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Amrit Mahotsav



ICAR-National Bureau of Agricultural Insect Resources

Consolidated report of TSP, SCSP, NEH (2019-22)



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NEH Programme

1. Title

Capacity building on Biological control in North Eastern Hill regions

2. Challenge

The selected tribal areas in NEH regions are regions where agriculture is practised without heavy reliance on chemical pesticides and empowering the subject matter specialists and the agriculture faculties on various aspects of biological control will go a long way in popularising biological control in these areas. Since most of the crops are organically grown, there was a need to create awareness on biological control in these areas. Hand holding of the small scale farmers and also the agriculture department officials in the mass production of biocontrol agents will help in sustainable pest management in the region and also pave way for establishing and promoting organic farming to more areas. Keeping in view of the scope for creating awareness on the importance of biological control and also to educate them about various mass production methods of biocontrol agents, ICAR-NBAIR organised various training programmes to disseminate the expertise, knowledge and skills related to biological control for the benefit of farmers, KVK personnel and entrepreneurs of the NEH region during 2019-20.

3. Initiative

ICAR-NBAIR took several initiatives for the promotion of biological control in NEH regions and also in the skill development of the agricultural officials including subject matter specialists, assistant professors, block and assistant technology managers etc. who are quintessential in making the farmers in the region aware and educated about the scope and benefits of biological control. The initiatives undertaken are as follows.

1. Trainers' Training: Biocontrol Training programme for officers of the NEH region

NBAIR organised a training programme on “Biological control and compatible pest management modules for management of major pests in NEH region with emphasis on Fall Armyworm” in three batches, viz. 19–23 August, 16–20 September and 14–18 October 2019. Twenty-nine participants employed as Subject Matter Specialists (Plant Protection), Assistant Professors, Block and Assistant Technology Managers, entomologists, pathologists and nematologists from Assam, Manipur, Arunachal Pradesh, Meghalaya, Sikkim and Tripura participated in the training. The participants were trained on mass production of various biocontrol agents that have relevance to their region. Special attention was given to expose them to strategies for management of the invasive fall armyworm (FAW), *Spodoptera frugiperda*. The trainees were also taken to FAW infested fields in Chikkaballapura, Karnataka to see the nature of damage by this pest.

2. Hands-on Training Workshop cum input distribution for empowerment of NEH farmers and KVK personnel

a. Imphal, Manipur

ICAR-NBAIR in collaboration with Directorate of Extension Education, Central Agricultural University, Imphal organized a two day workshop on “Biological control of crop pests & invasives and utilization of insects as food in North East Region of India” during February 25–26, 2020 at College of Agriculture, CAU, Iroisemba, Imphal. Keeping in view the

geo-graphical importance of NEH region, the workshop specially addressed the awareness and sensitization of farming community, KVK officials, State and AICRP personnels for the importance of invasive pests that have entered in to India (Fall army worm, *Tuta absoluta*, rugose spiralling white fly, papaya mealybug etc.).

b. Umiam, Meghalaya

ICAR-NBAIR and Directorate of Extension Education, Central Agricultural University (CAU), Imphal, Manipur jointly organized a two days workshop on “Biocontrol of crop pests & invasives and utilization of insects as food in North East Region of India” during 6–7 March, 2020 at College of Post Graduate Studies in Agricultural Sciences, Umiam, Meghalaya. There were four technical sessions and 15 lectures which were delivered by the highly experienced resource persons from NBAIR, Bengaluru and CPGSAS, Umiam. Competition on Poster Presentation was also arranged and 6 winners (3 farmers and 3 scientists) were awarded with trophies and cash prizes. Besides, farm inputs like sprayers, neem based insecticides were distributed to the progressive farmers.

3. State level training programme on scientific management of FAW in maize

ICAR-NBAIR in collaboration with Department of Agriculture, Govt. of Mizoram, ICAR-IIMR Ludhiana and ICAR RC on NEH Mizoram centre organized a “State level training programme on scientific management of FAW in maize” at SAMETI Hall, Aizawal. A total of 120 personnel from KVKs, Mizoram State Department of Agriculture, ATMA, YMA and CIPMC Mizoram participated in the training. Participants visited two maize fields under Jhum cultivation in Durtlang hills for practical demonstration on FAW monitoring using pheromone traps. The State Department of Agriculture, Mizoram officials were provided with nucleus cultures of parasitoids, predators and microbial agents to be multiplied and supplied to meet the farmers’ demand for FAW management.

4. Key result/insight/interesting fact

1. Establishment of Biological Control Laboratory in NEH region: Established first of its kind, Biological Control Laboratory in NEH region by ICAR-NBAIR in collaboration with COA, CAU, Imphal, Manipur, under NBAIR’s NEH funds.

2. Mobile Apps: A Mobile App was developed for the management of invasive pest, Fall Army Worm in maize crop and is named as BIPM ON FAW – NE (IND). This mobile app was developed in English, Hindi and in North-Eastern languages like Bengali, Assamese, Nagamese, Manipuri, Khasi and Sikkimism. The app provides detailed description on the biology, nature of damage and the management strategies involving the bio-intensive methods. This mobile application is free and the download version is available in the Google Play Store and the hyper link is at: https://play.google.com/store/apps/details?id=com.companynname.bipm_on_faw

3. Training Manuals: Three Training Manuals on “Biological Control and Compatible Pest Management Modules for Management of Major Pests in NEH Region with Emphasis on Fall Armyworm” were made and distributed to the participants of the Trainers’ Training Programme.

5. Impact

The workshops and the Trainers’ Training Programme facilitated in promoting the use of biological control for the sustainable management of crop pests with special reference to invasive crop pests in order to minimize the use of synthetic pesticides, promote natural fauna of

the region for biological control and provide awareness of entrepreneurship among farming community of NEH. The workshops further succeeded in addressing the promotion of insect resources as food and feed for domestic livestock (fish and poultry) besides use of insects in safer disposal of farm and kitchen organic waste in the region. The selected areas being known for its resource-poor farming will benefit from the adoption of biological control which can lead to sustainable agriculture and will pave the way for organic agriculture and spread of the same to wider areas. Through the capacity building programmes, the tribal farmers were made aware of the available opportunities for adoption of biological control, and also facilitated skill development in mass production techniques.

Promotion of private entrepreneurship in NEH region

Further, ICAR-NBAIR along with CAU, Imphal provided technical guidance for development of a company spearheaded by a lady entrepreneur, “*Green Biotech EcoSolutions Pvt. Ltd*” at Imphal, Manipur. They have started production of many biopesticides like green mealkil, green Tricho, green racer and green focus.

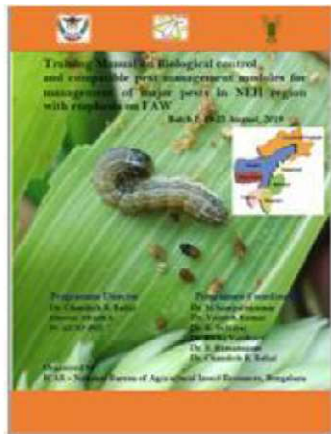
6. Lessons learned

The lack of a well-established biocontrol laboratory was another challenge which was identified during the capacity building programmes. This was addressed by establishing a first of kind, Biocontrol Laboratory in Imphal, Manipur.

One of the challenges faced in the training for the management of FAW was that it was observed that the farmers predominantly cultivate land races and composites, which are inherently heterogenous and less vigorous. The heterogenous population inherently having variation in terms of crop growth are found to be probably more vulnerable to pest damage. So the farmers were sensitized about the conservation of existing indigenous natural enemies, utilisation of pheromone traps for monitoring and mass trapping and mass multiplication and utilisation of biocontrol agents.



7. Supporting quotes and images



Publications and training manuals



Release of manuals by dignitaries for NEH farmers and trainers





Demonstration on use of Pheromone for monitoring and mass trapping FAW



8. Additional information

Budget – Rs. 17.52 lakhs (2019-20)

SCSP Programme

1. Title

Skill development training and input distribution on Indian honey bee, *Apis cerana indica* and stingless bee, *Tetragonula iridipennis* keeping for the SCSP farmers at Tamil Nadu

2. Challenge

Stingless bees keeping called as Meliponiculture is a promising agribusiness venture in many parts of India as the honey produced by stingless bees were reported to possess therapeutic and healing properties and have pharmacological value. Since the honey produced from stingless bee keeping claims to have medicinal property, they were marketed at a premium price in the market compared to the honey produced from Indian honeybees. These bees can be easily domesticated and managed for pollination and yield enhancement of many economically important crops. The cultivation of stingless bees in different structures viz., mud pots, arecanut culms, bamboo culms and box hives were standardized under Indian conditions. Significantly Indian honey bee keeping is already an established venture in many parts of Tamil Nadu with many farmers undertaken it on a commercial scale, **stingless bee keeping is still in a juvenile stage of development.** Keeping in view of the objective of additional income generation with alternative and safe entrepreneurial activity for rural artisans of SCSP community, ICAR-NBAIR has designed a skill development training and hand holding on stingless bee keeping.

3. Initiative

ICAR-NBAIR in collaboration with ICAR-ATARI Hyderabad had identified Krishi Vigyan Kendra, Gobichettipalayam, Erode district, Tamil Nadu for the promotion of stingless bee keeping to uplift the livelihood of 100 SCSP farmers in the aspirational villages of Erode district of Tamil Nadu.

Two skill development training programmes were conducted as given below

1. On 17th February 2022, hands on training on stingless bee keeping was given to 50 participants (SC Male: 15 SC Female: 35) at KVK Gobichettipalayam. A brief lecture on honey bees and stingless bee keeping was given to the participants. Stingless bee colony maintenance for high value honey production was explained to the participants. The domestication techniques of stingless bees and benefits of stingless bee keeping was explained to the farmers. Different hive designs for domestication and hive architecture of stingless bees were displayed to the participants. During the programme, handbook of bee keeping techniques and leaflet on stingless bee promotion were released for the benefit of the farming communities. The training programme was covered in newspaper media.
2. On 18th February 2022, hands on training on stingless bee keeping was given to 50 participants (SC Male: 10 SC Female: 40) at Thattachankaraivazhi village, Chennimalai Block, Erode district, Tamil Nadu. The participants were trained to identify the natural nesting sites of stingless bees and educated to hive the colonies in rectangular box hives for multiplication. Inputs viz., honey bee and stingless bee colonies, honey bee boxes, honey extractor and other accessories for bee keeping was distributed to the participants. Exhibits on value added products in honey were showcased to the participants during the programme.

3. Hand holding

A WhatsApp group was formed to monitor and address the issues related to the development of colony of stingless bees where in the farmers were trained for hiving the feral colonies as well and maintaining them in box hives through voice messages.

4.Key result/insight/interesting fact

For the first time, through this training and hand holding programme, the concept of stingless bee keeping was introduced to the farmers which was a skill based vital intervention made in the established Indian bee keeping hub of Erode district in Tamil Nadu.

5.Impact

Currently all 50 units with 50 farmers are established and surviving with good health. Several other farmers were interested to take up, which in due course shall make it a viable tangible income generation activity through a regular market network. The farmers who were undertaking Indian honeybee keeping gained diversification towards stingless bee keeping by understanding the feasibility for easier domestication and enhance value in income through stingless bee keeping. Currently the bee behaviour and their role in enhancing the pollination/crop productivity are being examined.

6. Lessons learnt

- Colony availability is season-based and hence farmers were trained for hiving of natural colonies of stingless bees and multiplication of the colonies.
- This needs a scale up activity through adoption of villages and larger areas.

7. Supporting quotes and Images





8. Additional information

Budget – Rs. 10 lakhs

Number of SCSP beneficiaries covered – 150

Farmers in Erode encouraged to take up stingless beekeeping

STAFF REPORTER
ERODE

With honey produced by stingless bees said to have high nutritional and therapeutic value, farmers in the district were encouraged to take up beekeeping for a sustainable income.

The ICAR - Krishi Vigyan Kendra, MYRADA, Erode District, ICAR - Agricultural Technology Application Research Institute, Hyderabad, Zone X, and ICAR - National Bureau of Agricultural Insect Resources (NBAIR), Bengaluru, jointly conducted a skill oriented training for the promotion of stingless bee colonies for the benefit of farming communities in Gobichettipalayam, Chennimalai and Bargur hills recently. A total of 150 farmers participated and they were provided with stingless bee colonies with all accessories to develop in the large scale adoption.

P. Alagesan, senior scientist and head, ICAR-KVK, MYRADA, said that agriculture and its allied ac-



Farmers being trained in stingless beekeeping at Gobichettipalayam.

tivities such as livestock management and poultry farming played a vital role in sustaining the income of farming community. Though agriculture provided income to the farming community, it heavily depended on successful onset of monsoons. He said that bees played a major role in cross pollinated crops and environmental sustainability. But use of high chemical pesticides and intensive cultivation practices had resulted in the decline of the population of honey bees, which in turn resulted in the low

yield in crops, he said.

The scientist said that Indian stingless bees, also called as dammar bee (*Tetragonula iridipennis*) or *Kosutheni* in Tamil, played a significant role in pollination behavior and its yield enhancement in agricultural and horticultural crops.

“The honey has good demand and is costlier than the ones produced by other bees because of its pharmacological value”, he said.

Mr. Alagesan encouraged farmers to take up stingless beekeeping for income enhancement.

Tribal Sub plan (TSP) Programme

Programme 1

1. Title

Capacity building program on organic farming using healthy planting material, bio-fertilizers and bio-agents at the tribal village of Killoguda, Dumbriguda Mandal, Araku Pedabayalu at Vishakapatnam district

2. Challenge

The selected tribal area at Araku valley is a site where natural farming is practised in rice, millets, turmeric, jackfruit, coffee and avocado over years and there is a need for intervention in terms of farm mechanization, value addition of products and supply of bio-inputs for sustainable crop production. Since most of the crops are organically grown with low agro-inputs, there was a need to create awareness on the processing and marketing facilities of the organically produced commodities in the tribal areas. The area being under organic cultivation, training and hand holding of tribal women and youth in the mass production of biocontrol agents will help in effective insect pest management as well as to establish small-scale production units in the tribal areas. Keeping in view of the scope for creating awareness on use of bio-inputs and value addition of agricultural products, ICAR-NBAIR in collaboration with ICAR Krishi Vigyan Kendra, Kondempudi organised capacity-building program on organic farming through supply of organic inputs, farm tools to the tribal beneficiaries at Killoguda, Dumbriguda mandals, Araku Pedabayalu in Vishakapatnam district.

3. Initiative

ICAR-NBAIR in collaboration with ICAR Krishi Vigyan Kendra, Kondempudi organised two days capacity-building program during 2019-2020 and 2020-2021 on organic farming through supply of organic inputs, farm tools to the tribal beneficiaries at Araku Pedabayalu at Vishakapatnam district.

A capacity-building programme was conducted at Killoguda, Dumbriguda mandals at Araku Pedabayalu in Vishakapatnam district during 11th March 2020 and 26-27th March 2021. Around 200 tribal farmers participated in the programme. The importance of Farmer Producer Organisations (FPOs) in creating opportunities for marketing of organically produced vegetables, turmeric, ragi, ginger, coffee and jackfruit. The scope of linking the FPO groups with online marketing was discussed. Bio-fertilizers and bio-agents like Azetobacter, Phosphate solubilising bacteria, plant growth promoting rhizobacteria, *Trichoderma viride*, Zincsol fertilizer, *Pseudomonas fluorescens* were supplied to the farmers. The use of sticky traps and pheromone traps in insect pest management was explained to the beneficiaries. The method of preparation of trichocards and field release techniques were explained to the farmers for biocontrol based insect management in rice. As jackfruit is largely cultivated crop in Araku valley, NBAIR facilitated the establishment of small-scale jackfruit powder processing units at the Araku valley to ensure efficient processing and marketability of the product.

4. Key result/insight/interesting fact

Small-scale unit for processing of jackfruit seed powder was established which will create an efficient market network for the tribal farmers and help in generation of additional farm income

to the farmers. Use of bio-control agents resulted in effective insect pest management. Seven publications

1. Allam Pasupu pantala saagu lo mealaina yajamanya paddatulu
2. Girijana Prantalaloo saagu chese kurdagaaya pantaloon samgra sasya rakshana
3. Girijana prantaalaloo nune ginjala saagu- mealaina yaajamanya paddatulu
4. chiru dhanyaalaloo viluva aadharita vutpattulu
5. Aushada makkala mariyu upayogalu
6. Girijana Prantalaloo saagu chese mukhya pantalu samgra yajamanyam
7. Girijana prantalalo jeevana yeruvula viniyogam pramukhyata

5. Impact

Facilitated establishment of an FPO with 1000 tribal women in aspirational tribal belt of Araku, Visakhapatnam, AP in collaboration with KVK-ANGRAU, Kondempudi, ATARI Zone 10; RARS-ANGRAU and an NGO. Empowered and handholding the tribal FPO/NGO. Currently the established units for jackfruit seed powder production is being operated by the tribal beneficiaries in an efficient way. Through the capacity building programmes, the tribal farmers were made aware of the available opportunities for diversification of their agricultural products through effective marketing networks. They participate enthusiastically in agri-fairs and exhibitions to show case their developed agro-products for wider publicity.

6. Lessons learnt

- Providing capacity building trainings and handholdings will help in empowering tribal farmers in a big way and there is great scope for improvement of their livelihoods.

7. Supporting quotes and Images





8. Additional information

Budget : Rs. 8 lakhs (2019-20)

Rs. 10.76 lakhs (2020-21)

Number of beneficiaries covered: 200 (2019-20); 200 (2020-21)

Tribal Sub plan (TSP) Programme

Programme 2

1. Title

Empowering the livelihood of tribal farmers of Devikulam, Idukki district in Kerala through small cardamom, black pepper, ginger cultivation, bee keeping and poultry birds

2. Challenge

The tribal belt of Idukki (Chembakatholukodi and Pachapulkodi) in Kerala district has congenial climatic conditions for commercial production of spices (small cardamom, black pepper and ginger). There is a need to train and disseminate the improved technologies for increasing the production and productivity of spices in the tribal belt. Small cardamom being a major cultivated crop in the identified area and honeybees being the major pollinators of the crop, there is a need to educate the cardamom growers on the benefit of keeping honeybees colonies in cardamom plantations for enhancing the crop productivity. As root grubs are major problem in cardamom cultivation, use of bio0-agents like entomopathogenic nematodes and entompthogneic fungi will aid in sustainable management of this root feeding insects. Keeping in view of this, ICAR-NBAIR has conducted field demonstration on improved technologies and provided training at Devikulam block at Idukki district in Kerala.

3. Initiative

ICAR-NBAIR in collaboration with ICAR- Krishi Vigyan Kendra Idukki organised field demonstrations on improved technologies comprising of bioagents for non-chemical based insect pest management at three tribal villages at Devikulam block viz., Chembakatholukodi and Pachapulkodi at Idukki district Kerala. Integrated Pest and Disease management and Integrated Nutrient Management in small cardamom, black pepper and ginger were demonstrated. Beekeeping training was organised and 200 bee boxes were supplied to the beneficiaries. The techniques of bee keeping with special reference to seasonal management, pest and disease management in honeybees and honey extraction techniques were explained to the farmers. Scientific techniques in poultry production was explained to the farmers to enhance their nutritional security.

4. Key result/insight/interesting fact

- There is an immense scope for promotion of microbial bio-agents for sustainable management of root feeding insects infesting the small cardamom and ginger crops.
- Indian honeybee keeping is a needed component in cardamom plantations for enhancing the crop productivity as well as for additional income generation through marketing of honey.

5. Impact

Through the capacity building programmes, the crop production in IPM treated plots significantly improved (60-90%) 20-30% higher than in the local practice. The farmers realised a higher yield of spices (520 kg in small cardamom, 345 kg in black pepper and 275 kg in ginger) through adoption of improved technologies in crop production. Organic cultivation and insect management methods in the spice crops were successfully adopted by the farmers. The tribal

beneficiaries were very responsive for the adoption of bee keeping in small cardamom for enhanced pollination and yield in the crop.

6. Lessons learnt

- There is an immense scope for promotion of microbial biocontrol agents and honeybee keeping in spices crop for efficient insect pest management and additional income generation in Idukki district in Kerala.

7. Supporting quotes and Images



8. Additional information

Budget: Rs. 8 lakhs ; Number of beneficiaries covered: 100

Tribal Sub plan (TSP) Programme

Programme 3

1. Title

Demonstration and training on biointensive IPM of agricultural and horticultural crops and entrepreneurs development in bee keeping for the Sitheri Tribal farmers of Dharmapuri district, Tamil Nadu.

2. Challenge

The tribal sub plan (TSP) scheme under institute TSP is aimed to preserve biodiversity and promotion of organic farming among the resource poor tribal farmers by training / demonstration and supply of biocontrol agents. In this Sitheri tribal village major crops viz., Paddy, Sugarcane, Sorghum, Ragi, Maize, Tomato, Brinjal, Bhendi, Chillies, small onion and gourd vegetables. In the above crops bio intensive insect pest management methods was demonstrated to the tribal farmers in this project. In addition to that entrepreneurship in bee keeping was promoted by providing training and inputs required for bee keeping to uplift the resource poor tribal farmers.

3. Initiative

ICAR-NBAIR in collaboration with KVK, TNAU, Pappireddipatty, Dharmapuri District of Tamil Nadu State for the demonstration and training on biointensive IPM of agricultural and horticultural crops and entrepreneurs development in bee keeping for the Sitheri Tribal farmers of Dharmapuri district, Tamil Nadu.

Two skill development training programmes were conducted as given below

4. On 17th March 2022, hands on training on honey bee keeping was given to 50 participants (ST Male: 40; ST Female: 10) at Sitheri village by KVK, TNAU, Pappireddipatty, Dharmapuri. A brief lecture on honey bees keeping was given to the participants. Honey bee colony maintenance for high value honey production was explained to the participants. The domestication techniques of honey bees and benefits of Honey bee keeping was explained to the farmers.
5. On 17th March 2022, hands on training on solar light trap was given by Scientists, KVK, TNAU, Pappireddipatty, Dharmapuri to tribal farmers at Sitheri village. For the management of paddy pests, usage of solar light traps demonstrated and briefly explained to the tribal farmers about the advantages of pest management using solar light traps. We also explained the chemical free pest management with the renewable energy resources through solar light trap and gives hands on training to the tribal farmers.

4. Key result/insight/interesting fact

For the first time, through this training and hand holding programme, the concept of honey bee keeping and solar light trap was introduced to the farmers which was a skill based vital intervention made in the established honey bee keeping and chemical free pest management under field conditions of tribal farmers in Sitheri tribal village, Dharmapuri, Tamil Nadu.

5. Impact

Presently tribal farmers in Sitheri village are well established with honey bees culturing and handling with good health. Few group of tribal farmers expressed their usage of solar light trap for the management without spraying any chemicals. Tribal farmers said that their health also improved without spraying any toxic chemicals for the pest management in rice field. Several other farmers were interested to take up, which in due course shall make it a viable tangible income generation activity through a regular market network for honey sale. The farmers who were undertaking solar light trap also interested to use more for their horticultural crops pest management.

6. Lessons learnt

- Honey bee colony availability is season-based and hence farmers were trained for hiving of natural colonies of honey bees and multiplication of the colonies.
- Usage of solar light trap improved farmers health as without using toxic pesticides for the rice pest management.

7. Supporting quotes and Images



8. Additional information

Budget: Rs. 9.06 lakhs (2019-20); Rs. 17 lakhs (2020-21); Rs. 4 lakhs (2021-22)

Number of beneficiaries covered: 150