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CULTIVATION OF PROCESSING POTATO VARIETIES TO ENHANCE THE INCOME OF FARMERS

- Dr Minsura Begum, District Horticulture Coordinator, APART, Barpeta

Farmers in Assam have been cultivating table purpose varieties of potato, mostly Kufri Pukhraj but it is observed that there is a tremendous scope of growing processing varieties that could enhance the income and livelihood of the farmers.

Lack of Quality seed, lack of knowledge of the farmers on processing varieties, gluts like situations in the market during peak season and distress sale and also less shelf life of table varieties are a few challenges that the farmers have to go through. International Potato

Interaction at Cluster level

Centre (CIP) being the Technical Knowledge Partner under the World Bank-financed project – APART, has

introduced and promoted the Small Farmers' Large Field (SFLF) model to enable smallholder farmers to get maximum benefits by pooling their lands for land preparation, mechanization, the lower unit cost for quality seed, inputs and other field operations and market linkages.

During the Rabi season of the year 2020-21, a Cluster-based Potato demonstration was taken using the SFLF model. 18 farmers (of which 11 farmers were a member of Potato Value Chain School-Mandia Potato Growers) were selected from Barpeta district under Mandia block. The demonstration plots were taken in three patches for a total of 5 ha and a similar area for the control plot. They cultivated Kufri Chipsona 3 variety in the demonstration plot and Kufri Pukhraj in the control plot. Kufri Chipsona 3 is a medium maturing, late blight resistant meant for processing and chip making with low reducing sugars and high dry matter content. For the demonstration plot, potato seeds were provided to the farmers from the project- APART with technical training. Stage-wise monitoring and supervision of the demonstration plot was regularly done by the district team- District Horticulture Coordinator and ATMA staff.

Kufri Chipsona variety

Farmers were highly satisfied with the variety; the total yield was 107.5 MT in the 5 ha demo plot area. Out of the total yield of the Chipsona 3 variety, a market linkage with the production unit of Haldiram at Nalbari was facilitated by the project for a quantity of 46.66 MT at the rate of Rs. 13.50 per kg. Approximately, 50 MT of the remaining produces were sold in the market with prices ranging from Rs. 7 to Rs. 10 per kg.

The yield from the control plot (Kufri Pukhraj) where the cultivation was done on farmers owns practices were sold at a market price of Rs 4.5 – Rs. 9/per kg.

Table 1:

Before APART intervention	After APART intervention
Farmers were growing mainly table purpose variety(eg K Pukhraj)	Farmers aware of processing variety
Shelf life of K Pukhraj was less (maximum for 1 month)	Shelf life was longer (3 months inside house over simple shelves/place)
Market price low	High demand in the processing industry

The farmer group had planned to keep aside 1540 kg of the yield from the demonstration plot at the Sorbhog Cold Storage, for the next season cultivation and also for distribution to other villagers interested to adopt the new variety for the next planting. It was also observed that with good yield and market price, around 24 more farmers from Mandia Block, Barpeta has come forward to adopt the new variety (Chipsona 3) for the rabi season of the year 2021-22. They had procured 25MT from their own and cultivated in a land area of 125 bighas.

Harvesting of cluster demo Potatoes

Market Linkage Facilitate of Chipsona 3 variety with Haldiram under APART

RICE VALUE CHAIN

DRY DIRECT SEEDING OF RICE (DSR): *A Promising Rice Cultivation Technology for the Farmers of Karbi Anglong*

- Contributed by: Dibyarishi Bhattacharjya, IRRI

Karbi Anglong is one of the few districts in Assam which is in the rain shadow area resulting in less rainfall of 1356.1 mm annually. Irregular and scanty rainfall pattern in the district makes the cultivation of major crops i.e., rice, sugarcane, toria, mustard, etc. challenging for the farmers. During the Kharif season, due to the erratic distribution of rains, the farmers are forced to opt for alternative options of rice crop establishment with minimal use of water.

The Sali 2021 season was the worst season for the puddled rice culture, due to a long spell of rainfall withdrawal at the peak period of nursery raising and transplanting in the district and adjacent Kaki, Udali rice belts of Hojai. It was a great concern not only for the farmers but also for the policymakers. At the same time during an interaction with farmers and experts from IRRI, the progressive and the lead farmers from greater Karbi Anglong Autonomous Hills district Bokajan, Howraghat, Lumbajong, Diphu, etc. expressed their views that dry seeding of rice with

Dry DSR method being used in the field of Jinjar Hanse

the use of seed-cum-fertilizer drill combined with effective and efficient weed and water management and nutrient management may be the most suitable paddy establishment method for the area in the scanty rainfall situation.

Mr Jirjar Hanse from Upper Hapjan, Karbi Anglong was also a part of the interaction; he came forward to cultivate his field by using the seed-cum-fertilizer drill for the Dry-DSR method of crop establishment on a trial-and-error basis. There was confusion! There were risks!! But he had the zeal to find out the solution to the long-lasting problem.

Mr Hanse approached KVK, Karbi Anglong to know more about the Dry-DSR method. Both KVK and IRRI responded to him positively and provided him with all the technical knowledge and support to establish the crop. During Sali season 2021, he volunteered to conduct the demonstration on Dry-DSR under APART. Junior Researcher and Research Technician from IRRI, APART team of KVK, Karbi Anglong provided all necessary support for running the machine, weed and pest management, quality seeds, fertilizers, seed-cum-fertilizer drill, etc. Hanse cultivated Ranjit-Sub1 variety in a 1 ha area of his land and diligently managed the field till harvesting.

Demonstration plot for Dry DSR

Hanse was able to harvest an expected yield from the crop. He observed that the cultivation cost had drastically come down by use of this technology, almost half the cost of cultivation done by traditional method. He expressed his satisfaction with the technology and assistance provided by the IRRI and APART team of KVK, Karbi Anglong.

Paddy cultivated by using of Dry DSR method

DRY GRINDING MACHINE: A WOMEN-FRIENDLY MACHINE FOR VALUE ADDITION

- Contributed by Saurajyoti Baishya and Ankita Sahu, IRRI

With the support from the International Rice Research Institute (IRRI) and Assam Agricultural University (AAU) under APART, women farmers across Assam have taken the initiative for value-addition of rice by using machines. Generally, in Assam the women farmers use to grind their broken rice kernels into rice powder with the help of pestle and mortar or by using dheki. The process takes a lot of effort and is time-consuming.

User-friendly rice grinding machine

The dry grinding machine promoted under APART is a low cost, easy maintenance and transport and user-friendly machine, which can be easily operated by women for value addition of rice. Under APART, value chain capacity building training and demonstrations were organized by Krishi Vigyan Kendra with the technical support of IRRI, where the woman had activity participated. The training mainly included processing techniques, value-addition, packaging, marketing, labeling, and cost-benefit calculation of processed products. Hands-on training was also imparted to the women participants so that they could use the machine properly and carry out minimal repair and maintenance, if required during the operation. The interested women were also been linked with the dealers of the dry grinding machines so that they can directly interact with them and negotiate the cost of the products. To date, 48 service providers of the dry grinding machine have been established all over Assam. The finished products include rice powder, turmeric powder, chilli powder, etc. These products are packed and sold mainly in Krishi Melas, local daily haats etc.

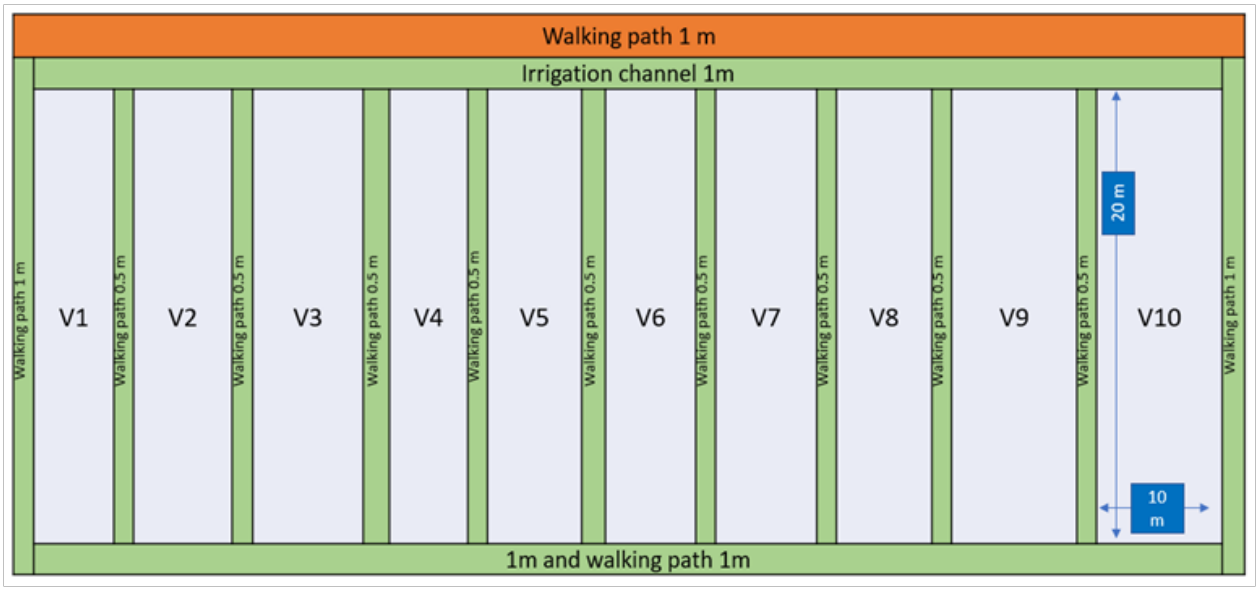
SHOWCASING THE TRADITIONAL VARIETIES: A STORY FROM RANGIA PQR CAFETERIA

Contributed by: Dr Kasturi Goswami and Ms Puja Rajkhowa, IRRI

Speciality rice holds a special place in the heart and life of Assam farmers, and they also cultivate several traditional rice varieties. There are three major classes' viz. Joha or aromatic rice, Bora or sticky rice, and Boka/Komal or soft rice. Joha rice is preferred for its aroma, taste, and small grain size. Bora rice is sticky and is mainly used for preparing rice cakes, locally called pitha. It can also be served as a breakfast food with milk, banana and jaggery when cooked. Soft rice or "Boka" rice as called in lower Assam does not require any kind of cooking.

Transplanting of traditional rice varieties

For showcasing the performance of these traditional varieties in a single field, District Agriculture Office, Kamrup (R) with the technical support of the International Rice Research Institute (IRRI) established a rice variety cafeteria in NizBorigog village under Nakul ADO circle of Rangia Development Block in the field of Mr Robin Bonia during the Sali season 2021.



The cafeteria was laid with 10 varieties of locally important varietie namelyJoha, Bora and soft rice. A black rice variety was also included in the cafeteria. The varieties included were Maniki Madhuri, Keteki, Batcha Bhog, Malbhog, Sugandhi, Tulsi, Bora, NalBanni; Boka rice and the black rice variety. A single plot of each variety was 200 sqm (10m x 20m), thereby, 10 varieties covered a total of 2000sqm (200sqm x 10). According to the size and shape of the field, all the 10 varieties were transplanted, with a half-meter wide walking path in between two varieties.

All the recommendations of AAU and IRRI for the management of the rice variety cafeteria were followed properly. Fertilizer was applied as per the recommended dose i.e. 40:20:20:5.25 (N:P:K: Zn) per hectare. The nitrogen dose was applied in a split of 3 equal applications - about 1/3 as basal, 1/3 at tillering, and 1/3 at panicle initiation. Need-based pesticides were also applied.

A field day was conducted when the crop was at the maturity stage. About 30 farmers along with 5 extension functionaries and experts from IRRI participated in the program. For the evaluation of the varieties, the participants were given 3 sheets each of two different colours to score for 3 most preferred varieties and three least preferred varieties. The evaluation

Premium Quality Rice variety cafeteria

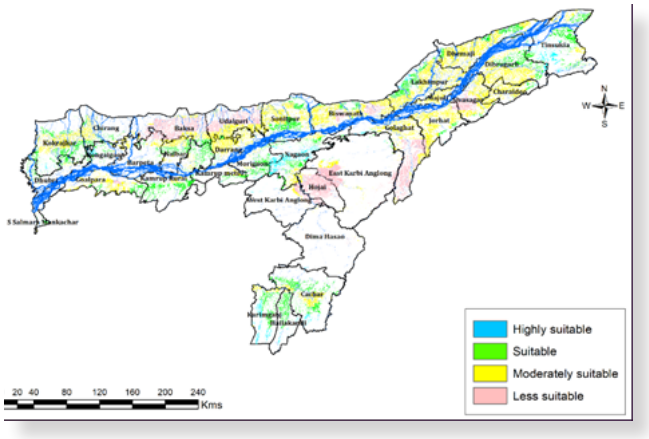
was done based on plant height, tillering ability, disease, and insect-pest resistance, lodging resistance, grain colour, grain type, filled and unfilled grains, panicle length, aroma and anticipated yield, etc. Out of the 10 varieties, the farmers scored highest for Manik Madhuri followed by Keteki Joha and Batcha Bhog. The crop cafeteria received appreciation from all the stakeholders.

TARGETING RICE-FALLOW AREAS FOR INCREASING PRODUCTIVITY, PROFITABILITY AND CROPPING INTENSITY IN ASSAM

Dr Suranjana B. Borah, Senior Specialist - GIS & Remote Sensing and
Dr Kanwar Singh, Senior Associate Scientist & Resident Coordinator, IRRI

Assam has an estimated 25 lakh hectares area under paddy cultivation which accounts for almost 83% of the total cultivable land of the state. But most of this paddy cultivation is confined to the Kharif season (sali) during which almost 19 lakh hectares of agricultural land is utilized. Though Assam is blessed with highly fertile arable soils and high rainfall during the monsoon, the lack of proper irrigation facilities, soil and nutrient management practices among other reasons lead to a large area under paddy cultivation during sali lying fallow during the other seasons.

One of the objectives under the Assam Agri-business and Rural Transformation Project (APART) is the use of geospatial technologies for developing extrapolation domains of different cropping systems for efficient targeting of technologies in low-productivity rice-fallows and stress-prone areas. Geospatial technologies including Remote Sensing (RS), Geographical Information systems (GIS) and Global Positioning Systems (GPS), are used for identifying rice-fallow and stress-prone areas of Assam for efficient targeting of technologies under APART. Rice-fallow areas are targeted to increase the cropping intensity to bring a significant increase in agricultural outputs in low productivity areas and enhance system productivity. Remote Sensing through satellite and drone images are analyzed with GIS for mapping of areas and developing various geospatial outputs, such as cropping system maps, rice maps, rice-fallow maps, soil moisture suitability maps and flood inundation maps. These outputs are validated by field data points collected through GPS.



Soil moisture suitability in rice-fallow areas of Assam (2020-21)

For the characterization of existing cropping systems of Assam, geospatial technologies have been used to create cropping intensity maps using time-series optical satellite data. Rice area maps have also been prepared using SAR (Synthetic Aperture Radar) images from satellites which have the advantage of cloud penetration during Kharif season. Since Assam is one of the most flood-prone states, a detailed characterization of flood-inundated areas is required for identifying the suitable area to target submergence-tolerant rice cultivars so that loss in rice production due to flood submergence can be minimized. Remote sensing technology using SAR data with cloud-penetration capabilities was used to map flood inundation areas over Assam. In addition, the duration and frequency of submergence in the frequent flood-prone areas were also extracted.

Rice-fallow maps were generated based on time-series satellite images so that these areas can be targeted for increasing cropping intensity and substantially improving the food supply and enhancing livelihoods in the state of Assam. An area of approximately 10 lakh hectares where rice is cultivated during Kharif is estimated to be remaining fallow during rabi season from this analysis. Targeting water-efficient crops in rice-fallow areas not only helps intensify the cropping system and enhance crop diversification but also contributes to soil fertility. There is considerable scope for enhancing the productivity of rice-based systems by introducing short-duration crops in the existing cropping systems during rabi. To achieve this objective, soil moisture maps for rice-fallow areas were prepared using satellite data to precisely target and utilize the short residual soil moisture window.

Cropping system demonstration (potato, mustard, pea and lentil) in rice-fallow areas

These outputs have been prepared annually for 2018-19, 2019-20 and 2020-21. Based on the availability of soil moisture in rice-fallow areas, a total area of 100 ha each year was selected in few districts for pulse demonstrations during rabi 2018-19 and 2019-20 and maize demonstrations during 2020-21 and 2021-22. The primary objective was to increase the cropping intensity in areas where farmers are cultivating only a single crop during the Kharif season. Every year, based on the rice-fallow area and soil moisture availability estimated from satellite data analysis, a few districts were selected for rice-fallow demonstrations. This year, a total of 14 districts, with areas ranging between 5-8 ha in each district, are

selected for maize demonstrations in rice-fallow areas.

Field testing demonstrations at a few representative sites of specific rice environments were selected during rabi 2020-21 and rabi 2021-22 to test four innovative cropping systems including stress-tolerant rice cultivars. Four cropping systems were tested by including green pea, mustard, potato and lentil after sali (Kharif) rice. Six districts, with an area of 20 bighas in each district, representing different agro-climatic zones of Assam were selected for the demonstrations. These crops will help in increasing the net income of the farmers and in the long run, one of the cropping systems having the highest return and system productivity can be promoted for wider adoption.

Maize sowing in rice-fallow areas at Sivasagar district of Assam during rabi 2020-21

SUCCESS STORY OF INTEGRATED CROP MANAGEMENT DEMONSTRATION OF BORO PADDY UNDER APART, LAKHIMPUR

Introduction

Name: Shri Jogot Taid
Fathers Name: Late Mukti Nath Taid
Address: Vill - Santipur Mising Gaon,
G.P. Saboti, P.O. Chaboti,
North Lakhimpur, Pin: 787051,
Total Dependant: Seven Numbers
Occupation: Agriculture and fish farming
Qualification: Class IX pass

Brief profile of the village

Name of the Village: Santipur Mising Gaon
Name of the G.P.: Chaboti
Total household: 80 numbers

The livelihood of the village:

Almost 80% of the villagers in Assam depend on agricultural activities, but 80% of the villagers do not have any knowledge about the high yielding variety of paddy i.e. Bina-11. Besides they do not have any knowledge about the essential good agricultural practices (GAP). They always cultivate the low yielding traditional variety using the traditional method of cultivation.

Shri Jogot Taid, a progressive farmer, from Santi Mising Gaon, looks for innovative technologies in agriculture to apply in his field for getting more production as well as economic benefits. He approached the APART and ATMA team of Lakhimpur block and also took up motivating and encouraging the other paddy growers of his locality to come forward to cultivating the new high yielding variety, the Bina- 11.

In the year 2020, the beneficiary, Jogot Taid was given an ICMD on Boro Paddy under APART and also given timely technical training on good agricultural practices (GAP), such as seed treatment, seedbed preparation, fertilizer application, line transplanting, pest management, marketing etc. Under the scheme APART, he was given 10 Kg of paddy seeds of Bina-11 variety for 0.25 ha area of land and fertilizers required for 0.25 ha area as per the package of practices (POP).


ICM demonstration for Boro paddy in the field of Jogot Taid

Details of demonstration:
Year of Demonstration: 2020-21
Area of demonstration plot: 0.25 Ha
Crop: Boro Paddy
Variety: Bina-11
Date of seed sowing: 31st January 2021
Date of transplanting: 24th Feb 2021
Date of harvesting: 11th June 2021.

The demonstration plot was maintained properly, as per the requirements and the ATMA officials also visited regularly. All technical guidance was provided to the farmer from the District Agriculture Office (DAO), Lakhimpur. As a result, Jogot Taid could harvest 52 quintals per ha of the variety. Observing the result of this demonstration the farmers of the locality came forward to accept the variety Bina-11 with all the good agricultural practices for getting more production from their paddy field.

APART Intervention:

Sl No	BEFORE APART	AFTER APART
1	Farmer used the traditional variety	Used the high yielding paddy variety, Bina-11
2	did not know seed treatment, line transplanting, the proper method of fertilizer application, marketing etc	All Good Agricultural Practices, such as seed treatment, line transplanting, fertilizer application, use of machinery etc was performed perfectly in due time.
3	Production obtained: 35 quintals per ha.	Production obtained: 52 quintals per ha
4	Marketing: Sold locally @ Rs 1,150 per qt.	Marketing: Sold through NACOF @ Rs1,868 per quintal.

Economics of the Demonstration:

Cost of cultivation:
Seed: From APART
Fertilizers and pesticides: From APART
Farmyard Manure (FYM): From farmers owned farm.
Preparation of land: Tractor @ Rs 270/- per bigha per plough = 2 bigha X 3 plough X Rs 270/- = Rs 1,620/-

Cost of transplanting:
3 men power per bigha @ Rs 400/- per man power
= 3 man power X 2 bigha X Rs 400/-
= Rs 2,400/-
Miscellaneous Cost: (pest management, carrying charge) =
Rs 3,000/-
The total cost of cultivation: Rs 7,020/-

Return Analysis:
Total production from 0.25 ha =13 quintal
Income: @ Rs 1,868/- per quintal X 13 quintal = Rs 24,284/-
Income: Rs 24,284 – Rs 7,020 = Rs 17,264/-

Conclusion:

These good economic benefits obtained by Jogot Taid have impressed the local farmers of the village which resulted in good replication of the variety, Bina-11 in the locality of Santipur Mising Gaon.

PROMOTION OF COMBINE HARVESTER: IMPACT ON PADDY PRODUCTION IN ASSAM

- By: SaurajyotiBaishya, Rohit Namdeo and Suryakanta Khandai

COVID-19 pandemic outbreak has seriously impacted agricultural labour and substantially reduced the pace of food production in Assam. Despite dependency on labour, the traditional harvesting of paddy accounts for a significant amount of field losses. Timely accomplishment of the operations and to resolve the issue of labour scarcity, and improved technology, for cutting and threshing i.e. mini track-type combine harvester was used in selected districts (Baksa and Kamrup) of Assam. The machine was procured by Assam Agricultural University (AAU) under APART and placed at the Custom Hiring Centre (CHC) Kamrup through KVK Kamrup for the promotion of the technology. During 2020-21, the machine was operated in 100 bighas in Sali season and 350 bighas in boro season. For scaling of the technology, the machine was operated in the nearby Baksa district where a total area of 450 bighas of paddy was harvested by the mini track-type combine harvester.

The economic analysis was carried out for mini track-type combine harvester and compared with the traditional practices. Cost savings in mechanical harvesting of paddy using combine harvester was found to be around

Harvesting of paddy using the Combine Harvester

56% while the saving of the labour was around 72%, over the manual methods. The notable advantage of the machine was that it could be used in water-logged paddy fields due to the presence of a track-type wheel. Due to higher field capacity in comparison to other harvesting machinery, a combined harvester definitely will be appropriate to harvest a large area within a short time. The mini combine harvester will be useful for small and medium farmers as well as in the fragmented land pattern of Assam. Harvesting within optimum time with a combined harvester reduces pre-harvest shattering losses, over the traditional practices. It can be inferred that mechanical harvesting with a combined harvester is a time, labour, and cost-saving system that reduces harvesting losses. As the

above-mentioned combine harvester is a half-feed type, the straw after harvesting is not damaged by the machine which can be used as animal fodder. As a result, total paddy production will be increased which will eventually help in the development of the livelihood status of the rural community in Assam.

SEED STAKEHOLDERS' MEETING FOR STRENGTHENING SEED SYSTEM IN ASSAM UNDER APART

- By Dr Kanwar Singh, Resident Consultant and Dr. Rahul Priyadarshi, Specialist – Agriculture Research & Development, IRRI

Seed is a vital component for improving the productivity of different crops. Quality seeds availability of a wide range of adapted crop varieties is essential forachieving food and livelihood security, and for eradicating hunger. Assam climatic conditions, soils, rainfall pattern are very conducive for seed production. Paddy, one of the highest consuming crops, grown widely in all agro-ecological-zones of Assam is still dependent on the neighboring states for good quality seed. To increase the production, availability and strengthening the seed system in Assam, the 4th Seed Stakeholders Meeting under Assam Agribusiness and Rural Transformation project (APART) was organized by Assam Agricultural University (AAU), Jorhat

Participants of seed stakeholders' meeting, 2021

in collaboration with International Rice Research Institute (IRRI) on November 26, 2021at IIBM, Guwahati on the topic entitled "***Emerging trends in seed production technology" and discussion on "Emerging strategies for seed production, processing and marketing"*** with different seed stakeholders.

The participants of seed stakeholders' meeting 2021 were scientists/officials from Assam Agricultural University (AAU), Assam Rural Infrastructure and Agricultural Services (ARIAS) society, Department of Agriculture, Assam Seeds Corporation Limited (ASCL), National Seeds Corporation Limited, Assam Seed & Organic Certification Agency (ASOCA), International Rice Research Institute (IRRI), Krishi Vigyan Kendra's, Regional Agricultural Research Stations, seed dealers, seed growers, Farmer Producer Organizations/ Companies (FPOs/FPCs. Total number of participants in seed stakeholders' meeting 2021 were 55 and 16 of them were female. During the seed stakeholder meeting the experts had made their presentations and shared the major achievements for seed system of Assam. Seed production has been focused with the availability, linkage and disbursement of breeder seed (9865 kg) and foundation seed (11540 kg) of different stress tolerant rice varieties through formal and informal seed system. The support for storing approx. 750 MT informal seed system with 15000 Super bagshas been given through AAU in the project. A strategy paper on revamping the seed system of Assam has been submitted to the ARIAS Society for implementation and further improvement in the seed system of Assam. Three Farmer Producer Companies (Shankar Azan Farmer Producer Company, Nagaon; PooharAgro Producer Company, Morigaon&TeteliaAgro Organic Producer Company Ltd., Tetelia, Tihu, Kamrup) were selected, trained for seed production and provided with the breeder and foundation seed for seed production. Now the seed processing plant/units will be established with these three seed production FPCs along with packaging of the seed.

To promote the seed production, the Govt. of Assam has provided special rebate to the seed growers by reducing the registration charges on seed certification to Rs 1 through ASOCA and a team of six Seed Certification Assistants are associated with ASOCA for increasing the inspection, supervision and monitoring of the crop at various stages and maintaining the quality of the seed. Capacity building trainings like QSP trainings, and support for seed production, processing & storage will be provided to the interested growers. The seed workshop was organized by ASCL in collaboration with IRRI by inviting the seed entrepreneurs and farmer producer companies for preparing the seed vision document 2030 for Assam. The seed suppliers have suggested developing a seed

application portal and a tracking mechanism, i.e., QR code in seed tag along with the development of an ap for market intelligence in seed sector. There is a need to infuse creativeness in seed sector in Assam, organizing a brainstorming in the seed sector with local seed growers in the presence of the state ministry, State Project Director, ARIAS society, Directorate of Agriculture, govt. officials, AAU & IRRI Scientists and other stakeholders is a much needed initiative at this moment.

MUSTARD VALUE CHAIN

TECHNICAL TRAINING UNDER MUSTARD VALUE CHAIN

Rapeseed- mustard is grown in a substantial area in Assam. But the productivity of the crop is quite low as compared to many other mustard growing states in India. Low and unstable oilseed system productivity is a major problem in the state where cultivation is undertaken mostly on small and marginal agricultural holdings.

Therefore, ICAR-DRMR is contributing towards enhancing rapeseed-mustard production in Assam through a project on "Consulting services for technical advisory support on Augmenting rapeseed-mustard production of farmers of Assam for

Technical Training under mustard value chain

sustainable livelihood security" since April 28, 2020. ICAR-DRMR is providing technical backstopping, arranging human resources, and creating awareness among all stakeholders, facilitating demonstrations, training, exposure visits, extension literature etc. in 15 undivided districts of Assam viz., Jorhat, Sivsagar, Golaghat, Sonitpur, Morigaon, Darrang, Dhubri, Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup, Lakhimpur, Dhemaji, and Nagaon since 2021-22 crop season.

Under the programme, 5000 crop demonstrations on rapeseed-mustard crops have been conducted in these districts during 2021-22. Several technical training linked with crop demonstrations were planned to organize in four phases at different stages of crop growth during the crop season so that farmers can be advised properly by experts of ICAR-DRMR about technological interventions at different stages. Timely advice to the farmers is very crucial and effective adoption of scientific cultivation practices. To provide practical exposure and technical advice to the farmers, two phases of technical training on rapeseed mustard for farmers were organized at different places/villages of these 15 districts during Nov.-Dec. 2021.

The first phase of technical training for mustard crop demonstrations farmers on "Scientific production technology of rapeseed-mustard" was conducted

Weeding Demonstration

cluster wise at the Department of Agriculture/ATMA office/ block office/ villages of respective districts before sowing during November 2021. During the training, all participating farmers were distributed seeds and fertilizers for conducting crop demonstrations. The technical knowledge and skill about land preparation, seed treatment, fertilizer application, seed rate, sowing method, sowing time, spacing, etc. were provided to the participants by ICAR-DRMR. A total of 2234 farmers and farm women participated in 141 technical training of the first phase.

The second phase of technical training was conducted on "Improved agronomic practices of Rapeseed-Mustard for higher production" during December 2021 at the time of vegetative growth of the crop at farmers' fields in each of the selected clusters. The technical knowledge and skill about weeding, hoeing, thinning, irrigation management, top dressing, etc. were provided to the participants by ICAR-DRMR during the second phase of technical training. A total of 2376

farmers including 95 women farmers participated in the technical training of the second phase organized till 31st Dec. 2021.

Thus, a total of 236 technical training were organized during the period wherein 4610 farmers including women participated. These technical training were organized at farmers' fields by the District ATMAs with the technical support from ICAR-DRMR.

These technical trainings looks forward in increasing the production and productivity of rapeseed-mustard crops through the adoption of scientific intervention and promote the efficient use of energy resources, natural resources such as land, water etc. and other inputs like chemicals, fertilizers, seeds etc.

Thinning and weeding demonstration

AGRICULTURAL MARKET INTELLIGENCE UNIT

FARMER AWARENESS PROGRAM BY AGRICULTURAL MARKET INTELLIGENCE UNIT (AMIU), APART

An awareness program on the Agricultural Market Intelligence Unit (AMIU) of APART and its various farmer-centric activities was held on 22nd November 2021 at the Department of Agricultural Economics and Farm Management (FM) of Assam Agricultural University, Jorhat. A total of 60 farmers from Jorhat, Sivasagar and Golaghat districts participated in the program. The program was inaugurated by Professor Nivedita Deka, Head of the Department of Agricultural Economics and FM. Prof Deka gave a brief introduction on AMIU and emphasized mainly the collection of regular price information from the wholesale markets of Assam, and dissemination of the same to the farmers to bring awareness on current market prices and its trend to improve farmers' bargaining power leading to better remunerative price. She also mentioned that farmers need to produce commodities based on market demand.

Awareness program on Agricultural Market Intelligence of APART

Prof. Utpal Barman, Department of Extension Education, said that the connection between the buyers and sellers can create a conducive environment for the marketing of farm produces, for which correct market information is required to the farmers in advance. Dr Sangita Borah and Dr Udeshna Talukdar, Assistant Professor, Department of Agricultural Economics and FM explained the price delivery information system of the Market Intelligence Unit. They also clearly mentioned the information transparency, profitability and market access to the farming community

and advantages of establishing the unit for the betterment of the farmers. The program was concluded by Professor Ramen Sarma, Agricultural Economics and FM, who spoke about improved marketing by the formation of FPCs and FPOs. Some of the farmers shared their experiences on-farm production and marketing and also mentioned that the unit would help them in better price realization and marketing.

LIVESTOCK VALUE CHAIN

FODDER CULTIVATION PILOT BY THE INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE (ILRI)

Pilot work on fodder cultivation has been initiated by the International Livestock Research Institute (ILRI), knowledge partner of APART, with support from the Animal Husbandry & Veterinary Department and the Dairy Development Department, Govt. of Assam in November 2021 at Digheli area of Nalbari district and Maloibari area of Kamrup (M) district of Assam. Under the pilot, two-hybrid fodder varieties viz. Makkhan grass and Khand Mishri seeds were distributed among 36 dairy farmers having around 1-4 Bighas of land by each for fodder cultivation. In the selection of the beneficiaries, dairy farmers having a strong interest in fodder cultivation and resources to use for irrigation and fertilizer were emphasized. All total, 50 kg seeds of Makkhan Grass and 50 kg seeds of Khand Mishri were distributed among the dairy farmers who cultivated fodder almost in 66 Bighas of land. To support the farmers in understanding the package of practices of fodder cultivation, they were supplied the package of practices in the form of a flow chart that was further explained to them at the time of distribution of fodder seeds.

The outcome of the pilot will be analysed in the form of production performance, factors attributing to fodder cultivation and the economics of dairy farming in the event of inhouse

fodder production. For this purpose, baseline data from the beneficiary farmers have already been collected. Periodic data will also be collected for analytical purposes. It is planned to supply some other varieties of fodder seeds after harvesting the above-mentioned varieties, so that they can make fodder available in their farm premises throughout the year. Besides, in both the pilot sites, some fodder technologies will also be demonstrated at the time of harvesting the fodder crop for fodder preservation

Capacity building of Farmers by ILRI Team

Distribution of the fodder seeds to farmers

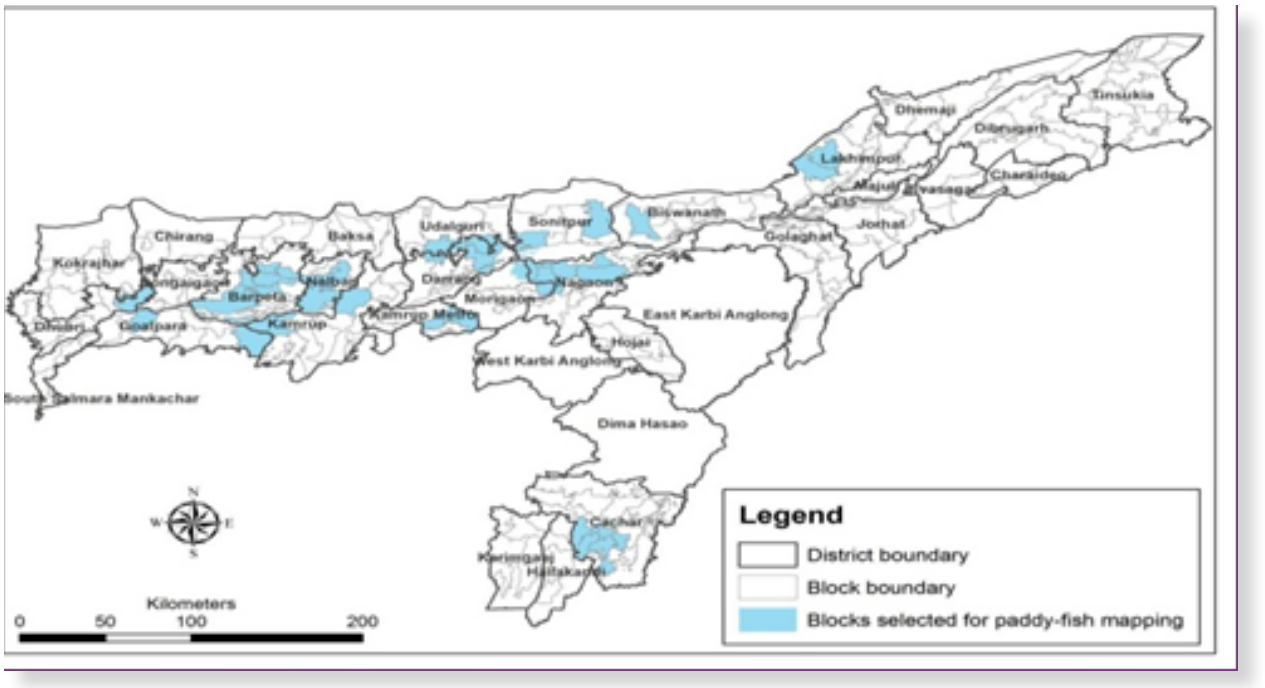
FISH VALUE CHAIN

CLIMATE-RESILIENT RICE –FISH FARMING UNDER WORLD BANK FUNDED ASSAM AGRI-BUSINESS AND RURAL TRANSFORMATION PROJECT (APART)

Assam is one of the North-Eastern states of India wherein paddy cultivation is the main occupation in rural areas and rice is the staple food for the people and it forms an essential part of their lives and culture. It has been observed that along with paddy farming, fish cultivation in Assam has evolved over a while due to increasing demand for fish for local consumption. Among the most popular integrated farming practices, paddy-cum-fish integrated farming is a highly beneficial practice for rural farmers. The paddy-cum-fish culture is an innovative farming system in which paddy is the main crop and fish is taken as an additional crop to earn extra income by using the same farming area. The majority of farms in Assam are affected by floods during the monsoon season as most of the lands are in low lying areas highly vulnerable to climate risks. Therefore, rotation type paddy-cum-fish farming as a climate-resilient farming practice allows increasing their productivity and providing a reliable source of income and employment for the rural farmers apart from nutritional security.

Traditionally, paddy-cum-fish culture in Assam is practiced in flooded river basins, unmanageable vast waterlogged areas and perennial waterlogged wet rice lands, where fishes enter into the fields during monsoon and grow along with paddy. Fishing activities start after the recession of water during November-December 2021 and the fish farmers use various fishing gears like cast nets, gill nets, lift nets and also various traditional indigenous traps either operated in the rice-free spots of the field or fixed at appropriate water entry and exit points in the fields.

Preparation of paddy fish farm



Potential paddy-fish farming clusters in Assam

The paddy-fish farming system contributes to 5.43 % of total fish production in the state and around 2.3 million ha of seasonally flooded paddy cultivated lands of Assam have the potential for fish production along with paddy farming. In Assam, fishes are introduced intentionally and are also found naturally in the paddy fields which enter from the adjacent water bodies. Paddy species which grow in low lying areas or flood-prone areas are broadly termed as "Baudhan" in Assam. Unfortunately, the productivity and viability of conventional paddy-cum-fish farming system is very low in the state due to the lack of proper technological interventions in paddy-cum-fish farming practices followed by the farmers. In paddy–fish systems, paddy and fish forms a mutualistic symbiosis as:

- Fish excreta provides nutrients for paddy
- Fish control insect pests in a paddy field by feeding on herbivore insect eggs and larvae. They also feed on planktons and small aquatic macrophytes

The Fishery Department, Assam is implementing a scientific rotation rice-fish farming demo about 431 ha, water body in 11 (Eleven) project Districts ie Barpeta, Cachar, Goalpara, Nalbari, Kamrup, Nagaon, Morigaon, Lakhimpur, Dhubri and Sonitpur covering 867 beneficiaries for the last three years 2018-19, 2019-20 and 2020-21 following the technology provided by the WorldFish and IRRI as Better Management Practices under World Bank funded Project APART.


Paddy variety was BINA-11(introduced in the state) which is high-yielding, has stress tolerance and has good market demand

The production of a fish crop between the rice crops gives the Paddy fish farmers an off-season occupation which increases the income without increasing expenses. Apart from the additional income available from rizi-pisciculture, the combined culture leads to a reduction in labour in weeding and an increase in the yield of paddy by 10 to 25% the increase in rice production (average 7.0 tonne/ Ha) and nearly 2.0-tonne fish production/ ha/crop is ascribed to various factors, namely:

- Increase in organic fertilization by fish excreta and remains of artificial feed.
- Better tillering of the rice seedlings due to the activity of the fish.
- Reduction in the number of harmful insects, such as, paddy stems borers, whose larvae are eaten by fish.
- Increased mineralization of the organic matter and increased aeration of the soil resulting from the puddling of mud by benthic feeders.
- Control of algae and weeds (by phytophagous fish) which compete with rice for light and nutrients.

The beneficial effect of fish on paddy-fish farming system is that a sort of Mutual Symbiosis takes place, in which each of the two components is not damaged but rather favored, up to a certain point, by the presence of the other.



Introduction of Amur Carp and Mola at Paddy Field

FISHERY TRAINING TO GORUKHUTI STAKEHOLDERS UNDER APART

A two-day training cum exposure visit was held on 15th and 16th December 2021 at the Associate Directorate of Extension Education, Assam Agricultural University, Khanapara campus in collaboration with the Directorate of Fisheries, Assam, under the World Bank-financed Assam Agri-business and Rural Transformation Project (APART). It has to be mentioned that a total of 10 Ha water bodies have been created at the Gorukhuti multi-cropping farm, where a total of twenty (20) local youths are being trained for scientific fish farming, with an aim to achieve maximum yield from the unit area. Apart from the various classroom classes, a field trip was also arranged at the multi-disciplinary farm of the National reputed organisation Kalong Kapili at Dimoria Development Block under Kamrup (M) District.

Addressing the valedictory session, Sri Bidyut Bikash Bhagawati, Managing Director, Assam Seed Corporation Ltd appealed to the stakeholders for proper utilization of the technical knowledge gathered during this training programme. He also stressed on multi-cropping farming at Gorukhuti, where fish may be one of the major components. Dr Atul Borgosai, Associate Director of Extension Education (Veterinary) expressed his satisfaction in organising such training cum exposure visit for the benefit of the Fisheries Stakeholders under the Gorukhuti project.

Amongst other, Dr Dhrubajyoti Sharma, Dr Sanjay Sarma from Department of Fisheries, District Fisheries Development Officer, Darrang, Sr FDO, Sri Himanshu Talukdar, Dr Pabitra Takukdar, Asst Professor, College of Fisheries, Raha, Sri Ashim Kr Bora, NFDB Regional Office and Dr Ranjita Baniya, leading NGO leader acted as a Resource persons and interacted with the stakeholders. Fishery compendium and certificates were also distributed to the participants.

Fishery training to the stakeholders from Gorukhuti multi-cropping farm

APART CONDUCTS PEARL CULTURE TRAINING FOR FISHERY FPCs

A day-long hand holding training on Pearl Culture & Pond Water Quality Management was conducted on 17th Dec 2021, at the conference hall of the Directorate of Extension Education, Veterinary College Campus, Khanapara, Guwahati. The training was organized by the World Bank-financed project APART under the ARIAS Society, Govt of Assam in collaboration with the ICAR-Central Institute of Freshwater Aquaculture (CIFA) Bhubaneshwar, Govt of India, Department of Fisheries, Govt of Assam and the Directorate of Extension Education, Assam Agriculture University, Khanapara.

Training session on Pearl Culture

The training program was aimed to give hands-on training on emerging pearl culture methodologies to more than 30 representatives of Farmer producer companies (FPCs) formed under the guidance of ARIAS Society. The training programme was attended by the Chairman, Board of Directors, CEOs and fish farmers of these FPCs.

Dr S. Swain, Director, CIFA inaugurated the training program and highlighted on the importance of pearl culture, which can be cultivated along with carp varieties, thus enabling more profits from the same pond. He also distributed water testing kits to all the 10 FPCs through, which can be used by the fish farmers to check different water quality parameters like pH, ammonia, nitrate, Nitrite, Dissolved Oxygen, Alkalinity and hardness of water and maintain the water quality of the pond.

The key resource person, Dr Sailesh Saurabh, Senior Scientist & Technical Expert of pearl culture from ICAR-CIFA conducted the technical session with all the details including the biological process of pearl farming and explained how it is an emerging livelihood opportunity in the aquaculture sector. The training programme created a lot of enthusiasm among the trainees.

CLUSTER DEVELOPMENT ACTIVITIES

CUSTOM HIRING CENTER (CHC) AND INPUT SHOP LICENSE FOR FPC-APART PROJECT

NEFSA AGRO ORGANIC PRODUCER COMPANY LIMITED (NESFA), Darrang District, Assam, is a story of hope, ambition, fulfilled promises, and convergence of on-time professional expertise. Since its inception in 2019, NEFSA with the desire to elevate farming into a market intelligence-driven business under the legal entity of a Farmer Producer Company (FPC) has worked dedicatedly for its 700+ shareholders, to holistically transform an unpredictable livelihood activity i.e. farming into an economically viable enterprise. Transformation is the goal that was achieved when Grant Thornton Bharat LLP (GT) as a service provider in collaboration with Assam Agribusiness and Rural Transformation Project (APART)

Under APART-FPC PROJECT, GT has taken a major initiative towards formation of FPCs to establish Custom Hiring Centers (CHCs) and this effort brings smiles to the hardworking farmers of Darrang District. NEFSA FPC has received Drum Seeder and Reaper, that will be available to the farmers for the farming activities related to the machines provided.

Although, NEFSA FPC has received Licenses for Fertilizers, Pesticides and Seeds in the name of the firm name, NEFSA Agro Organic Producer Company Limited. It is also highlighted that the NEFSA has prepared a Business Plan for a working capital loan amount of Rs.5, 00,000/- (Rupees five lakhs only) and received a sanction letter from the Samunnati financial intermediation and services private limited.

Grant Thornton Bharat, LLP - CDTA creates awareness amongst its beneficiaries on PMFME Scheme Modalities

Ministry of Food Processing Industry (MoFPI) has launched the Pradhan Mantri Formalisation of Micro food processing Enterprises (PMFME) scheme under the Aatmanirbhar Bharat Abhiyan to enhance the competitiveness of existing individual micro-enterprises in the unorganized segment of the food processing industry and promote formalization of the sector.

Out of the 17 APART Districts, special awareness and registration drive districts was conducted for potential beneficiaries of the PMFME scheme in Morigaon, Sivasagar, Lakhimpur, Dhubri, Kokrajhar, Nagaon, Biswanath, Karbi Anglong, Jorhat, Majuli districts.

PMFME Awareness Training Programs

CAPACITY BUILDING

TRAINING PROGRAMME FOR DAMCS AND DHCS AT IIPM BANGALORE

A four day training programme on Agribusiness and Marketing was organised for District Agriculture Marketing Coordinator (DAMCs) and District Horticulture Coordinator (DHCs) of 16 districts at Indian Institute of Plantation Managemnet (IIPM), Bangalore. A total of 16 participants participated in this programme including 11 DAMCs and 5 DHCs. The program covered three days of classroom training and one day of exposure visit to the field.

The changing scenario from Agriculture to agribusiness was taken up by Dr.V.G. Dhanakumar, Director, IIPMB followed by group activities. Topics on Emerging opportunities, Market selection and strategies for Marketing Agriculture Commodities of Assam was shared by Dr. S.John, Professor, IIPMB and Export opportunities and procedure for agriculture products by Dr K. Venkateswaran, IIPMB. Discussions and interactions on Branding B2B and B2C: Strategies for Agri- produces, Entrepreneurial opportunities and developing an entrepreneurial mindset in farmers: Assam was shared by Dr Arun Bhattacharyya, IIPMB including a guest speaker from Bazaari funde Pvt ltd.

On the 3rd day, the participants visited the Sivaganga farmer producer company, Nelamngala, Bangalore. The FPC was registered in the company act in 2017 and involved in procuring and supplying fresh vegetables and fruits to retail outlets like More, e-commerce platforms like Amazon, Bigbasket and other retail outlets in Bangalore, Chennai and Hyderabad. The participants studied the business and management process of the FPC.

Other topics covered during the training session were - Engaging with FPOs to augment market access, Access, Certification for Marketing agricultural produce by Dr K. Narendran, IIPMB and

discussion on building a market plan and agribusiness model a group activity followed by group presentation.

The participants were awarded with certificate on the short term executive programme on Agribusiness and Marketing by Dr.V.G. Dhanakumar, Director, IIPMB.

ASSAM AGRIBUSINESS GROWTH LAB

MAHABAHU FISHERIES PVT LTD. EMERGES AS A NEW INVESTMENT OPPORTUNITY

Mahabahu Fisheries Pvt Ltd., an APART funded Assam Agribusiness Growth Lab (AAGL) enterprise, is an integrated aquaculture production unit with fish farms and seed banks, along with a mid-sized feed mill.

Anup Sarmah, a hardcore entrepreneur from Gohpur in Sonitpur district of Assam, initiated Mahabahu Fisheries Pvt Ltd. on the 24th of Oct, 2016. The enterprise started its "Pisces Project" in just 30 bighas of water bed in 2016 in the flood-prone Jakapara village of Gohpur, which has now gone on to become one of the largest fish industries in Central Assam with 210 bighas of waterscape.

The project widely covers 210 bighas of pond area equivalent to 70 acres of land. Its annual fish production comes to around 80000 kgs in 2020-2021. At present, the entrepreneur is selling his indigenous varieties of local fishes in the native Gohpur and nearby Itanagar markets. Simultaneously, he established a fish feed mill that is producing 60000 kgs fish feed in the current financial year. The entrepreneur

is planning to expand his fishery area up to 200 acres in the next 3 years. He is aiming to produce 100000 kgs of fish along with 12000 kgs of fish seedlings annually for enhancing the capacity of his fish seed bank. Until this date, he completed preparation for the production of 300000kgs of fish grains annually. To this effect, in the upcoming days, 90 more bighas of new pond area will be dug.

Despite being a first-generation entrepreneur, Anup Sarmah has been able to provide livelihood opportunities to 20 persons from his native village who are currently working for his business venture. Every single day, he is striving to impact native lives, so that his community becomes economically self-sufficient.

In recognition of this emerging enterprise in the domain of fisheries, The National Fisheries Board, Government of India has awarded Anup Sarmah with a rare honour of "The Best Pisces Palak" in the Northeast and other Hill states at a national level. He received token money of Rs.200000/- and a Certificate of Recognition for his great entrepreneurial efforts on 21st November 2021 on World Fisheries Day.

Assam Government has deployed three technical consultants for three years through the APART project to help his newest venture called Gohpur Fish Farmer Producer Company for high-class fish production. Under this plan, 400 new fishermen will be soon moved to a large fish production site in Sanguri, Gohpur.In addition to the 20 employees recruited in this entire project, about 50 fish traders have been able to buy and sell fish from their fisheries to feed their families. Anup Sarmah dreams of transforming his indigenous fish company into one of the largest fish producing projects in the country by expanding up to 2000 bighas of ponds in the next 5 years. Currently, this enterprise is incubated in the APART backed Assam Agribusiness Growth Lab (AAGL) initiative to leverage support for the fulfillment of this greater goal.

STORY OF MADE IN NORTHEAST INDIA - LAAJAWAB SPICES

Spicenatura Foodtech LLP, an APART supported Assam Agribusiness Growth Lab (AAGL) incubatee, aims to harness exotic local spices and develop unique Spice Blends tailored to garnish ethnic cuisines from the NE region and also establish a superior alternative to regular spice blends available in the market.

Dr Suman Jyoti Deka, hailing from Assam, India, who is a PhD scholar in cancer biology from IIT Guwahati, always had a dream to start something of his own since his college days. But he was not sure what exactly he wanted to pursue. He was working as a lecturer in NIT, Arunachal Pradesh when he started saving for his potential startup. Besides having expertise in cancer drug development and herbal phytochemical extraction during his PhD, he also discovered his keen interest in food technology, as he has a degree in Biotechnology and food technology was a part of it. He started visiting different food technology labs along with a friend and began experimenting with various technologies. Eventually, when he started doing research and development for his Startup in food technology, he discovered that Northeast India has many exotic and endemic spices, which are far superior in flavour and aroma when compared to their counterparts from other parts of India.

He realized that there is a huge scope in herbs and spices from the North-East, which can be taken to a global platform, with a better marketing strategy. Although the spices from the Northeast are exported in raw form, yet there is little or no innovation at all on the same and that is where he found his niche area to work upon. This research of his led to the birth of his brand - "Laajawab Spices", under the company called Spice Natura Foodtech LLP, which launched officially in November 2019.

As the name itself suggests, "Laajawab Spices" makes innovative authentic and naturally processed spice blends without any adulteration or artificial flavouring agents, unlike those used by many of the MNC spice brands. The brand primarily focuses on making spice blends tailored for exotic cuisines for various savoury dishes in Northeast India.

Currently, there are five products- Garam Masala, Red Chilly, Cumin, Coriander and Turmeric in the powdered form, which are actively running in the market. They have made sure to make these authentic masalas accessible to everyone, hence these masala packets are sold at the market starting from just five rupees only. The team made sure to do testing for two months period before launching it in the market as their priority has always been 100% customer satisfaction. Initially, Dr Suman and the team gave free samples to friends and family for garnering feedback. Eventually, they started approaching chefs of various renowned restaurants to understand if the spices are quality-oriented to launch in the market. They focused mainly on the taste of the spices, quality and packaging. They made sure to get the feedback from every customer and worked upon each feedback that they had received. They made sure to improve constantly and further add value to the product consistency.

Within a few months after launching, the company had to take a break due to lockdown because of the pandemic. Yet, the team didn't lose heart and devised new ways of taking their products to the consumers. They either gave away their products for flood relief campaigns or sold them in the nearby stores during the days of curfew. The team equivocally believes that utilizing superior Northeast Indian spices in their products is going to boost the production of farmers from the Northeast region. With persistent efforts, the Startup has been able to generate a huge demand for its spices and the team has been able to increase its sales daily. Additionally, innovative packaging has increased the aesthetic value of their products and made them look quite attractive.

One of the core strengths of the brand is the experienced team itself. The team presently comprises four members, including Dr Suman Jyoti Deka. Apart from him, Mr Ujjal Kumar Nath has a Masters degree in MSW from Delhi University and looks after marketing, Bhrigumoni Deka, M.Sc in Integrated Physics from IIT Roorkee looks after product development and accounting, and Mr Punamjit Brahma who is pursuing his graduation as well is looking after production. Dr Suman Jyoti Deka and Ujjal Kumar Nath are the two Directors and the rest two are partners of Spice Natura. The team is highly experienced and possesses the technical know-how of using the

exact composition for making these authentic spices.

Lajawaab spices aim to increase their product as well as the marketing portfolio for which a huge investment is required. Hence, they are looking for venture funding. Today, apart from being sold to various retailers in Northeast India, the spices are also being sold in a few supermarkets in Delhi and Bengaluru. The response from there has been very overwhelming. One of the USP of these sachets is that only a pinch of these masalas is enough to make any cuisine tasty as compared to other Indian brands. The team has received great feedback from some of the renowned chefs in Assam and Bengaluru.

Laajawab spices' latest addition is its Pork Masala, developed and launched on 1st December 2021 in Guwahati, an innovative spice blend developed from exotic Northeast Indian Spices and is already in limited market trials. Soon, the team aims to come up with different exotic Spice Blends, which are tailored towards ethnic Northeast Indian and Continental cuisines. Besides, the development of a new liquid spice product line is underway, derived from spice oleoresin, which has a huge demand in the foreign markets. The team believes that liquid Spices will revolutionize both domestic as well as the international spice markets shortly and plans to take the market by storm.

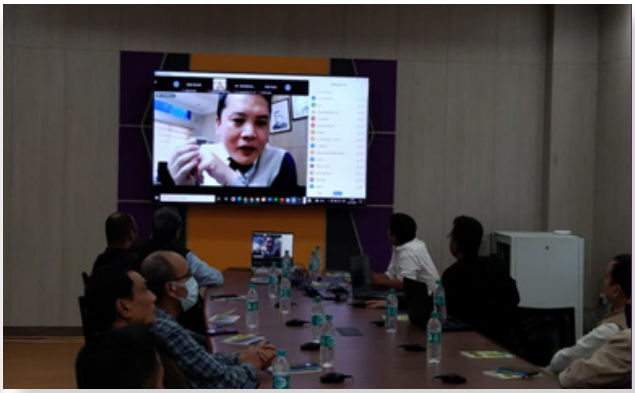
AAGL ENTERPRISES MEET DIC OFFICIALS FOR AWARENESS ON GOVERNMENT POLICIES, SCHEMES, GRANTS AND SUBSIDIES FOR VARIOUS AGRI AND ALLIED INDUSTRIES

APART in association with CIIE.CO and ICCSPL organised a half-day Round Table Interactive Meet with the Office of the Commissioner of Industries and Commerce, Govt. of Assam on 10th December 2021 at Guwahati Biotech Park, Amingaon. The two main agenda of the Meet were -Introduction of the 1st AAGL Cohort to the Commissioner, Department of Industries and Commerce & An overview sharing on the various policies, schemes,

grants and subsidies by DIC officials with the AAGL enterprises. In addition to the AAGL entrepreneurs, the other members present were, officials of DIC, the APART team, officials of Guwahati Biotech Park and a few international knowledge partners of APART, such as ILRI, World Fish and World Veg.

On behalf of CIIE.CO, Mr Arijit Sarmah addressed the participants with a welcome note and Shashi Gupta, the AAGL Team Lead shared the AAGL program roadmap with the stakeholders present in the session. Mohammad Afreen Rahman, Entrepreneurship Specialist introduced the Cohort Enterprises to Sri. Oinam Singh, Commissioner, Department of Industries and Commerce, was virtually present in the meeting. Dr Bula Chowdhury, Senior Scientist, Guwahati Biotech Park took the participants through a presentation on the facilities the entrepreneurs can avail at the GBP, Amingaon.

As the DIC official was presenting various government policies, schemes and benefits to the entrepreneurs, they also highlighted some of their key challenges in availing the benefits from the multiple schemes introduced by the department. The DIC officials, who were present, took note of the struggles of the entrepreneurs and assured them all kinds of assistance and support from the department in leveraging the opportunities rolled out by Govt. of Assam for developing the entrepreneurial ecosystem of the state, with special emphasis on agriculture and allied sectors.



Visuals from the Interactive Meet with DIC officials

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অলকেশ মল্ল বৰুৱা
ৰেচম সমন্বয়ক,
এৰিয়াছ ছ'ছাইটি

ৰেচম শিল্প অসমৰ এটি অন্যতম কুটীৰ শিল্প হিচাপে পৰিচিত। অসমৰ গ্ৰাম্য অঞ্চলত বাস কৰা বৃহৎ সংখ্যক লোকৰ অৰ্থনৈতিক বিকাশৰ ক্ষেত্ৰত থলুৱা পৰম্পৰাগত ভাৱে কৰা ৰেচম উৎপাদনে এক গুৰুত্বপূৰ্ণ ভূমিকা পালন কৰি আহিছে । মুগা আৰু এড়ী ৰেচম অসমৰ পৰম্পৰা আৰু সংস্কৃতিৰ সৈতে ওতঃপ্ৰোতভাৱে জড়িত। অসম কৃষি বাণিজ্য আৰু গ্ৰাম্য ৰূপান্তৰকৰণ প্ৰকল্প (এপাৰ্ট)ৰ জৰিয়তে এড়ী পলু পালনৰ ক্ষেত্ৰত ইতিমধ্যে ৰাজ্যৰ বিভিন্ন জিলাত ভিন্ন পদক্ষেপ হাতত লৈছে। এড়ী পলু পালনৰ জৰিয়তে সফলতা অৰ্জন কৰা কামৰূপ জিলাৰ বকোস্থিত এগৰাকী কৃষকৰ সফলতাৰ কাহিনী। এলজেৰা চাংমা কামৰূপ জিলাৰ বকো থানাৰ অন্তৰ্গত দামৰাং গাঁৱৰ স্থায়ী বাসিন্দা এগৰাকী থলুৱা জন-জাতীয় মহিলা হেতু তেওঁ শৈশৱ কালৰ পৰা এড়ী পলু পালনৰ লগত জড়িত হৈ আছে। বৰ্তমান এড়ী পলু পালন কৰি স্বামী সঞ্জীৰ্থ মাৰাকৰ সৈতে তেওঁ পৰিয়াল পোহ-পাল দি আহিছে। এই পৰিয়ালটোৰ উপাৰ্জনৰ মুল উৎস হ'ল এড়ী পলু পালন তথা এড়ী লাট আৰু এড়ী সঁচ উৎপাদন কৰা। বিগত প্ৰায় পাঁচ বছৰৰ পৰা ব্যৱসায়িক ভিত্তিত এই পৰিয়ালটোৱে এড়ী পলু পালন কৰি অধিক এড়ী লাট উৎপাদনৰ প্ৰচেষ্টা কৰাৰ লগতে গাঁৱৰে দুই-তিনিজন ব্যক্তিক মজুৰি ভিত্তিত আত্মনিয়োগ কৰাৰো ব্যৱস্থা কৰিছে। অধিক এড়ী লাট উৎপাদনৰ প্ৰচেষ্টাৰে এলজেৰা আৰু তেওঁৰ স্বামীয়ে বৰ্তমান তিনি একৰ ভূমিত প্ৰায় ছয় হাজাৰ জোপা শিমলু আলু আৰু প্ৰায় এক একৰ ভূমিত অসম কৃষি বাণিজ্য আৰু গ্ৰাম্য ৰূপান্তৰকৰণ প্ৰকল্প (এপাৰ্ট) আঁচনিৰ জৰিয়তে ২০১৯-২০২০ বৰ্ষত প্ৰায় ৪৫০ জোপা কেছেৰু গছ ৰোপণ কৰিছে। ইয়াৰ আগতে তেখেতৰ মাত্ৰ

দুই হাজাৰ জোপা শিমলু আলুৰ গছ আছিল। এলজেৰাই এবাৰতেই প্ৰায় ৩০০-৪০০ জনী চকৰীৰ কণী/সঁচ আৰু বছেৰেকত পাঁচৰ পৰা ছয় বাৰ এড়ী পালন কৰে । উল্লেখযোগ্য যে, ২০২০ বৰ্ষৰ ১ আগষ্টৰ পৰা ২০২১ বৰ্ষৰ ৩১ জুলাই লৈ এলজেৰা আৰু তেওঁৰ স্বামীয়ে কমেও ১১০ কেজি এড়ী লাট উৎপাদন কৰিবলৈ সক্ষম হৈছে । তেওঁ আশা কৰে যে, এপার্টৰ জৰিয়তে ৰোপণ কৰা কেছেৰু গছ সমূহ উৎপাদন সক্ষম হৈ উঠিলে অহা তিনি চাৰি বছৰৰ ভিতৰত বৰ্তমানতকৈ দুগুণ বেছি এড়ী লাট আৰু সঁচ উৎপাদন কৰি নিজ পৰিয়ালটোক আৰ্থিকভাৱে টনকিয়াল কৰিবলৈ সক্ষম হ'ব। বৰ্তমান তেখেতে ৮০০০ মান লাট এড়ী সঁচ উৎপাদনৰ বাবে ব্যৱহাৰ কৰে । ইয়াৰে উৎপাদিত সঁচ তেওঁ নিজ পলু পালনৰ বাবে ব্যৱহাৰ কৰি আছে যদিও ভৱিষ্যতে বিক্ৰীৰ বাবেও উৎপাদন কৰাৰ পৰিকল্পনা আছে। প্ৰতিবাৰ এড়ী পলু পালনত গড় হিচাপে ১৯০০০ টকা খৰচ কৰাৰ লগতে তেওঁ এড়ী

লাট আৰু পিউপা বিক্ৰী কৰি গড়ে ৫০০০০ টকা উপাৰ্জন কৰে। ইয়াৰ পৰা বছৰেকত তেখেতে গড়ে ১,৫৫,০০০ টকা মুঠ আয় কৰে। এড়ী পলু পালনৰ পৰা হোৱা আয়েৰে এলজেৰাই ঘৰৰ খৰছৰ উপৰিও সন্তানৰ পঢ়া খৰচটো বিনিয়োগ কৰে।

(বি:দ্ৰ: কামৰূপ জিলাৰ ৰেচম বিষয়া সকলৰ সহায় সহযোগিতাক শলাগ লোৱা হ'ল)

“এপার্ট প্রকল্পত শাক-পাচলিৰ নার্ছাৰীৰ ব্যৱসায় ভিত্তিক পৰিকল্পনা আৰু দীর্ঘকালিন স্থায়ত্বৰ বাবে কৌশল”

যুগুতালে: পংকজ হাজৰিকা
জিলা উদ্যান-শস্য সমন্বয়ক, নগাওঁ

পাতনি : অসমত শাক-পাচলিৰ উৎপাদন বহুত কম আৰু প্রতিজন উপভোক্তাৰ বিপৰীতে উপলব্ধ শাক-পাচলিৰ পৰিমাণ আৱশ্যকীয় পৰিমাণতকৈ বহুত তলত। কিছুমান শাক-পাচলি বহিঃৰাজ্যৰ পৰা আমদানি কৰা হয়। উল্লেখনীয় যে, সেই আমদানিকৃত পাচলিৰ বজাৰ মূল্য আকাশলংঘী হয়। জনসংখ্যা বৃদ্ধি আৰু মানুহৰ স্বাস্থ্যৰ প্রতি বাঢ়ি অহা সচেতনতাৰ বাবে শাক পাচলিৰ চাহিদা দিনক দিনে বাঢ়ি আহিছে। আৱতৰিয়া কালত (Off Season) পাচলিৰ উৎপাদন কৰাটো খুব এটা সহজ বিষয় নহয়। আৱতৰিয়া পাচলি উৎপাদনৰ সকলোতকৈ গুৰুত্বপূর্ণ অৱশ্যেকটা হৈছে ৰোপণ কৰাৰ যোগ্যতা থকা পুলি, যিটো অসমৰ পৰম্পৰাগত কৃষি পদ্ধতিৰে উৎপাদন কৰাটো প্রায় অসম্ভৱ। কিন্তু নিয়ন্ত্রিত পৰিৱেশত ট্রে’ পদ্ধতিৰে নার্ছাৰীৰ ভিতৰত আৱতৰিয়া পুলি প্রস্তুত কৰাটো সম্ভৱ আৰু ইয়াৰ উদাহৰণ ভাৰতৰ অন্য ৰাজ্য যেনে - মহাৰাষ্ট্র, কর্ণাটক আৰু অন্ধপ্রদেশৰ দৰে ৰাজ্যই দাঙি ধৰিছে। সেই ৰাজ্য সমুহত প্রায় ৯০% কৃষকে আৱতৰিয়া কালত নার্ছাৰীৰ পৰা পুলি ক্রয় কৰি পাচলিৰ খেতি কৰে। অসমৰ কৃষক সকলে যদি আগন্তুক দিনত নার্ছাৰীসমূহত পুলি প্রস্তুত কৰাৰ অভ্যাস গঠন কৰে আৰু সেই পুলি খেতি পথাৰত ব্যৱহাৰ কৰি শাক-পাচলি উৎপাদন কৰে, তেতিয়া আৱতৰিয়া কালতো শাক-পাচলিৰ অভাৱ পূৰণ হ’ব ।

নার্ছাৰীত উৎপাদন কৰিব পৰা ভিন্ন শাক-পাচলিসমূহ : নার্ছাৰীত ট্রে’ পদ্ধতিৰে মাটি বিহীন মাধ্যমত উৎকৃষ্ট মানদণ্ডৰ শস্যৰ পুলি যেনে- বন্ধাকবি, ফুলকবি, বেঙেনা, জিকা, উৰহী, লাঁও, জলকীয়া, ভোট-জলকীয়া, বিলাহী, ষ্ট্রবেৰী আদি প্রস্তুত কৰিব পৰা যায়। কৃষকে উক্ত শস্যৰ পুলিসমূহ নার্ছাৰীৰ পৰা বতৰ আৰু আৱতৰত কৃষি কর্মৰ বাবে ক্রয় কৰিব পাৰে। নার্ছাৰীত পুলি প্রস্তুতৰ বাবে আৱশ্যকীয় প্রয়োজনীয় সামগ্রীবিধ হ’ল- বীজ অথবা বিধান । ভাৰতবর্ষত আজিৰ তাৰিখত বহুতো উন্নত বীজ উদ্যোগ গঢ়ি উঠিছে আৰু অসমলৈ বহিঃৰাজ্যৰ পৰা বীজসমূহ আমদানি সহজ হৈ পৰিছে। ইয়াৰ উপৰিও নার্ছাৰীত পুলি প্রস্তুত কৰিবৰ বাবে আৱশ্যকীয় সামগ্রী সমূহ হ’ল -

» ক'ক'পিট (নাৰিকলৰ আঁহৰ পৰা প্ৰস্তুত কৰা ব্লক)
» কেঁচুসাৰ (জৈৱিক সাৰ)/ ভাৰ্মিকোলাইট
» জীৱাণু সাৰ অথবা কীটনাশক দ্ৰব্য যেনে -
ট্ৰাইক্ৰদ্ৰাৰমা
চিউড'মনাছ
পি. এছ. বি.
এজ'ট'বেক্টৰ
এজ'স্পিৰিলিয়াম
বিউভেৰিয়া
মেটাৰাইজিয়াম
ৰাসায়নিক সাৰ/ কীটনাশক দ্ৰৱ

এপার্ট জিলাত নার্ছাৰীৰ আনুষ্ঠানিক শুভাৰম্ভণি ঃ কৃষক সকলৰ বাবে প্ৰয়োজনীয় পুলি যোগানৰ কাৰণে এপার্ট প্ৰকল্পৰ অধীনত নিৰ্বাচিত জিলাসমূহৰ মাজত প্ৰায় ১০০ খন নার্ছাৰী প্ৰতিষ্ঠা কৰাৰ পৰিকল্পনা আছে । তাৰে এইটো বিত্তীয় বৰ্ষলৈকে ৫৪ খন নার্ছাৰীয়ে এপার্ট প্ৰকল্পৰ নীতি-নিৰ্দেশনা মৰ্মে ব্যৱসায় চলাই আহিছে। প্ৰকল্পৰ অন্যতম কাৰ্যসূচী হিচাপে এই নার্ছাৰীসমূহৰ ব্যৱসায়ীক ভিত্তিক উন্নতিকৰণৰ ক্ষেত্ৰত এপার্ট প্ৰকল্পয়ে নিম্নোক্ত শিতান সমূহ পৰিচালনা কৰি আহিছে।

» ৰোগমুক্ত আৰু সুস্থ সৱল পুলি প্ৰস্তুতকৰণ।
» বতৰৰ আগতিয়া আৰু পলমকৈ পুলি প্ৰস্তুতকৰণ।
» নিয়ন্ত্ৰিত পৰিৱেশত আৱতৰিয়া পুলি প্ৰস্তুতকৰণ।
» শস্যৰ সঠিক পুলি প্ৰস্তুতকৰণ।
» ট্ৰে' পদ্ধতিৰে পুলি প্ৰস্তুতকৰণ
» প্ৰতিকূল বতৰ সম্পৰ্কীয় সমস্যাৰ পৰা কৃষকসকলক সুৰক্ষা প্ৰদান কৰা।
» শ্ৰেষ্ঠ অংকুৰণ ক্ষমতা সম্পন্ন আৰু উৎকৃষ্ট মানদণ্ডৰ পুলি প্ৰস্তুতকৰণ ।
» নার্ছাৰীৰ ওচৰে পাজৰে থকা প্ৰতিবাসী কৃষক / কৃষকগোট / এগ্ৰ'প্ৰডিউচাৰ কোম্পানীৰ লগত নার্ছাৰীৰ হিতাধিকাৰীক সমন্বয় স্থাপন কৰা ।

উক্ত উদ্দেশ্য সমূহ আগত ৰাখি নগাঁও জিলাত কৃষি বিভাগৰ আৰু জিলা ATMA-ৰ উদ্যোগত ৰূপায়িত এখনি শাক-পাচলিৰ নার্ছাৰীৰ আনুষ্ঠানিক উদ্বোধনী কৰা হয়। ৩ জানুৱাৰী ২০২২ তাৰিখে খাগৰীজান কৃষি উন্নয়নখণ্ডৰ কাৰৈমাৰি গাৱঁত স্থাপিত 'গ্ৰীণ হেভেন নার্ছাৰী' খন কৃষি বিজ্ঞান কেন্দ্ৰৰ প্ৰকল্প সমন্বয়ক ড° নিৰঞ্জন ডেকা আৰু বিশ্ব শাক পাচলি কেন্দ্ৰৰ স্থানীয় পৰামৰ্শক ড° অৰবিন্দ উপাধ্যায়ে যুটীয়া ভাৱে উদ্বোধন কৰে। নিলোৎপল গোস্বামীৰ উক্ত নার্ছাৰীখন বিশ্ব বেংকৰ অৰ্থ সাহাৰ্যত ৰূপায়িত এপার্ট প্ৰকল্পৰ নীতি নিৰ্দেশনা মৰ্মে নিৰ্ধাৰিত মানদণ্ডৰে প্ৰতিষ্ঠা কৰা হয় । ভিন্ন ধৰণ পাচলিৰ পুলি, ফুলৰ পুলি, ইন্ড'ৰ প্লেণ্ট,

ভিন্ন প্রজাতিৰ ঔষধি গছৰ পুলিৰে ভৰপুৰ নার্ছাৰীখনে প্রায় ৩.৫ বিঘা মাটিকালি আৱৰি আছে, লগতে এটা বিক্রী কেন্দ্র আৰু তিনিটা ক্ষুদ্র পুলি উৎপাদন ইউনিট আৰু চাঙৰ খেতি, ষ্ট্রবেৰী খেতিও নার্ছাৰীৰ চাৰিওফালে কৰা হৈছে। এপার্ট প্রকল্পৰদ্বাৰা হিতাধিকাৰী নিলোৎপল গোস্বামীয়ে ডেফ'ডিল উদ্যান শস্য মহাবিদ্যালয়ত প্রথম পর্য্যায়ৰ আৰু অসম কৃষি বিশ্ববিদ্যালয়, যোৰহাট চৌহদত দ্বিতীয় পর্য্যায়ৰ প্রশিক্ষণ গ্রহণ কৰে। প্রশিক্ষণ লোৱাৰ পিছত হিতাধিকাৰীজনে ৰঙালাও, বেঙেনা, ভোট-জলকীয়া, লাও, জিকা আদি শস্যৰ পুলি প্রস্তুত কৰি প্রতিবাসী কৃষক গোটক

পুলি বিক্রী কৰা আৰম্ভ কৰিছে আৰু ভৰিষ্যত পৰিকল্পনাও হাতত লৈছে আৰু ইয়াৰ জৰিয়তে আর্থিক স্বাৱলম্বীতা গঢ়ি তোলাৰ প্রয়াস কৰাৰ লগতে নার্ছাৰীখনত নিয়োগৰ সুবিধাও সৃষ্টি কৰিছে।

ড্রাম ছিদাৰ'ৰ জৰিয়তে অংকুৰিত বীজ

বোকা পথাৰত 'ড্রাম ছিদাৰ'ৰ জৰিয়তে অংকুৰিত বীজ শাৰী শাৰীকৈ ছটিওৱা হয়। প্রতিটো শাৰীৰ মাজৰ ব্যৱধান ২০ ছেঃমিঃ ৰখা হয় । ড্রাম ছিদাৰৰ দ্বাৰা ছটিয়াবৰ বাবে প্রতি হেক্টৰত ৪০-৪৫ কিঃগ্রাঃ বীজৰ প্রয়োজন হয়। মূল পথাৰত কঠীয়া ৰোৱাৰ ক'মেও তিনি সপ্তাহৰ আগত হালবোৱা আৰম্ভ কৰিব লাগে। ধানৰ বীজখিনি ১২ ঘণ্টা পানীত ডুবাই থোৱাৰ পিছত পানীখিনি উলিয়াই দি ভিজা বস্তাৰে বীজখিনি ২৪-৭২ ঘণ্টা ঢাকি থ'ব লাগে। দিনত দুবাৰকৈ ধানখিনি ওপৰ তল কৰি দিব লাগে। বীজ সিঁচাৰ ১-২ দিনৰ আগতে পথাৰখন বোকা কৰি ল'ব লাগে আৰু ৰোৱনী চাহৰ সময়ত অনুমোদিত পৰিমাণৰ সাৰ প্রয়োগ কৰিব লাগে। পথাৰত পাতল পানীৰ তৰপ (১-২ ছেঃমিঃ) এটা ৰাখি অতিৰিক্ত পানীভাগ উলিয়াই দিব লাগে।

গজাঁলি ওলোৱা বীজবোৰ পথাৰত খোপনি পোতাৰ পিছত যেতিয়া ২-৩ টা পাত ওলোৱাৰ সময়ত পথাৰত পানী দিয়াৰ ব্যৱস্থা কৰিব লাগে। নাইট্রজেন যুক্ত সাৰ প্রথমবাৰ বীজ

ছটিওৱা ২০-২৫ দিনত (পোখা মেলাৰ সময়ত) আৰু দ্বিতীয়বাৰ ৪৫-৫০ দিনত (গেঁৰ ধৰা সময়ত) প্রয়োগ কৰিব লাগে। সংহত নিয়ন্ত্রণ পদ্ধতিৰে অপতৃণ নিয়ন্ত্রণৰ ব্যৱস্থা কৰিব লাগে।

সংগ্রহ : ইন্টাৰনেছনেল ৰাইচ ৰিচার্চ ইনষ্টিটিউট

ড্রাম ছিদাৰৰ বিষয়ে

- মুল্য : ৬,০০০ - ২,৪৮,০০০।
- ক্ষমতা : প্রতি হেক্টৰৰ বাবে ৫ ঘন্টা প্রয়োজন হয় ।
- পেট্রল বা ডিজেলৰ প্রয়োজন নাই ।
- কম শ্রমিকৰ প্রয়োজন হয় ।
- মিথেন নির্গমণ কম হয় ।

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