



Sustainable Livelihood Development of Farmers through Farmer FIRST Programme



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(An ISO 9001:2015 Certified Organization)**

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PREFACE

The Farmer First Project was launched by ICAR during 2016-17 with an aim to involve farmers for technology development/refinement based on their need utilizing their own Farm, Innovations and Resources incorporating the latest development in Science and Technology (FIRST). In the past, the wisdom available with the farmers was not channelized appropriately to derive the suitable options for different production systems. This necessitates a new approach for project development with the strong partnership of the farmers for developing location specific, demand driven and farmer friendly technological options.

This ICAR sponsored project is being under implementation at two centres under ICAR-ATARI, Umiam; one- *“Livelihood improvement of Hill Farmers through Sustainable Farming Systems in North Eastern Hill Region”* at ICAR Research Complex for NEH Region, Umiam and the other- *“Sustainable Livelihood Development of Farmers in Manipur through Participatory Technology Application”* at Central Agricultural University, Imphal in last three years. Module-wise based coverage such as crop, horticulture, livestock and fish, enterprise, NRM, integrated farming system, etc. were taken up by the institute-wise under the project for the benefit of small and marginal farmers in their respective states. During 2019-20, a total of 773 nos. of farm families were covered up under ICAR Research Complex for NEH Region, Umiam and a total of 600 nos. of farm families were covered up under the Central Agricultural University, Imphal benefitting a total of 1373 nos. of farm families.

This bulletin entitled *“Sustainable Livelihood Development of Farmers through Farmer FIRST Programme”* has been prepared by compiling the achievements attained by the FFP Centres: ICAR Research Complex for NEH Region Umiam and CAU, Imphal for the benefit of various stakeholders of the region. I wish this publication would be of great help for the practicing farmers and other stakeholders.

I would like to express my sincere thanks and gratitude to Dr. V.P. Chahal, ADG (AE) for his constant encouragement, guidance and support in executing the project. I also thankfully acknowledged the Accounts Section of ICAR-ATARI, Zone-VII, Umiam for their timely released of funds for without which the progress, goals and achievements of the project would not have been possible.

Place: Umiam, Meghalaya

Date :



(A.K.Tripathi)
Director I/c

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CHAPTER-1

Introduction

Background

The Farmer FIRST project was conceived and implemented by ICAR so as to involve the practicing farmers for research problem identification, prioritization and to conduct of experiments in farmers' field utilizing the resources available with the farmers. The focus is on Farmer's Farm, Innovations, Resources, Science and Technology (FIRST). Two terms 'enriching knowledge' and 'integrating technology' qualify the meaning of Farmer FIRST in Indian context. Enriching knowledge signifies the need for the research system as well as farmers to learn from each other in context to existing farm environment, perception of each other and interactions with the sub-systems established around. Technology integration is looked from the perspective that the scientific outputs coming out from the research institutions, many times do not fit as such in the farmers' conditions and thus, certain alterations and adaptations are required at field level for their acceptance, adoption and success. 'Farmer FIRST' programme aims at enhancing farmer-scientist interface for technology development and application. It will be achieved with focus on innovations, technology, feedback, multiple stakeholder's participation, multiple realities, multi method approaches, vulnerability and livelihood interventions.

Why Farmer FIRST Programme?

The past efforts brought lot of success in terms of raising production and productivity and addressing issues of the farmers and the technology was considered as a vital factor in the production system and farmer as a recipient of the technology outputs. The knowledge and innovations of the farmers were not valued much and their presence was relegated at most as a participant but not as a partner in the experimentations. The wisdom available with the farmers was also not channelized so much to derive suitable options for different production systems. The participation of multiple stakeholders was also not taken up in perspective for technology development, integration and adoption. Now the situation has changed drastically in terms of increased number of smallholders, growing proposition of women-led agriculture, need for higher return per unit area and addressing the changing socio-economic

environment, etc. This necessitates new approach for project development involving innovation and technology development with the strong partnership of the farmers for developing location specific, demand driven and farmer friendly technological options.

Aims and Objectives of FFP

'Farmer FIRST' programme aims at enhancing farmer-scientist interface for technology development and application. It will be achieved with focus on innovations, technology, feedback, multiple stakeholder's participation, multiple realities, multi-method approaches, vulnerability and livelihood interventions. The specific objectives are:

- To enhance farmer-scientist interface, enrich knowledge and facilitate continued feedback;
- To identify and integrate economically viable and socially compatible technological options as adoptable models for different agro-ecological situations;
- To develop modules for farm women to address drudgery reduction, income enhancement and livelihood security;
- To study performance of technologies and perception of the farmers about agriculture as a profession in the rural settings;
- To build network of linkages of organizations around the farm households for improving access to information, technology, input and market.
- To institutionalize Farmer FIRST process.

FFP Centres under ICAR-ATARI, Umiam

FFP project has been implemented in the entire country with the active involvement of Faculties/ Scientists of State/ Central Agricultural Universities and ICAR Institutes with farmers in lead role in decision making process. This ICAR sponsored project is being under implementation at two centers under ICAR-ATARI, Zone-VII, Umiam viz,

i. Centre: ICAR Research Complex for NEH Region, Umiam, Meghalaya

Project Title: Livelihood Improvement of Hill Farmers through Sustainable Farming Systems in North Eastern Hill Region

Project Initiation: There is growing concern that the demand of the farmers about the recent technological and institutional needs is not adequately addressed and most often, the research system is not getting adequate feedback to plan and conduct demand driven research thereby creating a huge gap in the research output required at the farm level and that being developed at institute level. It

is also being perceived that the research system should play a pro-active role in researching to the farmers for getting first hand information, farmers' perception, feedback on generated technologies and develop new more appropriate processes, methodologies and technologies for diverse farm environments. This is only possible with the active participation of the farmers as a barefoot researcher to work in coordination with scientists to contribute essential knowledge to be incorporated in the development of several technologies related to contribute essential knowledge to be incorporated in the development of several technologies related to production, harvesting and post harvest management. Hence, the technological adoptability, economic feasibility and overall sustainability of any technology can be perceived through farmers' participatory approach with participation of multi stake holders having multiple realities, multi-functional agriculture, multi-method approaches.

In this backdrop the project was initiated on November, 2016. The project intervention has been initiated in 10 villages of Ri Bhoi district of Meghalaya viz., Borgang, Sarikhusi Lalumpam, Purangang, Umtham, Borkhatsari, Nalapara, Nangagang, Mawphrew and Mawtnum.

ii. Centre : Central Agricultural University, Imphal, Manipur

Project Title: Sustainable Livelihood Development of Farmers in Manipur through Participatory Technology Application

Project Initiation: For the development of agriculture, efforts are being taken to enhance production and productivity in the Northeastern states. Due to its topography and special features, this region needs special focus, attention and location based suitable technologies. The farmers are partners of the research, extension and production process. The indigenous Technical Knowledge (ITKs) available with the farmers has hardly been utilized so far in a scientific ways to derive suitable options for the better production along with the scientist.

In this backdrop the project was initiated on February, 2017. The project intervention has been initiated in 2 villages of Imphal East district of Manipur viz., Yairipok Top Chingtha and Yairipok Yambem.

The outcome of the project has been widely accepted by the farming community specially small and marginal farmers in the project implementing districts of the respective states in the region.

CHAPTER-2

Enhancing Farmer –Scientist Interface

2. A. Name of Centre: ICAR Research Complex for NEH Region, Umiam, Meghalaya

2.A. 1. Programmes, Demonstrations and Trainings Conducted

➤ **Distribution of farm machinery and village inspection visit by Dr. S. Prabhu Kumar, NPCM Member, FFP, ICAR, New Delhi on the 31st May, 2019**

A farm machinery distribution programme as well as a visit to Farmers FIRST adopted villages for observing the activities of Farmers FIRST Programme was held on the 31st May, 2019 at Purangang village in Marngar with the presence of Dr. S. Prabhu Kumar, Former Zonal Project Director, ICAR – Zonal Project Directorate Zone I, Ludhiana & Zone VIII Bangalore and NPCM Member, Farmers FIRST Programme, ICAR, New Delhi, Dr. R. Laha (PS and PI, FFP), Dr. P. K. Sinha (Scientist and Co-PI, FFP), Mr. Er. Naseeb Singh (Scientist and Co-PI, FFP) were also present during the programme. A total of 15 farmers from the adopted villages attended the programme. During the programme, two power tillers, three brush cutters and two water pumps were handed over to the farmers under the Custom Hiring Centre under the Farmers' FIRST Project. Dr S. Prabhu Kumar at first visited the IFS models developed under the FFP at Nalapara and Borkhatsari villages and different modules of FFP like livestock based modules, NRM based modules, enterprise based modules, etc. During the programme, he had a brief interaction with the farmers present. He was impressed by the activities of FFP going under ICAR Research Complex for NEH Region, Umiam, Meghalaya and praised everyone for the beautiful work going on under the project.



➤ **Van Mahotsav - The festival of life**

The programme was held in the FFP village clusters comprising Nalapara, Umtham, Joigang, Purangang, Sarikhusi, Borkhatsari villages. *Van Mahotsav* is a festival which originated in the 1950s, was initiated by the then and first Union Minister for Agriculture, Shri. K. M. Munshi, to foster a sense of environmental responsibility among the citizens and to combat deforestation and practice afforestation. With this in mind many people from all walks of life take part in this festival by planting or sowing seeds of trees. The ICAR Scientists present during the occasion include Dr. Rajappa J.J. Scientist, NRM (Agroforestry) Division and Dr. R. Laha, PS and PI of the Project along with Ms. Astha Barman (SRF), Mr. Cheku Aman Pariat (Field Asstt.) and Mr. Emanuel Sangma (JRF). Many farmers attended the program and received saplings/seedlings of different tree species. Dr. Rajappa J. J. stressed upon integrated farming system with the planting of trees that can be used as fodder, timber, fruits, shade and ornamental integrated with crop production, livestock rearing, olericulture, etc. He further stated that these trees will serve as a source of income in the nearby future and the planting of these trees in hills will also help reduce soil erosion and increase water retention in the nearby areas. Most of the areas in Ri-Bhoi district are fertile but it should be utilized in the right way, in contrast to commercial farming with profit as a source of motivation which ultimately leads to land degradation. The integration of Agro-forestry systems in cereals and commercial crops will create sustainability, diversity with a focus on maximum land utilization and income generation. Dr. R. Laha, Principal Scientist & P.I. of the project thanked Dr. Rajappa, Scientist for organizing the programme and farmers and other staff of ICAR for celebrating *Van Mahotsav* festival. He stressed on monitoring of the planted trees from time to time. The saplings of different agro-forestry plants species such as tree bean (*Parkiaroeburghii*), bottlebrush (*Callistemon* Spp.), Khasi mandarin and Poma (*Chukrassiatubularis*) were distributed to the farmers present and these saplings were then planted in and around the farm lands of farmers in the ten adopted villages under Farmers' FIRST project in Ri-Bhoi district of Meghalaya. The efforts of ICAR was a small step in its afforestation efforts but it serves as a leap in creating awareness in the minds of the people regarding conservation of forests and afforestation.



➤ **Animal Health Camp organized under Farmer's FIRST**

ICAR Research Complex for NEH region, Umiam, Meghalaya organized Animal Health camp at Sarikhusi village, Ri Bhoi, Meghalaya under Farmers' First Project on 19th July 2019. A total of 28 nos. of farmers (Male: 24; Female: 4) from seven different villages (Lalumpam, Nalapara, Sarikhusi, Borkhatsari, Borgang, Umtham, Purangang) have participated in the programme. They were made aware of importance of deworming and vaccination in livestock and poultry to prevent them from various parasitic, bacterial and viral diseases. Inputs in the form of veterinary medicines such as anthelmintics, vitamins and mineral supplements, antidiarrheal, antibiotics, acaricides, topical cream, etc were distributed among the farmers. Pigs (120 nos.), poultry (588 nos.), ducks (13 nos.), cattle (17 nos.), goats (10 nos.) and rabbits (12 nos.) were treated under this programme. In this occasion extension folder entitled 'Deworming and Vaccination in Livestock and Poultry'; 'Common Important Poultry Diseases and its Control', 'Poultry Coccidiosis' and 'Parasitic Diseases of Pigs' in both English and Khasi language were also distributed among the farmers. The programme was coordinated by Dr. Meena Das (Senior Scientist), Dr. R. Laha (Principal Scientist), Dr. M. Niranjan (Principal Scientist), Ms. Astha Barman (SRF), L. Khongrymmai (Field Assistant), Cheku Aman Pariat (Field Assistant) and Yearbok Marwein (Junior Research Fellow). Another Animal Health camp was again organized in Sarikhusi village on 1st February, 2020 with a total of 40 farmers from different villages attended the programme.



➤ **Field visit Programme under Farmers' First Project on 18.10.2019**

A field visit programme was conducted on the 18th October, 2019 with the presence of Dr. B.S. Hansra, member of PIM, FFP along with Dr. A.K. Singha, Member Secretary of ZPMC of FFP under Zone-VII. The programme was coordinated by Dr. R. Laha, PS & PI of the project along with Dr. P.K. Sinha, Scientist and Co-PI, Dr. S. Gojendro Singh, Scientist and Co-PI, Astha Barman (SRF), Lapyngbiang Khongrymmai (Field

Assistant) and Cheku Aman Pariat (Field Assistant). Dr. B.S. Hansra and Dr. A.K. Singha were first taken to the Integrated Farming System model developed in Nalapara village where they were felicitated by Dr. R. Laha and Dr. Pankaj K. Sinha respectively. Dr. B.S. Hansra had a brief discussion with the owner of the IFS model Mr. Jiten Sohkhwai. He appreciated and praised the work being carried out and also made some suggestions for improvement in the future. The next site visited was the Pig Breeding Cluster under the Enterprise based module developed in Borkhatsari village under the farmer Mr. Mrinal Sohkhwai. Dr. B. S. Hansra and Dr. A.K. Singha were pleased to see the Pig Breeding unit. They were also taken to the Jalkund model constructed by the same farmer with the assistance under the project and were explained that the water stored in the jalkund is used when there is water scarcity or in the lean season and also for various other farm activities like cleaning of piggery shed etc. The newly constructed fishery pond and the permanent raised and sunken bed system of rice and vegetable cultivation field was also visited by Dr. B.S. Hansra, member of PIM, FFP and Dr. A.K. Singha, Member Secretary situated in Umtham village. Dr. B.S. Hansra gave his valuable suggestion for improvement of pond site. In between the above mentioned villages, various other sites and activities were also shown. During the visit few farm implements (row marker and conoweeder) under the Custom Hiring Centre and veterinary medicines were also distributed by Hon'ble member of PIM, FFP. Overall, the village visit programme was a successful one and Dr. B. S. Hansra was very satisfied and pleased with the work being carried out under the Farmers FIRST Project, ICAR RC for NEH Region Umiam, Meghalaya.



➤ **Field Visit Programme of Shri Kailash Choudhary, Hon'ble Minister of State for Agriculture and Farmers' Welfare, Govt. of India to Farmers FIRST villages under ICAR Research Complex for NEH Region, Umiam, Meghalaya**

Shri. Kailash Choudhary, Hon'ble Minister of State for Agriculture and Farmers' Welfare, Govt. of India along with Dr. V. P. Chahal, ADG (Agril. Extension), ICAR, New Delhi, Dr. B. C. Deka, Director, ICAR-ATARI, Zone-VII, Umiam and other dignitaries

visited the villages of Farmers' FIRST Programme under ICAR Research Complex for NEH Region, Umiam on 24th November, 2019. Dr. B.C. Deka, Director, ICAR-ATARI, Zone VII, Umiam, Meghalaya delivered the welcome address and in his speech he briefed about the history of sanctioning of this project i.e., how the Farmers' FIRST Programme was taken up by the ICAR Research Complex for NEH Region, Umiam in the villages of Marnagar. He also briefed about the activities undergoing in the villages and also praised the farmers for their hard work and dedication for producing organic products. Dr. V. P. Chahal, ADG (Agril. Extension), ICAR, New Delhi also appreciated the achievements of Farmers' FIRST Programme and expressed that it is a means of direct communication between scientists and their technology and farmers. He thanked the farmers for taking Farmers' FIRST Programme within them. Two progressive farmers, Mr. Midot M. Binong and Mr. Jiten Sohkhwai also expressed their gratitude towards the Project and said that it has helped them to learn new technologies which were very much helpful in improving their livelihoods. After a brief interaction of the farmers and the dignitaries, the Hon'ble Minister of State for Agriculture and Farmers' Welfare, Govt. of India, Shri Kailash Choudhary delivered a fine speech. He thanked everyone for such a warm welcome in the village and appreciated the work carried out by the Institute through Farmers FIRST Programme and improving the livelihood of the farmers. He also presented a brief remark on the programmes and schemes developed under the Ministry of Agriculture and Farmers Welfare for enhancing the income of the farmers. The dignitaries were then taken to the Integrated Farming System Model developed under the Project in Nalapara village. They appreciated the work being carried out and also gave some valuable suggestions for further improvement of the model. In this occasion Hon'ble Minister also distributed seeds, etc. to the farmers. The event was co-ordinated by Dr. R. Laha (PS & PI, FFP), Dr. P. K. Sinha (Scientist and Co-PI), Dr. P. Baiswar (Scientist and Co-PI), and all the staffs of Farmers FIRST Programme.



2.A.2. Workshops/Trainings attended

- Exposure of farmers to the one day training programme on 'Scientific Beekeeping'

Five selected farmers were invited to join a day long training programme on 'Scientific Beekeeping' held at Umiam on 27.04.2019. Farmers were taught different hand on techniques on scientific beekeeping practices to reduce the common problems encountered during beekeeping.

➤ **Participation of farmers in Awareness programme on diagnosis and management of invasive fall armyworm in Meghalaya- 28th May, 2019**

Invasive fall armyworm has recently invaded North-Eastern Hill region of India including Meghalaya during 2019. In order to create awareness on this invasive alien pest among the farmers, 25 selected maize growers from the Farmers' FIRST villages were invited to join 'National Workshop on Management of Fall Armyworm in Maize Production' held on 28th May 2019 at Umiam. Farmers were exposed to hand on techniques on diagnosis and management of fall armyworm under field conditions and basic inputs were also provided to the farmers during the workshop.

➤ **Farmers attended awareness programme on diagnosis and management of invasive fall armyworm in Meghalaya- 28th May, 2019**



➤ **Farmers attended training at ICAR-NRC Pig, Rani, Guwahati, Assam- 25th to 27th June 2019**



- **Farmers attended training at NDRI, Kalyani, West Bengal from 6th to 9th August, 2019**



B. Name of Centre: Central Agricultural University, Imphal, Manipur

2.B.1. Programmes, Demonstrations and Trainings Conducted

- Directorate of Extension Education, CAU, Imphal in collaboration with Directorate of Veterinary & Animal Husbandry Services, Govt. of Manipur jointly organised one day Animal Health cum Mass vaccination programme under Farmer FIRST Programme, CAU, Imphal at Yairipok Top Chingtha and Yairipok Yambem on 3rd Aug., 2019. About 201 nos. of cows, 172 nos. of pigs and 62 nos. of dogs were vaccinated from the two villages during the campaign.



- ARS Probationers along with FFP, CAU, Imphal conducted a 21 days Field Experience Training (FET) on 25th Feb-16th March 2020. The following programmes and activities had been successfully carried out during the course of the training :-
 - i. An Orientation programme was organized on 24th Feb, 2020 at the College of Agriculture, CAU, Imphal. The members present were Prof. R.K. Saha, DEE, CAU, Imphal, Prof., Indira Sarangthem, Dean, College of Agriculture, CAU, Imphal, Prof.

- Ph. Ranjit Sharma, PI, FFP, CAU, Imphal, Dr. Th. Renuka Devi, Co-PI, FFP, Professors & Head of Various Department, COA, CAU, Imphal, ARS Probationers, Staff of FFP, CAU, Imphal and farmers representatives of FFP, Project site.
- ii. FET ARS Probationers along with FFP Team interacted with the FFP, CAU, Imphal beneficiary farmers on 25th Feb., 2020 at the FFP Project site (Yairipok Yambem village, Imphal East, Manipur).
 - iii. An Institute Seminar was organized on 7th March, 2020 at the College of Agriculture, CAU, Imphal. The members present were Prof. R.K. Saha, DEE, CAU, Imphal, Prof., Indira Sarangthem, Dean, College of Agriculture, Dr. P. Krishnan, Principal Scientist, ICAR-NAARM, Prof. Ph. Ranjit Sharma, PI, FFP, CAU, Imphal, Dr. Th. Renuka Devi, Co-PI, FFP, Professors & Head of Various Department, COA, CAU, Imphal, ARS Probationers, Staff of FFP, CAU, Imphal and farmers representatives of FFP, Project site.
 - iv. A Village Seminar was conducted on 8th March, 2020 at Yairipok Yambem village, Imphal East, Manipur. The members present were Shri. S. Bimol Singh, Pradhan, Yairipok Yambem, Dr. P. Krishnan, Principal Scientist, ICAR-NAARM, Prof. Ph. Ranjit Sharma, PI, FFP, CAU, Imphal, Dr. Th. Renuka Devi, Co-PI, FFP, ARS, Probationers, Staff of FFP, CAU, Imphal and farmers representatives of FFP, Project site. The Programme was presided by Prof. Ph. Ranjit Sharma, Principal Investigator, Farmer FIRST Programme, CAU, Imphal as well as FET Local Coordinator. During the Village Seminar the PRA exercise was conducted by the Scientists, FFP team along with the Farmers.

2.B. 2. Workshops/Trainings attended

- Directorate of Extension Education, CAU, Imphal conducted farmers training cum demonstration programme on the following topics:-



- i. **Topic- “Scientific cultivation of rice, and other kharif crops”** on 8th September, 2019 at Yairipok Top Chingtha Village, Imphal East, Manipur. A total number of 35 farmers (both male and female) participated the training programme. Experts/

resource persons Dr. L. Nabachandra, Prof. & Head, Dept. of Agronomy, COA, CAU, Imphal and Dr. Kh. Ibohal Singh, Assoc. Prof. & Head, Dept. of Entomology, COA, CAU, Imphal gave lectures on scientific cultivation practices of rice and other Kharif crops.



ii. **Topic- “Scientific cultivation of Mushroom and Vermi-composting”**

on 15th February, 2020 at Yairipok Yambem Village, Imphal East, Manipur. A total number of 30 farmers (both male and female) participated the training programme. Experts/resource persons Dr. L. Nongdrenkhomba, Assoc. Prof. Dept. of Plant Pathology, COA, CAU, Imphal and Dr. Nivedita Oinam, SRF, AICRP-MSPE, CAU, Imphal Centre delivered the lectures on scientific cultivation of mushroom and vermicomposting.



➤ **Details of VIPs and other scientists visited to project site**

i. **Hon’ble Vice Chancellor, CAU, Imphal along with QRT team visited FFP, CAU, Imphal Project site on 21st Nov., 2019**



- ii. Monitoring field visit by Prof. R.K. Saha, Director, Extension Education, CAU, Imphal along with PI, FFP & interaction with the FFP farmers of Yambem & Top Chingtha village on 3rd Aug., 2019**



- iii. Two officials (Dr. Ms. Aruna T. Kumar & Dr. Ms. Mitali Gosh) from ICAR-DKMA, IARI, New Delhi for monitoring the implementation of FFP Programme CAU, Imphal centre Project sites on 5th Feb., 2020**



CHAPTER-3

Achievements during 2019-20

3. A. Name of Centre: ICAR Research Complex for NEH Region, Umiam, Meghalaya

Module wise progress of technology assessment and demonstration

I. Crop based module:

- a. Promotion of Improved Package of Practices of Khraif Crops-
 - i. Demonstration of Line Transplanting of Rice with recommended Spacing and package of practices:-



- b. Promotion of Second Cropping through dissemination of Package of Practices of Improved Technologies in Rice and Maize Fallow

Technology demonstrated- Promotion of Cole Crops cultivation in the paddy field fallow

Cultivation of broccoli in the adopted village is relatively new. Therefore, series of hands on training, awareness and demonstration programme was conducted in the cluster villages under the project. The main focus of the training was to impart technical know-how on packages of practices including nursery bed preparation, transplanting, spacing, mulching, irrigation and harvesting. In addition, focus was also made to improve the efficiency of indigenous/farmers' innovative/knowledge and practices such as the use of banana pseudostem and bamboo for protection of seedlings and irrigation, respectively. The details of interventions made are given below:

Nursery bed preparation & Line sowing:

- Deep ploughing of nursery bed to a fine tilth during the month of October
- Incorporate FYM @ 3 kg / m² and leveling the beds
- Sow the seed in line at 5 cm distance between rows and 2-5 cm between plants
- Irrigate the bed gently and mulch with dry straw for better germination.
- Keep the nursery weeds free by hand weeding.



Transplanting & spacing

- Transplanting of seedling at 4-5 weeks after sowing (4-5 leaf stages, during November – February)
- Place a single seedling at a uniform depth (5 cm)
- Place the seedling vertically into the ground to avoid a condition known as “J rooting”.
- Irrigate immediately after transplanting.



Banana pseudostem to protect seedlings against sun heat

- Cut the banana pseudostem in cross-section to about 30 cm length and split into halves
- Peel the overlapping leaf sheaths
- Erect the leaf sheaths immediately after transplanting at an angle of 45° to protect from evening sunshine.



Mulching: A 4-5 cm thickness of mulching was adopted by farmers for moisture conservation. Mulching materials used are paddy straw and dry grasses



Eco-friendly pest management in cole

crop: Use of well rotten FYM to reduce soil borne pest problems. Mechanical destruction of egg masses and early instar larvae in patches. Alternate foliar spraying of *Bacillus thuringiensis* 2 g/litre and Nimbecidine 0.15EC @ 5 ml/litre water at 15 days interval.

Bamboo drip irrigation: Apply irrigation 10-15 mm/ week for the 1/3th to 1/2th of the growing season and about 25 mm/week thereafter for winter production. Provide frequent irrigation at 10–15 days interval.



Broccoli is relatively a new crop to the cluster villages which was popularization for commercial cultivation from 2017 onwards through scientific interventions under Farmers' FIRST Project, ICAR Research Complex for NEH Region, Umiam. The favorable environmental conditions and series of successful demonstrations, 33 beneficiaries have adopted broccoli cultivation on regular basis since 2017 covering an area of 7.5 ha. The produced obtained was sold in the local market at Nongpoh @ Rs. 25-30 per kg. This brings a net profit of Rs. 6,54,400 (Rupees Six Lakh Fifty Four Thousand and Four Hundred only) as remuneration. Furthermore, farmers of nearby villages have embraced the technological advancement on cultivation of broccoli. This was evidence with Mrs. Angela Rangad, a farmer from Umden, nearby to the cluster villages, cultivated broccoli about 0.35 ha area which bring return as net profit of Rs. 13,500/-. Intervention through improved packages of practice of broccoli cultivation under the Farmers' FIRST Project, ICAR Research Complex for NEH Region, Umiam, proved to be successful among growers and today broccoli has overtaken garden pea as the most important commercial vegetable crops in the cluster villages.

Table 1: Details of Technology

Particulars	Value
Area (ha)	7.5
Average Head Weight (g)	378
Market Price (Rs.)	25-30
Expenditure (Rs.)	2,74,420
Gross Income (Rs.)	9,28,800
Net Return (Rs.)	6,54,400
Cost benefit ratio	1:3.38



Potato tubers were distributed in the month of January, 2019 and harvested in the month of April, 2019. A total of 1100 kg of potato tubers were distributed to the farmers of the adopted villages.

The farmers obtained an approximate yield of 65 q potato which was sold @ Rs.15/kg. The total income was found to be Rs. 97,500.



II. Horticulture based module:

b. Establishment of orchard of fruit crops

The following crops mentioned in Table 2 were planted during 2nd fortnight of October, 2017 in cluster villages through demonstrations.

Table 2: Details of Technology

Sl. No.	Crops	Area covered (ha)	Status/ stage
1	Khasi mandarin	0.60	Vegetative stage
2	Guava	0.85	Vegetative stage
3	Assam lemon	0.70	Initial bearing (8 to 10 fruits nos./ plant)

b. Establishment of orchard of plantation crops and spices

The following crops mentioned in Table 3 were planted during April-May, 2017 in cluster villages through demonstrations.

Table 3: Details of Technology

Sl. No.	Crops	Area covered (ha)	Status/ stage
1	Arecanut	3.00	Vegetative stage
2	Black pepper	0.70	Vegetative stage

c. Biological Pest & Disease Control of different field and horticultural crops

Ginger is a most important cash crop in Meghalaya and particularly in Ri-Bhoi district. During different stages of growth, the crop is affected by various biotic stresses. Shoot borer (*Conogethus* spp. and *Prodiotes* spp.), leaf defoliators (Scarabaeid beetles and *Spodoptera* spp.) and white grubs (*Holotrichia* spp.) are among the major pests of ginger crop in the Ri-Bhoi district. Three farmers were selected for field demonstration on ginger, namely Mrs. Demali Syiem, Mr. Pranad Binong and Mrs. Until Majong. Farmers were provided with inputs (bio-pesticides) and timely advice on management practices in ginger based on the pest population dynamics in the locality. Proper monitoring and timely management activities are essential in bio-intensive pest management programme. Population of shoot borer & rhizome fly complex are high during July and August in Ri-Bhoi district.



Pest of Ginger

Smt. Deimali Syiem, a ginger farmer from Jaigang found 24.3% increase in ginger yield by adopting need based pest management module at appropriate time.

III. Livestock based module:

a. Backyard poultry rearing

- Distributed 200 poultry birds to farmers of Mawphrew village.
- Mrs. Saila Maharana from Borkhatsari village who was given 100 poultry birds in the year 2018-19 from which she earned an income of Rs. 59,000. She had saved an amount of Rs. 5,400 from it and purchased 80 nos. of Kuroiler birds in the month of July, 2019. After rearing for a period of 3-4 months, she obtained a total revenue of Rs. 78,470 from selling the birds @ Rs. 300/kg. The total quantity of birds sold weighed approximately 262 kg. Her total expenditure on feed was Rs. 50,900 giving her a profit of Rs. 22,170.
- Constructed five poultry houses in adopted villages.



➤ Backyard pig rearing

20 Hampshire Cross piglets were distributed to 20 beneficiaries from the adopted villages under FFP on 30th May, 2019 and constructed two pig sheds houses in adopted villages.

- ❖ 16 rabbits and 5 goats were also distributed under the Livestock Based Module.
- ❖ Two successful rabbit beneficiaries had produced 17 rabbit offspring from the rabbits they received within one year.
- ❖ Two goats were sold by the beneficiaries and obtained an income of Rs.7,000.
- ❖ 20 piglets and 40 goats were also distributed to the farmers by NDRI, Kalyani, West Bengal.

IV. Enterprise based module:

a. Pig Breeding Cluster

Sows under the Pig Breeding Cluster of Mr. Mrinal Sohkhwai were artificially inseminated which produced 9 piglets in the month of April, 2019 and another batch of 11 piglets was produced in the month of November, 2019. In another batch, 26 piglets were born from 3 sows.

Another beneficiary, under the breeding cluster, Mr. Dominic Syiem was given 6 piglets (2 male and 4 female) towards the end of the year 2018. After rearing for a year, 1 sow gave birth to 9 piglets on the last week of March, 2020. Another sow is due for giving birth in the end of April, 2020.



b. Integration of Scientific Beekeeping

Awareness on Scientific beekeeping practices are being created consistently among farmers and beekeepers and are encouraged through regular visits and resolving the basic problems encountered by them during daily activities. Absconding of colonies and predatory wasps are the major problems observed during the *kharif* (rainy) season in villages. In order to reduce the problems, farmers were exposed to scientific practices during regular visits and monitoring of colonies. About 15 farmers have harvested the honey during April to November 2019. Net monetary benefit from honey production was ranged from Rs. 1,200 to Rs. 9,600 depending on the colony status, with an average benefit of Rs. 3,040 per farmer.



c. Low cost Mushroom Production Unit

Around 80 packets of mushroom spawn were distributed in the month of February, 2020 to three interested beneficiaries for cultivating oyster mushrooms.

- Mrs. Saila Maharana, from Borkhatsari village sowed 20 packets of spawn from which she obtained a yield of 61 kg of oyster which she sold @ Rs.150-200/ kg. Her total income was found to be Rs. 10,980.
- Mr. Ferdinand Barka received a total of 40 packets of mushroom spawn in the month of February, 2020 which he sowed in two batches. In duration



of 3 months, he obtained a total yield of 98.5 kg oyster mushroom which he sold @ Rs. 200/ kg giving him total revenue of Rs.19,700. His total expenditure on labor charge and mushroom house repairing was Rs. 9,000. Hence, his profit was found to be Rs. 10,700.

- Mr. Dominic Syiem received a total revenue of Rs.3,600 after selling 18 kg of mushroom @ Rs. 200/kg. The remaining yield was used for home consumption.

V. NRM based module:

- a. Management of water lodging problem of Lowland Rice field for cultivation of Second crop
 - i. Preparation of raised and sunken bed for cultivation of crops:

Three farmers were selected for construction of permanent raised and sunken beds. Nursery preparation for Rabi vegetables was done from the end of October after which the seedlings were transplanted to the main field in the month of December. Some of the results obtained for vegetables cultivated under the demonstrated technology are given in Table 4. It was found that highest net return was obtained from broccoli cultivation followed by pea and potato, whereas, highest expenditure was incurred for potato cultivation.



Table 4: Details of Technology

Crop	Yield (q) / acre	Market Price (Rs./q)	Expenditure/ Acre (Rs.)	Gross Income/ Acre (Rs.)	Net Return/ Acre (Rs.)
Pea	12.14	3,000.00	18,218.62	36,420.00	18,201.38
Potato	33.5	1,500.00	33,394.33	50,250.00	16,855.67
Broccoli	20.12	2,600.00	28,524.45	52,312.00	23,787.55

- b. Construction of jalkund for water storage

To overcome the problem of need of water for agriculture and allied activities during the period of water scarcity, several jalkunds (25x25x7 ft) have been prepared

for storage of water, under NRM module of FFP. To encourage the farmers to practice water harvesting using low cost techniques, three numbers of Jalkunds were provided to three farmers named as Mrinal Sohkhwai, Ferdinand Barka and Dominic Syiem. The water stored in Jalkund is used by the farmers for various activities such as irrigation of crops, cleaning poultry and pig sheds, drinking water for livestock, etc. Fish and duck rearing are also being taken up in the harvested water. Two farmers, Dominic and Ferdinand have also started rearing fish in the Jalkunds which were later harvested for home consumption.



VI. Integrated farming system (IFS) module:

a. Demonstration of Integrated Farming system Model

The income generation over the years from the different components of the IFS unit in Nalapara is given in Table 5.

Table 5: Details of Technology

Sl. No.	Component	Year	Revenue generated (Rs.)	Expenditure (Rs.)	Net profit (Rs.)
1.	Fishery	2017-18	1,18,000.00	16,000.00	1,02,000.00
		2018-19	2,50,000.00	46,000.00	2,04,000.00
		2019-20	3,00,000.00	85,000.00	2,15,000.00
2.	Poultry	2017-18	34,000.00	10,950.00	23,050.00
		2018-19	78,492.00	25,800.00	52,692.00
3.	Duckery	-	22,500.00	9,580.00	12,920.00
4.	Piggery	-	80,500.00	45,500.00	35,000.00
5.	Dairy	2018-19	1,78,000.00	1,74,370.00	3,630.00
		2019-20	6,71,000.00	4,53,000.00	2,18,000.00
6.	Rabbitery	-	2,100.00	-	2,100.00
7.	Crop	2017-18	46,000.00	13,000.00	33,000.00
		2018-19	47,900.00	15,000.00	32,900.00

The most profitable components were found to be the fishery unit and the dairy unit. With the help of ICAR, Mr. Jiten Sohkhwai, in whose farm the IFS unit was established, has been promoted as one of the key influencers on IFS in Marngar area, Nongpoh, Meghalaya. He now gives training to other farmers who are really interested in setting up of IFS models in the adopted villages. His success had influenced neighbouring farmers so much that many other farmers getting interested and are adopting the IFS models in their farms as well.

The following are the other developments made under the module:-

b. Development of IFS model (Umtham village): Agroforestry intervention

Components: Pig, Duck, Fish and Multipurpose trees

- Introduced Multipurpose tree species such as *Parkia roxburghii*, *Aeglemarmelos*, *Embllica officinalis*.
- Piglets were distributed for integration.
- Ducks introduced for evaluation of fish-duck productivity for enhanced income.



c. Agro-forestry intervention in livestock based IFS model (Nalapara village)

Components: Pig, Duck, Fish, Poultry and multipurpose trees

- Introduced multipurpose tree species *Parkia roxbhurghi*.
- Piglets were distributed for integration.
- Ducks introduced for evaluation of fish-duck productivity for enhanced income.



d. IFS model including Medicinal and Aromatic Plants (Puragang village): Agroforestry based intervention

Components: Fish, Multipurpose trees, Medicinal and Aromatic plants

- Medicinal & Aromatic Plants such as lemongrass and citronella were introduced.

e. Integration of Ducks in IFS Model for productivity enhancement:

- 75 Ducks are distributed in 3 villages.



VII. Fishery based module:

a. Composite fish culture:

- 167 nos. of fish ponds were recorded in the villages till 2018, now the number has risen to 207 till date.
- Demand for fish seeds and feeds have dramatically increased.
- The B: C ratio is observed to be 1: 4.8.
- 5000 nos. of fish seeds distributed to IFS ponds.
- One new fishery pond is constructed under the project.



b. Demonstration and popularization of cage culture

- Two suitable sites for cage culture demonstration are selected at Umtham and Sarikhusi village.
- Production of 18 kg of fish per cage was obtained.
- Some cages were also destroyed by crabs and fouling organisms, difficult to maintain by farmers.



c. Nursery rearing

- 1,00,000 fish spawns were distributed to demonstrate nursery rearing.
- 3 earthen ponds already constructed under nursery culture.

- Rs. 50,500 already earned from sale of seed and still continuing.
- 2 jalkunds were also utilized for nursery rearing.

VIII. Farm Mechanization based module

a. Farm Mechanization for reduced cost of cultivation

- Farm implements were distributed during the visit of Dr. S. Prabhu Kumar, former Zonal Project Director, ICAR – Zonal Project Directorate Zone I, Ludhiana & Zone VIII Bangalore and NPMC Member, Farmers' FIRST Programme, ICAR, New Delhi, and Dr. B. S. Hansra, Member of PIM, FFP under the Custom Hiring Centre under FFP.
- There are more than 100 farmers registered under the Marngar Custom Hiring Centre with representatives/leaders from the 10 adopted villages. The members have also opened a savings bank account to keep the amount collected from hiring the implements and use the money for repair and maintenance of the same. Around 200 farmers have been using the implements under the Custom Hiring Centre. Total revenue generated so far under the CHC has been recorded to be Rs.1,61,478. This revenue generated is deposited in a savings bank account and is used for maintenance and repair of the tools and equipments. They also plan to invest in new machineries once the amount generated is sufficient enough.



3.B. Name of Centre: Central Agricultural University, Imphal, Manipur

Module wise progress of technology assessment and demonstration

I. Crop based module:

a. Popularization & quality seed production of Paddy Var. CAUR-1 & RC-Maniphou-13

The traditional method or Farmers' practices of rice cultivation in Yairipok Yambem village, Imphal East includes direct seeded cultivation & random transplanting of rice 2-3 seedlings per hill with the spacing of 15 x 15 cm, resulting to low cost of cultivation and less production and profit.

Farmers in this village were less aware about the scientific method of cultivation i.e., SRI method of cultivation. Under Farmer FRIST Programme, CAU, Imphal, the activity was conducted under an area of 14 ha for CAUR-1 and 4 ha for RC-Maniphou-13 at Yairipok Yambem village, Imphal East, Manipur covering 79 farm families. Based on the data recorded from the activity, the results were shown on Table 6.

Table 6: Details of Technology

Particulars	CAUR-1 (Tamphaphou)	RC-Maniphou-13
Method of sowing	SRI	SRI
Cost of cultivation	Rs. 53,000 / ha	Rs. 53,000 / ha
Yield per ha	6052 kg	5480 kg
Selling price	Rs. 32 / kg	Rs. 32 / kg
Gross income achieved	Rs.1,93,664 /-	Rs.1,75,360 /-
Net profit	Rs. 1,40,664 /-	Rs. 1,22,360/-
Benefit Cost ratio	2.65 : 1	2.3:1

❖ Yield increased by CAUR-1 over RC-Maniphou-13 = **10.4%**

❖ Increment in Net Profit= **Rs. 18,304/- (14.9%)**



CAUR-1 (Tamphaphou)



RC-Maniphou-13

b. Varietal evaluation performance of CAUR-1, RC-Mniphou-13 & Akhan phou (Local)

The activity was conducted under an area of 0.25 (each variety) at Yairipok Yambem village, Imphal East, Manipur under Farmers' FRIST Programme, CAU, Imphal covering 1 farm family. Based on the data recorded from the activity, the results were shown in Table 7.

Table 7: Details of Technology

Particulars	CAUR-1	RC-Maniphou-13	Akhanphou (Local)
Method of sowing	SRI	SRI	SRI
Cost of cultivation	Rs. 15,000	Rs. 15,000	Rs. 15,000
Yield per (0.25 ha.)	1280 kg	1200 kg	980 kg
Selling price as quality seed	Rs. 32 / kg	Rs. 32 / kg	Rs. 32 / kg
Gross income achieved	Rs.40,960	Rs. 38,400	Rs. 31,360
Net profit	Rs. 25,960	Rs. 23,400	Rs. 16,360
Benefit Cost ratio	1.73 : 1	1.56 : 1	0.8 : 1
Percentage yield		6.67 %	30.6 %
Increment in Net Profit		12.04 %	67.52%

- ❖ Yield increased by CAUR-1 over RC-Maniphou-13 & Akhanphou (Local) = **6.67% & 30.6%**
- ❖ Increment in Net Profit by CAUR-1 over RC-Maniphou-13, Akhanphou (Local) = **Rs. 2560/- (10.94%) & Rs. 9600/- (58.68 %)**

c. Popularization of improved production practices of Pea variety Aman & Arkel under conventional tillage as well as zero tillage condition of rice fallow

Large scale cultivation of Pea Var. Aman and Pea Var. Arkel either as sole/mixed in rice fallows was made for additional income generation in Yairipok Yambem and Top Chingtha villages, Imphal East, Manipur in an area of 10 ha covering 30 farm families under Farmer FRIST Programme, CAU, Imphal. Based on the data recorded from the activity, the following results were obtained and given in Table 8.

Table 8: Details of Technology

Particular	Pea Var. Aman	Pea Var. Arkel
Cost of cultivation	Rs. 12,000 / ha	Rs. 12,000 / ha
Yield per ha (Green pod)	540 kg	450 kg
Selling price as quality seed	Rs. 40 / kg	Rs. 40 / kg
Gross income achieved	Rs.21,600	Rs.18,000
Net profit (1 ha area)	Rs. 9,600	Rs. 6,000
Benefit Cost ratio	8:1	15:1

- ❖ Yield increased by Pea Var. Aman over Arkel =**20%**
- ❖ Increment in Net Profit= **Rs. 3600/- (60%)**

**Pea Var. Aman****Pea Var. Arkel**

- d. Yield augmentation and popularization of rapeseed-mustard varieties; NRCHB-101, TS-38 & TS-67

In such situations, if the state could increase oilseed area at least additional of 10% of the existing rice fallows for cultivation of rapeseed and mustard with available production practices, the production may increase by at least up to self sufficient level. Under FFP, CAU, Imphal cultivation of rapeseed mustard were carried out under a total area of 20 ha at Yairipok Yambem and Top Chingtha villages, Imphal East, Manipur covering 25 farm families. The varieties were NRCHB-101, TS-38 and TS-67. Based on the data recorded from the activity, the following results were obtained and shown in Table 9.

Table 9: Details of Technology

Variety	NRCHB-101	TS-38	TS-67
Cost of cultivation (ha.)	Rs15,000	Rs. 15,000	Rs. 15,000
Yield per ha.	640 kg	700 kg	690 kg
Selling price as quality seed	Rs. 50 / kg	Rs. 50 / kg	Rs. 50 / kg
Gross income	Rs.32,000	Rs. 35,000	Rs. 34,500
Net profit	Rs. 17,000	Rs. 20,000	Rs. 19,500
Benefit Cost ratio	1.13 : 1	1.33 : 1	1.3 : 1
Percentage yield increased	9.37%	-	1.45 %
Increment in Net Profit	17.64 %	-	

- ❖ Yield increased by TS-38 over NRCHB-101 & TS-67 = **9.37% & 1.45%**
- ❖ Increment in Net Profit by TS-38 over NRCHB-101 & TS-67 = **Rs. 17,000/- (17.64%) & Rs. 19,500/- (2.56%)**

**NRCHB-101****TS-38****TS-67**

e. Cultivation of Lentil under Zero tillage condition

The cultivation of lentil Var. HUL-57 under zero tillage cultivation was demonstrated in the two selected villages Yaripok Top Chingtha & Yaripok Yambem in an area of 2 ha covering 4 numbers of farm families. Result of the activity is shown in Table 10.

Table 10: Details of Technology

Crop	Lentil
Variety	HUL-58
Cost of cultivation (per ha.)	Rs. 18,800/-
Yield (Kg)	300 kg
Selling price:	Rs. 90/kg
Income	Rs. 27,000/-
Profit:	Rs. 8,200/-



- f. Evaluation of Wheat Var. HD-2967 as a (supplementary crop if the kharif crop is failed) in drought affected areas

During the drought like situation at the project sites FFP, CAU, Imphal conducted the cultivation of Wheat Var. HD-2967 in an area of 10 ha. as a contingency crop in the drought affected area covering 30 no. of families. Result of the activity is shown in Table 11.

Table 11: Details of Technology

Crop	Wheat
Cost of cultivation (per ha.)	Rs. 25,600
Yield (per ha.)	1600 kg
Selling price as quality seed	Rs. 35 / kg
Gross income achieved	Rs.56,000
Net profit earn by the farmers from 1 ha area	Rs. 30,400
Benefit Cost ratio	1.18 : 1



II. Horticulture based module :

a. Production of quality planting materials of U-morok (King/Giant chilli)

Production of quality planting material of King/Giant Chilli is demonstrated at two selected villages i.e. Yaripok Top Chingtha & Yaripok Yambem. The activity was carried out at the peripheral area (0.25 ha) of farm pond covering 5 farm families and with a target of 10000 numbers of saplings.



b. Organic cultivation on ginger and turmeric

Organic cultivation of ginger and turmeric were demonstrated in the village Yairipok Yambem in an area of 0.125 ha each covering one farm family. Result of the activity is shown in Table 12:

Table 12: Details of Technology

Crop	Turmeric
Variety	Lakadong
Area (ha.)	0.125 ha.
Farm family	1
Cost (0.125 ha.)	Rs. 5000
Yield (Kg)	365 kg from 0.125 ha. Area
Selling price:	Rs. 55/kg (Fresh)
Income	Rs. 20,075/- (in 0.125)
Profit:	Rs. 15,075/- (in 0.125 ha.)



CHAPTER-4

Success Stories

4.1. Success story of Mushroom cultivation by Mr. Mrinal Sohkhwai

Mrinal Sohkhwai is a 31 year old farmer, from Borkhatsari village of Marngar area, Ri- Bhoi district, Meghalaya, who owns about 10 ha land on which he mainly grows crops like paddy, vegetables, spice crops (ginger and turmeric), pineapple and tea in his field. He is also interested in the rearing of pigs as well as poultry. The major component of his income is through agriculture. Even though he has been involved in traditional farming practices, he is also interested in modern and improved technologies of farming as well.

As he was the first farmer in his area to show interest in mushroom farming, he was initially provided with some financial assistance from the institute for the construction of the mushroom house which would also serve as a model for the entire village. A 24x15 sq. ft. house was constructed with locally available materials like bamboo, pine wood, hay, etc. He also made an investment of about of about Rs.1,500 for purchase of inputs like polythene bags, etc. Leftover straw was used as a growing medium from previous year's paddy harvest to grow the mushrooms. The straws were chopped and packed in polythene bags which were then arranged in shelves made of bamboo inside the mushroom house. The use of bamboo racks is more cost effective as it eliminates the need for large spaces.

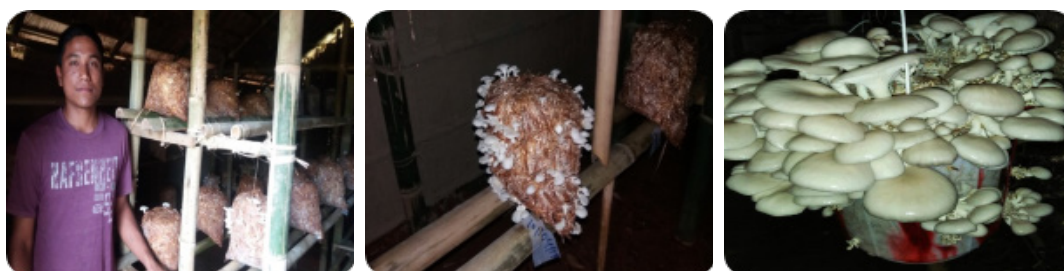
His first harvest was done in the month of May, 2017. He obtained a harvest of 4-6 kg mushroom per day which was sold to the nearby market Nongpoh @ Rs.200/kg. He earned Rs. 6000 in a short duration of one and half months, by selling a total harvest of 300 kg. With an expenditure of Rs. 2,000, his total profit was found to be Rs. 4,000. After the success of the 1st batch of growing mushroom, he expanded the intervention by sowing 150 packets of spawn. The total yield was found to be 193 kg giving him an income of Rs. 38,600. It was observed that instead of earning Rs. 20-30/kg of vegetables, one can get a return of Rs. 200/kg just by selling mushrooms.

One of the focuses of the FFP is to search farmers 'Innovations'. It is commonly seen that polythene bags are used for growing mushrooms which need to be changed after each harvesting and are discarded which cause harm to the environment, but,

Mr. Mrinal applied his own innovative idea of mushroom production using plastic buckets which can be reused after every batch by properly cleaning and sterilizing.

He purchased 15 of plastic buckets @ of Rs. 200/- each and used it for mushroom production. Now, he is reusing the plastic buckets every time after sterilizing it properly and doesn't harm the environment also.

By adopting this practice 2 kg mushroom can be harvested from one plastic bucket, whereas only 0.5 kg can be harvested using plastic bags. In one cycle Mr. Mrinal used to get only 30 kg of mushroom with 60 plastic bags, whereas with the same space by using the plastic bucket he harvests 120 kg of mushroom.



4.2 Mr. Midot M. Binong a famer from Purangang village in Ri-Bhoi District, Meghalaya successfully demonstrate the benefit of Pig Farming

Pig Farming in Purangang village in Ri-Bhoi District was developed in the Farmer field with the intervention of Farmers' FIRST project under ICAR during the year 2016-17 to 2019-20. Prior to this, the farmer used to rare local pig using traditional technology. The intervention of the Farmers' First Project helps the farmer not only to boost his income but also improved his livelihood. The farmer's income before intervention was not up to the mark. Through this project Mr. Midot received training for big breeding from NRC Pig in which he was selected as a pig breeder under the project. Now, the farmer earns a lot by selling piglet and breeding pigs from his farm. The Project also encourages the farmer to adapt both tradition and modern ways of feeding pigs, this help the farmer in reducing the cost of feed. Traditional way for feeding pigs is by giving colocasia plants, jackfruit, rice husk which are readily and freely available to the farmer. The modern ways of feeding pigs is by giving pig feed which comes with a cost, the farmer spent Rs. 20,000 for buying feed apart from giving traditional feed. In recent months the farmer sold 11 piglets which were produced from his four pigs and the net profit he obtained is Rs. 38,500. The farmer really appreciated the benefits he obtained from the intervention of the Farmers' FIRST Project.



4.3. Successful Poultry Rearing by Mr. Ferdinand Barka, from Purangang village

Mr. Ferdinand Barka, from Purangang village of Marngar, one of the poultry farmer under Farmers' FIRST Programme, received 50 one day old Vanaraja chicks on the 24th of March 2017. Following the management practices that he received from trainings at ICAR Research Complex for NEH Region, Umiam, his chicks were performing very well with very low mortality rate. Only two chicks died out of the 50 that he received. He had even learned how to care for animals during sickness and disease outbreak and to act upon them by medicating/vaccinating them accordingly. He is very enthusiastic and passionate about livestock management and he plans on expanding and improving his farm. He was advised to keep just a few of the roosters and to sell the rest for getting additional income. He feeds his chickens by mixing rice bran, paddy, maize and concentrates. Although, the chickens are not as big as those which have been fed by concentrated alone, they are healthy and the cost of rearing is also comparatively low which in turn can be more profitable in the long run. For expanding his poultry population, he was advised to incubate the eggs by using local chickens.

He kept 28 hens for egg laying purpose and sold most of the roosters @ Rs. 300/ kg live weight. He sold off 14 roosters so far with average weight of about 3 kg each. So far he had received an income of Rs. 12,000/- from the roosters. The hens lay eggs at an average of 20 eggs per day. He sold the eggs @ Rs. 10/ egg to nearby market places



but mainly supplies them to Nongpoh market, which is one of the main market place in that area. His monthly investment on feed is about Rs. 2500. His total income from the selling live birds and eggs is over Rs. 26,000.

4.4 Large scale success story of technology adoption, up-scaling, out- scaling and farmer to farmer technology dissemination

Shri. Heikrujam Premjit Singh aged 28 years of Yairipok Top Chingtha, one of the youngest beneficiary under FFP, CAU, Imphal, started Agri-Horti-Fishery-Livestock integrated farming since 2018-19. Before FFP intervention income of Shri. Singh was Rs. 1,80,000/ year.

Generally under the IFS model, farmers considered only Fishery and Livestock components as such on the peripheral farm pond areas. Also fishery and livestock were carried out without proper scientific knowledge. Therefore, expected profit/ income could not achieve against the expenditure.

With the initiation of FFP of CAU, Imphal the following intervention were taken up:-

- Introduce nutritional vegetable and fruits garden on the peripheral banks of the farm pond.
- Inclusion of crop plants like cucurbitaceous crops and pulses etc. on the peripheral banks of the farm pond.
- Cultivation of improved varieties of Cereals, Oilseeds & Pulses.
- Introduction of Composite Fish Farming.

Outcome: After the intervention, his income increases to Rs. 2,84,000/- & Rs. 2,87,000/- respectively with an additional income of Rs. 1, 04,000/- during 2018-19 & Rs, 1,07,000/- during 2019-20.



CHAPTER-5

Content Mobilization

Table 13: List of Publications by FFP Centres

Publication	Title	Prepared by/Author
ICAR Research Complex for NEH Region, Umiam, Meghalaya		
Folder	Processing and Value Addition of Jackfruit (<i>Artocarpus heterophyllus</i>)	S. R. Assumi, A. K. Jha, N. A. Deshmukh, H. Rymbai, M. B. Devi, H. D. Talang, P. T. Singh, P. K. Sinha, R. Laha
	Value addition in Carambola (<i>Averrhoa carambola</i>)	S. R. Assumi, A. K. Jha, N. A. Deshmukh, H. Rymbai, M. B. Devi, H. D. Talang, P. T. Singh, P. K. Sinha, R. Laha
	Common External Parasites of Pigs (English)	M. Das, R. Laha, L. Khongrymmai, C. A. Pariat, A. Barman, A. Sen, D. Bhattacharjee
	Zoonotic Parasites of Cattle (English)	M. Das, R. Laha, L. Khongrymmai, C. A. Pariat, A. Barman, A. Sen, D. Bhattacharjee
	Red Mite of Poultry (English)	M. Das, R. Laha, L. Khongrymmai, C. A. Pariat, A. Barman, A. Sen, D. Bhattacharjee
Article	Pig Farmers of Hilly Region of Meghalaya under Farmers FIRST Project	R. Laha, M. Das, P.K. Sinha, M. Niranjan, A. Sen, A.K. Tripathi, A. Barman. I. Swer, L. Khongrymmai, G. Kadirvel, B.C. Deka, N. Prakash

	Mushroom cultivation- A Potential Source in Improving the Household Income of Small Farmers of Hilly Region of Meghalaya	P. Baiswar, R. Laha, P.K. Sinha, H. Rymbai, D.M. Firake, A.K. Tripathi, A. Barman, I. Swer, L. Khongrymmai, B.C. Deka and N. Prakash
	Enhancing the Income of Tribal Farmers of Meghalaya through Introduction of improved rural Poultry Varieties under Farmers FIRST Project	M. Niranjan, R. Laha, Meena Das, A. Barman, I. Swer and L. Khongrymmai
Documentaries	Raised and Sunken Bed Technology https://www.youtube.com/watch?v=j_zLeLAPgXQ	
	Mushroom Production https://www.youtube.com/watch?v=KwggE3WLZVA	
	Innovation under Farmers FIRST Programme https://www.youtube.com/watch?v=y4SRshnmG28	
	Backyard Poultry Farming https://www.youtube.com/watch?v=56TwtwDmZVk	
Central Agricultural University, Imphal, Manipur		
Folder	“Gaint Chilli- Cultivation under Polyhouse”	Prof. R.K. Dilip Singh, Dr. Th. Renuka Devi, Mutum Suraj Singh, Konsam Cha Shyamananda, R.K. Sandeep Singh
	“Spawn Production and Cultivation Technology of Oyster Mushroom”	Dr. L. Nongdrenkhomba Singh, Dr. Th. Renuka Devi, Mutum Suraj Singh, Konsam Cha Shyamananda, R.K. Sandeep Singh
	Vermicomposting	Prof. Indira Sarangthem, Dr. Nivedita Oinam, R.K. Sandeep Singh, Konsam Cha Shyamananda , Mutum Suraj

CHAPTER-6

Budget Provision & Fund Utilization

A total budget provision of **Rs.58.75 lakhs** had been allotted as RE for 2019-20 under ATARI, Zone-VII, Barapani for the Farmers' FIRST Programme (FFP). Out of **Rs. 58.75 lakhs**, **Rs. 5.50 lakhs** had been allotted to ATARI with **Rs. 0.00** and **Rs. 5.50 lakhs** expenditures under Capital and General heads respectively. The RE 2019-20 for the FFP implementing centre ICAR RC for NEH Region, Umiam, Meghalaya was **Rs. 32.75 lakhs** total allocation with **Rs.16.00 lakhs** and **Rs. 16.75 lakhs** expenditures under Capital and General heads respectively. The RE 2019-20 for the FFP implementing centre Central Agricultural University, Imphal, Manipur was **Rs. 20.50 lakhs** total allocation with **Rs.5.00 lakhs** and **Rs.15.50 lakhs** expenditures under Capital and General heads respectively. The Centre-wise details of budget provision and its fund utilization are also highlighted in Table 14.

Table 14: Details on Budget Allocation for FFP

Sl No.	Centre	Total Budget Allocation	RE for 2019-20			Expenditure		
			Capital	General	Total	Capital	General	Total
1	ICAR RC for NEH Region, Umiam, Meghalaya	58.75	16.00	16.75	32.75	16.00	16.75	32.75
2	Central Agricultural University, Imphal, Manipur		5.00	15.50	20.50	5.00	15.50	20.50
3	ICAR-ATARI, Zone-VII, Umiam		0.00	5.50	5.50	0.00	5.50	5.50
	TOTAL		21.00	37.75	58.75	21.00	37.75	58.75

