

Farm Mechanization: Improving Farming, Improving Life

“Happy to get the first-hand experience on improved technologies..... adoption of farm machineries have now started in our village too,” said Mr Krishna Mahanta, President, Rangdhali Krishak Gut, Custom Hiring Centre (CHC), Jorhat who hosted the exhibition-cum-technology showcase of different Post-harvest machineries at the CHC, Jorhat on November 25, 2020.



Exhibition-cum-technology showcase program was organized at Custom Hiring Centre, Jorhat

Agriculture plays an important role in India's economy as large majority of rural population depends on agriculture for livelihood. In the changing scenario, mechanization of agricultural activities is one of the priority areas, which has drawn a special interest from farmers to policymakers.

In Assam, under the World Bank-financed Assam Agri-Business and Rural Transformation Project

(APART), Assam Agricultural University (AAU) with the technical support of the International Rice Research Institute (IRRI) has introduced farmer-friendly machines to address their needs in post-harvest and rice value chain, since 2018. APART has focussed on the resilience technologies of rice value chains in the State for targeting the smallholder farmers and agro-entrepreneurs in 23 districts of the State. By increasing access to updated knowledge and technologies, the Project is trying to empower farmers for better decision-making so that yield gaps are minimized, farmer income is increased and a sustainable rice-based agri-food system is developed.



Exhibition-cum-technology showcase program was organized at Custom Hiring Centre, Jorhat

Technological exhibitions play a critical role in increasing awareness among key stakeholders, especially farmers and government officials of agriculture and allied departments, thereby promoting farm mechanization and post-harvest technologies and encouraging entrepreneurship among youths and women. With this objective an exhibition-cum-technology showcase program was organized at Custom Hiring Centre, Jorhat on 25th November 2020 by AAU with the technical support from IRRI.

The technologies demonstrated during the program were Reaper, Axial-Flow Thresher, Combine Harvester, Solar Bubble Dryer, Portable Rice Mill and Dry Grinding Machine. During the event, IRRI experts explained the benefits of mechanized harvesting and threshing and also a comparative advantage of a combine harvester and reaper/axial flow thresher use over the traditional method of harvesting and threshing. The biggest motivation for the farmers on using improved technologies as expressed by some progressive farmers is that with the use of post-harvest machinery the field could be vacated early, which facilitates timely plantation/sowing of the next crop.

In Assam, the drying process requires special attention as moisture content at harvest is generally high and higher humidity further increase the moisture percentage of the grains after threshing. To address this issue, the Solar Bubble Dryer was introduced in APART, which was demonstrated to the participants wherein, 0.5-ton paddy was dried in 8 hours with the reduction of 8.4% moisture. The broken percentage in traditional rice milling system is more than 30%,

a very significant loss to the farmers. The Portable Rice Mill (PRM) introduced under APART in the state to address this issue was also demonstrated with a result of 3-5% broken rice due to the presence of rubber roller in this rice mill. It is worth mentioning that the Portable Rice Mill involves a two-step process of milling where husk and bran are obtained separately and brown rice can also be obtained.



Participants taking part in the Demonstration of farm machineries

The women-centric dry grinding machine was demonstrated during the event, to motivate the women participants for switching as an entrepreneur in the rice powder business.

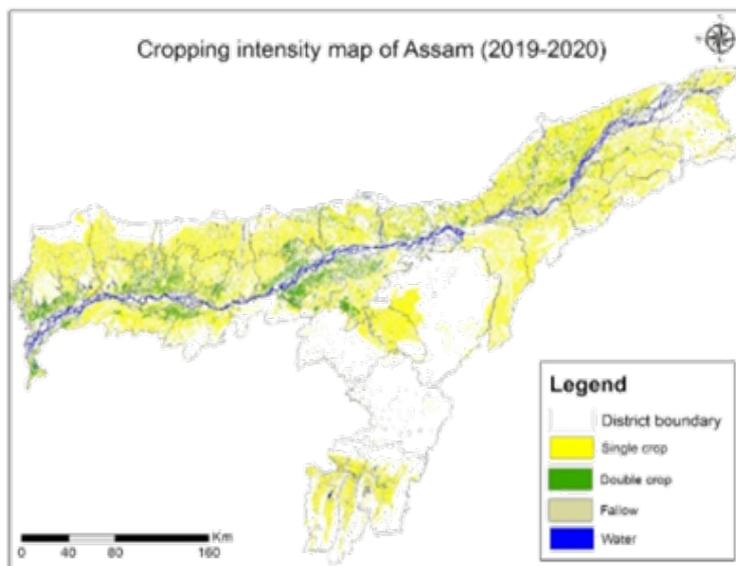
The most effective part of the event was farmer-scientist interaction in the field during the demonstrations for better understanding of machines and their usage. More than 120 farmers from Golaghat and Jorhat districts participated in this event. Dr Mrinal Saikia, Associate Director of Research, AAU, Dr M Neog, Associate Director of Extension Education, AAU, Dr Kanwar Singh, Senior Associate Scientist & Resident Coordinator, IRRI, Dr Rupam Borgohain, Nodal Officer, APART-OPIU-AAU and other distinguished guests and officials from AAU, IRRI and Department of Agriculture graced the event.

“CHC models were created through various projects earlier in Assam. But somehow it didn’t work well. I have seen technologies are reaching to the farmers at large scale and the concept of CHC is taking momentum in Assam in the present IRRI supported CHC initiative. I am sure with our combined effort, CHC is going to benefit the farmers of Assam in long run” said Dr Mrinal Saikia,

-Dr. Suryakanta Khandai, Saurajyoti Baishya and Ankita Sahu, IRRI

Utilizing Rice fallows for economic gain

Rice is the single most important crop in Assam. It occupies 2.54 million ha of the gross cropped area of 4.16 million ha and contributes 96% of the total food grain production of the state. Due to various reasons, such as the cultivation of long-duration paddy varieties, waterlogging and excessive moisture, lack of moisture at planting time for winter crops, lack of irrigation, non-availability of seeds of short duration varieties of rabi



crops and other socio-economic problems like stray cattle etc. most of the area remains fallow after harvest of paddy during rabi season in the state.

Assam Agricultural University (AAU) with the technical support from International Rice Research Institute (IRRI) under APART has introduced short duration Stress Tolerant Rice Varieties (STRV) such as BINA Dhan 11 that makes growing of second crop possible in the rabi season. At the same time, the IRRI GIS team has drawn the moisture availability map and identified the rice-fallow areas, where the crops which require a minimum quantity of water can be grown by the farmers after rice. It is expected that the intervention will help in increasing cropping intensity in Assam and directly have an impact on the farmer's income.



Utilization of rice fallow areas by introducing other crops

With the ever-changing climatic scenario and the increasing cost of production, the need of alternative crop establishment methods, which have a positive impact on the environment as well as at the same time save the critical inputs, is felt. Zero tillage is the resource conservation technology which provides a direct benefit to the environment as well as the impact on farmer's income. So, zero tillage-based technologies are being tested for large scale adoption by farmers in the state under APART. Details of demonstrations for the cropping system carried out presently in Kamrup, Nagaon, Golaghat and Lakhimpur districts are as follows

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Total Area selection at one site: 9.5 Bigha

Cropping system	Plot Area (Bigha)
Rice fb Green pea	2.5 Bigha
Rice fb Mustard (rapeseed)	2.5 Bigha
Rice fb Potato	2.0 Bigha
Rice fb Lentil	2.5 Bigha
Total Area at one location	9.5 Bigha

Cultivar:

Rice: Medium-duration variety for Sali (BINA Dhan11)	1.	Mustard (Rapeseed): DMR 150-35, NRCHB 101
	2.	Green pea (Hyb): VL Matar-42, Rachana and HUDP-15
	3.	Lentil: HUL 57, KLS 218 and AxomMasur 1
	4.	Potato: KufriHimalini, Kufri Surya, Chip Sona 3

Method of sowing:

- » Rice: FP-TPR
- » Mustard (rapeseed), Green pea and Lentil- ZT - Zero tillage, with surface retained rice-residue, using seed-cum-fertilizer drill
- » Potato: Conventional method
- » The zero-tillage technology of mustard (rapeseed), green pea and lentil has received good response from farmers of the State and if this system works in the right direction, a major change is anticipated shortly for creating a great impact on Assam economy.

-Jyoti Bikash Nath, Vipin Kumar and Vivek Kumar, IRRI –APART, Assam

Varietal evaluation of crop cafeteria: a platform to select the best varieties

Crop cafeteria is a replicated trial to promote the diffusion of highly preferred rice varieties, climate-resilient stress-tolerant rice varieties (STRVs), state/national/international level released varieties, private sector varieties, high yielding varieties and premium quality rice varieties among the key stakeholders of the rice value chain. Under APART, Assam Agricultural University (AAU) with the technical support of International Rice Research Institute (IRRI), conducted two crop cafeterias at Regional Agricultural Research Station (RARS), Titabar and Krishi Vigyan Kendra (KVK), Nagaon during Sali season 2020.

The best varieties from crop cafeteria are selected through participatory



Crop cafeteria at Krishi Vigyan Kendra (KVK), Nagaon



SPD ARIAS interacting with IRRI and AAU team during the Crop Cafeteria Workshop

varietal evaluation by formal and informal seed system stakeholders. The participatory varietal evaluation of crop cafeteria at Krishi Vigyan Kendra (KVK), Nagaon was conducted on 06th November 2020 under the Assam Agribusiness and Rural Transformation Project (APART). The stakeholders of crop cafeteria participatory varietal evaluation were farmers, seed dealers, rice millers, officials of Department of Agriculture, Assam Seeds Corporation Limited, Assam State Seed Certification Agency and Research Scientists from different Institutions. The Stakeholders selected the best variety of rice, based on the crop characteristics; yield and yield-related parameters i.e. plant height, duration in days, non-lodging character, disease resistance, pest resistance, effective tillers, grain type, panicle (Grain/panicle), grain colour, anticipated yield etc.



Participants in the participatory varietal evaluation of crop cafeteria at Krishi Vigyan Kendra (KVK), Nagaon

The inauguration session of the crop cafeteria participatory varietal evaluation was moderated by Dr Niranjana Deka, Senior Scientist & Head, KVK, Nagaon. The program was graced by Shri Vinod Seshan, IAS, SPD, ARIAS Society, as chief guest, Dr AK Tripathi, Director, ATARI, as the special guest, Dr R Borgohain, Nodal Officer (OPIU-AAU, APART), Dr Kanwar Singh, Senior Associate Scientist and Resident Coordinator, IRRI, Dr P C Sarma, Chief Scientist, RARS Shillongani, Mr Kailash Barman, Director, ASSCA, and other formal and informal seed system stakeholders including millers, dealers, seed growers and farmers were present. In this program, a total of 39 participants had participated including farmers, seed dealers, rice millers, seed growers, FPCs, department of agriculture officials, scientists, with 54 per cent women participation. The farmers based on their observation selected CR Dhan 909 (PQR), Bahadur-Sub1 (STRV), Prafulla (LPV), Ranjit-Sub1 (STRV) and RNR15048 (PQR) in a sequential preference at KVK, Nagaon.

Another participatory varietal evaluation of crop cafeteria was conducted at Regional Agricultural Research Station (RARS), Titabar, Jorhat, on November 11, 2020. The inauguration session of the Titabor event was chaired by Dr T. J. Ghosh, Chief Scientist, RARS, Titabar. While attending the session, Dr R. Borgohain, Nodal officer APART, OIPU-AAU, Dr Kalyan. Pathak, Alternate Nodal Officer, APART, OPIU-AAU gave brief



Arial view of the Crop cafeteria at KVK Nagaon

information of APART activities and Dr Kanwar Singh, Senior Associate Scientist and Resident Coordinator, IRRI gave a brief description about the IRRI supported activities under APART and also elaborated the objectives of the crop cafeteria evaluation program. In this program, a total of 39 participants had participated including farmers, seed dealers, rice millers, seed growers, extension officers, scientists with 18 per cent women participation. The preferential sequences of the varieties taken up by the farmers are Ranjit-Sub1 (STRV), RNR15048 (PQR), CR Dhan 909 (PQR), Bahadur-Sub1 (STRV), Prafulla (LPV), BINA Dhan 17 (STRV) and CR Dhan 307. The present scientist and extension officers have also made the scientific evaluation of different varieties based on the selected crop parameters and yield attributing characters in the prescribed format. The final results of the selected varieties will be shared after crop cutting and analysis of the data. He

- Dr Kanwar Singh & Dr Rahul Priyodarshi, IRRI

Field data collection for Mapping Rice area

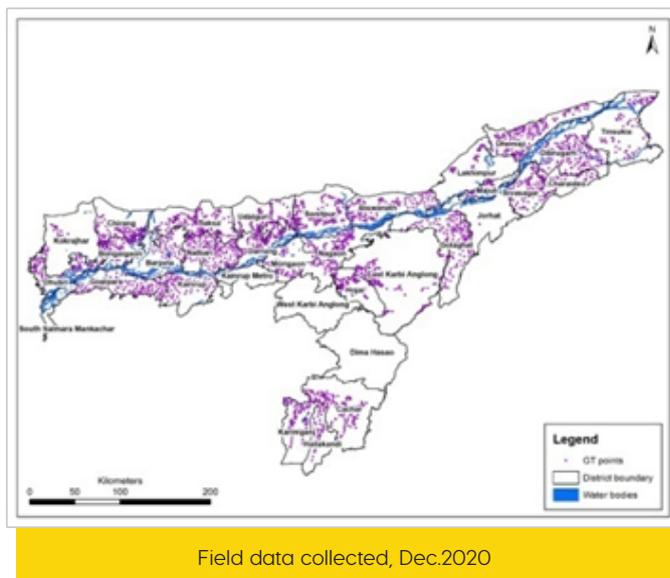
Rice area and cropping system maps, using satellite data and Geographic Information System (GIS) is one of the important outputs of APART GIS initiative. To generate these maps for Assam, field data points for rice and non-rice areas are required as input in the algorithm as well as for post-mapping validation and accuracy assessment of maps. The GIS team consisting of 4 Project Scientists (PS), 2 Assistant Project Scientists (APS) and 4 Research Technicians (RT) along with IRRI RTs stationed at different districts are currently involved in collection of ground truth data from all districts of Assam. A total of 3000 points from 32 districts (excluding the hill district of Dima Hasao) were planned to be collected. An average of around 70-150 points were collected from each district depending on the total agricultural area of the district. An elaborate survey form was prepared in KoboCollect and data on rice varieties, time of sowing, disease information, flood information and Use of satellite data and Geographic Information System (GIS)



Use of satellite data and Geographic Information System (GIS)

cropping systems/intensity are being collected by the teams from the field using the KoboCollect mobile app and GPS receivers for location information. Survey locations were carefully selected by pre-planning and creating points in Google maps so that they remain fairly equally separated from each other and are ideally not within 2 km range from each other.

The survey began from the first week of December 2020 with 7 teams simultaneously covering the 32 districts. Till now, 2640 points have been collected from all the districts of Assam and survey is still going on in 5 districts. Survey for the entire state will be completed by 15th Dec 2020. Out of the total points collected, 85% of points have been collected in agricultural areas where paddy is cultivated and the rest are in other areas such as other crops or current fallow areas. Out of the total points, 42% falls in areas where floods had affected the sali paddy and around 15% of these flood-affected paddy areas faced some damage due to flooding. It was also seen that more than 70% of the sali paddy areas remain fallow in the boro or rabi season. Areas that remained fallow during the sali season were mainly due to waterlogging after floods. The collected field data points will be depicted on the developed maps to validate the accuracy level of developed maps for further usage by the extension functionaries.



- Suranjana B. Borah and Jyoti Bikash Nath, IRRI

Initiatives of Convergence with Government of India Schemes

Grant Thornton India LLP has been working as the Cluster Development Technical Agency under the ambit of Assam Agribusiness & Rural Transformation Project to form 17 cluster-based Industry Associations in Assam for development of the agro-based industry in the State.

The implementation of APART activities in the districts of Nalbari, Kokrajhar & Dhubri, has been ongoing since last one year and Grant Thornton has been working relentlessly for the development of Micro, Small, Medium enterprises in Agri & allied sector. For the holistic development of the enterprises, Grant Thornton has been maintaining a healthy relationship with all the line departments, agencies and experts like Agriculture, Fishery, Dairy, KVK, UCO-RSETI and other business development service providers. The support from the line departments is appreciable.

Distribution of Pulveriser Machine among Entrepreneurs

In August 2020, it came to the knowledge of Grant Thornton that Pulveriser Machines are being allocated and distributed for the Food & Spice processing enterprises of the districts by the Agriculture Department. Grant Thornton Team collected the detailed information, criteria of selection and how to/where to apply from the Agriculture Department. These machines were distributed under HMNEH scheme, which is a regular programme of the Agriculture Department.



Grant Thornton team disseminated the information and called the interested applicants the districts of Nalbari, Kokrajhar & Dhubri and assisted them to apply online through hortnet.com.

Sl. No.	Representative Name of the unit	Unit name	District Name
1	BarnaliDeka	Shasank Food Products	Nalbari
2	Hiranmoyee Barman	Romee's Food	Nalbari
3	BinitaKalitaMazumder	Kamaladevi	Nalbari
4	Rupali Baruah	Madhurjyoti Natural Udyog	Nalbari
5	Biva Devi	D M B	Nalbari
6	Sewali Deka Barman	J B Food	Nalbari
7	RupaliNath	Aabiskar	Nalbari
8	Mrs Rima Moni Sharma		Kokrajhar
9	Mrs Dipali Roy		Kokrajhar
10	Mrs Bibha Rani Roy		Dhubri
11	Mrs Mira Devi		Dhubri
12	Mrs Juthika Das		Dhubri
13	Mrs Champa Roy		Dhubri



Meetings and interactions with beneficiaries



Beneficiaries with their Pulveriser Machines received through the HMNEH scheme, Agriculture Department

Adoption of carp-mola-sis farming in Nalbari district under APART

Polyculture of carps along with Mola and other Small Indigenous Species (SIS) technology was introduced in the fish value chain of APART in 2019-20. Culture of small indigenous fishes including mola along with carps is a viable technology demonstrated by WorldFish in Bangladesh, Cambodia, Myanmar and in the state of Odisha in India which helped to increase the production and income to the farmers apart from conserving the fish diversity and providing nutritional security to the local communities.



Mola fish production under APART

WorldFish Experts Dr. Benoy Kumar Barman and Dr. Manos Kumar Saha from WorldFish, Bangladesh visited during October-November, 2019 to Assam and provided training to the project staff and farmers in Nalbari, Barpeta and Kamrup districts in coordination with Department of Fisheries. During the year 2019-20, Mola and SIS in Polyculture of carps demonstrations were adopted by 67 beneficiaries in 10 districts covering 22.9 ha. The WorldFish has also provided the BMP guidelines for the Polyculture of carps with Mola and SIS, conducted trainings in the FPGs and provided required technical support. WorldFish Experts Dr.C.V.Mohan from Malaysia and Dr. Benoy Kumar Barman from Bangladesh visited the project sites during February 2020 and assessed the establishment of Mola and SIS along with carps and the results were encouraging. The results of the demonstrations showed that the farmers were able to get an additional production of 200-300 kg of small fishes including mola through partial harvesting without compromising on the production of carps. These demonstrations have encouraged many farmers in the cluster to adopt the technology.

During the year 2020-21, it is proposed to conduct the Polyculture of carps with Mola and SIS in 50 ha with 150 beneficiaries. During October, 2020 in Nalbari district 54 beneficiaries from 4 FPGs have already stocked Mola and SIS along with Carps and the technology demonstration is also taken up in other districts based on the success of the technology during the year 2019-20 which is encouraging both the beneficiaries and non-beneficiaries to adopt the technology.

Capacity building field level training programme by the College of Fisheries

College of Fisheries, AAU, Raha imparted training on “Polyculture in Pond Fisheries” for both the beneficiaries and non beneficiaries in residential mode at the cluster level under the Capacity Building Programme of APART (fishery sub component). Amid the pandemic Covid-19 situation, it has been decided to conduct the training programmes at field/cluster level for the current year 2020-21. The field level trainings were conducted in a day long programme module instead of three days covering the following important topics –

- » Concept and methods of Carp Polyculture Technology.
- » Management of soil and water quality parameters in fish culture ponds.
- » Climate resilient Short Duration Fish Culture technology.
- » Polyculture of carps with other fishes viz. Mola, Jayanti Rohu, Amur Carp etc.
- » Supplementary fish feed and methods of preparation.
- » Fish diseases, prevention and their control measures in fish culture pond.

The training programmes have been conducted at field level at the respective clusters for 20 nos of beneficiaries in each batch. All the required precautionary measures and social distancing norms of Covid-19 protocol have been followed and maintained during the training programmes. A total of 600 beneficiaries in 30 batches have been trained initially for the following districts-

District	Cluster	Nos. of Trainees
Sonitpur	Borcholla, Sootea and Pub Choiduar	55
Lakhimpur	Karunabari & Nowboicha	60
Nagaon	Botodrawa, Juria, Lowkhowa, Rupahihat, Binnakandi	135
Golaghat	Gomariguri & Morongi	50
Jorhat	North West Jorhat	45
Morigaon	Dolonghat & Moirabari	130
Goalpara	Rangjuli	60
Nalbari	Pub nalbari	20
Darrang	Kolaigaon	45

Resource persons from the Dept. of Fisheries, Govt. of Assam, College of Fisheries, Raha and the WorldFish have extended their full cooperation for conducting the day long field level training programme in a successful way.



Polyculture training at College of Fisheries, Raha.

Krishi Rupantar

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