entry into India. Exotic weeds in agricultural fields are typical examples of accidental introduction through the pathway of grain trade as contaminants. Intentional introduction of species into the environment to meet the horticultural and ornamental demand for new and exotic plants has also contributed to the massive unrestricted global movement of plants, many of which may become invasive.

The age old adage "An Ounce of Prevention is Worth a Pound of Cure" holds good for invasive weed management. All plants may not become a weed and all weeds may not be invasive in all ecosystems. Therefore the preventive strategy requires a robust system to identify and evaluate the potential plants for ability to become/ behave as invasive in new ecosystem. Weed Risk Assessment (WRA) is one such a biosecurity screening tool which evaluates the likelihood of entry, establishment and spread of a weed, and the potential for direct and indirect impacts. WRA aims to identify or rank the risk potential of a given species becoming weedy or invasive prior to introduction. Although they are primarily used as predictive tools, they have also been used to evaluate the risk posed by recently introduced weeds and to identify appropriate management strategy. WRAs allow regulators and managers to make informed decisions that will reduce future economic and ecological harm likely to be caused by weedy and invasive plants.

Though, WRA is important in tackling the Plant biosecurity threats, unfortunately, the competent personnel in this immensely important area is scanty. There is a dire need to build capacity among the regulators at National, Regional and International level. The task is gigantic and challenging. NIPHM, in its endeavour to become an International Centre of Excellence, has forged alliance with strategic partners like USDA-APHIS, USAID, DAFF-Australia etc. and established a centre for Pest Risk Analysis (PRA) with faculty trained under USDA-APHIS.

To meet the human resource gap in the core area of PRA as well as WRA, NIPHM has developed a number of training programmes such as Pest Risk Analysis, Biosecurity & Incursion Management, Pest Surveillance and Weed Risk Assessment for the benefit of various stakeholders. I hope the extension functionaries of State & Central Govt., Scientists from ICAR, Commodity Boards, State Agricultural Universities and Plant Quarantine officials will take advantage of these programmes and join hands in preventing exotic & invasive weeds into India. I wish, all concerned will take the benefit of these programmes.

(Smt. V. Usha Rani, IAS)  
Director General

## Theme Article

Weed Risk Assessment: A Bio-security Tool to Assess Weed Potential  
Dr. K. Susheela and Dr. N. Sathyanarayana

Weeds are among the most serious threats to agriculture production. Many of plants that have been purposely introduced as potential new crops, ornamentals, or as novelties have become problematic weeds in agriculture and environment. The problem of exotic invasive weeds will worsen due to increase in free trade, thereby increasing the risk of new plant introductions, including exotic plants that may or may not possess weedy characteristics. The plants possessing "weedy" characteristics are more likely to become invasive; since those characteristics enable them to spread rapidly and to compete effectively with native plants. Their persistence and invasiveness in new habitats has been mainly due to their prolific production of seeds or other vegetative organs. Their presence and proliferation heavily affect the ecosystem, causing a shift in the existing vegetation and wildlife.

There are many examples of introduced plants, some of them intentional, but those later became serious weeds in the natural environment in India. For example, the Himalayas in India, which is an enchantment territory of the nature, covering an area of about 5 lakh km<sup>2</sup> (about 16.2% of country's total geographical area) and forms the northern boundary of the country, is affected by a total of 190 invasive alien species of which 18 species have been introduced intentionally, while the remaining species entered and established unintentionally through trade (Sekar, K.C., 2012).

## Some of the exotic weeds in India and their origin

Weed	Origin
<i>Acanthospermum hispidum</i>	Central & South America
<i>Achyranthus aspera</i>	Tropical America
<i>Ageratum conyzoides</i>	South America
<i>Argemone Mexicana</i>	Central America
<i>Boerhavia diffusa</i>	Paleo tropical
<i>Chenopodium album</i>	Paleo tropical
<i>Convolvulus arvensis</i>	Europe
<i>Cyanodon dactylon</i>	Tropical America
<i>Datura stramonium</i>	Paleo tropical
<i>Eichornia crassipes</i>	Brazil
<i>Euphorbia geniculata</i>	Pan tropical
<i>Lantana camara</i>	Central America
<i>Mimosa pudica</i>	Brazil
<i>Parthenium hysterophorus</i>	USA
<i>Phalaris minor</i>	Mexico
<i>Salvinia molesta</i>	East Africa
<i>Solanum elaeagnifolium</i>	-
<i>Tridax procumbens</i>	Mexico
<i>Xanthium strumarium</i>	South America

Agriculture is also one of the areas most affected by the invasion of new exotic plants. For example, in India, the problem of *Phalaris minoris* serious in rice-wheat system which occupies about 10 m. ha in India. 40-60% reduction was recorded in wheat yield at 108-915 plants per square meter. Sometimes, the *Phalaris* weed population is so high in Wheat fields, (i.e. 2000-3000 plants/m<sup>2</sup>), the farmers are forced to harvest the wheat as fodder. Further, the problem is confounded by the herbicide resistance (to the chemical Isoproturon) developed by this introduced weed (Singh, P.K., 2013).



As per an estimate, the annual loss due to alien invasive species was reported to be to the tune of US\$336 billion in six countries: United States \$137, South Africa \$7 billion, U.K. \$12 billion, Brazil \$50 billion and India \$117 billion (Pimentel et al. 2000). Preventive measures, therefore, will have to be implemented to check entry of exotic plants that may have potential to adapt and become established in new habitats. Nevertheless, regulatory authorities responsible for bio-security need a tool that synthesizes much of the available information.

**A weed risk assessment (WRA) is a systematic process by which the available evidence is evaluated to estimate the risk of a plant species entering, establishing, spreading, and causing harm in a new area (Groves et al. 2001).**

The Weed Risk Assessment (WRA) is such a science-based quarantine risk analysis tool for determining the weedy potential of proposed new plant/plant material imports intended for propagation. WRA is relatively a new discipline and its merits and limitations may come forth in due course of time, but it's very concept is very useful for determining the weed potential of proposed new plant imports or for that matter in evaluating the risk of endemic weeds having limited geographical spread in a given country.

## INTERNATIONAL FRAMEWORK

Concern about invasive plants is well reflected in the World Trade Organization (WTO)'s Agreement on Sanitary and Phytosanitary Measures (SPS), International Plant Protection Convention (IPPC) and Convention on Biological Diversity (CBD). The WTO-SPS & IPPC agreements, whilst allowing countries to specify requirements for the entry of plant material, describe the obligations of countries so that import requirements are not unjustified trade barriers. Whereas, CBD states that the countries shall prevent the introduction, control or eradicate the alien species which threaten ecosystems, habitats, or species.

As per IPPC, the term "pests" include "weeds". A *quarantine pest* is defined by the IPPC, as *a pest of potential economic importance in an area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled*. 'Economic importance' includes actual or potential effects on the economy of ecosystems and their component species, and that the IPPC definition of a pest is sufficiently broad to include weeds covering the full range of ecosystems, including those covered by the Convention of Biological Diversity.

**The three steps indicated in IPPC pest risk analysis (PRA) are:**

- a) Identification of the pathway that may allow the introduction and/or spread of the exotic plant**
- b) Pest risk assessment, considering all aspects viz., geographical distribution, biology and economic importance. This information is used to assess the establishment, spread and impact potential in the endangered area**
- c) Pest risk management, i.e. determining phytosanitary measures to be applied to effectively protect the endangered area**

International Standard for Phytosanitary Measures No. 11 (ISPM 11) set by IPPC provides details for the conduct of pest risk analysis (PRA) to determine if pests are quarantine pests. It describes the integrated processes to be used for risk assessment as well as the selection of risk management options. Recently, a new supplement was added to this standard which provides more detail on 'the analysis of environmental risks'. The supplement includes details regarding the analysis of risks of plant pests to the environment and biological diversity, including those risks affecting uncultivated/unmanaged plants, wild flora,

habitats and ecosystems contained in the PRA area.

It is important to note that WRA is part of PRA, i.e. the process of evaluating biological or other scientific and economic evidence to determine whether a pest should be regulated and the strength of any phytosanitary measures to be taken against it. Some countries have found it convenient to develop a framework that addresses plant issues specifically, but these schemes aim to fit within the international guidelines for PRA (IPPC, 2013).

## WEED RISK ASSESSMENT SYSTEMS

Risk is determined as a combination of the likelihood and consequences of an event. Weed Risk Assessment (WRA) is the application of models based on technical criteria to determine the relative weed threats posed by various plant species. In WRA the event is introduction of a particular plant species; likelihood relates to the plant's 'invasiveness' (i.e. an index measure of likely rate of spread); and consequences relates to the species' 'impacts' (i.e. its negative effects) and 'potential distribution' (i.e. geographic areas at risk of invasion). WRA is concerned primarily with the first two stages of the *pest risk assessment* involving (a) *pest categorization*, that is, *the process for determining whether a pest has characteristics of a quarantine / regulated non-quarantine pest or not* and (b) Potential to enter, establish and spread in the PRA area.

WRA systems are based on a series of technical considerations grouped into key criteria and these considerations can be given a score by simply recording the expected answers through yes/no or multiple choice questions. A final score or ranking allows comparison. The main elements of such WRA include a range of criteria for assessment, which can be classified into their inherent invasiveness, likelihood to survive and thrive, impacts, and likelihood of entry. Based on assessments of existing systems, an ideal WRA should contain the following criteria pertaining to entry, establishment, spread and impact potential:

### *Invasiveness*

- record of invasiveness elsewhere
- rapid (juvenile) growth
- high reproductive potential
- dispersal mechanisms
- stress tolerance
- escape from natural enemies

*Climatic/ecological match*

- Damaging effects
- competition with crops or natural vegetation
- allelopathy
- nitrogen fixation
- response to fire
- damage to man or livestock
- undesirable interaction with crop pests/diseases
- difficulty/expense of control

*Likelihood of introduction*

- likelihood of survival in transit
- likelihood of accidental introduction
- likelihood of deliberate introduction
- ease of detection

Weed risk assessment provides standard, robust and objective processes for making weed management decisions. WRA systems are also educational, providing means to explain and justify these decisions to people with limited weed knowledge (e.g. landholders, politicians). WRA predicts potential weediness and prioritizes weeds for management. It is important that systems be kept comparatively simple, with as few questions as possible whilst still retaining accuracy, and with questions that can be answered relatively rapidly using existing knowledge or by quick field observations.

The information on WRA systems at present is rich but limited to certain set of environments in the sense the very concept was initially understood by country – experiences of Australia and New Zealand and later as taken up by USA. The WRA, by default, needs effective quarantine protocols



for preventing the introduction and spread of unwanted plant species. Additionally, proper national legislation is a must to check internal spread of weeds of concern within the country however, WRA by itself cannot prevent the

entry and spread of weeds. It is very pertinent to understand the impact of weeds and the WRA is a realistic risk assessment tool in case of weeds, especially invasive weed. The recent incursion of *Ambrosia psilostachya* would serve as an eye opener as the weed has been established in parts of Karnataka and its WRA indicates most of the states in India as vulnerable or highly vulnerable to its invasion.

**WRA systems followed by different nations****1. Australian WRA System****2. South Australia Weed Risk Management System – 2008****3. PRATIQUE System of the European Union****4. Plant Protection and Quarantine Assessments (USDA-APHIS)****5. Weed Risk Model for Aquatic Species of New Zealand**

Very few countries are currently applying a formal WRA as a part of their regulatory process. Australia, South Australian, European Union and USA are few among them. Although the content, style, and approach of WRAs vary considerably (e.g., Pheloung et al. 1999; Randall et al. 2008; Reichard and Hamilton 1997), they all consider similar kinds of information. Weed risk assessments that identify or predict potential invaders before they enter a country are sometimes referred to as screening tools or pre-border WRAs. One of the most popular screening tools is the Australian WRA, which consists of 49 primarily "yes/no" questions about plant traits and status elsewhere (Pheloung et al. 1999). The questions evaluate whether a plant possesses traits typically associated with weedy and invasive species; the higher the risk score, the more likely a given plant will become invasive or weedy in the WRA area.

**Indian Context**

Total 173 species in 117 genera under 44 families were documented as invasive alien plant species, representing 1% of the Indian flora. Large number of exotics has become naturalized in India and affected the distribution of native flora to some extent (Reddy C, Sudhakar, 2008). Further, few have conspicuously altered the vegetation patterns of the country. *Cytisus scoparius*, *Chromolaena odorata*, *Eupatorium adenophorum*, *Lantana camara*, *Mikania micrantha*, *Mimosa invisa*, *Parthenium hysterophorus* and *Prosopis juliflora* among terrestrial exotics, and *Eichhornia crassipes* and *Pistia stratiotes* among aquatics, have posed

serious threat to the native flora.

In India, although preliminary screening of quarantine weeds was in use to place them in Schedule VIII in PQ order, 2003, a risk assessment system for the impacts caused by invasive plant species does not yet



exist. Further, some plants and plant materials are permitted for import without assessing their weed/invasive potential. For example, currently, the genus *Hypoestes* is permitted for import of seeds for sowing. However, *Hypoestes phyllostachya* is reported to be invasive in the State of Manipur (Ningombam and Singh, 2012) and is believed that it might be introduced for ornamental purposes. The species has now become naturalized displacing native plant communities of the hilly districts and also can become a potent invader in the valley districts. Nevertheless, there are 975 weeds in different parts of the world which have not been recorded or reported in India yet (Holm et. al., 1979). Before it is too late, there is an urgent necessity for the development of early warning systems like Weed Risk Assessment to determine the likelihood of a given species becoming invasive and of methods to conduct rapid assessments of the status of invaders.

WRA system should accommodate the rating system to meet the specific needs for a diverse country like India and focus on plant species that may become invasive in this region. The rating system should be validated by applying it to exotic plant species of India that had variable degrees of success in becoming established. The ideal WRA system, incorporating the best features of the available systems, has yet to be developed. This situation is open to challenge as there is increasing pressure to ensure that quarantine restrictions are based on a thorough scientific assessment and thus cannot be exploited to interfere with legitimate trade. Therefore, there is a pressing need to formulate scientifically sound methods and approaches in this emerging field. Until which, a suitable WRA model may be adapted from the existing WRA systems developed by other nations, to evaluate the relative weed threats posed

by the plant species in Indian subcontinent.

#### References

- Holm, Leroy, et al. *A geographical atlas of world weeds*. John Wiley and Sons., 1979.
- IPPC 2013. International Standards for Phytosanitary Measures: 1 to 36 (2013 edition). Food and Agriculture Organization of the United Nations, Secretariat of the International Plant protection Convention (IPPC). 434 pp, Rome, Italy.
- Ningombam, D. S., and P. K. Singh. "The first record of *Hypoestes phyllostachya* Baker an invasive species from Manipur." *Flora and Fauna (Jhansi)* 18.1 (2012): 57-61.
- Pimentel, David, et al. "Environmental and economic costs of nonindigenous species in the United States." *BioScience* 50.1 (2000): 53-65.
- Pheloung, P. C., P. A. Williams, and S. R. Halloy. "A weed risk assessment model for use as a biosecurity tool evaluating plant introductions." *Journal of Environmental Management* 57.4 (1999): 239-251.
- Randall, John M., et al. "The invasive species assessment protocol: a tool for creating regional and national lists of invasive non-native plants that negatively impact biodiversity." *Invasive Plant Science and Management* 1.1 (2008): 36-49.
- Reddy, C. Sudhakar. "Catalogue of invasive alien flora of India." *Life Science Journal* 5.2 (2008): 84-89.
- Reichard, Sarah Hayden, and Clement W. Hamilton. "Predicting invasions of woody plants introduced into North America." *Conservation Biology* 11.1 (1997): 193-203.
- Singh, P. K. "Introduction to Weed Science and Challenges". CAFT on Agro-ecological Approaches towards Sustainable Agricultural Production from 01-21 Oct. (2013)
- Singh, C. B., et al. "Biological and chemical properties of *Zingiber zerumbet* Smith: a review." *Phytochemistry Reviews* 11.1 (2012): 113-125.
- Sekar, K. Chandra. "Invasive alien plants of Indian Himalayan region—diversity and implication." *American Journal of Plant Sciences* 3.02 (2012): 177.

### Special Event: NIPHM - USDA collaboration closing event

NIPHM has entered into collaboration with USDA/USAID in order to strengthen the capacity in training, research and policy issues in the area of Plant Health Management and Plant Biosecurity in 2012, and the collaboration came to an end and the closing event was organized on 8-12-2015. The event was started with special address delivered by Mrs. Usha Rani, IAS, DG, NIPHM. The collaboration aimed to establish NIPHM as Centre of Excellence in South Asia for Human Resource Development in Plant Biosecurity and Plant Health Management. Dr. N. Sathyanarayana, Director (PB) explained about the additional infrastructures created at NIPHM such as training block, new hostel, computer facilities, laboratories and briefed about the joint

international training programme organized at NIPHM and US based training programmes for NIPHM faculty. Ms. Erica Johnston, International Program Specialist, USDA briefed about USDA's role in the collaboration. USDA expert Dr. Parul Patel talked about the USDA faculty visit to NIPHM while Dr. Susheela presented about new skills and concept learnt by NIPHM faculty during their training at USA. Ms. Latha and Dr. Kulkarni presented about capacity building programmes conducted during NIPHM-USDA collaboration and fine tuning training curriculum respectively. Dr. Girish and Dr. Kulkarni briefed about the outcome of the projects funded by USDA on fumigation with phosphine and khapra beetle management in storage.



### International Workshop on Khapra beetle (4<sup>th</sup> - 6<sup>th</sup> November, 2015)

Khapra Beetle (*Trogoderma granarium*) is one of world's most destructive pests of stored grain products and seeds. It is a serious pest of cereal grains and oilseeds, and many countries, including the USA, Australia, China, Kenya, Uganda and Tanzania, have specific quarantine regulations against possible importation. In order to have safe trade to USA and to sensitize among all stakeholders, a three days' workshop on Khapra beetle was organised at New Delhi in National Agricultural Science Complex during 4-6 November, 2015. The rice exporters, millers, accredited pest control operators, Plant Quarantine officials, experts from USDA, Customs and Border Security officers from USA, Officials from NIPHM and 7 international participants

representing Nepal, Bhutan, Sri Lanka & Kenya participated in the workshop. A total of 81 participants attended the workshop.

The workshop participants identified a number of general and specific issues; such as need to educate the stake holders in adoption of ISPM standards, additional declarations should be based on activities such as Inspection and treatment, CBP, FDA and USDA rules and regulations, industry practices in using packing material, cleanliness of containers, identification of pest free processing units for Khapra beetle, keeping the premise of rice mill free from Khapra beetle through survey and monitoring.



### Regional Plant Health System Analysis (23<sup>th</sup> November – 7<sup>th</sup> December, 2015)

The RPHSA programme aims in creation of a pool of experts to analyze Plant Health Systems to safeguard native agricultural biosecurity and to build SPS capacity to gain market access. It is designed to enable officials working with the NPPOs of South Asian and African Countries and actively engaged in the area of Plant Biosecurity. The International trade of plants and plant products has witnessed several fold increase in the post WTO era. A number of International Agreements/Treaties/Conventions have emerged in the past decade to harmonize various factors/ issues associated with International Trade. The developing countries need to understand the complexities and implications of PHS of a country and the SPS Measures. The Programme gives the opportunity to review the existing National Regulations, evaluate the gaps and to identify appropriate systems that need to be followed to enhance agriculture production, safeguard native agro-ecosystems from invasive pests and promote exports.

The course was organized from 23 November – 7 December, 2015 at NIPHM and attended by 12 international participants representing Nepal, Sri Lanka, Bangladesh, Kenya and Bhutan and 19 participants from various states of India including Rajasthan, Haryana, Punjab, Jharkhand, Karnataka, West Bengal, Maharashtra, Telangana, Gujarat, Pondicherry and Tamil Nadu. Experts from USDA Dr. Parul Patel and Dr. John Crowe from USDA were involved in the programme. Dr. Craig Fedchock of IPPC, Rome with an implicit arrangement by NIPHM-USDA could deliver some of the training sessions through video-conference.

The Course was thematically divided into three areas viz. (i) Sustainable Agricultural Production, (ii) Biosecurity and (iii) Market Access and various topics related to those themes were covered with an emphasis on regional harmonization in areas like Pest Risk Analysis, Pest Surveillance and Emergency preparedness in managing the pest risks and to gain market access as well.



### International Training Programme on Pest Surveillance (26<sup>th</sup> October - 2<sup>nd</sup> November, 2015)

Pest surveillance provides insights into the health status of a country's agriculture and strengthens preparedness for preventive actions both in addressing the problems due to domestic pests of serious concern as well as in protection of native agricultural biodiversity from the incursion threats of exotic pests. Surveillance also provides vital information for development of robust quarantine policies and also facilitates early detection of invasive alien species which is very essential for their eradication. Establishment of pest free areas and areas of low pest prevalence to gain market access can be achieved only through well designed pest surveillance programmes. NIPHM organized 8 day duration programme on Pest

Surveillance from 26<sup>th</sup> October to 2<sup>nd</sup> November, 2015 and trained 6 international participants representing Nepal, Bhutan and Sri Lanka and 19 national participants representing Himachal Pradesh,



Karnataka, Tamil Nadu, Chhattisgarh, Madhya Pradesh, Uttar Pradesh and Maharashtra.

In the training programme, participants were trained in the concepts of pest surveillance and various pest surveillance strategies such as detection, monitoring and delimiting surveys. The training imparted hands on experience in various lures and traps preparation for carrying out fruit fly surveillance for monitoring as well as for area-wide control.



### Training programme for Nurserymen of Kadiyam on Ornamental Nursery growing and market access (14<sup>th</sup> - 18<sup>th</sup> December, 2015)

Kadiyam nurseries having spread over 3,500 acres in 11 villages of Kadiyam mandal in East Godavari district are involved in supply of quality ornamental plants throughout the country. The nurseries though generate huge revenue tolling up to crores per annum have not tapped the avenues of export. Realizing the huge export opportunities and potential of the association, a training program on "Ornamental Nursery growing and market access" was organized at Kadiyam from 14 - 18, December, 2015 and around 128 participants of Sir Arthur Cotton Nursery Farmers Association attended the training.



The programme provided exposure about (i) export procedures for plants, cut foliage & cut flowers (ii) importance of growing pest and disease free plants and (iii) potential international market for export of plants / plant materials. Phytosanitary certification is an important aspect in exports of Agricultural commodities. The training was tailored for Kadiyam Nurserymen in the area of Phytosanitary certification in line with International Standards of Plant Quarantine, market access for ornamental plants, good nursery practices, packaging and processing of plants for export and bio-intensive production systems.



## Capacity Building

### Plant Quarantine Procedures for Imports and Exports (5<sup>th</sup> - 9<sup>th</sup> October, 2015)

The liberalization of trade in the post WTO scenario has opened up new avenues for international trade in agricultural commodities. One of the main components in the international trade of agricultural commodities is application of Biosecurity and quarantine rules and procedures, by exporting and importing countries. The PQ rules, procedures and degree of implementation vary in specificity and protocols from country to country. Proper understanding and following the procedures reduces the chances of consignment rejections, penalties and non-compliances which are of major trade concerns.



A five day training programme on Plant Quarantine Procedures for Imports and Exports was organized from 5<sup>th</sup> to 9<sup>th</sup> October, 2015 and 60 Post Graduate Diploma in Management (Agri Business Management) students of MANAGE, Hyderabad, fourteen government officials and our private industry participants were trained. The participants learnt topics related to SPS and Technical Barriers, International conventions, National Regulations, SOPs on imports and exports. Practical scenarios on procedures for import/export of seeds, plants, bulbs, grains, fruits, GMOs, germplasm and bio-control agents were organized.

### Farmers Field School (FFS) Methodology

A 5 day training on Farmers Field School (FFS) Methodology was organized from 2 to 7 November, 2015. In the training,



22 participants from SAUs, KVKs and State agriculture and horticulture departments of Tripura, Karnataka, Tamil Nadu, AP, Telangana, Maharashtra and Madhya Pradesh



participated. The trainees were imparted exposure to enhance knowledge and skills in Agro Ecosystem Analysis (AESA), Ecological Engineering for plant health management, Mass multiplication and production of biopesticides, predators & parasitoids, on-farm production techniques of Biocontrol Agents & mycorrhiza.

### Integrated Soil Nutrient and Weed Management (ISNWM)

The training programme on Integrated Soil Nutrient and Weed Management (ISNWM) was organized from 8<sup>th</sup> -14<sup>th</sup> December, 2015. In the training, 14 participants from different states viz. Tamil Nadu, Madhya Pradesh, Haryana,

Himachal Pradesh and West Bengal participated. The participants were trained in AESA, Ecological Engineering, living soil concept, improvement of



rhizosphere for enhancing soil microbial activities, integrated nutrient management, Integrated Weed Management and weed vegetation analysis. During the training, participants were learnt various techniques of safe and judicious use of pesticides, hands-on-practical on farm level mass production of BCAs, Biopesticides and Mycorrhiza.



## Capacity Building

### Induction Training for New Recruits

In view of the vital role of extension functionaries in implementing various government programme / polices aimed to benefit the farmers in sustainable agricultural production, a training programme is being introduced through NIPHM and MANAGE collaboration. This two



week induction training programme is aimed to train the newly recruited Agricultural / Horticultural Officers in environment friendly Plant Health Management and extension techniques. During the quarter three training programmes were organized in which 42 Agriculture Officers from Tamil Nadu and 37 Asstt. Directors from Chhattisgarh were trained in various aspects of Plant Health Management. The training was especially focused on farm level mass production of biocontrol agents, biopesticides and mycorrhiza bio fertilizers, principles of biosecurity and Extension management skills, marketing, work ethics, etc.

### Rodent Pest Management in food grains

The training program on “Rodent pest management ” for warehouse professionals was conducted from 1st to 5th December, 2015. A total eight participants representing Food Corporation of India and State Warehouse Corporation



were attended the training programme. The aim of this training is to manage rodent pests in food grain storehouses to minimize grains losses & spread of diseases through contaminated food materials. Participants were imparted skills in diagnosis of rodent pest species, infestation measurement, bait preparation and baiting techniques. They acquired knowledge about role of reproductive biology and ethology in scientific management of rodent pests in storage structures.

### Certificate course on 'Urban Integrated Pest Management'

A Certificate course on 'Urban Integrated Pest Management (UIPM)' was organized from 7th to 21st December, 2015. Twelve participants attended the training programme.



During the training, participants were trained on safe, ecofriendly management of urban pests. Participants also learnt biology and management of mosquitoes, termites, flies, cockroaches, rodents, stored insect pests and other pests related to urban environments and stored grain pests identification and their management techniques.

### 'Rodent Pest Management in Urban Environs

The training programme on Rodent Pest Management on urban environs (URPM) was organized from 8th to 12th December, 2015. The aim of this program is to provide knowledge on biology, breeding, management, preventive and proofing methods for rodent pest. Participants also were imparted with safe and judicious use and application of rodenticides in residential houses and food industries.

### Appropriate Pesticide Application Techniques and Farm Level Storage Structures (28<sup>th</sup> September - 4<sup>th</sup> October 2015):

Appropriate pesticide application techniques and equipment selected for applying pesticide are vital to the success to pest control operations. This complex process requires a high level of knowledge and understanding,

## Capacity Building

practical skills, well maintained and calibrated equipment, and probably most importantly a desire or will to protect the environment. The main purpose of pesticide application technique is to achieve maximum efficacy with minimum side effects on non – target organisms. The knowledge on farm level storage structures enhances the farmers to safely store the produce and also can sell it when there is a better market price.



23 participants attended training programme from 28th September to 4th October 2015 and gained knowledge on use of high volume, low volume and ultra – low volume spraying techniques, nozzle selection, and calibration of the equipment, storage problems of food grains at commercial / farm level. The participants learnt the importance of suitable equipment selection and operation of the equipment, selection of suitable nozzles and calibration of the sprayers.

### Safe and Judicious Use of Chemical Pesticides (16<sup>th</sup> – 23<sup>rd</sup> November 2015)

Pesticides are poisonous substances and they can cause harm to many living organisms, therefore their use must be very judicious. The application techniques ideally should be target oriented so that safety to the non – targets and the environment is ensured. Spray drift and the risks associated



with the application of pesticides in agriculture are attracting increasing attention. In this regard, a training on Safe & Judicious use of chemical pesticides, was organized from 16 – 23rd November 2015 and trained 22 participants on Pesticide formulation and their properties, quality control of pesticides, judicious use of rodenticides, safe use of pesticides and precautions to be taken while spraying and storing of pesticides. Practicals on application techniques, selection of suitable nozzles, calibration of the sprayers, and their operation enabled the participants to understand and implement the concepts covered in the programme.

### Pesticide Formulation Analysis

Training programme on Pesticide Formulation Analysis (PFA) was organized from 03.11.2015 to 07.01.2016. In the training, 17 Insecticide analysts from various State Pesticide Testing Laboratories were trained in the quality control analysis of pesticides. The participants were trained in the concepts of pesticide management, various sections and rules of insecticide act 1968 & rules 1971, procedures of implementation during enforcement, pesticide formulations and their physico-chemical properties, principles of volumetric analysis and different type of titrations, volumetric and instrumental methods of analysis for quality control of pesticides. The participants were also trained in operation and maintenance of UV-Vis & FT IR spectrophotometers, gas chromatographs & liquid chromatographs. They were given hands on experience in analyzing pesticides using the modern analytical instruments as per the latest Bureau of Indian Standards (BIS) and Registration Committee (RC) approved methods of analysis. All the participants were given training on laboratory quality system management and internal audit as per ISO/IEC 17025-2005 as an integral part of the PFA program.



## Capacity Building

**Inspection Sampling and Prosecution Procedures under Insecticide Act 1968**

Training programme on “Inspection Sampling and Prosecution Procedures under Insecticide Act 1968” was organized from 14th to 19th December 2015. The programme was attended by thirty participants and they were trained on the salient features of the Insecticide Act 1968, Insecticide Rules 1971, duties & Responsibilities of inspectors, procedures for sampling, interpretation of the Analytical Reports and procedures for prosecution including the evidence act & Cr. PC.

**Laboratory Quality System Management and Internal Audit as per ISO/IEC 17025-2005**

Training programme on “Laboratory Quality System Management and Internal Audit as per ISO/IEC 17025” was organized from 28 to 02 January 2016. A total 9 participants attended the training programme and trained on Quality system procedures, quality management, guidelines, internal audit, and maintenance of records as per the standards to maintain the required conditions in the Laboratory under ISO certification & help the laboratories in securing Accreditation by NABL.

**World Soil Health Day Celebration**

The World soil health day was celebrated at NIPHM on 5th Dec. 2015 (Saturday). A special session on importance of soil in sustainable agriculture and human life was organized with NIPHM faculty and PGDPHM Kerala participants.

**Participation in South Zone Regional Agricultural Fair and Exhibition**

NIPHM participated in South Zone Regional Agricultural Fair and Exhibition organized at Regional Agricultural Research Station, Lam Farm (ANGRAU), Guntur (AP) from 19 to 21 December 2015. During the 3 days exhibition, low cost farmer friendly technologies developed by NIPHM were displayed and explained to visitors.

**New initiative**

NIPHM has proposed support to Farmers Producer Organizations (FPOs) by forging linkage with Small Farmers Agribusiness Consortium (SFAC) to train the farmers in the low cost on-farm production of biocontrol agents & microbial biopesticides and biofertilizers to promote sustainable agriculture. A group of 28 farmers representing various FPOs in the states of Bihar, West Bengal, MP and Maharashtra was trained for 3 days from 1st to 3rd Dec. 2015 at NIPHM. The group was facilitated and funded by Indian Gramin Services, Hyderabad - an NGO working with farmers and rural communities.

## Around the World

Agriculture in Sikkim has a glorious history that has been practised for generations where people and nature live in perfect harmony. With the system of farming that was time tested, deeply interwoven with ecological system and climatic conditions and founded on sustainable farming practices, an idea of transforming Sikkim into an organic farming State took shape in the year 2003. In the same year, the Chief Minister of Sikkim made a historic declaration in the State Legislative Assembly to bring the entire agricultural land under organic management. It was given a formal approach with the launch of "Sikkim Organic Mission" in the year 2010 to convert all the cultivable land into organic by the year 2015. Recently, having certified more than 74,000 ha of land, Sikkim becomes the first organic State in the country.

Several other parts of India now also inspire the same and working hard to achieve the organic status. Leading the race is Kerala followed by Mizoram and Arunachal Pradesh.

Diverse agricultural systems had evolved in Kerala, as diverse as its landscapes. But in the last few decades, traditional agriculture was rejected in favor of the modern, intensive kind. This had a negative impact not only on agriculture but also on the economy, environment, culture and social life of the people. The transformation of 'agriculture' to 'agri-business' is most evident in Kerala. In the past 10-15 years, many farmers in Kerala other than those who continued the traditional methods, have taken up organic farming quite earnestly.

NIPHM plays a proactive role in creation of awareness between the farmers and stakeholders either by capacity building training programmes or by various awareness campaigns. In view of this, NIPHM has entered in to an agreement with Directorate of Agriculture, Government of Kerala for offering PGDPHM programme in off-campus mode at SAMETI, Thiruvananthapuram. This course is being offered in off-campus mode in four semesters over a period of two years. The main objectives of the course are

- To develop a highly committed and competent cadre of agricultural professionals
- To promote environmentally sustainable Plant Health and Biosecurity Management,
- To develop competence in AESA based plant health management in conjunction with Ecological engineering for pest management.
- To develop skills to organize Farmer Field Schools effectively.
- To improve knowledge to promote safe and judicious use of pesticides through adoption of appropriate application techniques.
- To develop skills in pest surveillance and disease diagnosis.

## Alumni Forum

Mr. Raju Gupta, Farmer, K i s a r i g u t t a , Chigatimamidi village, Hyderabad, Telangana State came to know about the use of low-cost bottle trap and ME lure for fruit fly management. He was trained in preparation of low-cost bottle traps and he procured ME lures

from NIPHM and used in Guava, Papaya and Mango orchard for management of fruit fly damage, with in one week after placement of traps lot of fruit flies were trapped. The fruit flies trapped were identified as *Bactrocera dorsalis* and *B. correcta*.



## Awards and Honour

Dr. N. Sathyanarayana, Director (Plant Biosecurity), NIPHM received an Eminent Educationist Award for his contributions in the area of sustainable Plant Health Management and Plant Biosecurity. Award given by C. D. Arha, IAS (Retd.), Former Secretary, GOI and Mr. Gadgil, Chief Executive & Managing Director, L&T Metro Rail (Hyderabad) Limited during Indo Global Education Summit 2015 organized by Indus Foundation.



Dr. N. Sathyanarayana, Director (Plant Biosecurity), NIPHM was awarded with Certificate of Appreciation for his contributions for successful implementation of NIPHM – USDA Collaboration. The award was given by Ms. Erica Johnston, USDA Foreign Agriculture Service, Washington DC, USA during the closing event of NIPHM – USDA Collaboration. Mrs. V. Usha Rani, IAS, DG, NIPHM graced the occasion. The event was also attended by Mr. Scott. D. Saxe – USDA Attache at US Embassy, New Delhi, USDA, Dr. Parul Patel & Mr. John Crowe – USDA APHIS, Mr. Mr. Chandan, USAID, New Delhi

## Plant Pest Diagnostics & Advisory Services

NIPHM has developed an online web application for identification of plant pests and advisory services to the farmers. A farmer who desires precise diagnosis of pest problems and advisory solutions from NIPHM can upload photographs of the pest damage symptoms, pest images etc., and can get appropriate advisories for management of the problem. Additional Secretary Dr. Ashok Dalwai, IAS., inaugurated the web application on 02.12.2015. Mrs. Usha Rani, IAS, DG, NIPHM elaborated the contents of the web application. Shri. Atul Patni, Director – Plant Protection, DAC was present on the occasion. The web application can be accessed in the website <http://niphm.gov.in>



### Foundation Day Celebration

NIPHM foundation day was celebrated on 24th October 2015. Smt. Usha Rani, IAS DG NIPHM lightened the lamp and inaugurated the programme. On the occasion of foundation day celebration, cultural activities and various games were organized. All the staff and their families participated in the programme. In addition to this, DG NIPHM released “an Illustrative guide for trapping, monitoring & identification of economically important fruit flies” and “ Identification Kit” for quick and reliable identification of fruit flies occurs in India.



### Release of An Illustrative Guide for Regulated Weeds

'An Illustrative Guide for Detection and Identification of Regulated Weeds' by Dr. K. Susheela, Scientific Officer and Dr. N. Sathyanarayana, Director, Plant Biosecurity of NIPHM, Hyderabad was released in XXII Annual group meeting of All India Coordinated Research Project on Weed Management. The Conference was organised at Professor Jayshankar Telangana State Agricultural University (PJTSAU), Hyderabad, from 17-18 October 2015.

The guide includes 62 weeds of quarantine significance; identification characters of their seeds, current distribution, potential pathways, means of dispersal etc. The guide will facilitate detection of weed seeds in grain

movement and further, in detection of weed plants in post entry quarantine and field surveillance. This guide is especially useful for quarantine officials to ensure that our native agricultural biosecurity is protected by appropriate & timely detection and identification of Regulated weeds.



## Celebration of "Vigilance Awareness Week"

"Vigilance Awareness Week" was organized by NIPHM from 26 to 31 Oct 2016. The vigilance pledge was administered to all the faculty and staff by the Director (Plant Biosecurity). During the week long programme, various activities such as slogan writing, essay writing and debate competitions were organized. A lecture was organized on the theme "Preventive Vigilance as a tool of Good Governance" in connection with vigilance awareness delivered by Guest Speaker Dr. P. Jeya Kumar, Senior Scientist, Indian Institute of Rice Research, Hyderabad.



आगामी वनस्पति स्वास्थ्य समाचारपत्र में प्रकाशन हेतु राजभाषा संबंधित सामग्री वर्ष 2015-16 हेतु राजभाषा कार्यान्वयन समिति की तृतीय बैठक संपन्न

दिनांक 13-11-2015 को श्रीमती वी.ऊषारानी, भा.प्र.से., महानिदेशक, रावस्वाप्रसं (एनआईपीएचएम) की अध्यक्षता में राजभाषा हिन्दी के प्रगामी प्रयोग से संबंधित प्रगति रिपोर्ट की समीक्षा हेतु राजभाषा कार्यान्वयन समिति(राकास) की बैठक आयोजित की गई। उक्त बैठक में महानिदेशक के समक्ष में जुलाई-सितंबर, २०१५ को समाप्त तिमाही रिपोर्ट प्रस्तुत की गई। महानिदेशक ने उक्त रिपोर्ट की समीक्षा की एवं राजभाषा अधिनियम की धारा 3(3) के पूर्णतः अनुपालन होने पर एवं 'ग' क्षेत्र हेतु निर्धारित लक्ष्यों को हासिल किये जाने पर सराहना की और भविष्य में इसके अनुपालन सुनिश्चित करने हेतु निदेश भी दिये। महानिदेशक ने संस्थान के सभी प्रभागों के निदेशकों को किसानों से जुड़े तकनीकों, उनके कौशल संवर्धन हेतु व्यावहारिक कृषि पद्धतियों प्रैक्टिसों एवं कृषि क्षेत्र में हो रहे विकास संबंधी अद्यतन जानकारियां एनआईपीएचएम की वेबसाइट पर हिंदी, अंग्रेजी एवं क्षेत्रीय भाषाओं में उपलब्ध करवाने के निदेश दिये। संस्थान द्वारा विकसित की गई तकनीकों एवं अनुसंधानों को हिन्दी समाचारपत्रों एवं पत्रिकाओं में भी प्रकाशित करने हेतु निदेश दिए। वर्ष 2014-15 हेतु संस्थान की वार्षिक रिपोर्ट एवं वार्षिक लेखा रिपोर्ट द्विभाषीय (हिंदी-अंग्रेजी) तैयार की गई।

संस्थान गीत : जय जय जय संस्थान हमारा

जय जय जय संस्थान हमारा पौध स्वास्थ्य का रखवारा।  
दुनियां भर का ज्ञान प्रदाता समस्त राष्ट्र में है न्यारा।।  
कीट रोग से मुक्ति दिलाता नैसर्गिक संबल दाता,  
नहीं निरापद जीव सताता अपतृण फसल बचाता,  
जैव सुरक्षा नीति सुझाता वैदेशिक संगरोध मिटाता,  
कुशल प्रबंधन कीटनाशी का भोज्य विषाक्त कम करता,  
सर्व प्रदेश कृषि सेवारत के विशिष्ट ज्ञान का तार। 1।  
जय जय जय संस्थान हमारा .....

अधिस्रातक डिप्लोमा इसका व्यावहारिक कौशल लाता,  
कृतक नाशीजीव सुरक्षा खेत गृहों से खूब मिटाता,  
इसके अभियांत्रिक प्रभाग से यंत्र कुशलता सिखलाता,  
तकनीकी प्रसार सूचना निगरानी हर पल रखता,  
स्वायत्त शासन कुशल प्रशासन 'ऐसा' है पथ उजियारा। 2।  
जय जय जय संस्थान हमारा.....

जय जय जय संस्थान हमारा पौध स्वास्थ्य का रखवारा।  
दुनियां भर का ज्ञान प्रदाता समस्त राष्ट्र में है न्यारा।।

डॉ. ओ.पी. शर्मा  
संयुक्त निदेशक (ए एवं एएम)  
राष्ट्रीय वनस्पति स्वास्थ्य प्रबंधन संस्थान-  
हैदराबाद

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