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Success Story of Minakshi Devi from Dandua Village on Maize Farming in Assam

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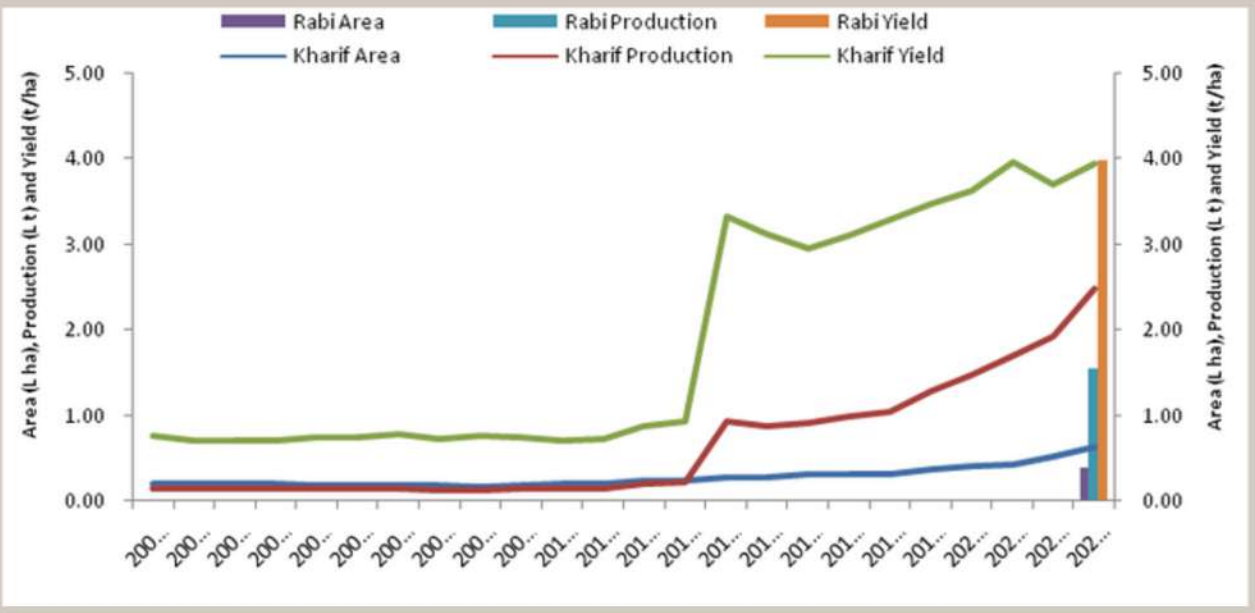
Introduction

Assam State is located in Northeast India and is blessed with fertile land and a suitable climate for agricultural activities. However, the potential of the agricultural sector in Assam remains largely untapped, and farmers face several challenges that hinder their productivity and economic growth. Maize is a key crop after paddy cultivation in Assam and it is used for food, feed, starch, and industries. Maize crop has good production potential, where the cultivation is supported with technology and knowledge inputs in Assam. It serves as a primary ingredient in animal feed, a vital component for the growth and development of piggery, poultry, cattle, buffalo, etc.

The nutritional value provided by maize ensures affordable meat production, which is crucial for ensuring food security and meeting the growing demand for protein-rich diets. Thus, maize cultivation besides supporting the agricultural sector can also contribute to the overall economic growth and nutritional security of Assam and the North-Eastern Himalayan (NEH) region.

Status and Demand of Maize in Assam

Assam currently produces only 1.5 to 2 lakh tonnes (Figure 1) of maize whereas the requirement for maize is more than 10 lakh tonnes for feed and bioethanol purposes. Currently, the population of poultry, piggery, and livestock is more than 6.69 Cr. which requires more than 23 lakh MT fodder per year while dual/grain-based distilleries for bioethanol production also established with 620 kiloliters per day capacity that adds additional maize demand by over 6.5 lakh tonnes in Assam. The production and area of maize increased per year but it is at a slower pace due to limiting factors like suitable hybrids, seasonal heavy rainfall, proper agronomic practices, and >10 lakh hectares of fallow land after paddy crop. In Assam, feed and ethanol industries could be a good market for ensuring good price of crop produce and has internal demand for up to 3 lakh ha acreage. An analysis of 30 years weather data (1991-21) showed the state normally receives >200 seasonal rainy days with moderate temperature throughout the year which can complete the demand for water with 2-4 supplemental irrigation in maize during rabi and spring season.



APY of kharif and rabi maize during 2000-01 to 2023-24 in Assam

Assam and North-Eastern himalayan region are currently net importers of maize and require replication of West Bengal's success stories.

Challenges

Ø Limited access to high-quality seeds: High costs, limited availability, and lack of awareness programs hinder farmers from obtaining quality seeds.

Ø Inadequate knowledge of modern farming techniques: Precision farming, integrated pest management, and sustainable agricultural practices are not widely practiced.

Ø Insufficient market linkage: Farmers struggle to connect with markets effectively.

Ø Fluctuating weather conditions: Floods and unseasonal rains disrupt agricultural activities.

Ø Lack of irrigation facilities: Inadequate irrigation hampers crop growth.

Ø Insufficient market infrastructure: Inadequate storage facilities, cold chains, and transportation hinder market access.

Ø Market price fluctuations: Farmers face exploitation by middlemen and unstable prices.

Initiative and Outcome of the Project

ICAR-Indian Institute of Maize Research, Ludhiana and APART Project of the Assam Government sponsored by World Bank implemented in Morigaon district during rabi season of 2023-24 in Assam. Farmer Minakshi Devi received the ADV-756 maize seeds and other essential inputs like fertilizer application strategy, integrated weed management through mixture of Atrazine 50% + Tembotrione 34.4% and protect the crop from pests, Emamectin benzoate insecticide at a rate of 200-240 gm/ha, showcasing a proactive approach to crop management. The project offered scientific maize production technique, capacity-building sessions, and technical training on maize to the farmer. Minakshi Devi and other farmers from Saronporia Farmer Producer Company (FPO) embarked on extensive maize cultivation, armed with the knowledge and resources to adopt proper agricultural practices.

Farmer Minakshi Devi's thrived maize crop, resulting in an impressive harvest of 54 quintals from 0.5 ha land. By selling her maize at ₹2000 per quintal, she achieved a significant income with a 2.4B:C ratio, which improved her family's financial stability and overall quality of life. The success of her maize cultivation also demonstrated the effectiveness of the project's interventions, inspiring other farmers in her village to adopt similar practices, leading to improved productivity and a promising future in agriculture.Her journey underscores the need for continuous learning and adaptation to improve farm productivity and livelihood security.

Minakshi Devi and other progressive farmers during the field day

Future Prospective

The success story like this underscores the potential for collaborative efforts, innovative practices, and resilience in overcoming agricultural challenges. The training and mass awareness for stakeholders lead to increased adoption of maize to a scale and the first time 39 thousand ha rabi maize area reported during 2023-24 in Assam and total maize acreage also had significant jump from 52,000 ha in 2022-23 to 102 thousand ha in 2023-24. The handholding and upscaling of good agronomic practices with high yielding maize hybrid including better crop establishment with zero tillage, integrated weed management, intercropping with vegetables, etc. in maize with stakeholders' linkages. Therefore, scaling up of maize production based on region's suitable climatic conditions and market opportunities can ensure sustainable livelihood security in Assam by revamped maize value chain.

Transforming Agriculture in Assam : The Warehouse Receipt Financing Initiative

- Team ASWC

Introduction

Warehouse Receipt Financing (WRF) is a system of agricultural financing wherein farmer can get a loan from bank or other financial institutions against the value of agricultural produce stored in warehouse.

In a pioneering move towards ensuring scientific storage, pledge financing against the stored produce and better market access to farmers, Assam has initiated the system of Warehouse Receipt Financing (WRF) under the World Bank funded Assam Agribusiness and Rural Transformation Project (APART). This initiative, spearheaded by the Assam State Warehousing Corporation (ASWC) in collaboration with Arya Collateral Pvt. Ltd in Sonitpur district, marks a significant shift in the agricultural financing and market access for local farmers.

Background and Innovation

The WRF initiative addresses longstanding challenges faced by farmers of the state, including distress sales at low prices and limited access to scientific storage facilities as well as poor access to agricultural credit. By introducing WRF, farmers now have the option to store their produce in modern warehouses equipped with AI cameras for monitoring, automated systems, testing facilities clubbed with hygienic storage etc. This not only ensures the safety of their agricultural produce but also enables them to obtain finance against stored commodities, breaking the cycle of immediate post-harvest sales at low prices.

Achievements and Impact

Since its inception in September 2022, the WRF initiative has made significant progress:

- Over 1,060 farmers sensitized about WRF benefits.
- Storage of significant quantities of maize and paddy crop produce and seeds.
- Facilitation of WRF loans, enhancing financial security for farmers.
- Establishment of market linkages through Arya.ag platform, enabling better price negotiations & hence higher realizations for farmers.

Stakeholders and Beneficiaries

Key stakeholders include Farmer Producer Companies (FPCs) of Sonitpur District, namely, Majiya FPC, Jaymati FPC, and Kheuj Nayan FPC, who actively participated in the initiative. The initiative has empowered these FPCs through enhancing their capacity to procure from member farmers, store scientifically, and sell the agricultural produce at competitive prices through electronic trading platforms as well as obtain financing for immediate needs.

A Warehouse Receipt Financing (WRF) sanction limit of Rs. 1 crore was established for Kheuj Nayan Farmer Producer Company by AryaDhan Financial Services Pvt Ltd, following the due procedure.

In Kharif Harvest 2023, stored ~80 MT of Paddy seed through Majiya Farmer Producer Company in the warehouse and facilitated WRF loan of Rs. 12.8 lakh. A total of 123 MT of maize of Kheyujnayan FPC from the early harvest was also stored and altogether 204 farmers have been supported with the storage.

During the Rabi Harvest of 2023, approximately 45 metric tons of Paddy seed from 14 farmers was stored through Majiya FPC, and approximately 630 metric tons of Maize from 216 farmers was stored through Kheuj Nayan FPC in the ASWC warehouse godown at Tezpur Centre. A WRF loan of Rs. 80.83 lakhs was facilitated for the farmers of Kheuj Nayan FPC against the Maize stored in the warehouse which was repaid timely.

For the upcoming Rabi Harvest 2024 season, ASWC and Arya team have already facilitated application of WRF for Kheuj Nayan FPC and have planned to store 650 MT of maize.

A transaction of 453 MT maize has been finalized by Kheuj Nayan FPC with Central Warehousing Corporation (CWC) at a price of Rs. 23.87 per Kg (excluding transport) which is around 18% higher than the price at the time of harvest. The farmers are very happy with this price & also to get an assured large buyer from the public sector. A loan of Rs 81.25 lakh has also been availed by the FPC against the value of stored maize lot.

Sustainability and Replication

The initiative's success has prompted plans to replicate it across the 40 ASWC warehouses being modernized under APART. This expansion aims to institutionalize WRF and promote best practices in scientific storage and agricultural financing.

Technological Integration and Efficiency

The use of AI cameras and electronic warehouse receipts has streamlined operations, ensuring transparency and efficiency in transactions.

Community Involvement and Feedback Mechanism

Community engagement has been integral to the initiative's dissemination, with FPCs playing a pivotal role in spreading awareness and building trust among farmers. A robust grievance redressal mechanism ensures transparency and accountability, further bolstering farmer confidence.

Conclusion

The concept of Warehouse Receipt Finance is first of its kind initiative in Assam. This pilot on WRF has helped in creating an ecosystem of finance against Warehouse Receipts, digitization of warehousing process and adoption of practices of scientific storage. The successful implementation of this pilot through the members of three FPCs has boosted the confidence of other FPCs and stakeholders too in such government initiatives. For one of the FPCs namely Kheuj Nayan FPC, the turnover in 2021-2022 was nil which increased to Rs 4 lakh in 2022-23 but after availing the finance against the stored commodities, the turnover reached to Rs 1.22 crore in 2023-24. In the case of Majiya FPC, the turnover increased to Rs 17 lakh in 2023-24 after the intervention of WRF.

The Warehouse Receipt Financing initiative in Assam stands as a beacon of innovation in agricultural financing and market access. By leveraging technology and community involvement, it not only addresses immediate farmer needs but also sets a sustainable precedent for agricultural development in the region. As efforts continue to scale and replicate this model, Assam's agricultural landscape is poised for enduring transformation and prosperity.

Assam Fodder Mission (AFM):

Bridging the Fodder Gap for Sustainable Dairy Farming

- AFM team

In a significant move to bolster fodder production and enhance dairy farming sustainability, the Assam Fodder Mission (AFM) was launched in September 2022. Spanning over seven years, this initiative is spearheaded by the Agriculture Department of the Government of Assam. The mission is supported in initially 2.5 years by the Assam Agribusiness and Rural Transformation Project (APART) and further it will be supported by Government of India and Government of Assam.

Objective and Scope

The primary objective of AFM is to address the shortfall in fodder production through strategic interventions. Fodder crops such as Fodder Maize, Oats, Berseem, Bajra-Napier Hybrid, and Fodder Sorghum have been selected for cultivation under this mission. The focus extends beyond cultivation to include effective post-harvest management techniques, such as crop residue management, mechanization, silage making, and baling.

Key Components

AFM aims to leverage various Government of India schemes to maximize impact, particularly in promoting fodder entrepreneurship among farmers. Training and capacity-building initiatives are integral, with plans to train over 40,900 dairy farmers across 26 districts covered under APART. The mission also envisions setting up 85 fodder processing units in an entrepreneur mode, enhancing value addition and local economic development.

Implementation Strategy

Spanning a total area of 45,015 hectares, AFM anticipates the participation of more than 1,75,000 dairy farmers throughout its duration. The mission is financially structured with a budget of Rs. 120.20 Crore, strategically divided among stakeholders:

- Rs. 30.10 Crore (25%) from APART in the initial 2.5 years
- Rs. 30.00 Crore from the State Government
- Rs. 60.10 Crore (50%) from various Government of India schemes

Status of fodder production under AFM

	Rabi season fodder production under AWP 22-23			
Sl.	Fodder crop	Fodder production demo area in ha	Total beneficiary (Nos.)	Total fodder production (@ 40ton/ha)
1	Fodder maize	1070	4280	42800
2	Oat	630	2520	25200
		1700	**6800**	**68000**
	Kharif season fodder production under AWP 23-24			
Sl.	Fodder crop	Fodder production demo area in ha	Total beneficiary (Nos.)	Total fodder production (@ 200 tons/ha/year)
1	Bajra-Napier hybrid	1300	5200	260000
	Kharif season/Rabi season fodder production 24-25			
1	Fodder maize (APART)	2600	10400	1,04,000
2	Fodder Maize (RKVY)	21926	87704	8,77,040

Two Silage units will be installed in Sonitpur and Morigaon to provide the support to dairy farmers.

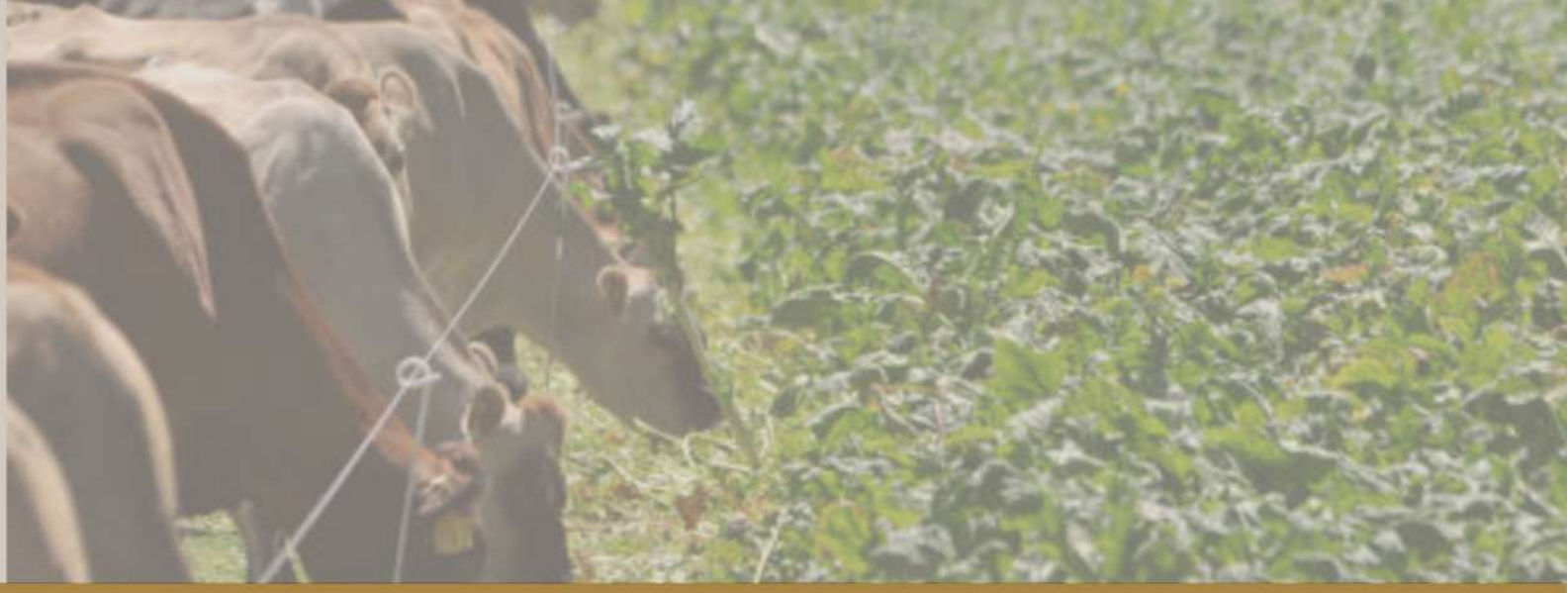
Impact and Future Prospects

AFM holds the promise of transforming Assam's dairy sector by ensuring sustainable fodder supply, thereby boosting milk production and farmer incomes. By enhancing fodder productivity and management practices, the mission not only supports dairy farmers but also contributes to agricultural resilience and economic growth in the region.

Conclusion

The Assam Fodder Mission stands as a testament to the state's commitment to agricultural development and rural prosperity. With its comprehensive approach to fodder production, management, and capacity building, AFM is poised to make a lasting impact on Assam's dairy farming landscape over the coming years, paving the way for a more sustainable and prosperous future.

As AFM progresses towards its goals, it is expected to serve as a model for similar initiatives in fodder deficient states, emphasizing the critical role of fodder security in agricultural sustainability and economic empowerment.



Kharif: Cultivating growth and sustainability

- Jyoti Bikash Nath, Sr. Specialist, IRRI

The brooding monsoon clouds in the sky sensitize the earth for the cultivation of kharif rice. The kharif is the time of creation, the time of beginning, the time of hope, the time of resilience and the time of abundance. The rains are not mere droplets but the lifeblood that translocates in the veins of every paddy sapling.

Kharif is the season of sowing the seeds of rice. Farmers start with the meticulous process of ploughing and leveling their field to show the seeds in the nursery, later transplanting in the main field. The process of sowing, transplanting, intercultural operation, harvesting and postharvest operations carry immense joy and enthusiasm among Assam farmers which bears the seeds of colorful festivals in Assam.

The International Rice Research Institute (IRRI), a global leader in rice science, has promoted several technologies in the rice value chain to increase productivity and profitability of the farmers of Assam. The age-old practice of sowing rice seeds, transplanting and harvesting require significant investment in labour, time and money. The modern technologies promoted, if adopted beyond the APART initiatives, can bring the most desired changes to the agricultural ecosystem of Assam.

Replacement of variety : The need of hour

While the monsoon in *kharif* often brings joy, it can also bring sorrow as the fields become submerged due to heavy rain. The use of flood/ submergence tolerant(Sub1) varieties of rice is recommended for the farmers that can withstand complete inundation for two weeks. Due to massive demonstrations and training, farmers are now aware of these varieties, therefore there isa need to encourage adoption of these varieties for a joyful *kharif*.

Direct seeding of rice

Amidst the climate change concerns, direct seeded rice (DSR) offers a promising option for crop establishment. Transplanted rice produces 1.5% of the global greenhouse gases and accounts for about 10-12% of the methane emissions. So, there is an urgent need to promote the alternate method of rice cultivation, DSR. It provides numerous advantages over transplanted rice like faster sowing and earlier maturity, better water use efficiency, and labour use efficiency, higher profitability to farmer and decreased GHG emissions. IRRI under APART has showcased the technology extensively in the field. It's now up to the agricultural fraternity of Assam to advance these technologies to the next level.

Diversification: The mantra

Rice-fallow areas in Assam were mapped from 2018-19 onwards till 2020-21 using time-series satellite data under APART by IRRI and AAU. During this period, the rice-fallow area in rabi varied between 56-58 % of the kharif rice area. Approximately, 4.48 lakh ha rice-fallow area in Assam is suitable to grow one of the crops amongst potato, mustard, maize, summer pulses and vegetables. Data also reveals that the average rice-fallow area in Assam during these three years was around 10.34 lakh ha. IRRI with its implementing partners has successfully showcased cultivation of second crop in the rice-fallow and many farmers are convinced with the diversification mantra. The digital Rice-based Cropping System Knowledge Bank (www.rkbassam.aau.ac.in) offers a simple and convenient tool to identify the suitable crop after rice in the farmer's field. The digital platform provides necessary information including variety, time of planting and agronomic practices to be followed by farmers for harnessing maximum benefit from their farmland. Users can download the mobile App from Google play store. It covers both kharif and rabi making it a comprehensive, one-stop information source available in both English and Assamese.

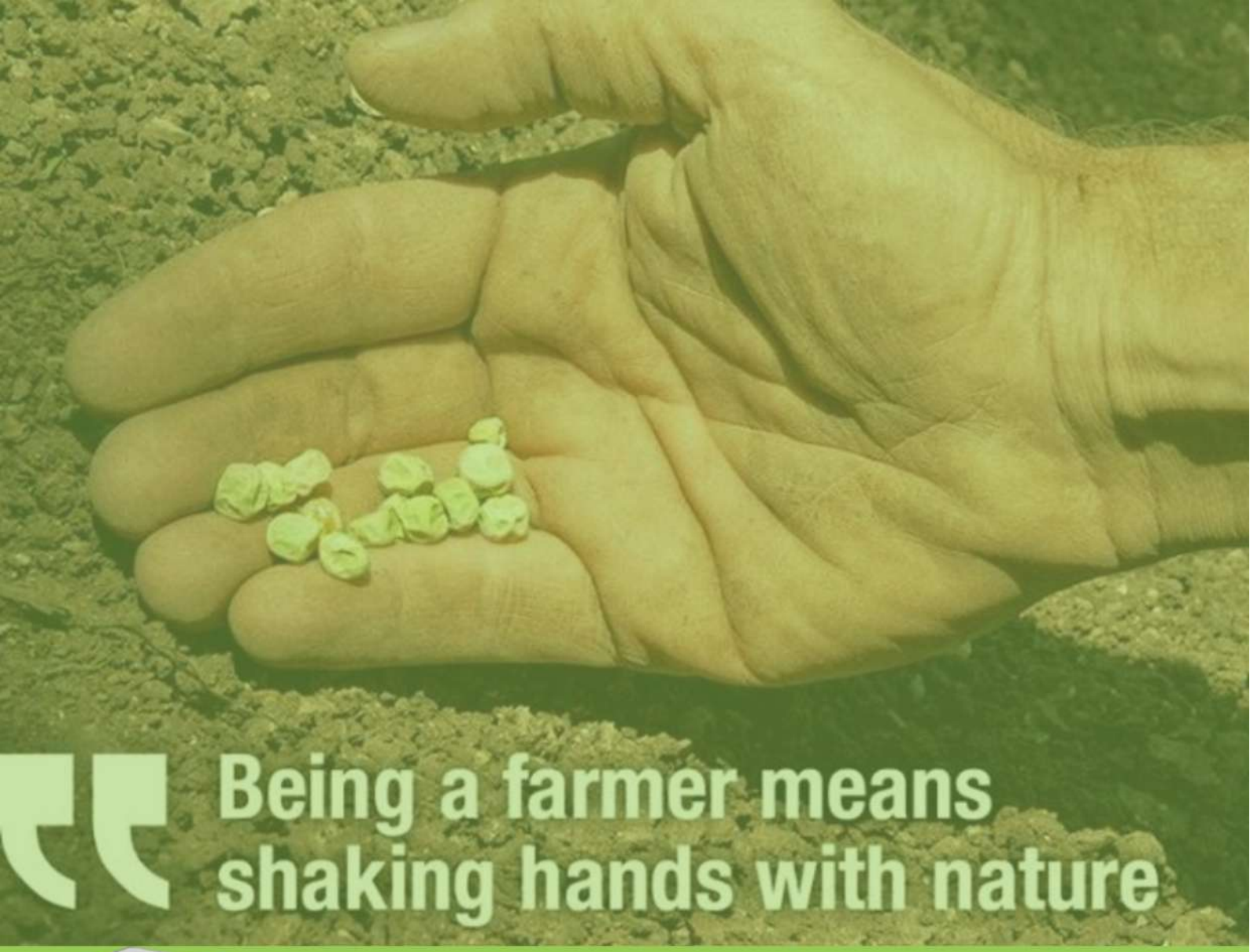
Scaling up mechanization

IRRI has not only promoted and showcased machines across rice value chain but also has built capacity of farmers to operate the machines. However high investment required for purchasing machine remains a concern. What then is the best option to mechanize the field of small and marginal farmers? IRRI has promoted the concept of Custom Hiring Centre (CHC), the optimal solution, enabling the farmers to access the machineries without initial investment of procurement. Let's appeal to all the Farmer Producer Companies (FPCs) to keep themselves organized and implement the CHC in a planned manner, supporting those in need and taking pride in being a pathfinder through a successful business models.

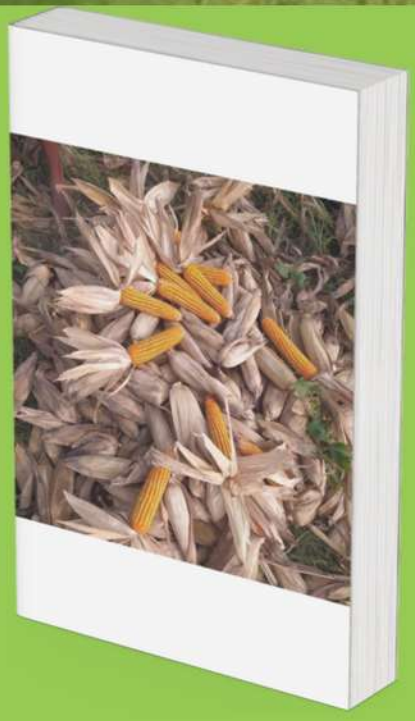
Women: unlocking the potential

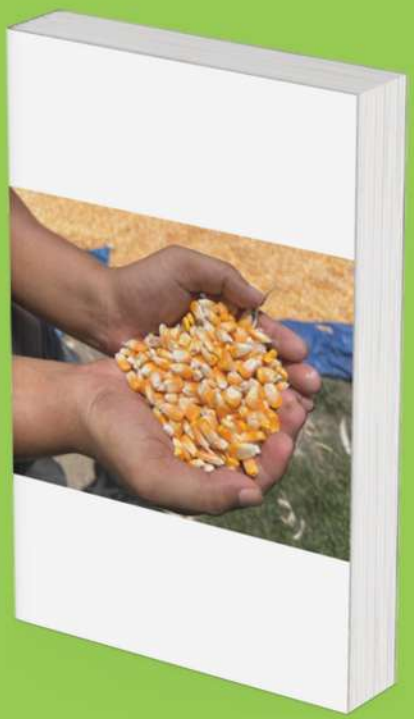
Majority of rural women of Assam have traditionally been engaged in agriculture and allied activities. However, only a small fraction of these women own land and have a very limited role in decision making process. Against the traditional and limited role of the women engagement in agriculture, under APART it has been observed that a significant percentage of rural women took part in capacity building program as well as in operating machineries in their field. This is a remarkable shift from traditional societal thoughts. Women are now front-runners in many of the agricultural activities. Kharif can be more bountiful if these women and their groups are engaged towards technology adoption.

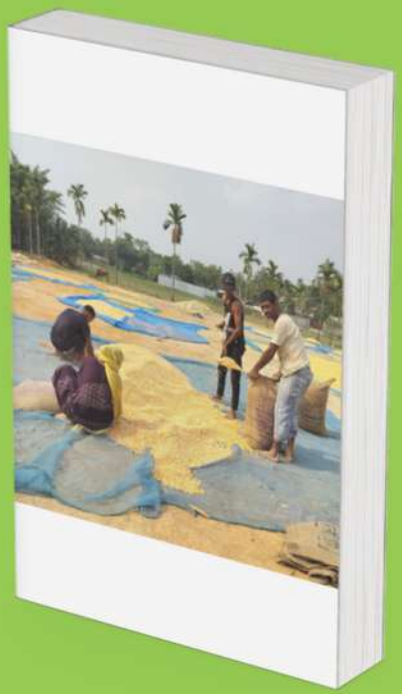
***Kharif* is blessing to mankind and a gift to our planet! It is a season to provide a new direction to our farmers, possibly by replacing the old and launching a robust campaign to adopt new technologies. Its neither a one-day task nor can it be accomplished by a single organization's initiative. Multiple stakeholders including Govt., non-govt. organizations, research organizations, State Agriculture Universities (SAUs), farmers' organizations, farmers, and international development organizations can bring the desired changes in near future through a coordinated and collaborative effort.**



Being a farmer means shaking hands with nature







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