

A report on

3rd Farmers Innovation Expo, 2022

**Theme: Integrated Agriculture for Rural Bio-entrepreneurship
and Livelihood Security**

Venue: Nongstoin College, Nongstoin

West Khasi Hills District, Meghalaya

Date: 13th - 15th June, 2022

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INTRODUCTION:

Farmers Innovation Expo-2022, is a mega event organised jointly by College of Agriculture, Central Agricultural University, Kyrdemkulai and Nongstoin College, Nongstoin during 13th-15th June, 2022. The theme of the Farmers Innovation Expo (FIE) is **“Integrated Agriculture for Rural Bio-entrepreneurship and Livelihood Security”**. In this event, around 1000 numbers involving farmers, rural youths and other stake holders will take part to receive training in various areas of agriculture and allied subjects.

In the past fifty years, the technological changes in agriculture and allied sectors backed by investments in irrigation, infrastructure, markets, institutions and enabling policies have led to significant increases in agricultural productivity and food supplies making the country self-sufficient in food and several other commodities. However, agriculture is facing challenges such as declining farm size, deteriorating soil health, depleting groundwater, increasing cost of production, labour scarcity and climatic shocks. Addressing these challenges is essential for efficient, sustainable and inclusive development of agriculture and to realize Prime Ministers' vision of doubling farmers' income by 2022. Indian agriculture is characterized by dualism with simultaneous existence of subsistence and commercial mode of production. The commercial producers use state-of-the art innovations either acquired from the formal research systems or developed by themselves modifying the existing technologies and practices suiting to their resource requirements and agro-ecological conditions. In recent years, a number of farmers and other stakeholders interested in agriculture have come out with a number of innovations related to crop breeding (higher yielding climate resilient varieties), soil and water management, pest management, farm machinery & equipment, post-harvest processing & value addition, marketing, integrated farming system model etc. Several of such innovations have been recognized by several institutions including the Indian Council of Agricultural Research. These innovations are location-specific and field tested for their technical and economic feasibility; hence these are of greater importance to farming communities, especially small holder farmers who are often unable to afford costlier technologies because of the lack of access to finance and information. Farm innovations are either reconfiguration of existing resources giving incremental adjustments or innovations generated to solve an immediate problem. Dissatisfaction with the low economic returns from farming push the farmers to innovate or to find newer way to solve a problem. These innovators can be an effective and reliable source of information and also inputs for other farmers in the vicinity. Indicators for identification of farm innovations and its scalability have been standardized and are widely being used for identification and recognition of innovative farmers. These farmers proved that income can be enhanced manifold by innovations in their existing farming situation. There is a need to identify a pool of such farm innovations, validate and up-scale and out-scale those innovations across the country. Indian Agricultural Research Institute has recognized and documented the cases of more than 300 innovative farmers. Besides that, ICAR, ATARIs, PPV & FRA have also recognized many such innovative farmers.

PARTICIPANTS

Innovative farmers, agricultural entrepreneurs, extension professionals, policymakers, financial institutions, traders, small-scale processors, and voluntary organizations.

EXPECTED OUTPUTS

- Feedback to R&D institutions to internalize informal farm innovations into the research agenda.
- Policy and institutional arrangements for scaling up the innovations.
- Greater uptake of local innovations by farmers.
- Farmers to farmers sharing and cross-learning of technologies.

OBJECTIVES OF THE FARMERS INNOVATION EXPO 2022

With the above in view, it is proposed to hold "Farmers Innovation Expo 2022 – Integrated agriculture for rural bio-entrepreneurship and livelihood security" with the following specific objectives:

- To document successful farm innovations, and understand socio-economic, institutional and policy factors underlying these innovations.
- To draw lessons for formal research institutions to internalize the best practices of informal farm innovations in their research agenda.
- To develop village-level innovation platforms by providing innovators with resources and incentives to train other farmers.
- To suggest ways to provide formal recognition to innovative young farmers offering them formal education training and incentives for scaling up their innovations through start-ups, and agri-clinics.
- To improve visibility of these innovations and their innovators through dissemination of their success stories through print and electronic media on a regular basis.
- To acquaint the innovators/innovative farmers to new scientific innovations in agriculture.
- Promotion of rural bio-entrepreneurship through specialised training on various agriculture and allied areas.

THEMES: The FIE 2022 will deliberate on prime concern of integrated agriculture with special reference to rural bio-entrepreneurship and enhancing the farmer's income under the following important themes:

- *Integrated Farming Systems for livelihood security of small and marginal farmers*
- *Livestock based integrated agriculture system*
- *Horticulture based integrated agriculture system*
- *Rice-based Farming Systems and Rice Production Technology for Meghalaya*
- *Post-Harvest Technology, Value addition and Farm Mechanization*
- *Mushroom based farming system, Vermi-composting and nutrient management*

INAUGURAL SESSION

The Inaugural function was held on the 13th June 2022 at 11:30 a.m in the Conference hall of the Nongstoin College in the presence of Shri Macmilan Byrsat (MLA, Nongstoin constituency) as the chief guest, Prof D.Sahu (Director, Centre for Himalayan Studies, Univeristy of Delhi), Dr M.S Behera (Principal Scientist, ICAR- Central Research Institute on Jute and Allied Science) and Dr (Mrs) I. Mawthoh (Principal, Nongstoin College) along with the faculty members of College of Agriculture, Kyrdemkulai and Nongstoin College and around 200 farmers from and around the Nongstoin Town.

The function was chaired by Dr (Mrs) J.V.Marbaniang (Faculty of the Nongstoin College). The function begins with the welcome speech delivered by Dr (Mrs) I. Mawthoh (Principal Nongstoin College). In her welcome remarks, Dr (Mrs) I. Mawthoh highlighted the importance of the expo in providing necessary insights to farmers in and around Nongstoin with regards to different issues like bio-entrepreneurship and livelihood security.

The welcome address was followed by the the presentation of bouquets to all the dignitaries. The programme was enlightened by the speech from the Special Chief Guest Dr M.S Behera (Principal Scientist, ICAR –Central Research Institute on Jute and Allied Science) whereby he stated that the purpose of the of this Farmers EXPO is to imbibe in the local farmers the scientific ways and means of Farming which includes Rice, Livestock and Mushroom farming and others. The programme was entertained by the song from Miss Ibakor Sun (Student of Nongstoin College). The programme was also enlightened by the speech from Prof D.Sahu (Director, centre for Himalayan Studies,Univeristy of Delhi). Prof Sahu made an appeal that each and every individual must plant trees for the benefit of the self. He also stated that the farmers are the backbone of the food supply because they are the producers. He also highlighted his experiences in the Northeastern states including Meghalaya where he mentioned that Meghalaya is indeed one of the best stated in the whole of India. He also brought into the attention of the audience the importance of planting trees for the Biodiveristy and the planet stating facts that three mature trees can give us oxygen for a lifetime. The Chief Guest, Shri Macmilan Byrsat (MLA Nongstoin constituency) gave an inspiring speech and specially mentioned that farming should be considered a job as most

farmers fail to do so and consider government jobs and other jobs as the only means of employment.

The inaugural session ended with the vote of thanks by Dr S.Wanniang, Asst. Professor, COA, Kyrdemkulai.

At the end of the inaugural session, various agricultural inputs viz. Farm implements, vegetable seeds, rice seeds, milk canes, vermin-composts, animal feeds and fruit plants were provided to the farmers by the College of Agriculture, Kyrdemkulai in the presence of MLA, Dean and faculties of college of agriculture, Kyrdemkulai. This was followed by planting of trees in the campus.

Post inaugural programme comprises of various Technical Sessions divided into different modules in which presentations and discussions were made on various sub-themes

TECHNICAL SESSION I

DAY 1: 13th June, 2022

Venue: Hall 02, Nongstoin College, Nongstoin

Module 01 : Integrated Farming Systems for livelihood security of small and marginal farmers

TOPIC: Backyard poultry rearing and its importance in Integrated Farming system

Presented by: Dr. Greenburg Hynniewta, Senior Veterinary Officer, Regional Poultry Breeding Farm, Kyrdenkulai, Meghalaya

Various issues were addressed for Integrated farming system with special emphasis on Backyard poultry rearing. The contents of his presentation included how a chicken coop should be constructed, its direction, elevation ect. to limit infections and spread of diseases. It also highlighted how infected, dead birds should be kept. The presenter also specified the vaccination procedures, their availability and how to prepare before vaccinating the poultry. Collection of BV380 eggs and loading in the incubator for hatching after 21 days was also highlighted.

TOPIC: Piggery based Integrated farming systems and the economics

Presented by: Dr. Meban Lyngdoh, Veterinary Officer, Regional Poultry Breeding Farm, Kyrdenkulai, Meghalaya

Dr. M. Lyngdoh mentioned the best way of making sty and how different categories of pigs need different covered space and open space. He also highlighted some of the food for pigs using 40% kitchen waste, and the amount of feed needed to be given accordingly with age. Care of piglets was also addressed for instance using iron syrup like Sharkoferol which is applied on the udder of the mother before feeding. Two types of vaccines is needed to be given to the piglets for prevention of swine epidemic or diseases. He also highlighted the importance of bokashi piggery and the use of IMO to promote growth and management of healthy pig.

TOPIC: NABARD and Govt. of India schemes for rural youth and progressive farmers for entrepreneurship development

Presented by: Smt. Phila Nongkynrih, District Development Manager, NABARD, Nongstoin

The representative from NABARD brought awareness to the farmers regarding various schemes, subsidies and projects to aid various entrepreneurship developments. On the other hand, she offered her help and assistance to the participants and different SHGs in order to attend various trainings and workshops to enhance their knowledge and skills pertaining to agriculture and other allied subjects.

Venue: Hall 01, Nongstoin College, Nongstoin

NAAS Regional Chapter Awareness Programme on "Grow a tree for better life, ecosystem and planet"

Speaker: Dr. Dinabandhu Sahoo, Director, Centre for Himalayan Studies, Delhi University, New Delhi and Professor, Delhi University, North Campus, New Delhi. Fellow NAAS, New Delhi.

On 13th June, 2022, National Academy of Agricultural Sciences (NAAS) Regional Chapter for NEH Region, Barapani organized awareness Campaign to "Grow a tree for better life, ecosystem and planet" in collaboration with International Union of Organic Agriculture, Shillong and Nongstoin College, Nongstoin. The programme was successfully organized by the joint efforts and team work of the faculties and staffs of College of Agriculture, Kyrdemkulai and Nongstoin College, Nongstoin under the chairmanship of Dr. U.K. Behera, Dean, College of Agriculture, Kyrdemkulai, and Convenor, NAAS, Regional Chapter, Barapani. The programme was co-ordinated by Dr. M. Premi Devi, Assistant Professor (Horticulture). A total number of 82 participants were present during the programme, including students, farmers and entrepreneurs. The programme was inaugurated with the lighting of lamp and felicitation of the dignitaries present during the occasion. After which Dr. U.K. Behera, Dean, CoA, Kyrdemkulai, delivered the welcome address, introduced the honorable speaker, Dr. Dinabandhu Sahoo, Director, Centre for Himalayan Studies, Delhi University, New Delhi and Professor, Delhi University, North Campus, New Delhi and Fellow, NAAS, New Delhi. Dr. Sahoo made key note presentation on topic "Biodiversity for Everyone's Life : Fascinating World of Plants". He explained various aspects of Biosphere Crisis. We need to save our Biodiversity both under water and on the Land. Life without Biodiversity will be like life in Antarctica - the "White Desert" a land of mystery and wonder with extreme conditions. He explained the importance and uses of sea weeds. The sea is now equally contaminated as our land resources. Besides, Mr. Nicholas Marwein, Vice Principal, Dr. J.V. Marbaniang, Head, Department of Botany and Dr. C. Thabah, Head, Department of Zoology, Nongstoin College, Nongstoin made presentation and shared their views to audience on the subject. Dr. M. Premi Devi, Assistant Professor and Dr. H.G. Kenharaddi, Assistant Professor, College of Agriculture, Kyrdemkulai explained about the importance of biodiversity conservation and how it is dangerous to world, since there is rapid erosion of biodiversity. Dr. Dinabandhu Sahoo was felicitated and awarded by International Union of Organic Agriculture, Shillong for his valuable contribution to environment protection and biodiversity conservation. At the end, there was tree plantation in the campus, particularly Cherry blossom plants and Golmohar ornamental plants were planted in the campus by the dignitaries and farmers.

TECHNICAL SESSION II

DAY 2: 14th June, 2022

Venue: Hall 02, Nongstoin College, Nongstoin

Module 03 : Horticulture based integrated agriculture system

TOPIC: Potato cultivation in NE Region with special reference to Meghalaya

Presented by: Dr. J.S. Minhas, Resident Consultant and Project Manager, International Centre for Potato, Guwahati, India

Potato is among the most important food crop globally and its demand is rising rapidly in Asia. The same is true in India, the second largest producer of potato in the world, next to China but easily accessible information on its production, marketing, and utilization is still limited. The average potato productivity in Meghalaya is less than half of the country average owing to the several issues farmers encounter in production. These include the lack of quality potato seeds of improved varieties, decreasing soil fertility, and other environmental stresses including climate change. There is no post-harvest processing and formal quality control being done for Meghalaya potatoes, while proper storage and transportation options are limited, which affects potato prices. Dr. J.S. Minhas in his presentation spoke about various ways and means to enhance the production of potato and to increase their yield. He highlighted various areas pertaining to potato cultivation from storage, preparation of land, use of fertilizers, irrigation, harvest and disease causing agents and their control measures. One of the most interesting slide presented was about the Zero tillage + Paddy Straw Mulching Practices which is relatively new to the people of Meghalaya.

TOPIC: Nutritional Garden: A suitable model for food security and Economic benefits

Presented by: Dr. P.P. Mohapatra, Assistant Professor, CoA, Kyrdenkulai

India may be the world's second largest producer of food, but it has its second largest undernourished population. Further, more than half of women in India suffer from anaemia, which is one of the reasons for the high rate of low-birth weight babies. An unbalanced diet and lack of food is directly linked to high rates of stunting, excessive weight, and death in children under five years of age. The Government of India has implemented programmes for providing food security and ensuring access to adequate quantity of quality food. There is a need to look at multiple strategies to combat the issue of food security. Community and nutrition gardens can play an important role in enhancing national food security and dietary diversity to combat malnutrition. Dr. P.P. Mohapatra showed the nutritional value of vegetables depending on their colour. Purple vegetables for instance like Brinjal, black radish, etc. are rich in antioxidants and phytochemicals. Onion, cauliflower, garlic etc are rich in allicin, potassium which help in lowering blood pressure and to reduce cholesterol. There is a need to look at multiple strategies to combat the issue of food security in the context of the ever-growing demand. Community gardens can play an important role in providing national food security by supplementing rations and providing essential nutrients. Nutrition gardens

enhance dietary diversity by providing micronutrients through constant supply of fruits and vegetables sufficient to meet the family's requirements. Thus, nutrition gardens can prove to be a sustainable model for providing food security and diversity to combat malnutrition at the household or community level.

Module 03A: Fruits-based integrated agriculture system

TOPIC: Production Technology of important food crops of Meghalaya

Presented by: Dr. Hammylliende Talang, Scientist (Fruit science), ICARRC for NE-region, Barapani

The presentation underlines various propagation techniques of fruit crops which are common in Meghalaya like Khasi mandarin, Assam lemon, Sweet orange etc. Dr. Hammylliende Talang addressed various topics like preparation of land, sowing of the seeds, distance from seed to seed or tree to tree etc. He mentioned that the pits should be dug at a distance of 5 x 5 metres apart on half moon terraces, the size of which is 0.75 x 0.75 x 0.75 m. The use of 15-20 kg FYM, 100 g Urea, 100g MOP, 300g SSP and 20g chloropyriphos dust or granule is found to enhance productivity of fruit trees.

TOPIC: Potential Spice crops of North-eastern Hill Region, India.

Presented by: Dr. Mayanglambam Bilashini, Scientist (Horticulture) ICARRC for NE-region, Barapani

Dr. Mayanglambam Bilashini mentioned various spice crops of the North-eastern Hill Region from pepper, star anise, chilli to garlic and ginger. She gave special emphasis to the propagation of ginger demonstrating a new technique in order to produce many plants from a single rhizome by cutting small portions from the rhizomes and then introduce them to the palnting tray in presence of various manures like vermicompost, coco-peat etc. The sprouted rhizomes are cut into pieces, weighing 20-25 gm (approx.), 4-5 cm length in size and each piece having 2-3 good bud sprouts. Seeds are treated by dipping in water, spread in shade for about 3-4 hours before planting. Mother rhizomes are treated for 10-12 hrs before sowing.

TOPIC: Genetic resources of neglected and underutilized fruits for food and nutrition security

Presented by: Dr. H G Kencharaddi, Assistant Professor, COA, Kyrdenkulai

Wild edible fruits were the important sources of food for mankind before dawn of civilization. The presenter highlighted the underutilized fruits of the region as farmers are giving their attention towards other fruit varieties imported from other states. Besides their economic importance, the local fruits hold a large repository of genetic resources which can help in research and they are the donors of important genes for crop improvement. They harbor nutritionally rich compounds, climate resilient nature, rich in neutraceutical and medicinal properties. The presenter calls for conservation and protection of such fruit trees by various methods like establishment of Ex-situ genetic conservation park in the diversity rich regions

as a backup for the future research and development needs. Capacity building of custodian farmers in general and women in particular for consumption, cultivation and conservation of these crops is one of the ways by which the issues can be addressed.

TOPIC: Potential underutilized fruit crops in Meghalaya

Presented by: Dr. M Premi Devi, Assistant Professor, CoA, Kyrdenkulai

North Eastern Region of India is the treasure trove for many indigenous as well as exotic horticultural crops. Meghalaya possesses a considerable share of potential natural resources. The region is known for its rich diversity of underutilized fruits like Sohiong, Sohphie, Sohkwit, etc. and vegetables like sohbaingon-dieng, bird-eye-chilli, chow-chow, jack bean and sohphlang. In present context, Meghalaya has tremendous advantages and opportunities in changing the future of horticultural outputs by trending the local UUHC as they are rich in vitamins, minerals and other nutrients. These UUHC are potential alternative sources of primary and secondary bio-products in terms of nutraceutical aspects. The presenter stressed that UUHC being cultivated in the homestead garden for livelihood improvement, have immense potential to contribute location specific food production.

Venue: Hall 01, Nongstoin College, Nongstoin

Module 04 : Rice-based Farming Systems and Rice Production Technology for Meghalaya

TOPIC: Rice-based Farming Systems and Rice production Technology for Meghalaya

Presented by: Dr. Kanwar Singh Yadav, IIRI Scientist, Guwahati, Assam

Rice is a major food crop of the State occupying an average annual area of 104800.00 Ha. Out of the total crop area of 276932 Ha. in the State, rice alone occupies 37.84% of the total cropped area producing an annual average of 135000.50 Metric Tons with an average yield of 1290.6 Kg /Ha during the period 1990-91 to 2000-01. Rice is grown in the region in a wide range of climatic conditions ranging from deep water to high altitudes. The requirement of varieties are also diverse as it is also grown in different seasons during the year. Different rice-based integrated farming system evolved in India in general and Meghalaya to be more precise like Shifting Cultivation, rice-fish-livestock integrated farming system. Dr. Kanwar Singh Yadav addressed various topics like Seed selection and treatment, Preparation of seed bed, Manures and fertilizers for seed bed, Land preparation, Transplanting/sowing, Nutrient management, Bioorganics for rice production etc.

Module 04A : Post- Harvest Technology, Value addition and farm mechanization

TOPIC: Nutritional knowledge of vegetables and fruits for a smarter diet.

Presented by: Dr. C. Aachen, Senior scientist (Plant Biochemistry), Division of Crop Science ICAR RC for NE-region Barapani

Dr. C. Aachen underlined the nutritional knowledge of various vegetables and fruits like dietary fibres, vitamins (vit-B, B-complex, vit-C, fat soluble vitamins, etc), minerals and trace elements. She mentioned crops rich in essential quality amino acids like fenugreek seeds, bittergourd, potato, coriander seeds, cumin seeds etc. All non-vegetarian foods are very good source of quality proteins. The presenter also highlighted several antinutritional factors like calcium oxalate. Smart diet by using mixed pulse grains for dal and the use of unpolished whole grains gives more nutrition. Sprouts boost nutrition because of newly synthesized nutrient concentrates which aids in digestion, boost blood circulation, builds immune system etc. Some ways to improve nutrition includes diversifying our kitchen garden, increasing salad ingredients, consuming the remaining stock/broth of boiled vegetables, using of lesser oil to minimize health risks, retention of Vit C in cooked food by cooking in less heat and small amount of water. A very important topic discussed was mental and nutrition; treatment with nutrients (Vit E, folates and Magnesium) increases both prevention and recovery from mental related issues, as compared to psychiatric medications.

TOPIC: Dairy products of Indian Market: Preparation method and Market Potential.

Presented by: Dr. G Bhuvana Priya, Assistant Professor (Veterinary Science) CoA, Kyrdenkulai

Under this topic there was a demonstration on how to prepare dahi and paneer from milk using very basic techniques. Dr. G. Bhuvana Priya featured the two types of dairy products viz. Traditional Dairy products like fat rich products-cream, butter, ghee; fermented products-yoghurt, srikhand; acid coagulated products- chenna, paneer etc and non-traditional dairy products like condensed and dried milk products- milkmaid, milk powder; fat rich products, ice-cream and frozen desserts.

After the programme, there was distribution of seeds, milk can and dairy feed to all the farmers.

TECHNICAL SESSION III

DAY 3: 15th June, 2022

Venue: Hall 02, Nongstoin College, Nongstoin

Module 05: Mushroom based farming system, vermicomposting and Nutrient Management

MODULE 05A: Advances in Mushroom Production Technology

Topic: Mushroom Production Technology

Presented by: Dr. R. K. Tombisana Devi, Professor, College of Post Graduate Studies In Agricultural Sciences, Uriam

The contents of her presentation includes- Different categories of mushrooms (edible, poisonous, medicinal etc), their economic importance, value-addition, income generation etc. At the end of the presentation, there was a demonstration and hands-on training on how to cultivate mushroom using paddy straw in polythene bags.

MODULE 05B: Biomass Recycling and Nutrient Management Technology

Topic: Agriculture waste management and Vermicomposting

Presented by: Dr. Sabjasachi Majumdar, Assistant Professor, COA, Kyrdemkulai

He emphasised on the importance of vermicomposting and the various techniques involved in its production which includes the types of earthworms used, site selection, cost of production etc. Preparation of vermicompost from various organic wastes will save our environment as a whole and subsequently check organic waste management. Use of two species of earthworms i.e. *Eisenia foetida* and *Lumbricus rubellis* is commonly used to produce vermicompost.

At the end of the technical session, there was a distribution of vegetable seeds, spawns and poultry birds to all the farmers.

VALEDICTORY SESSION

The Valedictory session was held on the 15th June 2022 at 3:00 p.m in the Conference hall of the Nongstoin College in the presence of Shri E.P.Syiem (Syiem of Nongstoin) as the chief guest, Dr R.K Tombisana Dev (Professor CPCSAS, Umiam), Dr (Mrs) I Mawthoh (Principal,Nongstoin College) and Shri N.Marwein (Vice Principal, Nongstoin College) along with the faculty members of ICAR Kyrdemkulai and Nongstoin College and around 250 farmers from in and around Nongstoin Town.

The function was chaired by Dr (Mrs) J.V.Marbaniang (HOD, Department of Botany, Nongstoin College).The function begins with the welcome speech given by Dr (Mrs) I Mawthoh (Principal Nongstoin College). It was followed by the presentation of bouquet to all the dignitaries. The programme was enlightened by the speech from the Special Chief Guest Dr R.K.Tombisana Devi (Professor CPCSAS, Umiam) whereby she stated that she is so delighted and thankful to see the enthusiasms of the farmers who attended the programme to receive the training with patience and willingness to learn. The programme was enlightened by the speech made by Shri E.P.Syiem (Syiem of Nongstoin). Shri E.P.Syiem extended his thankfulness to the Principal for taking up this programme for the benefit of the farmers. He also stated that Farming is the backbone of the Nongstoin and therefore this programme is an exposure to all the farmers of the region to gather more knowledge in relation to farming. He stated that time has changed with modernization yet right from the olden days we still depend on farmers for food so we should respect them because they are the producers of food. He also mentioned that as Farmers should also be grateful to also the mentors and trainers for spending their valuable time for the benefits of the farmers itself. The programme concludes with the vote of thanks from Shri N.Marwein (Vice principal Nongstoin College). After the close of the programme there was distribution of seeds and poultry to all the farmers.

Photo Gallery















