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Theme Article

Biofertilizer-A Potential Input for Sustainable Agriculture

Special Event

Jeep Campaigning

WHAT'S INSIDE

Department of Agriculture, Cooperation & Farmers Welfare
Ministry of Agriculture and Farmers Welfare, Govt. of India

From the Director General's Desk

Green revolution in India has been a collective result of high yielding varieties with enhanced use of irrigation facility and chemical fertilizers. In course of time, the indiscriminate use of chemical fertilizers resulted in poor soil health. The challenge emerged to maintain soil health with alternative source of plant nutrients like Biofertilizers. Though the commercial production of biofertlizers in India began in 1956 but the growth in biofertilizer use was very slow till 1980s. Major issues behind this were lack of awareness about biofertilizers among the farmers, availability of quality products and its slow influence on crop yield. Biofertilizer production and consumption started increasing considerably since last few years with annual production of 80.7 thousand tonnes in 2014-15. Presently, commonly produced and marketed biofertilizers in India are *Rhizobium, Azotobacter, Azospirillum*, phosphate solubilizing bacteria (PSB) and mycorrhiza.

Biofertilizers have a great potential in improving soil health conditions leading to sustainable agricultural production. Application of biofertlizers not only increases soil health and fertility status but also accelerates crop growth by producing growth promoting substances *vis-a-vis* suppressing soil borne pathogens. Presently, the liquid formulations of biofertiliser have been developed by various institutes gaining more importance due to longer shelf life and higher counts.

Government of India is making serious efforts to fill this gap by introducing new schemes and policies to promote use of biofertlizers in sustainable agriculture. Apart from bio-intensive approaches for pest management, NIPHM is also promoting use of biofertilizers by organizing capacity building programmes for officers, farmers and other stakeholders; by developing techniques of on farm production of biofertilizers and by providing mother culture to trainees. In this issue, the theme article on biofertlizers focus on importance and use in various crops for the benefit of stakeholders.

Sd/-
(G. Jayalakshmi, IAS)
Director General

Theme Article:
Biofertilizer-A Potential Input for Sustainable Agriculture

Dr. O.P. Sharma (JD-Agro), Dr. Ch. Sreenivasa Rao (Director-PHM)) and Dr. Neha Singh (SRF-Microbiology)

Introduction

In last century chemical fertilizers became popular throughout the world with instantaneous increased in the crop yield, thereby increasing the profit to the farmers. But in recent years notable environmental damage is observed because of their continuous and non-judicious use. Water and soil pollution, loss of micro-organisms and beneficial insects and overall reduction in soil fertility are some of the ill effects of chemical fertilizers. Sole dependence on chemical fertilizers for future agricultural growth would mean further loss in soil quality and increased environmental pollution. Farmers are now showing interest in more eco-friendly products and approaches. Biofertilizers hold promising future in reducing soil quality problems with optimum crop yield (Renuka, 2013). Furthermore, government of India is also having policy to reduce use of chemical fertilizers and pesticides by promoting organic farming to produce safe food. Application of biofertilizers can reduce the requirement of chemical fertilizers for crops. Hence, it becomes imperative to enhance production and application of biofertilizers as a potential input by incorporating in integrated nutrient management (INM) and in various practices of organic farming.

What are Biofertilizers?

Biofertilizer contains living or latent cells of efficient microorganisms which, when applied to soil, colonizes the rhizosphere or the interior of the plant and promotes growth by increasing the availability of nutrients to the host plant (Nalawde and Bhalerao, 2015). These are important eco-friendly agricultural input for sustainable agriculture system. Biofertilizers are artificially multiplied cultures of beneficial soil microorganisms that can improve soil fertility and crop productivity. They add nutrients through the natural processes of nitrogen fixation, solubilizing phosphorus, and stimulating plant growth through the synthesis of growth-promoting substances. The major biofertilizers are prepared with efficient strains of bacteria, fungi, blue-green algae, azolla etc. (Singh et al 2014).

Benefits of Biofertilizers:

- Biofertilizers are eco-friendly, non-pollutants and cost effective input useful for all type of the crops and cropping systems.
- No adverse effect on plant growth & soil fertility; improve structure and water holding capacity of soil.
- Stimulates plant growth by secreting growth promoting hormones, vitamins, antibiotics and other bio-chemicals which suppress growth of pathogenic microbes in rhizosphere.
- Biofertilizers are non-toxic and easy to apply.
- Decompose plant residues, and stabilize C: N ratio of soil.
- Fix nitrogen, solubilize & mobilize plant nutrients and enhance uptake of nutrients.
- Reduce cost of cultivation by reducing quantity of chemical fertilizers.
- Biofertilizers can increase crop yield by 15 to 35%.

Biofertilizer production in India:

Biofertilizers were commercially introduced in India in 1895 (Nobbe and Hiltner 1895). Though the commercial production of biofertilizer began in 1956 but the growth in biofertilizer use was very slow till

1980s. Major issues behind this were lack of awareness about biofertilizers among the farmers and its slow influence on crop yield. Biofertilizer production and consumption started increasing considerably since last few years. Presently, in India, most commonly produced and marketed biofertilizers are Rhizobium, Azotobacter, Azospirillum, phosphate solubilizing bacteria (PSB) and mycorrhiza. In 2014-15, the annual production of biofertilizer is recorded at 80696.46 tonnes. The state of Karnataka tops in biofertilizers producing 16462.62 tonnes followed by Tamil Nadu (15373.29 tonnes) and Maharashtra (14847.39 tonnes). Agro Industries Corporation, State Agriculture Departments, National Center for Organic Farming (NCOF), State Agricultural Universities, ICAR institutes and private biofertilizer companies are the vital players in biofertilizer market (NCOF, DAC&FW 2015).

Biofertilizer application methods: Biofertilizers are mainly used in three ways i.e. seed treatment, seedling root dip and soil application as mentioned below;

- **Seed treatment:** Seed treatment helps in germination, improve seed vigour and develop resistance to pests in and around the seed. Seeds are treated with biofertilizers either in the form of powder or liquid formulations. It is very simple, cheap and effective method of biofertilizer application. It is suggested to add jaggery or any other material which can helps in sticking the biofertilizer with seeds. Jaggery also provides nutrition to biofertilizer inoculants at initial stage. There may be variation in recommended dose of biofertilizers and quantity of seed material to be treated. Generally, one packet (approx. 200 grams) of the biofertilizer inoculant is mixed with 200 grams of jaggery or rice kanji to make slurry. The seeds required for an acre are mixed in the slurry so as to have a uniform coating of the inoculant over the seeds and then shade dried for 30 minutes. The shade dried seeds should be sown within 24 hours. The procedure and other details mentioned on the biofertilizer packet or bottle should be followed carefully while using the biofertilizer for seed treatment.

- **Seedling root dip:** This method is used for transplanted crops like rice, vegetables and ornamental crops. Two packets (400 grams) of the inoculant are mixed in 40 litres of water. The root portion of the seedlings required for an acre is dipped in the mixture for a few minutes and then transplanted.

- **Soil application:** This method is used for application of biofertilizers like mycorrhiza, azolla, and blue green algae. Recommended dose of these biofertilizers can be applied in soil and mixed to avoid direct exposure to sunlight. Mycorrhiza can be applied by broadcasting and tilling soil or by mixing in pits before planting of saplings. Bacterial biofertilizers may also be applied in soil with doses higher than seed treatment. Recommended dose of biofertilizers (Table 1) should be mixed with around 20 kgs of dried and powdered farm yard manure and then broadcasted in main field just before sowing or transplanting.

Application rate: Recommended dose of biofertilizers may differ depending on the type of crops and method of applications. Generally, liquid biofertilizer culture/formulation having the inoculum count of 1×10^{8} cells/ml is recommended @ 200ml/acre seed treatment for all crops. In case of carrier based biofertilizers minimum colony forming unit (cfu) count should be $5x10^{7}$ cell/g of finished product including carrier material in the form of powder or granules. The recommended doses are indicated in the (Table 1).

Liquid Biofertilizer

Seed Treatment

Seedling Root Dip

Soil Treatment

Table 1: Application of liquid biofertilizer in different crops:

Sl.N.	Crop name	Recommended Bio-fertilizer	Quantity to be used
1.	Pulses- Chickpea, beans, groundnut, soybean, lentil, Lucerne, berseem, green gram, pigeon pea etc.	Rhizobium- Seed treatment	200ml/acre
2	Cereals -Wheat, oat, barley	Azotobacter/ Azospirillum- Seed treatment	200ml/acre
3	Rice	Azospirillum- Seed treatment	200ml/acre
4	Oilseeds- Mustard, sesame, linseeds, sunflower, castor	Azotobacter- Seed treatment	200ml/acre
5	Millets- Pearl millets, finger millets, kodo millet	Azotobacter- Seed treatment	200ml/acre
6	Maize and sorghum	Azospirillum- Seed treatment	200ml/acre
7	Forage Grasses- Bermuda grass, napier grass , etc.	Azotobacter- Seed treatment	200ml/acre
8	Plantation Crops-Tobacco	Azotobacter- Seedling treatment	500ml/acre
9	Tea, Coffee	Azotobacter- Soil treatment	400ml/acre
10	Rubber, Coconuts	Azotobacter-soil/seedling treatment	2-3 ml/plant
11	Agro-Forestry/ Fruit Plants-All fruit/agro-forestry seedling/saplings	Azotobacter- Soil treatment	2-3 ml/plant at nursery
12	Leguminous plants/ trees	Rhizobium- Soil treatment	1-2 ml/plant
13	All crops	Mycorrhiza- Soil treatment	3-4 kgs/acre

Role of NIPHM in popularizing the low cost technology: Apart from bio-intensive approaches for pest management, NIPHM is also promoting use of biofertilizers by organizing capacity building programmes on biofertilizers for officers, farmers and other stakeholders; by developing techniques of on farm production of biofertilizers and by providing mother culture to trainees. A brief account of these activities is mentioned below:

A. Organizing capacity building programmes on biofertilizers:

To enhance the knowledge of farmers on Plant Health Management, NIPHM is creating a pool of master trainers by training them on various aspects of PHM strategies. Incorporation of biofertilizers including mycorrhiza in agricultural practices plays a vital role in promotion of soil health and uptake of important macro and micro nutrients by the crops. Taking a holistic view of plant health, NIPHM is organizing training courses on production protocol of biofertilizers as well as incorporating biofertilizer related sessions in other courses on plant health management offered by NIPHM. The important courses offered on biofertilizers are;

a) Production protocol for biofertilizers and biopesticedes- 10 days
b) On-Farm production of biocontrol agents, microbial biopesticedes and biofertilizers-10 days
c) Production protocol for biocontrol agents, quality analysis and quality management of microbial biopesticides and biofertilizers -21 days
d) Integrated soil nutrient and rhizosphere management (ISNRM)- 8 days
e) On-farm production of biocontrol agents for promotion of sustainable agriculture- 3 days for farmers
f) Organic farming for sustainable agriculture- 3 days for farmers

In these courses, new information on living soil concept, rhizosphere engineering, role of PGPRs, low cost techniques of biofertilizer production etc. are incorporated. Details about these courses may be accessed from http://niphm.gov.in/Training/NIPHM_TC_2018_19.pdf.

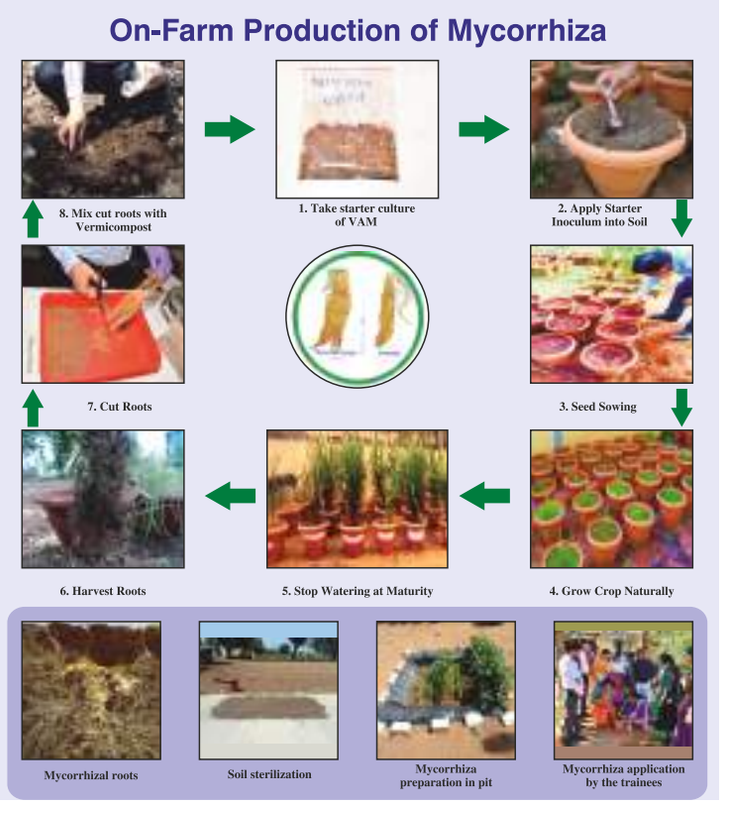
B. On-Farm Production of Biofertilizers:

a. On-farm production of mycorrhiza: Mycorrhiza or Vesicular Arbuscular Mycorrhiza (VAM) is the roots associated fungal biofertilizer. Mycorrhiza makes symbiotic association with more than 80% of the plant species. Mycorrhiza colonizes the root cortex cells making a mycelial network consisting vesicles and arbuscules. It increases the root surface area, hence, the absorption of water, phosphorus and other nutrients also increased. **Mycorrhiza is useful for all cereals, legumes, fruits, vegetables, forestry and plantation crops.** NIPHM, Hyderabad has been developed a low cost techniques of on farm production of Mycorrhiza so that a trained farmers can produce Mycorrhiza at farm level easily (Sain and Sharma, 2015).

Materials Required: Sterilized soil, plastic pots, maize / sorghum /ragi seeds and Mycorrhiza mother culture.

Methodology:

1. Take required quantity of fertile soil from own field to fill up the pots. Sterilize the soil to minimize the presence of other fungus or pathogens in soil by heating for 2-4 hours using a big metal pan or by drying under intense heat of the sun for 2-3 days.
2. After cooling, place the sterilized soil in thoroughly cleaned dry pots. For large scale production polythene bags or trough lined with plastic sheet may be used.
3. Place a pinch of mycorrhiza mother culture in the pot and then cover with a thin layer of soil.
4. Sow 3 to 5 seeds in each pot at such a depth that seedling roots should come in contact with culture.
5. Grow the plants for two to three months under normal conditions.
6. Stop watering the plants after two to three months and cut the upper part of plants or stalks near maturity.



7. Remove the roots along with adhering soil from the pots and dry in shade.
8. Cut the roots into small pieces and mix with vermicompost or the soil taken from the pot. Approximately 100g of good mycorrhizal roots can be mixed in 10 kg of vermicompost/ soil. Store the roots and soil inoculants in sealed plastic bags in cool & dry place up to six months.

Application doses: It depends on the quality of inoculum i.e. quantity of the active spores/ hyphae present in the product. Generally, a material containing 100 IP (Infective Propagules) per gram is recommended @ 3 to 4 kg per acre.

Precautions for use of mycorrhiza

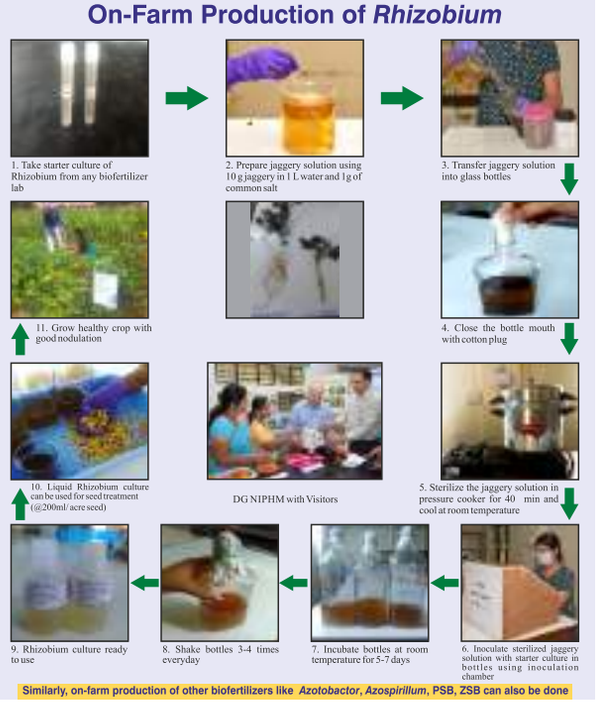
- Always use quality mycorrhiza mother culture for production (minimum 100 Infective propagules per gram)
- Create physical contact between the mycorrhizal culture and plant roots
- Normal care should be taken during plants growth
- Do not apply any chemical pesticides or fertilizers in the pots along with mycorrhiza

b. On-farm production of bacterial biofertilizers: Commonly used bacterial biofertilizers are *Rhizobium, Azotobacter, Azospirilium, Bacillus* etc. These biofertilizers are manufactured as carrier based as well as in liquid form. To ensure the use of biofertilizers by farmers and production at farm level, NIPHM has developed on farm production technique of *Rhizobium* as mentioned below;

Material required: Starter culture (*Rhizobium, Azotobacter, Azospirilium, Bacillus* etc.), Jaggery, NaCl, Glass bottles, Cotton plugs, Pressure cooker, Low cost wooden inoculation chamber, Rubber bands.

Method: the following steps should be followed, sequentially;

1. Take starter culture of Rhizobium (or any other biofertilizer like *Azotobacter, Azospirilium, Bacillus* etc) - it can be obtained from any biofertilizer lab.
2. Prepare 'jaggery solution' by adding 10g of jaggary and 1 g of common salt (NaCl) into 1 L of water.
3. Transfer 1/3 of the jaggery solution into 1 L glass bottles or flasks and close with cotton plug for sterilization.
4. Sterilize the bottles containing jaggery solution in pressure cooker for 40 min.
5. Cool the bottles at room temperature and inoculate the sterilized jaggery solution (approx. 300ml) with 3ml of starter culture in bottles using inoculation chamber.
6. Incubate the bottles at room temperature for 5-7 days by shaking the bottles every day for 3 to 4 times to enhance the bacterial growth.
7. Farmers can observe the bacterial growth in bottles. In case of good growth, jaggery solution will become turbid and light brown.
8. In this way, the solution containing Rhizobium is ready to use for seed, soil or seedlings treatment.
9. This culture can be stored at room temperature for 3 months.



10. Similarly, on-farm production of other bio fertilizers like *Azotobactor, Azospirillum*, PSB, ZSB can also be done.

Quality control: Quality of biofertilizer is one of the important factors resulting in their success or failure and acceptance or rejection by end-user i.e. farmers. Basically, quality refers to the number of live cells of selected microorganism (colony forming units or cfu) present in the active form per gram or milliliter of the biofertilizer formulation or culture.

Quality test of Rhizobium in low cost medium: the low cost jaggery media used for on farm production was tested by comparing with commercial medium (nutrient broth). The study was conducted for growth of Rhizobium IC4062 in terms of cfu/ml count. The results are encouraging and found at par with commercial nutrient broth as indicated below;

Table 2: Comparative study of Rhizobium IC4062 in jaggery and nutrient broth for quality test.

S.No	Dilution factors	Jaggery broth	Nutrient broth	Min. count as per FCO standard
1	10^{-5}	5.1×10^{7}	5.5×10^{7}	1×10^{8} cells/ml
2	10^{-6}	3.4×10^{8}	3.6×10^{8}	1×10^{8} cells/ml
3	10^{-7}	1.8×10^{9}	1.7×10^{9}	1×10^{8} cells/ml
4	10^{-8}	0.6×10^{10}	0.8×10^{10}	1×10^{8} cells/ml

The per liter cost of medium is Rs. 0.6 and 49.27 for jaggery and commercial nutrient broth, respectively. Hence, the low cost production medium like jaggery can be used by the farmers for multiplication of bacterial biofertilizers like *Rhizobium, Azotobactor, Azospirilum, Bacillus*, etc. on their own farm.

c. On-Farm Production of Azolla: Azolla is an aquatic floating fern, found in moderate climate suitable for paddy cultivation. The blue green algae cyanobacteria (*Anabaena azollae*) present as a symbiont with this fern in the lower cavities actually fixes atmospheric nitrogen. The nitrogen-fixing capability of azolla has led to azolla being widely used as a biofertilizer, especially in parts of Southeast Asia. Dry Azolla flakes can be used as poultry feed and green azolla is a good feed for fish. It can fix atmospheric CO2 and nitrogen to form carbohydrates and ammonia, respectively and after decomposition it adds available nitrogen for crop uptake and organic carbon content to the soil. Azolla suppresses tender weeds such as Chara and Nitella in paddy fields. It reduces water evaporation rate from the irrigated rice field. Azolla can be a substitute for chemical nitrogenous fertilizers to a certain extent (25 kg/ha) and it increases the crop yield and quality.

Mass multiplication of Azolla: Azolla can be produced in large quantity at farm level in both the kharif and rabi seasons.

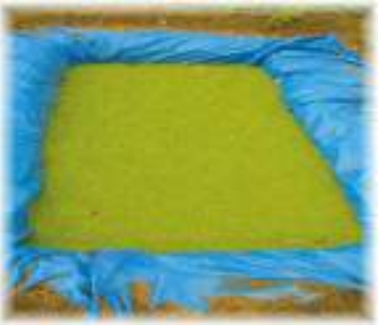
Materials required: polythene sheets, fertile soil, vermicompost, cow dung, powdered rock phosphate, starter culture of Azolla, etc.

Production technique: A water body is prepared by digging a pit size of 2m length x 2 width x 0.2 m depth preferably under the shade. The pit is lined with, polythene sheet to avoid seepage losses of water. About 10 – 15 kg of fertile soil is uniformly spread in the pit. Slurry made of 2 kg cow dung and 30 g of super phosphate mixed in 10 liters of water, is poured in the pit. More water is poured into the pit to raise water level to about 10 cm.

Precautions:

- Azolla should be harvested regularly to avoid overcrowding.
- Around 35˚C should be maintained for good growth. The pit/ plot should be covered with a plastic sheet in cold regions. Places with partial sunlight should be preferred. pH of the medium should be between 5.5 to 7.5.
- Suitable growth material such as cow dung slurry, micronutrients should be supplemented as and when required.
- Maintenance of pure culture free from contamination is also essential for good yield.





C. Supply of mother cultures: NIPHM has established a small scale biofertilizer laboratory in 2016 for production of biofertilizer mother cultures and supply to the trainees and farmers visiting NIPHM. Presently, efficient strains of biofertilizers are multiplied and mother cultures are provided to trainees and farmers. The facility is also utilized for practical sessions and demonstration to the students, trainee officers and farmers.

Table 3: Mother cultures of biofertilizers supplied to trainees (January 2016 to October 2018):

Biofertilizers	VAM (kg)	Rhizobium (liters)	Azotobacter (liters)	Azospirillum (liters)	PSB (liters)	Azolla (kg)	Total
Cultures distributed	28.912	9.737	11.690	30.915	30.840	44.270	156.362*
No of beneficiaries	1708	998	1025	5300	5374	341	14746

*VAM sample culture of 15g each; liquid biofertilizer sample culture of 5-10 ml each

Do's and Don'ts in biofertilizer handling and application

Sl.N.	Do's	Don'ts
1	Keep biofertilizers away from direct heat and sunlight. Store it in cool and dry place.	Don't store biofertilizers bottles under heat and sunlight
2	Use only biofertilizers which contain batch number, the name of the crop on which it has to be used, the date of manufacture and expiry period.	Don't sell or use biofertilizers which do not contain batch number, the name of the crop on which it has to be used, the date of manufacture and expiry period.
3	Discard the expired biofertilizers as it may not be effective.	Don't prick holes into the bottles or puncture them to pour the content
4	Keep bio-fertilizers away from fertilizer or pesticide containers.	Do not mix the biofertilizers with fungicides, insecticides, herbicides and chemical fertilizers.
5	Mix only compatible bio-inoculants with biofertilizers.	Do not mixed biofertilizers with other biofertilizers or pesticides, directly.

Government policy support and schemes for promotion of biofertilizers:

- Ministry of Agriculture, Department of Agriculture and Cooperation (GoI), New Delhi, vide their order dated 24th March, 2006 included biofertilizers and organic fertilizers under section 3 of the Essential Commodities Act, 1955 (10 of 1955) and in Fertilizer (Control) Order, 1985.
- These rules were further amended in respect of applicability, specifications and testing protocols vide gazette notification at 3 November, 2009 and 3 February, 2017.
- As per the clause 2(h) of ECA "Fertiliser means any substance used or intended to be used as a fertilizer of the soil and/ or crop specified in Part A of Schedule – I and includes a mixture of fertilizer, special mixture of fertilizer, biofertilizers specified in Schedule III, organic fertilizers specified in Schedule IV and non-edible de-oiled cake fertilizers specified in schedule V";
- As per the clause 2(h) of ECA after amendment in 2017, "Fertiliser means any essential substance, either in straight or mixed form and derived from either inorganic, organic or mixed sources, that is used or intended to be used to provide essential plant nutrients or beneficial elements or both for the soil or for the crop or makes essential plant nutrients available to the plants either directly or by biological processes or by both in the soil or plant as notified from time to time by Central Government and specified in the schedules or as may be notified by the State Governments.
- Biofertilizers and organic fertilizers are also covered under the broad term of fertilizers. As per clause 2 (aa) of FCO, 1985, Biofertiliser means the product containing carrier based (solid or liquid) living microorganisms which are agriculturally useful in terms of nitrogen fixation, phosphorus solubilisation or nutrient mobilization, to increase the productivity of the soil and/or crop.
- There is a need in the country to augment the infrastructure for production of quality organic and biological inputs including biofertilizers. Accordingly, National Project on Organic Farming (NPOF) is being implemented by National Centre of Organic Farming (NCOF) Ghaziabad and its eight regional centers at Bangalore, Bhubaneshwar, Panchkula, Ghaziabad, Imphal, Jabalpur, Nagpur and Patna. Besides working for realization of targets under NPOF; NCOF and RCOFs are also performing specific roles in promotion of organic farming.
- Every person including a manufacturer, an importer, a pool handling agency, wholesaler and a retail dealer intending to sell or offer for sale or carrying on the business of selling of fertilizer shall make a Memorandum of Intimation to the Notified Authority, in Form A1 duly filled in, in duplicate, together with the fee prescribed under clause 36 and certificate of source in Form O as prescribed in FCO, 1985.
- Under National Project on Organic Farming (NPOF) a capital investment subsidy scheme for commercial production units for organic/ biological inputs has been introduced. The scheme is being implemented by the Department of Agriculture, Cooperation & Farmers Welfare through National Centre of Organic Farming (NCOF) in collaboration with NABARD or NCDC.
- All Cooperative societies, individuals, NGOs, are eligible to set up biofertilizer production units. New as well as existing units (for expansion/ renovation) engaged in the production are also eligible under the scheme. The details of the scheme are given in National Mission on Sustainable Agriculture (NMSA) guidelines available on http://agricoop.nic.in/guidelines/integrated-nutrient-management.

References:

1. Chandra, K., and Kumar, V.P. 2015. Biofertilizer news letter, National Centre of Organic Farming, Ghaziabad. 23(2): 1-16.
2. http://agricoop.nic.in/Admin_Agricoop/Uploaded_File/Final_guidelines.pdf
3. http://agritech.tnau.ac.in/ta/org_farm/orgfarm_biofertilizertechnology.html
4. http://indiaeng.com/Kaveripakkam/01-Azolla%20water%20plant.htm

5. http://ncof.dacnet.nic.in/
6. http://niphm.gov.in/
7. Mazid, M., and Khan, T.A. 2014. Future of Bio-fertilizers in Indian Agriculture: An Overvie. International Journal of Agricultural and Food Research. 3(3): 10-23.
8. Nalawde, A.A., and Bhalerao, S.A. 2015. Comparative account of effect of biofertilizers on the growth and biochemical parameters of Vigna mungo (L).Hepper. International Journal of Advanced Research in Biological Sciences. 2(2): 55–58.
9. Renuka K. 2013. Biofertilizers: Opportunities and Challenges Published in Arab Fertilizer Associations Magazine, 65: 40-43.
10. Sain, S.K., and Sharma, O.P. 2015. Rhizosphere Engineering for Plant Health Management: Strategy for Sustainable Agriculture. Plant Health News letter, National Institute of Plant Health Menagement. Vol 5(2): p2-7.
11. Singh, S., Singh, B.K., Yadav, S.M. and Gupta, A.K. 2014. Potential of Biofertilizers in Crop Production in Indian Agriculture. American Journal of Plant Nutrition and Fertilization Technology, 4: 33-40.

Around the World: Water resources draft law

Dr. Vidhu Kampurath, JD-PHE

In recent past, water scarcity problems have opened the eyes of most of the country; in which some of them are showing consciousness towards saving the water either by force or by imposing penalties for misusing the water. Egypt is one such country which set the examples towards saving the water. The parliament of Egypt raised the voice and put proposal on "Water resource draft law" to get approve of the Parliament. According to Minister of Agriculture and Land Reclamation, Egypt is suffering a water crisis and that 114 billion cubic meters of water were required to cover the country's agricultural and industrial needs, alongside drinking and home usages. But it suffers from a shortage of water at 54 billion cubic meters after its renewable water sources coming from the Nile River, rain and underground water only reached 60 billion cubic meters.

The minister also explained that Egypt faces numerous water challenges such as limited share of Nile River water, increasing demand for food and steadily increasing population which has recently grown to over 100 million people.

The minister also added that Egypt currently covers shortages of water through the reuse of agricultural drainage water reaching up to 20 billion cubic meters, accounting for 33% of the total renewable water. The country needs 34 billion cubic meters to produce food instead of importing them.

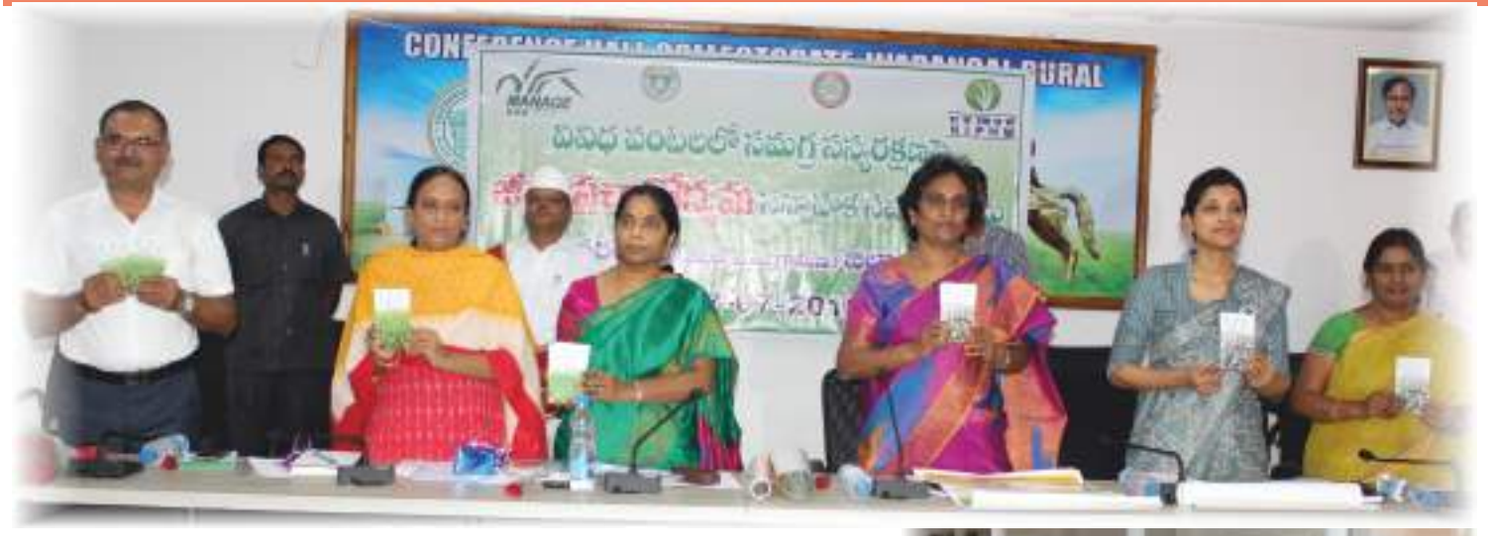
In the view of above, Egypt have taken a very serious action to make water available for survival.

- The most important feature of this law will be, intensifying the penalties on misusing water resources, including imprisonment
- Maximize the utilization of available water resources by taking the necessary measures to achieve water security such as banning encroachments on the Nile River.
- The draft law will enhance the possibility of developing an irrigation system all over Egypt
- The draft law also includes firm regulations for coastal protection.

(Source: Egypt today, Sat, Sep. 15, 2018)

We are a country where floods and drought always affect one or the other parts of the nation every year. Though technology is available, we are reluctant to absorb and practice ways and means to conserve water. We will be answerable to our own children for this over exploitation of resources. Be vigil and respond earlier….

Special Events: Inauguration of Jeep Campaigning



A meeting was held at Warangal in connection with the inauguration of Jeep Campaigning and on farm production of Bio agents unit at village level on 27.07.18. This meeting was attended by Smt. G. Jayalakshmi, IAS (DG, NIPHM), Smt. V. Usha Rani, IAS (DG, MANAGE), Smt. Amrapali Kata IAS (Warangal Urban Disctrict Collector), Smt. M. Haritha, IAS (Warangal Rural District Collector) and Dr. CH. Sreenivasa Rao, Director-PHM, NIPHM etc. The jeep campaigning was started at Warangal Rural and Urban districts covering the villages like Shayampet, Pathipaka, Hussainpally, Vasanthapur etc on this occasion nine posters and three books were also inaugurated. On farm production units were started at five villages namely, Relakunta, Murcherla, Nallabelli, Shambunnipalli and Varikole.

Workshop cum Training Programme on Plant Biosecurity

Plant Biosecurity is a growing field which deals with plant pests which impact on food security, trade, and market access, ultimately, the profitability and sustainability of agriculture and allied sectors. It is a strategic and integrated approach that encompasses the policy and regulatory frameworks for analysing and managing the risks to plant health including forests. The vast diversity in climate and cultivation of different type of crops offer tremendous opportunities for India to export. India is relatively free from many pests and diseases. The recent incursion of tomato pin worm (*Tuta absoluta*), rugose spiralling whitefly (*Aleurodicus rugioperculatus*) and litchi longhorn beetle (*Aristobia reticulator*) not only affecting the crop but also indirectly affecting the export.

Two days training cum workshop was conducted during 30th and 31st August, 2018 to create awareness about the potential threats to India, analyse the pathway of exotic pests, alien invasive species and their impacts, SPS issues and emergency preparedness measures for introduced pests.

Fruit Fly Management in Date Palm

One day training programme was organised to the date palm farmers on Fruit Fly Management at Jamanagar, Gujarat, on 13.07.2018. The programme was held at KVK, Jamnagar in collaboration with Krishi Vigyan Kendra, Jamanagar Gujarat. Date Palm growing farmers in the area are facing the problem in managing the Fruit Flies. Keeping this in view the farmers from date palm growing areas were selected by Dr. K.P. Baraiya, Principal Scientist, KVK, Jamnagar, Gujarat and organized one day farmer training on fruit fly management at KVK, Jamnagar. The programme was inaugurated by Dr. A. R. Pathak, Vice-Chancellor of Jungadh Agricultural University. The Director (Extension) and Director (Research) from JNU were also present during the training programme. Shri. A. Mariadoss AD (RPM) explained the farmers on the diversity, biology and nature of damage caused by the fruit flies in the date palm and other crops and demonstrated the preparation of the low cost bottle trap and fruit fly lures to the farmers.

Workshop on 'Organic Farming and Farmers Producer Organizations (FPOs)- A way forward'

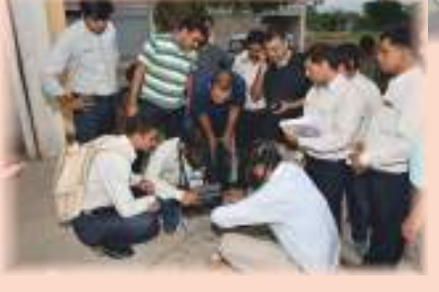
In view of vital role of Farmers Producer Organizations (FPOs) in promoting organic farming, a National Level Workshop on 'Organic Farming and Farmers Producer Organizations (FPOs)-A way forward" was organized at NIPHM on 4.9.2018. The workshop was inaugurated by Smt. G Jayalakshmi, IAS DG , NIPHM and attended by 131 participants and resource persons representing FPOs, organic growers, exporters, etc The workshop has provided a common platform to different stakeholders to provide information on government schemes and support to FPOs, to share their knowledge and discuss problems to help in making policies by Government of India. Dr.L. Jalapathi rao, Ex Registrar ANGRAU, Shri Vijay Kumar, CGM, NABARD TS, Sri. C. Udayabhaskar, GM, NABARD, Shri Pudi Thirupathi Rao GC Member NIPHM, Shri Ayangari Surendra Reddy EC Member NIPHM, Dr. Radhika Rani, Prof. NIRD&PR, Smt. Rama Lakshmi NABARD AP, Dr. K. Keshavulu, Director, Telangana State Organic Certification Authority (TSOCA), Dr.Ch. Srinivas Rao, Director, NIPHM, Dr OP Sharma, Joint Dir NIPHM, Dr Praveen Kumar, NCOF also addressed the audience during deliberations and technical sessions.

Capacity Building Training Programmes on Plant Biosecurity

The exponential expansion of trade and the speed at which the agricultural products are moving around the globe, coupled with the removal of quantity restrictions in post-WTO era, the chance of any pests to move to hitherto unrecorded areas are high. Concern about the exotic and invasive pests is well reflected in the World Trade Organization (WTO)'s Agreement on Sanitary and Phytosanitary Measures, International Plant Protection Convention and Convention on Biological Diversity. The division has organized following training programmes during the month of July to September, 2018.

Sl. No	Name of the Programme	Duration (Days)	Date	
			From	To
1	Plant Quarantine National Regulations and Producers	5 Days	02.07.2018	06.07.2018
2	Plant Quarantine Regulations Import and Export	5 Days	02.07.2018	06.07.2018
3	Pest Surveillance	5 Days	16.07.2018	20.07.2018
4	Customized Training Programme on Stored Grain Pest Management for FCI Quality Control Officials	5 Days	16.07.2018	20.07.2018
5	Orientation Training Programme for Phytosanitary Issuing Authorities	5 Days	23.07.2018	27.07.2018
6	Customized Training Programme on Stored Grain Pest Management for FCI Quality Control Officials	5 Days	30.07.2018	03.08.2018
7	Customized Training Programme on Stored Grain Pest Management for FCI Quality Control Officials	5 Days	06.08.2018	10.08.2018
8	Special programme for rentokil PCI Officials (Methyl bromide & Phosphine fumigation)	15 Days	06.08.2018	20.08.2018
9	Forced Hot Air Treatment	5 Days	27.08.2018	31.08.2018
10	Workshop cum training programme on Plant Biosecurity	2 Days	30.08.2018	31.08.2018
11	Stored grain pest detection, identification and management	5 Days	10.09.2018	14.09.2018
12	Phytosanitary Treatments (MBr & AlP)	15 Days	17.09.2018	01.09.2018
13	Quarantine pathogens: Seed health testing and molecular techniques	5 Days	24.09.2018	28.07.2018
14	Rodent Pest Management in store houses of food grains	5 Days	02.07.2018	06.07.2018
15	Urban Integrated Pest Management (UIPM)	15 Days	30.07.2018	13.08.2018
16	Rodent Pest Management	5 Days	24.09.2018	28.09.2018



Capacity Building Training Programmes on Plant Health Management

Plant Health Management is considered to have immense importance when crop production is concerned. It involves the eco-friendly pest management practices giving great importance to augmentation and conservation of biocontrol agents and use of biofertilizers. In addition to the insect and disease management, much focus is also given to the techniques practiced for the suppression of weeds also. The training programs organized by the division are framed to include various bio intensive pest management strategies for sustainable agriculture.

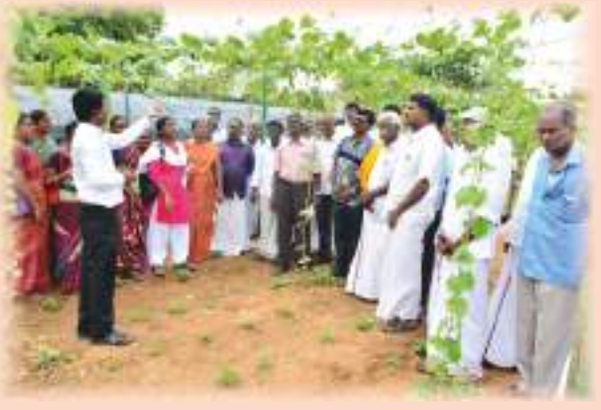
The following training programs were organized during July to September, 2018.

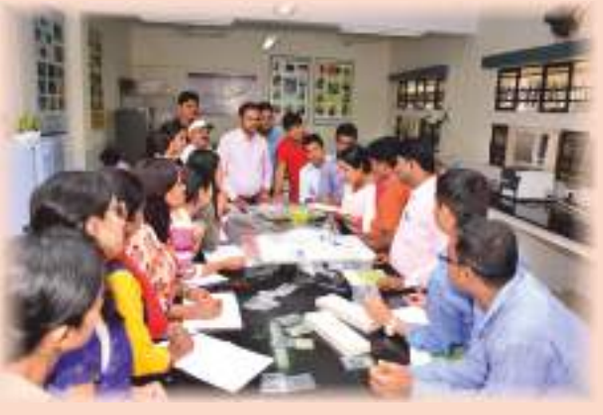
Sl. No	Name of the Programme	Duration (Days)	Date	
			From	To
Officials				
1.	Training to Pest monitors on field diagnosis for IPM under CROPSAP	5 Days	02.07.2018	06.07.2018
2.	Pest surveillance and Integrated Pest Management practices in FCV tobacco' for tobacco officials	5 Days	02.07.2018	06.07.2018
3.	Advances in Integrated Weed Management	3 Days	16.07.2018	18.07.2018
4.	Introduction to Entomopathogenic nematodes	3 Days	23.07.2018	25.07.2018
5.	Pest surveillance and Integrated Pest Management practices in FCV tobacco' for tobacco officials	5 Days	23.07.2018	27.07.2018
6.	Ecologically sustainable technologies for Plant Health Management	5 Days	06.08.2018	10.08.2018
7.	Induction training program 'Integrated Pest Management' for DPPQ&S officials	21 Days	23.08.2018	12.09.2018
8.	Farmers Field School Methodology	5 Days	27.08.2018	31.08.2018
9.	On farm production of biocontrol agents and microbial biopesticides	10 Days	17.09.2018	26.09.2018

Capacity Building Training Programmes on Plant Health Management

The following farmers training programmes were also organised during July to September, 2018.

Sl. No	Name of The Programme	Duration (Days)	Date	
			From	To
Farmers				
1.	On farm production of biocontrol agents under ATMA-SSEPRSfarmers of Tamil Nadu	3 Days	04.07.2018	06.07.2018
2.	On farm production of bio control agents and microbial biopesticides	3 Days	09.07. 2018	11.07. 2018
3.	On farm production of biocontrol agents under ATMA-SSEPRSfarmers of Tamil Nadu	3 Days	01.08. 2018	03.08. 2018
4.	On farm production of biocontrol agents under ATMA-SSEPRSfarmers of Tamil Nadu	3 Days	29.08. 2018	31.08. 2018
5.	Training program on Organic farming	1 Day	05.09. 2018	
6.	On farm production of biocontrol agents under ATMA-SSEPRSfarmers of Tamil Nadu	3 Days	05.09. 2018	07.09.18
7.	On farm production of bio control agents and microbial biopesticides	3 Days	17.09. 2018	19.09.18
Off-Campus				
1.	On farm production of biocontrol agents for the farmers of Akola, Maharashtra	2 Days	06.08. 2018	07.08.18
2.	Application of biopesticides, Trichoderma and Pseudomonas fluorescens in nursey and main fields of Tobacco for the farmers of Koyyalagudem, Jangareddy - gudem, Devaarapalli and Gopalapuram of Karnataka	2 Days	16.08. 2018	17.08.18





Capacity Building Training Programmes on Pesticide Management

The Pesticide Management Division continuously makes efforts to organize various capacity building programs in order to provide awareness among all the stakeholders on the use of pesticides besides conducting the mandated training programs viz. Pesticide Formulation Analysis, Inspection, Sampling and Prosecution Procedures under Insecticide Act, 1968 etc. for the extension officials of State and central Agriculture departments so that the use of Pesticides can be reduced significantly.

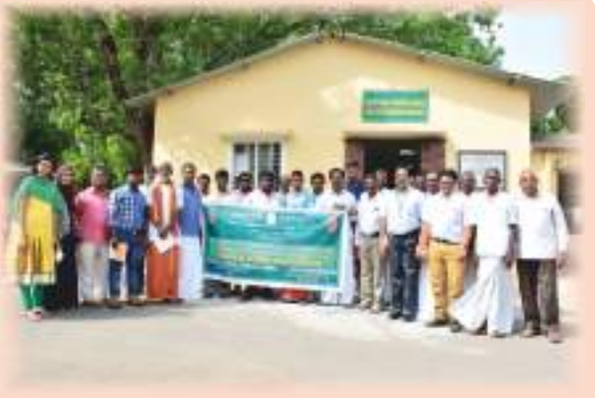
The following training programs were conducted during July to September, 2018.

Sl. No	Name of The Programme	Duration (Days)	Date	
			From	To
1	ISO / IEC 17025: 2017	1	11.07.2018	
2	Laboratory Quality System Management and Internal Audit as per ISO/IEC17025:2017	5	23.07.2018	27.07.2018
3	Inspection, Sampling and Prosecution Procedures under Insecticide Act, 1968 (ISPP)	5	24.09.2018	28.09.2018

Capacity Building Training Programmes on Plant Health Engineering

Application of pesticides continues to play a significant role in reducing crop losses due to pests even under IPM as a last resort. The success of pest management operations depends on proper technique of application of pesticide and the equipment used. Selecting the right equipment for pesticide application is vital for successful pest control to ensure safe and judicious use of pesticides. In view of this, Plant Health Engineering Division organized following training programmes during July to September, 2018:

Sl. No	Name of The Programme	Duration (Days)	Date	
			From	To
1.	Training on Pesticide Application Techniques and Safety Measures	5 Days	16.07.2018	20.07.2018
2.	In-plant training for B. Tech Agricultural Engineering students	120 Days	01.07.2018	30.10.2018
3.	Pesticide application Techniques and Safety Measures	2 Days	30.08.2018	31.08.2018
4.	Micro Irrigation (Efficient utilization of water)	2 Days	31.07.2018	01.08.2018
5.	Pesticide Application Techniques and Safety Measures	1 Days	18.09.2018	



Farmers training on Rodent Pest Management at Ambajipeta

One day off-campus training programme on Rodent Pest management in Rice ecosystem was organised at Ambajipeta, East Godavari District, Andhra Pradesh on 25.08.2018 to the farmers. The programme was organised in collaboration with Department of Agriculture, Andhra Pradesh. Total 94 farmers who are growing paddy, Cocoa and Coconut were attended from the selected mandal. NIPHM Scientist explained the farmers on the ethology of rodents in Agricultural crops, storage places and houses; different species of rodents; damages and diseases caused by them; procedure of poison bait preparation, application; importance of bait stations; effective management of rodents by following integrated approaches; use of local butta trap on rodent control and hands on training in operating the trap and also a practical demonstration was given to farmers.

Off campus training programme on Rodent Pest Management at Tripura

A 5 days training on Vertebrate Pest Management (off-campus mode) was organised to Tripura State Govt. Officials at KVK, Khowai, West Tripura from 27.08.18 to 31.08.18. A total of 20 officials were attended the training from the officials of State department of agriculture, subject matter specialist and scientists from the Tripura state. The training was given on theory and practicals on identification of live and preserved specimen of different rodent species, gadgets for rodent management, poison bait preparation, field visit to damage paddy field for study on damage pattern, burrow structure and population assessment etc.

12th Annual workshop on "Monitoring of Pesticide Residues at National Level" (MPRNL)

The 12th Annual workshop of the central sector scheme "Monitoring of Pesticide Residues at National Level" (MPRNL) was organized on 12th July, 2018. Smt. G. Jayalakshmi, Director General, NIPHM, Dr. P. K. Chakrabarty, ADG (Plant Protection & Biosafety), Dr. K. K. Sharma, Member Secretary, MPRNL and Shri. Rajesh Malik, Director, DAC&FW, were present among the members. During the inauguration, the Director General, NIPHM was stressed upon the importance of collection of farm gate samples which helps in mapping the pesticide residues in various commodities and expressed her concern over the presence of heavy metals in vegetables.

The DAC, Ministry of Agriculture monitors the presence and levels of pesticide residues in food commodities and environmental samples under the central sector scheme, "Monitoring of Pesticide Residues at National Level". The scheme was initiated during the 2005-06 and is being implemented through Indian Agricultural Research Institute, New

Delhi since then in association with participating laboratories. NIPHM is one of the participating centers under the above said scheme.

Dr. K.K. Sharma, Member Secretary, MPRNL has presented the salient findings and the significant achievements of the MPRNL scheme for the year 2018-19. The forum opened for discussions on the issues related to the sample collection, sample analysis and reporting formats etc. during the technical session through interaction with participating laboratories.

ISO/IEC 17025:2017

A One day training program on ISO/IEC 17025:2017 was organized on 11.07.2018 and a total 93 participants from different centers of the MPRNL project, Department of Agriculture, Cooperation & Farmers Welfare, ICAR headquarters etc. were participated. The program was inaugurated by Smt. G. Jayalakshmi, IAS, Director General, NIPHM. Dr. K. K. Sharma, Member Secretary, MPRNL, Dr. Randeep Singh Saini, MD, Green Economy Initiative Pvt. Ltd. was also present in the program.

Training Programme on "Plant Quarantine National Regulations and Procedures" at SKUAST, J&K

NIPHM Officials has delivered lectures in three days training programme on "Plant quarantine National Regulations and procedures" organized in collaboration with SKUAST, Shalimar, Jammu & Kashmir during 18th-20th September 2018. Twenty two participants from Dept. of Horticulture, Agriculture, Scientists and Private industry representatives, PG and Ph.D. students of SKUAST, Shalimar were attended the programme. PBD faculty have trained the participants on various topics regarding – "Plant biosecurity concept, National regulations, Plant quarantine procedures in India and import and export procedures" and also interacted with the participants regarding different issues of plant quarantine measures, quality standards for import and exports.

Training programme on " Rodent Pest management" at Jammu & Kashmir

As the rodents are the major problem in Apple orchards and causing severe damage to the fruits at the time of maturity a training programme on Rodent Pest Management (Off campus) was conducted in Kurhama and Kashnambal villages of Ganderbal district of Jammu & Kashmir in collaboration with KVK, Ganderbal on 18.10.2018. Scientist from NIPHM has explained about the rodent management practices to the local Kashmiri farmers and demonstrated the poison baiting with Bromodialone cake. About 20 farmers, Subject matter specialist, Extension personnel and RAWE students participated in the training.

Exhibition

NIPHM always plays proactive role and participates in exhibitions to showcase and popularize the low cost technologies for sustainable agriculture. Recently, NIPHM participated in the International Agri Horti Expo held at Pragati Maidan, New Delhi from 27th to 29th July, 2018 and Udyana 2018 conducted by Horticulture department Andhra Pradesh from 23rd to 26th August, 2018 at V R Siddhartha Engineering College Grounds, Kanuru, Vijayawada, Andhra Pradesh. Dr. OP Sharma (JD Agro), Mrs. Lavanya N (SO-BP&BC), Dr. Sunanda (ASO-ematology) and Dr. G. Bindu Madhavi AD (H&F) and Dr. M. Narsi Reddy, ASO have participated respectively.

NIPHM Alumni: Success story by DPHM student

Dear Sir,

I was a student of Diploma 7th batch this year, Hope you remember me, here I am very happy to share my experience about 6 month Diploma in Plant Health Management with specialization in Plant Biosecurity-

Name- Panchalee Basu
Address- West Bengal (Currently working in Bangalore)
Company- Indo Gulf Pest Control Pvt. Ltd.
Job Designation- Customer Relation Executive
Job Role- Mainly Handling Pest Control Operation, Customer Relation & Business Development in South Region.

How Helpful DPHM Was- I have done 6 months DPHM course in NIPHM & which was one of the memorable experience in my whole academic life.

From teaching faculty to non teaching faculty everybody was very supportive and friendly.
We got amazing experience in field closer to the farmers. Continuous practical classes made us interested towards subject & theory classes handled by experienced professors helped us a lot to understand the subject from core.
NIPHM is a great place where we continuously learnt about new technology to improve our agriculture systems & where we learnt mainly sustainable agriculture.
Continuous class presentation helped us building confident and helped us becoming presentable.
Amazing campus with sports facility also gave us joy.

I also did Phytosanitary Treatment Course which was very helpful and job oriented.
I got job immediately within few days only because of this course.
Thanking all the faculty members, my best friends and all members from NIPHM.

Best Regards
Panchalee Basu.

'Swachhta Hi Sewa' campaign

National Institute of Plant Health Management (NIPHM), Hyderabad has observed "Swachhta Hi Sewa" campaign from 15th September to 2nd October, 2018. The Campaign was flagged off by Ms. G. Jayalakshmi, IAS, Director General, NIPHM on 17.09.2018 by undertaking the Cleanliness drive leading all the officers, staff and trainees. Four (04) awareness programmes were organised on subjects "Waste decomposition mechanism", "De-centralized Solid Waste Management", "Safe Use of Pesticides", "Pesticide Management" in nearby villages for the benefit of farmers. Further guest lecture on "Waste Management" was delivered by expert from NIRD & PR. During the fortnight extensive cleaning activity has been taken up both in NIPHM Office premises and NIPHM Residential Quarters, like cleaning of laboratories, Water tanks cleaning, files weeding, tree Plantation etc. Certain Competitions such as Elocution, Essay writing, painting & Slogan writing were conducted among the staff & participants so as to spread the awareness of Swachhta.



The following programmes have been organized at various villages:

- Awareness Programme on "Waste Decomposition Mechanism" organized by PHM division in village Burjugadda Shamshabad (Hyderabad) on 18-9-2018.
- Awareness Programme on "Safe Use of Pesticides" and " Pesticide Management " organized by PHE and PMD divisions respectively in Ummethyal village, Kondurg Mandal, Mahboobnagar Distt., Telangana on 26-9-2018.
- Sensitization drive on "De-centralized Solid Waste Management" at Shamshabad Vegetable Market, Hyderabad on 27-9-2018.
- Dr. R Ramesh, Associate Professor, NIRD, Rajendra Nagar, Hyderabad has delivered a lecture on Household waste management to NIPHM staff on 1.10.2018








Meeting of the Executive Council of NIPHM

The 22nd Meeting of the Executive Council of NIPHM was convened on 17-08-2018 under the Chairmanship of Shri. Jalaj Shrivastava, IAS, Additional Secretary (AC&FW) Ministry of Agriculture, Cooperation & Farmers Welfare, Govt. of India. The other EC members Dr. D D K Sharma, PPA, DPPQ&S and non-official member Shri. Mohini Mohan Mishra have attended the meeting.

तकनीकी शब्दावली

Agro-ecosystem Analysis	:	कृषि-पारिस्थितिकी तंत्र विश्लेषण
Agricultural Engineering	:	कृषि अभियांत्रिकी
Beneficial insects	:	फायदेमंद कीट
Biological Control	:	जैविक नियंत्रण
Biosecurity	:	जैव सुरक्षा
Biopesticide	:	जैव कीटनाशक
Ecological Engineering	:	पारिस्थितिक अभियांत्रिकी
Fermentation	:	किण्वन / खमीर
Fumigation	:	धूमन
Gas chromatography	:	गैस वर्णलेखन

NIPHM Alumni

During the valedictory of the training programme on "Role on AESA and Ecological Engineering in Pest Management" a trainee participant gave feedback and talked about NIPHM campus and facilities available for the trainees. She quoted a line in hindi and praised the institute activities towards the sustainable agriculture. The quote is as below -

"जो पहाडो से टकराये उसे तूफान कहते है,
और जो तुफानो से टकराये उसे NIPHM कहते है"

Plant Health
News Letter

Independence Day

The 72nd Independence Day has been celebrated at NIPHM on 15-08-2018. Ms. G Jayalakshmi, I.A.S, Director General, NIPHM has hoisted the National Flag. While addressing the gathering, DG, NIPHM has urged all the staff of NIPHM to work with more dedication for upliftment of farming community in India and promoting sustainable agricultural practices.

एनआईपीएचएम में राजभाषा हिंदी के क्रियान्वयन से संबंधित क्रियाकलाप

राजभाषा कार्यान्यवन समिति (राकास) की द्वितीय बैठक वर्ष 2018-19 हेतु दिनांक 30-08-2018 को श्रीमती जी.जयलक्ष्मी, भा.प्र.से., महानिदेशक, एनआईपीएचएम की अध्यक्षता में आयोजित हुई। बैठक में महानिदेशक के समक्ष अप्रैल-जून, २०१८ की तिमाही हिंदी प्रगति रिपोर्ट प्रस्तुत की गई। उन्होंने उक्त रिपोर्ट की समीक्षा करते हुए संस्थान में राजभाषा अधिनियम की धारा 3(3) के पूर्णत: अनुपालन किये जाने के निदेश दिये। साथ ही उन्होंने बैठक की कार्यसूची एवं कार्यवृत्त द्विभाषी में करने हेतु निदेश दिये ।

एनआईपीएचएम में दिनांक 31-08-2018से 14-09-2018 तक की अवधि के दौरान हिंदी पखवाड़ा का आयोजन किया गया। संस्थान में हिंदी को बढ़ावा देने तथा अधिकारियों एवं कर्मचारियों में हिंदी के प्रति रूचि सृजित करने के उद्देश्य से इस पखवाड़े के दौरान विभिन्न हिंदी प्रतियोगिताएं जैसे : हिंदी निबंध लेखन प्रतियोगिता, वाक् प्रतियोगिता, हिंदी टंकण प्रतियोगिता, प्रशासनिक शब्दावली एवं देशभक्ति गीत प्रतियोगिता आयोजित की गई। दिनांक 14-09-2018 को श्रीमती जी. जयलक्ष्मी, भा.प्र.से., महानिदेशक, एनआईपीएचएम की अध्यक्षता में 'हिंदी दिवस एवं पुरस्कार वितरण समारोह' मनाया गया। इस अवसर पर उन्होंने अपने कर-कमलों से प्रतियोगिताओं में सफल प्रतिभागियों को नकद पुरस्कार एवं प्रमाणपत्र वितरित किया। अतिथि वक्ता डॉ. महेश कुमार, तकनीकी हिंदी अधिकारी, भारतीय कदन्न अनुसंधान संस्थान-हैदराबाद ने कहा कि अब कर्मचारी यूनिकोड के अलावा सीधे कंम्प्यूटर पर बोल कर यानी वॉयस टाइपिंग माध्यम से हिंदी में काम कर सकते हैं और जहां आवश्यक हो, उसमें सुधार कर सकते हैं।

संस्थान में दिनांक 05-09-2018 को एक दिवसीय हिंदी कार्यशाला का आयोजन किया गया। कार्यशाला के अतिथि वक्ता डॉ. संतराम यादव, सहायक निदेशक, क्रीडा-हैदराबाद ने राजभाषा हिंदी के नीति, नियम एवं केंद्रीय सरकारी कर्मचारियों को राजभाषा हिंदी के प्रति उत्तरदायित्व के बारे में विस्तापूर्वक जानकारी दी।

Chief Editor
Smt. G. Jayalakshmi, IAS, DG
Executive Editor
Dr. Ch. Sreenivasa Rao, Director-PM
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