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Seed Production Business: An Emerging Business Opportunity In Assam

By Dr Kanwar Singh & Dr Neeraj Kumar Tyagi

Quality seed production and access to good quality seed is a big challenge for the farmers of Assam and also that of the region. Non-accessibility to quality seed is a persisting problem in the region, as most of the public and private-sector seed companies/ corporations have little or no presence in several stress-prone, remote and ecologically fragile areas of Assam. Moreover, because of the lack of proper training on quality seed production, processing, and storage, the quality of the farmer-saved seed often remains sub-standard affecting crop yield. Broadly, the rice seed

Paddy grown for seed purpose

system of Assam consists of formal and informal components, where the formal component is dominated by the public sector including Assam Seeds Corporation Limited, and the National Seeds Corporation, for production as well as marketing of seeds, although the private sector involvement is increasing, particularly that of the farmer producer companies (FPCs) who are coming forward with the help of the public sector organisations. The informal component consists of farmer-based systems in which farmers select, process, store, exchange and use the seeds as they have been doing traditionally. This informal component is dominant as the formal component accounts for only around 33% of the total supply of seed used at the state level.

Though, Assam Agricultural University, Jorhat and Regional Rainfed Lowland Rice Research Station (RRLRRS) - Gerua, have been providing breeder and foundation seed to the Assam Seeds Corporation Limited/Private agencies/Progressive farmers, in time, for the production of foundation/certified seeds and getting themselves registered with the Assam Seeds Organic Certification Agency (ASOCA). The requirement for high-quality seed is far above what these agencies could produce. Considering these facts, IRRI and AAU have taken the initiative of quality seed production through FPCs under the Assam Agribusiness and Rural Transformation Project (APART), with technical and financial support for the production and marketing of seeds of pure, high-yielding, certified/authentic rice varieties with the registered growers. The formation and development of FPCs for rice seed production activities were actively encouraged and supported by the IRRI/AAU/ASCL, under APART by providing a platform for seed buyback, to strengthen the formal seed system in Assam. These FPCs can also distribute the seed with their network to the member farmers.

Seed production is an emerging enterprise which gives high returns per rupee investment. Seed production enterprise involves the major activities like production, testing, processing, storage and marketing of seed. Seed production is distinct from crop production in terms of cultural operations, utilization, technological

requirements and economics. Seed production involves the scientific production technology of seed, right from the selection of seed source to harvesting, processing, packaging and storage. Initially, during the Sali season2021, three FPCs, registered under the company act were involved in seed production and marketing activities in Assam. During the Sali season (2022-23), 15 more FPCs are involved in seed production with ASCL and have been properly trained for seed production. These FPCs are engaged in seed production of stress-tolerant rice varieties to strengthen the rice value chain and economic upliftment of smallholding farmers.

To successfully run a seed production program, the FPCs should follow some basic steps, mainly -

Planning

The foremost requirement for entrepreneurship in the seed sector is planning. Planning includes the demand forecast, selection of crops, varieties/hybrids, climate and location, and selection of the site for seed production and seed processing.

Technical knowledge

The seed entrepreneur must possess technical knowledge in seed production about climate and location of seed production, isolation distance, planting ratio, field inspection, roguing of off-types, synchronization of flowering in parental lines, maturity and harvesting.

Infrastructure

Infrastructure plays a central role in the very success of entrepreneurship. Infrastructure in the seed sector includes skilled manpower, seed-processing plant, seed testing, seed-storage facilities, seed packaging, market availability, etc.

Capital

Capital is the most important factor to be considered by the entrepreneur. Capital is required for the seed production process from input procurement to harvesting, establishing a seed processing plant, seed-testing laboratory, seed-storage structures, hiring trained manpower and transportation.

Source of seed and indenting

A seed entrepreneur must know about different classes of seed and their source of production. Breeder Seed is produced by Scientists/breeders of State Agricultural Universities (SAUs)/ICAR Institutes. AAU, Jorhat and RRLRRS, Gerua, are responsible

for Breeder Seed production. Foundation Seed is produced by Assam Seeds Corporation Limited, Assam Agricultural University and National Seeds Corporation. The seed entrepreneurs can take up the production of either foundation/ certified seed. The indent for the requirement of the Breeder Seed class is to be forwarded to the Director, Department of Agriculture. The breeder seed of promising varieties of rice in Assam includes Ranjit-Sub1, Bahadur-Sub1, Swarna-Sub1, DRR Dhan 42, DRR 44, BRRI Dhan-75, BINA Dhan 11, Bina Dhan 17, Luit, CR Dhan 307, CR Dhan310, CR Dhan 602 and CR Dhan 909.

Quality control mechanism

During seed production, strict attention should be given to the maintenance of genetic identity and purities of varieties. In general, succeeding generations of a crop, produce seeds of a lower standard. Therefore, a generation system of seed production has been developed.

Seed certification system

In addition to the seed generation system, seed certification is also practised controlling the quality of seed during production and multiplication. The purpose of seed certification is to maintain and make available high-quality seed and propagating materials of notified kind and varieties, so grown and distributed to ensure genetic identity and genetic purity. Seed certification involves field inspections and seed testing to ensure the seed lot meets the required minimum seed certification standards. In Assam, Assam Seed and Organic Certification Agency is functioning as the nodal agency for seed certification.

Training

The production of quality seeds depends on the skill of the seed grower. The seed grower should have thorough knowledge about the production and post-harvest technologies of seed. FPC members are constantly trained for quality seed production by IRRI/AAU/ASCL/ ARIAS Society/ASOCA teams, and ASOCA team monitors various crop growth stages to ensure the purity of the produced seed. There are various institutes in the country which are providing training on many aspects of the seed production system, such as the National Seed Research and Training Centre, Varanasi, National Seeds Corporation, Assam Seeds

Corporation Ltd., Assam Agricultural University, Non-governmental Organizations and Private Seed Companies.

Seed marketing

FPC intervenes in sourcing, procuring and marketing seeds produced by the member farmers. It also supports the farmers with agricultural inputs like machinery, fertilizers and pesticides, etc.FPC can work as a linkage between farmers and the public and private sector to strengthen the rice value chain. FPC can work to develop the capacity and skill of farmers in bulk purchase of seeds and supply to the public and private sectors. FPCs with their custom hiring centres (CHCs) can facilitate the access of machines and desired inputs to the local farmers in that area and may help in increasing the horizontal dissemination of good quality seed. The role of FPC is to act as an aggregator of inputs as well as output for member farmers which will enhance the economy of scale and bargaining power of member farmers.

Rice Doctor (RD) Assam

By Nomi Sarmah and Puja Rajkhowa, IRRI

The Rice crop is one of the most susceptible crops preferred by several insect pests, diseases, as well as other pathogens, and the climatic condition of Assam provides a favourable environment to these insect pests and pathogens. Many times the farmers are unable to reach the agricultural research stations or KVKs' to get the correct diagnostic advisory or adequate control measures. This calls for a user-friendly assistance to minimise crop damage. Rice Doctor is an application-based source of information on insect pests, diseases, nutrient deficiencies, toxicities and agronomy-related problems commonly observed in rice cultivation. It is a diagnostic tool that aims to assist extension advisors and farmers to have accurate and early diagnosis of more than 63 rice-related problems, insects, pests, diseases, nutrient deficiencies and toxicities, their infestations along with their management and solutions. It aims to reduce the incidence of mismanagement of rice crop problems by reducing misdiagnosis of causes and lack of knowledge about correct management options. The user may provide indications of the symptoms observed by him/her and the app will lead to the most probable pest/pathogen alongside the management technique.

Documentation for disease identification

Rice Doctor Assam was proposed with the intent to address these issues faced by farmers and extension advisors. To acquire a

climate resilient sustainable rice production system, such an app may play a major role in the early detection and management of the pest and pathogens. IRRI-APART focuses on innovative approaches to bridge the gap between research and practice to improve the lives of numerous rice-growing farmers through knowledge management and capacity building.

Before the launch of any app, it is pertinent to run tests on its usability amongst the target groups. Similarly, Rice Doctor Assam app was tested and evaluated across several locations in Assam. The main objective of the usability testing was to assess the efficiency and accuracy of the app for the diagnosis and management of insect pests, diseases and abiotic stress.

The three principles behind usability testing are:

- **a) Effectiveness** - accuracy and completeness of a product being used to attain a certain goal. In this study, diagnostic accuracy will be measured by comparing what the respondents have identified in the field and what expert has determined to be presented in the selected fields.
- **b) Efficiency** - time taken by the participants to identify the problems.
- **c) User satisfaction** - deals with the users' comfort and positive attitude toward the RD.

Rise Of Service Providers Of Paddy Transplanter In Sivasagar

By Ankita Sahoo, Junior Researcher, IRRI

Mechanized farming is necessary to advance the agriculture sector, and with changing times, it has been observed that more and more young farmers are taking up agriculture as a source of livelihood. This initiative by the young and progressive farmers is a step toward creating awareness of the adoption of new technologies and the creation of new employment avenues in agriculture for the youth. Farm power holds every opportunity in favour of smallholder farmers in rural areas to expand and raise their income.

Indeswar Dahotia, NakatoniKalugaon, Sivasagar

Mechanical transplanting of rice is gaining popularity to overcome labour shortage and also high labour cost during transplanting in, Sivasagar district of Assam. Mechanical transplanting saves time and labour, helps in timely transplanting and maintaining optimum plant density leading to an increase in productivity. Initially, the farmers of the district were reluctant to use the technology due to the high price of the machine, lack of knowledge on seedling raising technique, availability of the machine, lack of knowledge on machine operations and making mat-type nursery, shortage of properly trained operators, and unavailability of spares parts. But with the introduction of APART and

Tapan Kumar Bora, Jiamarigaon, Sivasagar

IRRI-AAU-led activities in the district, the dissemination of the technology was accepted and the farmers were eager to buy the machine. The Department of Agriculture Office, Sivasagar is playing a vital role in the intensification and faster transformation of paddy transplanting technology at the farmer's field level. At present, the Directorate of Agriculture has provided around 10 Nos of rice transplanters through a government subsidy program at the rate of 50% in Sivasagar. In total, four paddy transplanters were bought by the farmers. IRRI, DoA and AAU had carried out several field demonstrations to introduce the transplanter performance and imparted hands-on training on operation technique, repair, and maintenance at the farmer's field level. These types of field activities significantly changed the mindset of farmers and encouraged them to use rice transplanters. Field day and crop-cut programs are the other techniques to create awareness and quicker dissemination of rice transplanter. Field day organised by IRRI-APART helped to share the benefits of using the rice transplanter, whereas the crop-cut program showed the yield advantages of mechanically transplanted rice as compared to traditional transplanting. Hence, it can be concluded that the increase in service providers showed a significant positive impact on crop productivity. Paddy productivity is highly dependent on agricultural service providers and an important factor is the timely availability of implements. It can be seen that farmers having more implements can earn a maximum return. The details of private service providers for the mechanical transplanter are given below:

Rajesh Kr. Dutta, Namtinowholia, Sivasagar

Khagakanta Chutia, Bonmukh Chutia, Sivasagar

Mechanical Transplanting Of Bina Dhan 11 In Bongaigaon District: A Contingent Measure For Farmers Against Early Season Flood

Compiled by : Mr Akhoy Jyoti Bharadwaj, Junior Researcher (IRRI)

BINA Dhan 11 (Ciherang-Sub1) is a high-yielding short-duration (120 days) rice variety developed by the Bangladesh Institute of Nuclear Agriculture (BINA). It is a stress-tolerant rice variety (STRV) which can withstand and survive under flooded conditions for up to 15 days.

of Bongaigaon district.

APART was initiated in Bongaigaon district from 2022 and one of the implementing agencies of the project is Krishi Vigyan Kendra (KVK), Bongaigaon.

Members of Bhairavchura FPC

Farmers using technological interventions to plant Bina Dhan 11

The short duration of the variety played a major role for farmers of Assam to escape adverse conditions like early season floods in the ongoing Sali season (2022). Similar is the case for a group of farmers under Bharavchura FPC from Kasarpara, Boitamari region attended a one-day training organised by KVK under the objective II of IRRI-supported activities where they were introduced to mat-type nursery preparation, mechanical transplanting and short-duration variety BINA Dhan 11. Since in this

season Assam was heavily affected by erratic rainfall and early season flooding at the time of nursery bed preparation, the farmers found it very difficult to carry out timely sowing of seeds. The members of the FPC were also unable to sow their preferred variety of Ranjit. Hence, they opted for mechanical transplanting of BINA Dhan 11 because of its short duration. They prepared a mat-type nursery a month later when the flood water receded. A total of 8 farmers planned and prepared a mat-type nursery for 5 hectares of land on June 29, 2022, with technical guidance from International Rice Research Institute (IRRI). Transplanting was started on July 20; 2022and was completed on July 25, 2022.

Selection of variety, BINA Dhan 11 helped the farmers by providing the option for late sowing. At the same time, mechanical transplanting saved time and labour. Farmers are very satisfied and now showing keen interest in adopting the technologies in future.

North East India Level Regional Workshop On ASF

A north east India level regional workshop on ASF was organised by ILRI in partnership with AHVD, ARIAS Society and the Department of Animal Husbandry, Dairying (DAHD), Govt of India. The workshop was attended by senior officials from the Department of Animal Husbandry & Dairying (DAHD), Ministry of Fishery Animal Husbandry & Dairying (MoFAHD), Government of India (GoI); ICAR-New Delhi; ICAR-NRCP; ICAR-NIHSAD; ICAR-North Eastern Hills Region (NEH); senior officials from Animal Husbandry & Veterinary Departments of Assam, Arunachal Pradesh, Meghalaya, Mizoram, Manipur, Nagaland, Sikkim, Tripura, Uttar Pradesh and Punjab and senior representatives from AAU; FAO; the World Bank and ILRI. A total of 62 participants attended the workshop.

Key dignitaries are addressing the Inaugural and closing session of the workshop

The key objective of the workshop was to a have better understanding on status of ASF in NE states, existing control and management approaches, experience gained, limitations recorded and future approaches needed and to utilize the

knowledge gained from the workshop and to design an effective long term ASF control and management plan for the state of Assam, which could be utilized for designing the ASF control plan for other NE states and the rest of India.

The inaugural session of the workshop was addressed by Dr. Daniel Beltran-Alcrudo, Technical Advisor (Animal Health), FAO; Dr. Dieter Schillinger, Deputy Director General (DDG) (Biosciences); Dr. Bidyut Chandan Deka, Vice Chancellor, AAU; Dr. Praveen Malik, Animal Husbandry Commissioner (AHC), DAHD, GoI and Dr. Ashish Kumar Bhutani, IAS, Additional Chief Secretary cum Agriculture Production Commissioner (APC) to the GoA. In the 1st technical session, all the NE states made their presentation on the status of ASF, experienced gained and recommendations made followed by presentations from AAU, NRCP, NIHSAD and ILRI-FAO. The second technical session deliberated on the outcome of the first technical session and tried to identify the solutions to address the issues faced by the states. A series of specific actions were suggested by the key representatives of DAHD and ICAR, Govt. Of India to the State govts, to address the issues faced by them.

The workshop concluded with an Open Session, addressed by Dr. Dieter Schillinger, Deputy Director General (DDG) (Biosciences), Mr. Shamsiev Bekzod, Senior Economist cum TTL, APART, The World Bank; Dr. Praveen Malik, AHC, DAHD, GoI; Dr. B. N. Tripathi, DDG (Animal Science), ICAR; Shri Jayant Narlikar, IAS, Commissioner and Secretary, AHVD, GoA and Sri Atul Bora, Hon'ble Minister for Agriculture, Horticulture, Animal Husbandry & Veterinary etc., GoA. A comprehensive workshop report was drafted by ILRI and circulated with the all concern.

Key dignitaries are addressing the Inaugural and closing session of the workshop

Training On ASF Containment And Control Delivered By International ASF Experts From FAO And ILRI

A three-day-long training programme was organised by ILRI in association with AHVD and ARIAS Society on Containment and Control of ASF from 4th to 6th July 2022 at the Conference Hall of the Assam Livestock & Poultry Corporation Ltd. (ALPCo). The training was delivered by three international ASF experts namely, Dr Daniel Beltran Alcrudo, Technical Advisor (Animal Health), FAO; Dr Mark Hovari, ASF Control Expert, ILRI and Dr Marius Masulis, Stamping Out Expert, ILRI and participated by 30 veterinary officers from different districts of Assam and the NERDDL laboratory. In the training, the internal experts delivered sessions on ASF outbreak investigation, diagnosis, epidemiology, introducing and lifting zoning, imposing movement restrictions, proper methods of culling and compensation etc. The training was inaugurated by Sri Manoj Saikia, Chairman, ALPCo; Smt. Indira R. Kalita, Director, AHVD and Smt. Dipali Devi, Managing Director, ALPCo.

Training sessions

Training Of Govt. Veterinary Officials On Testing Pork For Quality And Safety

ILRI in association with Animal Husbandry and Veterinary Department, Assam organised training for the veterinary officers on testing pork samples to assess their quality and safety to human health. The training was organised at the Meat Testing Laboratory of ALPCo, Khanapara, Guwahati from 7th to 9th June 2022. Part of the practical demonstration was also conducted at the Central Milk Testing Laboratory

Briefing on pork quality and safety testing by ILRI expert

of DDD. The training was attended by six officials from AHVD and ALPCo. In these three days of training, both theoretical explanations of the various test procedures and bio safety protocol and the process of sample collection, labelling, packaging and

Interaction between ILRI experts and pork laboratory officials

dispatching were explained. This was followed by a practical demonstration of the test procedures. The delivery of the training was led by Dr Johanna Lindahl, Veterinary Epidemiologist, ILRI-Nairobi and supported by the

Demonstration of pork safety test by ILRI's resource person

local ILRI staff and hired resource person (meat specialist).

Workshop On Training, Monitoring & Certification (TMC)

On 1st July 2022 a workshop was organized for the District level Veterinary and Dairy officers, by OPIU, APART, Dairy Development on Training, Monitoring & Certification (TMC) of milk market actors, in collaboration with the International Livestock Research Institute (ILRI). A total of 23 District Veterinary & Dairy officers attended the workshop. The importance of monitoring the milk market actor training and final certification process, the proper way of reporting the training outcomes etc. were highlighted in the workshop.

Training in progress

Training For Milk Producers Under APART

To improve the milk quality and safety in the existing informal milk value chain, a training programme for milk producers was conducted by the District Coordinators Nalbari, Morigaon, Nagaon, Darrang, Karbi Anglong, Lakhimpur and Sonitpur, APART, Dairy Development, during July 2022 with the technical guidance from ILRI. The training topics were delivered by trained master trainers of A.H.& Vety Deptt, and Dairy Development Deptt.

Nalbari

Nagaon

Darrang

Karbi Anglong

Lakhimpur

Sonitpur

Training For Milk Traders Under APART

An awareness training programme on trading of clean & hygienic milk, for the milk traders was conducted by the District Coordinators at Kokrajhar, Sonitpur & Jorhat districts under Dairy Development, APART in the month of July 2022, with technical support from ILRI. In July 2022, with technical guidance from ILRI. The training topics were delivered by trained master trainers of A.H.& Vety Deptt, and Dairy Development Deptt.

Kokrajhar

Sonitpur

Jorhat

Group Discussion And Workshop With Farmers On Financial Education & Counseling (FEC)

Easy access to financial services and products is a key condition for achieving growth in any sector. It is true for the Agriculture sector as well which sustains more than half of our population as a source of livelihood. However, illiteracy and unawareness among farmers hinder their access to financial products and services. To address these issues the Assam Agribusiness and Rural Transformation Project (APART), launched the program on financial education and counselling in April 2022. The objective of the program is to enhance the financial inclusion of the farm community along with encouraging responsible use of financial services and products by them. This in turn aims to increase the growth and resilience of the Agri-business of Assam.

As one of the first activities of the program, the financial education and counselling (FEC) team held discussions and workshops with farmers across 8 districts of Assam. The target groups for these discussions were the Farmer Producer Companies (FPCs) along with the Farmer Interest Groups (FIGs) who are APART beneficiaries. The main objective of these discussions was to collect relevant data which would help the FEC team to create an ICT-based, self-paced, e-learning module on financial literacy for farmers. The discussions were held on the topics such as access of farmers to financial products and services in different blocks, participation of female farmers in the traditional banking system, usage of digital financial tools among farmers, their understanding of financial literacy and what kind of educational content do they need for better access to the financial products and services.

The activity was conducted in Kamrup (metro) and Kamrup, along with Morigaon, Cachar, Lakhimpur, Golaghat, Darrang and Rangia. Around two hundred and eight farmers were reached out in these districts. The final findings of the discussion and workshop were incorporated in the inception report for the FEC which was submitted in July.

Financial education and counselling with FPCs

Financial education and counselling with Farmers and project beneficiaries

It needs to be mentioned here that the FEC program will be conducted across 24 districts of Assam covered by Project APART. The project currently is implemented by the Assam Rural Infrastructure and Agricultural Services (ARIAS Society), Department of Agriculture under the Government of Assam and supported by World Bank.

A Financial education and counselling (FEC) team has been formed consisting of a consortium of four partners namely the New Delhi-based Digital Empowerment Foundation (DEF) along with Fair Climate Fund (FCF), the Indian Institute of Banking Management (IIBM) and the Council for Social and digital development (CSDD). The program will educate, counsel and facilitate financial products and services to over two lakh fifty thousand farmers under APART.

Enterprise Development Programme (EDP) On Greenhouse

The General Greenhouse Management training program was arranged by the Commissionerate of Industries and Commerce (CI&C) in collaboration with Assam Rural Infrastructure and Agricultural Services (ARIAS) Society for supporting the beneficiaries enrolled under Kshyamata Program, Assam Agribusiness Rural Transformation Project (APART). This training program facilitated 20 entrepreneurs from the selected districts of Assam and was arranged by the National Institute of Post Harvest Technology (NIPHT), Pune, Maharashtra at their Horticulture Training Centre (HTC).

The team at NIPHT, Pune

National Institute of Post Harvesting Technology's Horticulture Training Center is established by Maharashtra State Agriculture Marketing Board (MSAMB) in technical collaboration with leading International Partner, The

Netherland Development Finance Company (FMO) and Practical Training Center (PTC+) of the Netherland Year 2002. The key aim of the Institute is to take relevant agricultural research from the lab to land.

The main objective of this training program was to nurture promising entrepreneurs with the best practices of Greenhouse Management. Through this exposure visit, it is believed that the entrepreneurs selected have understood how to fill up the gaps & challenges faced while creating a business and the overall market. Most importantly, they were familiarized with various central schemes for facilitating convergence, along with that they have learned different new technologies that are used all over the world and also learnt how to use basic home remedies that would help in rectifying various unfamiliar conditions affecting their major crops. The institute also explained how to prepare a Detailed Project Report (DPR) to make the entrepreneur's investment ready.

It is the hope that with this learning, the entrepreneurs would help create an ecosystem for enlightening other upcoming entrepreneurs in related fields.

Classroom and practical sessions

Agri Input Study – Observations Of The Team Of Experts From MANAGE On The District-Level Scenario

A short-duration study entitled "Review and Analysis of Farm Input Supply Systems in Assam" was commissioned by the ARIAS Society in consultation with the World Bank, through the National Institute of Agricultural Extension Management (MANAGE), Hyderabad. To have a better understanding of the existing inputs supply system, the team of experts identified in the Study visited Guwahati in June 2022. The team of experts also had interactions with all relevant stakeholders during the Inception Workshop organized jointly by MANAGE & APART on 28th June 2022 at the Agri Campus, Khanapara, Guwahati. The Inception Report prepared based on the field observations of the experts and interaction with different stakeholders during the Inception Workshop representing the Government of Assam, agri-input industry and academia have already been shared with APART. The study mainly aims at developing an action plan for improving access of farmers to different farm inputs like seeds, fertilizers and chemicals. Accordingly, the study will focus on findings and suggestions that will help in strengthening private sector activities in farm input markets, and design capacity-building programs for agri-input supply chain stakeholders based on the findings of the study.

Team interacting with the agri-input dealers, retailers and farmers in Tezpur

Team with the DAO and agri-input stakeholders at Nagaon, Assam

Team with the DAO and other Govt officials in Diphu, Karbi Anglong, Assam

Team at Nagaon, Assam, with the Fertilizer & Agro-chemical dealer

The study is being coordinated by Dr Shalendra from MANAGE, Hyderabad and sector-wise assessment is being carried out by a team of experts identified under the Study with wide experience of working on different farm inputs. The team consists of Dr Soumitra Das, Team Leader, Shri Ajay Bharatiya, Fertilizer Expert, Shri Vijay Bhaskar Reddy, Seed Expert, Dr Ansuman Maity, Agro-chemical Expert visited different districts of the states to have a better understanding of the existing supply system and record perception of all the relevant stakeholders on opportunities and constraints faced by them. The districts covered during the field visit are Jorhat, Sonitpur, Nagaon, Karbi Anglong and Kamrup. The key stakeholders in the agri-input sectors mainly seed; fertilizer and agro-chemical were represented by the distributors, dealers, retailers, C&F agents and the end beneficiary, the farmers. The survey meetings were facilitated by APART coordinators and the district officials in each district. The team interacted with the stakeholders and filled in the Questionnaire prepared for seed, fertilizer and agro-chemicals. The team also discussed with the district officials, Assam Agricultural University (AAU) officials, KVK staff and others. Some of the seed production and processing plants, wholesale and retail outlets of seeds, fertilizers and agro-chemicals were also visited.

It would be appropriate to mention here that the socio-economic growth of the state, which heavily depends on agriculture, is constrained by poor quality seeds, poor agri-input supply chain, spurious agrochemicals, limited access to markets and inadequate availability of processing and storage infrastructure facilities. It is important to ensure timely delivery of good quality inputs to the farmers to have improved agricultural growth in the states. To address these issues, the information collected during the field visit will be compiled and analysed by the team to suggest actionable and

implementable recommendations to the Government of Assam. The findings are expected to facilitate the development of the agri-input and agriculture sector as well as overall farmers' welfare to go a long way. The findings will be compiled and presented as a mid-term report to APART.

Some illustrations of the field visit and interaction with various stakeholders in different districts of Assam are depicted here.

Experience Sharing By Summer Interns From Indian Institute Of Plantation Management, Bangalore

Study on Millets
Mohit Mehta
PGDM in Food Processing & Business Management
Study on Spices
Rahul Amratwar
PGDM in Agri Export & Business Management
Study on MAPs
Suraj Ambre
PGDM in Agri Export & Business Management

Every experience is a positive experience if we view it as an opportunity for growth and self mastery. Our three months working in ARIAS Society was a sneak peek into the corporate world. It taught us how to work in a team polished our leadership qualities and enhanced our business as well as technical skills. APART Team has a very co-operative work culture which streamlined our project smoothly till the end.

Our project asked us to identify and develop market linkage opportunities and supply chain analysis of Spices,

Medicinal and Aromatic Plants (MAPs) and Millets. The interactions that we had with various key stakeholders and domain specialists in the current Agri value chain of our respective commodities helped us to understand their impact on the value chain. The problems faced by them gave us a chance to devise viable cluster-based solution.

Lastly, we look forward to apply the knowledge from our summer internship experience in our future endeavours. It has indeed been a humongous learning experience.

The intern students interacting with the different stakeholders in the field

WorldFish Project Leader Dr C V Mohan visited APART Activities

WorldFish Project Leader Dr C.V Mohan, from Malaysia, visited Assam from 1st July to 4th July 2022 to support the WorldFish activities and interventions under the World Bank-financed-APART project.

During his visit, Dr C.V Mohan had a detailed discussion with the State Project Director and officials of ARIAS Society, Department of Fisheries and Assam WorldFish team regarding the progress of the APART project, its impact and the plan of activities under the project.

Dr C.V Mohan visited the Field School of Kalong-Kapili in Bogibari village, Kamrup district, along with Dr Sanjay Sarma, Fishery Coordinator, APART, Dr Baishnaba Charan Ratha, Sr. Nutrition Specialist, WorldFish, Odisha, Dr Dharitri Baruah, Technical Coordinator, WorldFish. Dr C V Mohan, Principal Scientist, WorldFish, discussed with the Kalong-Kapili team the promotion of SIS among fish farmers of the Northeast region.

Dr C.V Mohan attended the daylong Zonal Workshop on "Fish Nutrition in Human Health" organized by WorldFish in collaboration with ARIAS Society and the Department of Fisheries, Assam, under the World Bank-funded Assam Agribusiness and Rural Transformation Project

(APART) on the 3rd July 2022 at Conference Hall, AAU, Khanapara, Guwahati. He served as a resource person in the Zonal workshop and gave a presentation on "Aquatic Food Systems for Healthy People and Planet" and explained in detail the role and importance of Aquatic foods and Aquatic food systems for Sustainable Development.

Zonal Workshop On Fish Nutrition In Human Health

A Zonal Workshop on Fish Nutrition in Human Health was organized by the WorldFish in collaboration with ARIAS Society and the Department of Fisheries, Assam, under the World Bank-funded Assam Agribusiness and Rural Transformation Project (APART) on 3rd July 2022 at Conference Hall, AAU, Khanapara, Guwahati.

Dr C.V. Mohan, Principal Scientist, WorldFish, Malaysia, and Dr Baishnaba Charan Ratha, Senior Nutrition Specialist, WorldFish, were the Resource Persons for the workshop. Dr B.K. Bhattacharjya, Principal Scientist and Head, ICAR-CIFRI, Guwahati, Dr Chayan Kr. Acharjee, Deputy Director of Fisheries, Dr Binod Kalita, Dean (I/C), College of Fisheries, Raha, Dr Pranjal Pratim Sharma, Member, Assam Agriculture Commission, Dr Dandadhar Sarma, Prof. Dept of Zoology, Guwahati University, Ratul Sharma, AFIO, DoF participated as Guest speakers in the workshop.

A total of 66 participants attended the workshop, which was coordinated by Dr Dhrubajyoti Sharma, Nodal Officer, APART and Dr Sanjay Sarma, Fisheries Coordinator, ARIAS Society. DFDOs and FDOs from the Department of Fisheries, Senior Scientist, ICAR-CIFRI, NFDB officials, Block Development Officers, Technical Expert Fisheries (TEFs) and Engineering Consultant Fisheries (ECF) of APART Project Districts, FPC members, Beneficiaries of APART were the participants of the Workshop.

The main objective of the Zonal workshop was to create awareness about the health benefits of consumption of small fish and also encourage women, particularly pregnant and lactating women, infants and young children, to consume small fish based on regular diets.

During the workshop, Dr C.V. Mohan, Principal Scientist, WorldFish, Malaysia, gave a lecture on "Aquatic Food Systems for Healthy People and Planet" and explained in detail the role and importance of Aquatic foods and Aquatic food systems for sustainable development. He expressed that the small fishes are the "Super Food", that is rich in multiple bio-available essential micronutrients when eaten in whole are highly nutritious and contribute a wide range of micronutrients that benefit the health of pregnant and lactating women, adolescent girls and children.

Dr B.K. Bhattacharjya, Principal Scientist & Head, ICAR-CIFRI, Guwahati, shared his research experiences and the importance of fish consumption and sustainable development of the fisheries sector in Assam and presented detailed data on the biochemical composition of small indigenous fishes based on a study conducted by ICAR-CIFRI. He also presented the data on the macro and micro mineral content of the small indigenous fishes.

Dr Baishnaba Charan Ratha, Senior Nutrition Specialist, WorldFish, emphasised that fish plays an important role in providing the essential micronutrients including vitamins and minerals for a well-balanced nutrition and mentioned that among the different varieties of fishes available for human consumption, locally available small fish species have been found to have immense potential to improve nutrition and wellbeing. When eaten whole, they are particularly rich in micronutrients like calcium, vitamin A, iron and zinc and play an important role in the growth and development of a child.

Pranjal Pratim Sharma, a member of the Assam Agriculture Commission, talked about the importance of eating fish and vegetables and the importance of a diverse diet to achieve good nutritional benefits and prevent malnutrition in Assam.

During the occasion, a Video on Small Fish based nutrition Promotion explaining the benefits of small fish consumption, produced by WorldFish for the APART was released by Dr C.V.Mohan during the workshop.

World Bank's 7th Implementation Review Mission of APART

The 7th Implementation Review Mission of APART by World Bank was held from 12th – 15th July 2022. The start-up meeting took place on 12th July 2022 at the Conference Hall, ARIAS Society. The meeting was attended by the State Project Director, ARIAS Society, Task Team Leader World Bank, APART PCU team, OPIUs of APART, Consulting Agencies and other stakeholders. The meeting was held in both online and offline modes.

The World Bank team reviewed and discussed the implementation of the project activities by the OPIUs.

Field visits of the World Bank Consultants, PCU and OPIUs, were conducted from 16th July 2022, onwards, where the World Bank Consultants and APART teams visited the locations where APART activities are implemented, covering the different Agri and allied sectors.




World Bank TTL Dr. Bekzod Shamsiev visited Small Fish Nutrition Awareness program in Uttaran FPC, Rangia, Kamrup District

WorldFish, technical partners of APART project continued to conduct the Nutritional awareness program with the purpose to bring awareness to the community on the nutritional importance and nutritional security of the local communities. During the month of July, 2022 WorldFish team conducted 3 nutrition programs in Satgaon and Charipunia in Morigaon

District and in "Uttaran" FPC in Kamrup District. A total of 133 participants attended the awareness programs. WorldFish. The participants attended include women, pregnant women and lactating mothers, adolescent girls and children, caregivers, community members, ICDS staff and ASHA workers, DOF officials and APART staff.

On 9th July, 2022, WorldBank Task Team Leader, Dr. Bekzod Shamsiev visited the awareness program conducted in "Uttaran" FPC in Rangia, Kamrup District. Dr. Sanjay Sarma, Fishery Coordinator, ARIAS Society, Dr. Dhrubajyoti Sharma, Nodal Officer, Department of Fisheries,

Charan Ratha, WorldFish Nutrition Expert from Odisha, gave a presentation on the nutritional importance of small fishes and provided basic information on small fish nutrition among pregnant and lactating women and children.

Dr. Baishnaba Charan Ratha, WorldFish Nurition Expert, Dr. Dharitri Baruah, Technical Coordinator, Ms.Nabamika Sonowal, Technical Expert Fisheries were present during the visit. Dr.Bekzod, TTL, World Bank interacted with the FPC members and suggested the FPC to engage more women in different farm activities and to get involved in preparing dry fish products and in fish farming activities for increasing their employment and income for better livelihood.

During the program, Dr. Baishnaba

The importance of balanced nutrition in the first 1,000 days of a child's life, which encompasses pregnancy and the first two years after birth was discussed during the meeting. The team demonstrated the process of preparation of Small Fish Powder to the participants and explained them the benefits of using it in the daily diets. The WorldFish team also screened the Small Fish Nutrition Video and also distributed the SBCC materials for the benefit of the participants to better understand the role of small fishes in human nutrition.

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