ICAR-DRMR-OPIU (Agri)-APART Project

4th Six Monthly Report

January - June 2022

ICAR

ICAR-Directorate of Rapeseed-Mustard Research

ARIAS Society
GOVERNMENT OF ASSAM
Assam Rural Infrastructure and Agricultural Services Society

APART

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GOVERNMENT OF ASSAM

ICAR-DIRECTORATE OF RAPESEED-MUSTARD RESEARCH
BHARATPUR, RAJASTHAN-321303

ASSAM AGRIBUSINESS & RURAL TRANSFORMATION PROJECT
(APART)

Six Monthly Progress Report-IV

January-June 2022

Consulting services for technical advisory support on Augmenting Rapeseed-Mustard Production of Assam Farmers for Sustainable Livelihood Security

Assam Agribusiness and Rural Transformation Project (APART)

Contract No. OPIU Agri/APART/DRMR/23

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Submitted by

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Table and Figures

Cont.

Acronyms

AAU	Assam Agricultural University
AEA	Agricultural Extension Agent
ANLD	Anisotropic Non-Linear Diffusion
ANMR	Additional Net Monetary Return
APART	Assam Agribusiness & Rural Transformation Project
ARIASS	Assam Rural Infrastructure and Agricultural Services Society
ATM	Assistant Technology Manager
ATMA	Agriculture Technology Management Agency
AWP	Annual Work-Plan
B:C Ratio	Benefit: Cost Ratio
BTM	Block Technology Manager
BVZ	Barak Valley Zone
CBVZ	Central Brahmaputra Valley Zone
CoC	Cost of Cultivation
CD	Crop Demonstrations
DRMR	Directorate of Rapeseed-Mustard Research
DoA	Department of Agriculture
FP	Farmers' practices
GDP	Gross Domestic Product
GMR	Gross Monetary Return
Ha	Hectare
HYV	High Yielding Variety
HZ	Hills Zone
ICAR	Indian Council of Agricultural Research
ICT	Information and Communication Technology
YIOFP	Yield Increase over Farmers' Practice
IP	Improved practices/technologies
IMD	India Meteorological Department
INM	Integrated Nutrient Management
INR	Indian Rupee
IPM	Integrated Pest Management
ITK	Indigenous Technical Knowhow
IWM	Integrated Weed Management
KVK	Krishi Vigyan Kendra
LBVZ	Lower Brahmaputra Valley Zone
MSP	Minimum Support Price
MT	Master Trainer
NARES	National Agricultural Research and Extension System
NBPZ	North Bank Plain Zone
NEH	North East Hills
NER	North Eastern Region
NGO	Non-Government Organization
PHM	Postharvest Mechanization
ToT	Training of Trainers
TT	Technical Training
UBVZ	Upper Brahmaputra Valley Zone
UPS	Uninterruptible Power Source
WUE	Water-Use Efficiency

Preface

Oilseed crops are the second most important determinant of agricultural economy, next only to cereals. Today, the demand for vegetable oils is out pacing the supply with more than half of its annual requirements being met mainly through imports.

Enhancing the domestic edible oil availability is one of the prime concerns of the policy planners to check the rising edible oil imports. Rapeseed-mustard is one of the important sources of edible oil in the country which has made a significant contribution to domestic edible oil availability over the last few decades. Rapeseed-mustard crop has good production potential, where the cultivation is supported with technology and knowledge inputs.

Over the last decade, the number of rapeseed-mustard technologies have been developed, but for certain proven technologies there is a profound adoption gap particularly among smallholder farmers. Increased technology adoption, broadly defined to include adoption of improved agricultural practices, crop varieties, inputs and associated products has the potential to contribute to economic growth through increasing production and productivity of rapeseed-mustard.

Crop area expansion, either through inter cropping or spreading the crop in rice fallow land in the country may also help in increasing the production of rapeseed-mustard. Rapeseed- mustard is grown in substantial area in Assam. However, low and unstable oilseed system productivity is major problem in these areas where cultivation is undertaken mostly on small and marginal agricultural holdings. Keeping in view the vast availability of natural resources and fertile lands offering ample scope to promote oilseed cultivation in Assam, there is an urgent need to identify/screen the suitable technologies of rapeseed-mustard production for rice–fallow situation and motivate the farmers of these areas to adopt identified technologies through demonstrations, trainings, fairs, exhibitions and visits to research and experimental farm.

With this background, ICAR-DRMR is contributing for 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 sustainable livelihood security” since April 28, 2020. ICAR-DRMR as a knowledge partner is providing the expertise under the project to support the Directorate of Agriculture, Govt. of Assam for

a) Enhancing adoption of high yielding short duration rapeseed-mustard varieties
b) Enhancing area and raising productivity, profitability, and resource use efficiencies of rapeseed-mustard cultivation in Assam through improved crop management and protection technologies.
c) Strengthening post-harvest management, reduce losses, increase efficiency and profitability, and improve mustard value chain
d) Developing knowledge materials and capacity development of various stakeholders and extension functionaries in Assam.

The activities under the project were carried out in seven undivided districts namely; Jorhat, Sivsagar, Golaghat, Sonitpur, Morigaon, Darrang and Dhubri of Assam during 2020-21. The results of demonstrations were very encouraging and technology dissemination through various programmes was effective and created interest and motivation in the farmers to adopt the scientific rapeseed-mustard production technologies in larger area. The results also invigorated the policy

makers for expanding the scope of the project in new districts of Assam. After having long deliberation with all stakeholders, it was mutually agreed between ICAR-DRMR and Directorate of Agriculture to expend the project activities in additional districts namely; Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup, Lakhimpur, Dhemaji, Nagaon and Tinsukia of Assam with additional number of demonstrations and other activities for next three years (2021-22 to 2023-24). In this regard, a contract variation in "Consulting services for technical advisory support on augmenting rapeseed-mustard production of Assam farmers for sustainable livelihood security" was signed on 21-10-2021 between Director, Directorate of Agriculture, Khannapara, Guwahati, Govt. of Assam and Director, ICAR-Directorate of Rapeseed-Mustard Research, Bharatpur, Rajasthan. ICAR-DRMR is satisfied with the amount of cooperation and support received from DoA, APART, ARIAS society/ DAO and Nodal officers/ ATM/BTM of districts *vice versa*. It is really an interesting and enriching experience for ICAR-DRMR to work with the dedicated team of DoA, APART, ARIAS society during the implementation of the programme

Keeping in view the low productivity, poor marketing support and low confidence and capacities of the value chain actors, ICAR-DRMR believes that interventions with regards to organizing crop demonstrations along with technical trainings, PHT demonstrations, and training and capacity building of the value chain actors is critical for enhancing the production and productivity of rapeseed-mustard in Assam. Therefore, ICAR-DRMR is working with the Director of Agriculture, Government of Assam on the mustard value chains especially on organizing demonstrations, and training & capacity building programmes to increase the average productivity of rapeseed-mustard.

Other interventions in the mustard value chain are development of knowledge materials in the form of simple and actionable farmer-friendly extension material and digital/IT tools on the different aspects of scientific production and protection technology of mustard to reach a large number of farmers quickly and simultaneously at a low cost and provide accurate, motivating, credible and distortion free information to them. To create awareness among farmers about varieties, technologies, practices in the mustard value chain including post-harvest and market linkages, ICAR-DRMR is providing technical support to organize farmer fairs.

To reinforce the confidence of the extension personnel and farmers in new technologies, methods, etc., exposure visit of extension functionaries and farmers are being organized to ICAR-DRMR along with interaction with progressive farmers and visit to farmers' field in Bharatpur and surrounding areas, to have better knowledge and understanding of technology, methods and to improve the skills of the extension personnel and farmers in scientific production and protection technology of rapeseed-mustard.

ICAR-DRMR will also support in organizing a round table conference/workshop/ seminar to gain further insight into opportunities in Assam and to include and identify all mustard value chain actors from the agro-system (farmers to consumers).

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Executive summary

Under the ICAR-DRMR OPIU (Agri)-APART project 59 clusters of 15 districts of Assam namely; Golaghat, undivided Jorhat including Majuli, Sivasagar, Darrang, Sonitpur, Morigaon, Dhubri Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup, Lakhimpur, Dhemaji and Nagaon were selected to implement and organization of approved activities during 2021-22. For better supervision, monitoring, efficient delivery and effective implementation of mustard activities, ICAR-DRMR has deployed its team at all fifteen districts.

During 2021-22, 5000 mustard crop demonstrations were approved. Accordingly a total of 5000 mustard crop demonstrations in 581 villages of 58 clusters of 15 districts were laid out. Along with mustard crop demonstrations, 9000 minikit demonstrations in the selected clusters to strengthen mustard value chain- production were also laid out. In each minikit, one Kg seed was provided to each farmer to compare it with other existing varieties. Based on the climatic situation, cultivation of rapeseed-mustard, prevailing cropping pattern and resources, these demonstrations were conducted with three improved varieties of Indian mustard viz. NRCHB-101 (1700), PM-28 (1690) and DRMR-150-35 (350) and one variety of toria, viz. TS-38 (1260) along with crop management and protection technologies like line sowing, proper seed rate, seed treatment, proper plant population, thinning, weeding, intercultural operations, management of pest and diseases, etc. against the control plot. The seed of these improved varieties were supplied by ICAR-DRMR to DAOs / PD ATMA of 15 selected APART mustard districts. The seed of demonstrated variety along with required fertilizers and need based fungicides/pesticides were given to selected farmers for crop demonstration. Under minikit demonstrations, only one kg seed of improved varieties viz. NRCHB-101 (5435) and PM-28 (2465) of Indain mustard and one variety of toria, viz. TS-38 (1100) was supplied to the farmers. These crop demonstrations were distributed for different social categories as 1743 (Gen), 1572 (OBC), 478 (SC) and 1207 (ST) beneficiaries. Out of 5000 demonstrations conducted, 4646 demonstrations were successful, wheras a total of 354 demonstrations were failed in different districts due to poor germination, cattle grazing, drought, hail storms, etc. All 4646 successfull crop demonstrations were conducted in different situations viz. Irrigated (1077) and rainfed (3569) situations during 2021-22.These demonstrations were harvested successfully in Feb.-March 2022 and yield data were analyzed to study the performance of demonstrated technologies.

The performance of of crop demonstrations across the districts in both situation viz. irrigated and rainfed condition shows that mean seed yield from IP ranged from 839 (Morigaon) to 1396 kg/ha (Dhubri), whereas from FP ranged from 532 (Morigaon) to 855 kg/ha (Dhubri). The yield increase due to IP ranged from 32.9% in Jorhat to 119% (Sonitpur). The cost of cultivation of IP ranged from Rs. 20105 (Bongaigaon) to Rs 32485 /ha (Dhubri), while for FP it ranged from Rs. 16741 (Bongaigaon)) to Rs 24560 /ha (Sivsagar). The maximum additional cost Rs. 7925/ha for IP incurred (Dhubri), while minimum Rs. 2281/ha (Kamrup). The maximum ANMR of Rs 34348 /ha was reported due to the improved practices in Sonitpur, while minimum of Rs 13403 /ha was in Nalbari. All IP had positive ANMR.The Gross Monetary Return for IP ranged from Rs. 54535/ ha in Morigaon to Rs. 90740/ha in Dhubri, while in FP ranged from Rs. 34580/ha in Morigaon to Rs 56160/ ha in Dhubri. The B:C ration for IP ranged from 2.26 (Morigaon) to 3.19 (Barpeta), while for FP it ranged from 1.60 (Sivsagar) to 2.39 (Bongaigaon). The higher gross monetary return (GMR) and B:C ratio of demonstrated technology and positive additional net monetary return (ANMR) in all districts evidently show that demonstrated technology of rapeseed-mustard during 2021-22 was economically viable and profitable for the farmers of Assam.

Regular visits and monitoring of the crop demonstrations and minikit demonstrations were done by Research Associates and ATMA personnel to educate and motivate the farmers to adopt crop management practices like thinning, intercultural operations, weeding, applying irrigation, management of insect pests and diseases, etc.

ICAR-DRMR organized a total of 250 field days in fifteen selected districts at maturity stage during Feb.-March 2022 at the demonstrated fields of selected farmers. A total of 10047 farmers and farm women participated in these field days.

As per approved activities, a total of 47 PHT demonstration trainings were organized in fifteen selected districts during Feb.-March 2022. A total of 1532 farmers and farm women participated in these 47 PHT demonstration trainings.

During February 22-24, 2022 ICAR-DRMR organized one Exposure visit-cum-training of progressive farmers and one exposure visit-cum-training of Master trainiers/ extension personnel to Reginoal Agriculture Research Station (RARS), Shillongani, Nagaon, Assam, one of coordinating centres under All India Coordinated Research Project on Rapeseed-Mustard (AICRP-RM) working under ICAR-DRMR. A total of 27 master trainers/extension personnel, including research associates and 20 farmers from fifteen selected districts participated in the exposure visit-cum-training programme.

ICAR-DRMR organized a farmer fair at Gorukhuti, Darrang, Assam on February 24, 2022. More than 200 farmers, farm women and extension personnel from different districts of assam participated in the fair.

ICAR-DRMR developed and published a training manual on "Post-harvest management in rapeseed-mustard cultivation" that will help the farmers of the state to adopt better post harvest management practices and reduce the post harvest losses.

ICAR-DRMR has also developed a simple and actionable farmer-friendly extension material in the form of technical folder on "Integrated nutrient management of rapeseed-mustard in Assam" that will help the extension personnel and farmers of the state to identify the symptoms of nutrient deficiency and better nutrient management in rapeseed-mustard. The details of the targets and achievements of the activities are presented in Table 1.

Table 1: Executive summary of physical targets and achievements during January-June. 2022 as per AWP 2021-22.

Activities	Unit	Target	Achievement	Remarks
Crop Demonstrations	No.	5000	5000	Completed
Minikit demonstrations	No.	9000	9000	Completed
Field days	No.	250	250	completed
PHM demonstrations	No.	45	47	Completed
Exposure visit-cum-training of progressive farmers	No.	1	1	Completed
Exposure visit-cum-training of extension personnel	No.	1	1	Completed
Farmers Fair	No.	1	1	Completed
Publication of training manual	No.	01	01	Completed
Publication of technical folder	No.	02	02	Completed
Development of Website/webportal	No.	01	01	Completed

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Chapter 1: Detailed Report

1.1 About ASSAM

Assam, a state with a geographical area of 78,438 km^2, forms about 2.4% of the country's total geographic area and is the core of the North Eastern Region (NER) of India. It is situated in the South of the Eastern Himalayas, between 89°42′ E to 96°E longitude and 24°8′ N to 28°2′ N latitude. A large part of Assam is surrounded by hilly areas and it has both National as well as International boundaries. Assam shares its north boundary with Bhutan and Arunachal Pradesh. Nagaland, Manipur and a part of Arunachal Pradesh are to the east of Assam while Mizoram is to the south of it. States Tripura, Meghalaya and the country Bangladesh are situated to the south-west of the state and West Bengal is to the west of it. Assam comprises three broad natural divisions, namely, the Brahmaputra valley, the Barak valley, and the Hill range. The Brahmaputra valley is the largest strip of plain land extending from the West to North-East in the northern part of the state. The river is the main source of life for the people of Assam and a contributing factor for the fertile agricultural land of the state. Adding quality to alluvial soil, the river Brahmaputra is a perennial source of water for the state.

The southern part of the state is another valley with the river Barak passing through it, known as the Barak valley. This region is relatively small and accounts for only about 9% of the area of the state, accommodating about 12% of the state's population. The hilly range of Karbi Anglong and North Cachar lies in the middle of the state, separating the two valleys.

1.2 Agro-climatic Zones

Based on the amount and characteristics of rainfall, temperature, relative humidity, terrain condition (a stretch of land with regard to its natural features), and soil characteristics, Assam has been broadly divided into six agro-climatic regions as shown in fig 1. They are:

1. The North Bank Plain Zone (NBPZ), comprises of the districts Dhemaji, Lakhimpur, Sonitpur, Udalguri (BTAD) and Darrang, contributing to 18.37% area of Assam. Rice, Rapeseed-Mustard and Sugarcane are the major crops of the zone.
2. The Upper Brahmaputra Valley Zone (UBVZ), comprises of the districts Tinsukia, Dibrugarh, Sivasagar, Jorhat, and Golaghat, and accounting for 20.40% of the total area of Assam. Rice, Rapeseed-Mustard and Sugarcane are the major crops of the zone.
3. The Central Brahmaputra Valley Zone (CBVZ) comprises of the districts Nagaon and Morigaon, accounting for only 7.08% of the area of the state. This region is bowl-shaped and often flooded. Rice, Rapeseed-Mustard, Jute and Pulses are the major crops of the zone
4. The Lower Brahmaputra Valley Zone (LBVZ) comprises of the districts Kamrup, Nalbari, Barpeta, Bongaigaon, Kokrajhar, Chirang, Baksa, Dhubri, and Goalpara covering an area of 20,222 km2, accounting for 25.75% of the area of the state. Rice, Rapeseed-Mustard, Jute, Potato, Wheat and Pulses are the major crops of the zone
5. The Barak Valley Zone (BVZ) comprises of the districts Cachar, Hailakandi, and Karimganj and covers a total area of 6,962 km2, i.e., 8.9 % area of the state. Rice, Sugarcane and Potatoare the major crops of the zone
6. The Hills Zone (HZ) comprises of two districts Karbi Anglong and North Cachar Hills, encompassing 19.4% of the total state area. Maize and Sugarcane are the major crops of the zone.

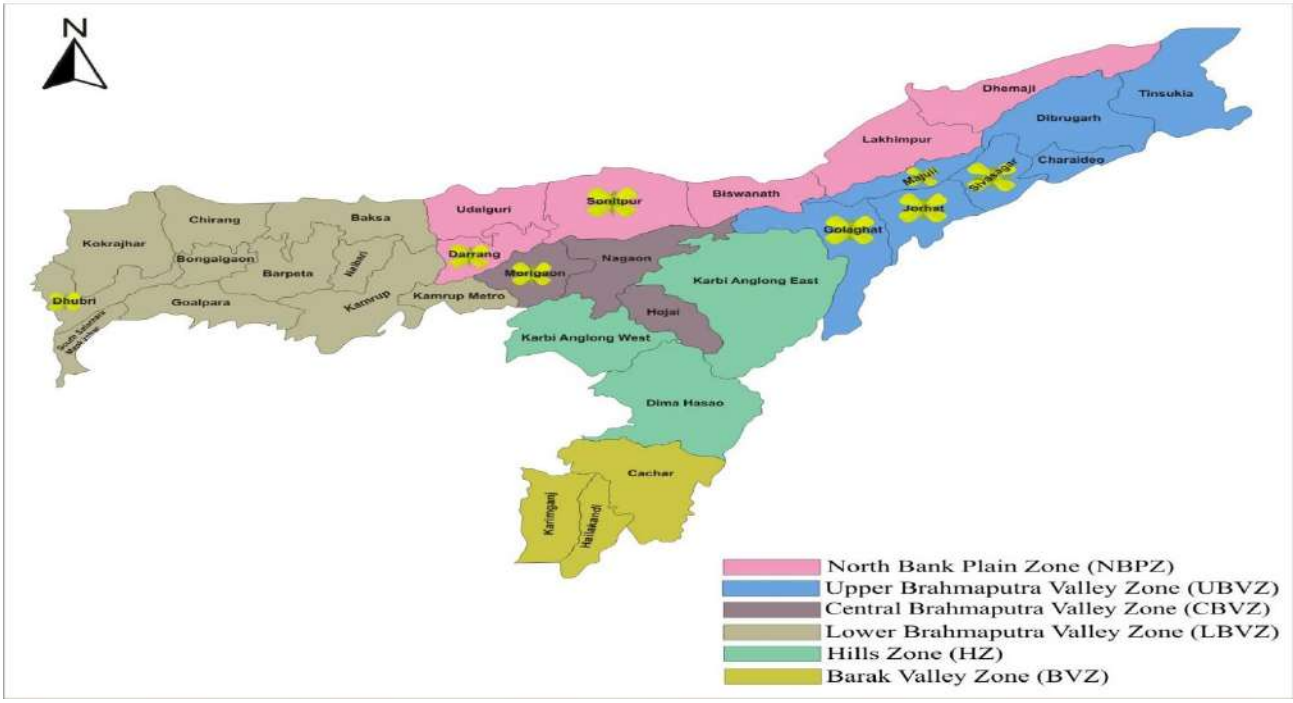

Fig 1: Agro-climatic Zones of Assam

There is a similarity of farm operation in the first five plain agro-climatic zones of Brahmaputra valley and Barak valley. The method of cultivation adopted in the plain region of Assam is more or less similar to that followed in most parts of India. Rice, grown during the wet season (June-Oct/Nov) also called Sali /winter rice, has traditionally been the principal crop in all these zones. Moreover, jute is also grown during the same period at a substantial scale. During the winter months when rainfall is scanty, and the scale of cultivation is also much smaller, the less water requiring crops, such as oilseeds, pulses, potato, and vegetables are traditionally grown in the plains. On the other hand, the system of farming in the hilly areas is significantly different from the system of farming in the plains. The primitive practice of shifting cultivation is still predominant mode of cultivation in the hills.

Climatic Condition: Generally Assam's climate comprises very wet summer season and sunny winter season. The monsoon rain normally starts from early June and continues up to the month of October. Moreover, in late April and May, normally there is also heavy pre-monsoon rain in the state. In Assam, during the summer, temperature normally varies between 25^{o} C and 40^{o} C. During the winter period, i.e., from the month of November to the February, climate mostly remains dry. Sometimes, the temperature during the winter falls bellows 5^{o} C.

The state normally witnesses a very heavy rainfall during the period from June to September. As opposed to monsoon season, the state witnesses on an average 51.0 millimeter rainfall during the winter season. Again in summer and post monsoon period, the average rainfall is 578.00 and 176.00 millimeter, respectively. The average rainfall in the state in a year is 2294 millimeter.

Sources of Irrigation: The major sources of irrigation in Assam are canal, tube well, tank and well supplying irrigation.

1.3 Brief description of the districts identified for rapeseed-mustard programme under the project

For the rapeseed-mustard programme under APART project from 2021-22 onward, fifteen districts of Assam namely; 15 districts of Assam namely; Golaghat, undivided Jorhat including Majuli, Sivasagar, Darrang, Sonitpur, Morigaon, Dhubri Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup, Lakhimpur, Dhemaji and Nagaon were selected. For better supervision, monitoring, efficient delivery and effective implementation of mustard activities of APART, ICAR-DRMR has deployed its team at all fifteen district locations. The selected districts belong to different Agro-climatic zones of the state as follows:

Districts for rapeseed-mustard programme	**Agro-climatic zone of Assam**
Jorhat, Golaghat and Sivasagar	Upper Brahmaputra Valley Zone
Dhemaji, Lakhimpur, Sonitpur and Darrang	North Bank Plain Zone
Nagaon and Morigaon	Central Brahmaputra Valley Zone
Kamrup, Nalbari, Barpeta, Bongaigaon, Kokrajhar and Dhubri	Lower Brahmaputra Valley Zone

Normally, there are considerable variations in physiography, climate, soils, flooding and cropping pattern etc. in an agro-climatic zone and these variations lead to formation of agro-ecological situations within the zone.

Morigaon: This district comprises of 155100 ha area, having 5 blocks. Total cropped area of the district is 214921 ha. and rice, mustard and maize are the major crops. The district is considered as flood prone having sandy loam soil. The 75% area is under rainfed and only 25% cropped area is covered by tube well irrigation. About 12546 ha area is under mustard crop and aphid and saw fly are the major pest of mustard in the district. The major cropping pattern are Sali Rice-Mustard-Summer Pulses and Sali Rice-Mustard-Jute. The occurrence of flood and sometimes drought in summer are the major constraints with respect to agriculture. The Mayong and Bhurbandha block of district have been selected for project activities.

Jorhat undivided including Majuli: This district comprises of 192862 ha area, having 8 blocks. Total cropped area of the district is 102839.2 ha and rice, paddy, pea, pulse, cabbage, cauliflower, brinjal and mustard are the major crops. The district is considered as flood prone having sandy loam soil. The 91% area is under rainfed and only 9% cropped area is covered by tube well irrigation. About 9507 ha area is under mustard crop and aphid and saw fly are the major pest of mustard in the district. The major cropping pattern are paddy- vegetables-vegetables, paddy-potato-vegetables, paddy-pulse-paddy-mustard. The occurrence of flood and sometimes drought in summer are the major constraints with respect to agriculture. The Kaliapani, Majuli, Ujani block of district were selected for project activities.

Sonitpur: This district comprises of 271729 ha area, having 7 blocks/cluster. Total cropped area of the district is 112281 ha and rice, maize, pulses, jute, sugarcane, potato and mustard are the major crops. The soil is clay loam and sandy loam. The 91 % area is under rainfed and only 9% cropped area is covered by tube well irrigation. About 15501 ha area is under mustard crop and aphid and saw fly are the major pest of mustard in the district. The major cropping pattern are rice-mustard, rice-vegetables, mustard-kharif vegetables. The occurrence of flood, soil erosion, non-adoption of line transplanting are the major constraints with respect to agriculture. The Gabhoru, Balipara, Bihaguri, Chaiduar Dhekiajuli, Rangapara and Biswanath clusters of district have been selected for project activities.

Sivasagar: This district comprises of 159885 ha area, having 5 blocks/ clusters. Total cropped area of the district is 1, 16,579 ha and rice, maize, pulses, jute, sugarcane, potato and mustard are the major crops. The district is considered as alluvial soil, clay loam and sandy loam soil. About 2,750 ha area is under mustard crop and aphid and saw fly are the major pest of mustard in the district. The major cropping pattern are rice-mustard, rice-vegetables, mustard-kharif vegetables. The occurrences of water stress, early shower during harvesting, dense foggy during the month of November are the major constraints with respect to agriculture. The Demow and Gaurisagar clusters of district have been selected for project activities.

Darrang: This district comprises of 158500 ha area, having 6 blocks/clusters. Total cropped area of the district is 73619 ha and paddy, maize, vegetable and mustard are the major crops. The district is considered as sandy loam and clay loam soil. About 15447 ha area is under mustard crop and aphid, white rust and saw fly are the major pest and disease of mustard. The major cropping patterns are sali paddy–maize-vegetable, sali paddy- mustard. Late sowing of sali paddy, laggard to new technology and flood are the major constraints with respect to agriculture. The Bechimari, Sipajhar and Pachim Mangaldai clusters of district have been selected for project activities.

Golaghat: This district comprises of 350200 ha area, having 8 blocks/clusters. Total cropped area of the district is 2,28325 ha and paddy, banana, pineapple, ginger, chilli tomato, sugarcane, potato, rapeseed-mustard, pea, lentil, green gram, maize and vegetable are the major crops. The district is considered as sandy loam and clay loam soil. About 13450 ha area is under mustard crop and aphid, white rust and saw fly are the major pest and disease of mustard in the district. The major cropping patterns are sali rice-rabi vegetables / rapeseed-mustard / black grams, sali rice-summer paddy and summer paddy-black gram / rapeseed-mustard / rabi vegetables. The occurrences of

flood and water stress, attack of insect pests such as aphid, early shower during harvesting, non-availability of fertilizers and chemicals during peak seasons etc. are the major constraints with respect to agriculture. The Bokakhat, Kakodonga and Podumoni clusters of district have been selected for project activities.

Dhubri: This district comprises 2,36,126 ha. area, having 11 blocks/ cluster. Total cropped area of the district is 2,30,536 ha and paddy, kharif vegetables, black gram, maize, jute, potato, rapeseed-mustard, and pea are the major crops. The district is considered as sandy loam and clay loam. About 23471 ha area is under mustard crop. The major cropping patterns are mustard –boro paddy, sali paddy-rapeseed /mustard/ rabi vegetables/ rice-pumpkin/potato/mustard. The occurrences of flood and water stress, attack of insect pests such as aphids, powdery mildew, early shower during harvesting, non-availability of fertilizers and chemicals during peak seasons etc. are the major constraints with respect to agriculture. The Gauripur, Rupshi, Agomani, Chapar-Salkocha and Mahamaya clusters of district have been selected for project activities.

Kokarajhar: This district comprises of 3,16,900 ha area, having 4 blocks/clusters. Total cropped area of the district is 1,55,276 ha and paddy, maize, rapeseed and mustard, potato, are the major crops. The district is considered as sandy loam. About 23873 ha area is under mustard crop and aphid, white rust and saw fly are the major pest and disease of mustard in the district. The major cropping patterns are mustard-summer paddy/sali paddy- mustard- summer paddy/ sali paddy-vegetables-ahu paddy. The occurrences of flood and water stress, attack of insect pests such as aphid, early shower during harvesting, non-availability of fertilizers and chemicals during peak seasons etc. are the major constraints with respect to agriculture. The Kokrajhar, Dotma and Kachugaon clusters of district have been selected for project activities.

Nagaon: This district comprises of 260879 ha area, having 13 blocks. Total cropped area of the district is 151744 ha. and paddy, mustard and maize are the major crops. The district is considered as flood prone having sandy loam soil. The 70% area is under rainfed and only 30% cropped area is covered by tube well irrigation. About 27236 ha area is under mustard crop and aphid and saw fly are the major pest of mustard in the district. The major cropping pattern are jute- rice-toria/ wheat - summer pulses and cowpea - rice- toria. The irrigation facilities, non-availability of improved variety at the sowing time, lack of knowledge about pests and disease management, fragmented land of farmers, lack of knowledge about soil condition and fertilizer application are the major constraints with respect to agriculture. The Raha, Khagorijan, Koliabor, Batadrava blocks of district have been selected for project activities.

Kamrup: This district comprises of 4,34,500 ha area, having 22 blocks. Total cropped area of the district is 2,07,344 ha. and paddy, mustard, maize, fruit crops i.e. Banana, and vegetables are the major crops. The district is considered as flood prone having clay loam, sandy loam, sandy soil, alluvial soil and red soil. The 81% area is under rainfed and only 19% cropped area is covered by irrigation. About 15820 ha area is under mustard crop and aphid and saw fly are the major pest of mustard in the district. The major cropping pattern are sali paddy-vegetable-rapeseed and mustard, sali paddy-mustard, sali paddy-boro paddy, fallow (summer)- vegetable/ Mustard, Summer vegetable-toria/ rabi vegetables. The Insect pest and disease, labour constraints, unseasonal rain/ weather constraints, non-availability of improved variety on time, lack of irrigation facilities, and lack of scientific knowledge on crop production are the major constraints with respect to agriculture. The Kamalpur, Bihdiya-Ajikona, Bongshor and Chandrapur blocks of district have been selected for project activities.

Lakhimpur: This district comprises of 2,27700 ha. area, having 9 blocks. Total cropped area of the district is 2,17,222 ha. and winter paddy, summer rice, rapeseed and mustard, potato, blackgram, arecanut and banana, are the major crops. The district is considered as flood prone having alluvial soil. About 15820 ha area is under mustard crop and aphids, mustard sawfly, bihar hairy caterpillar, Pea leaf miner, powdery mildew, sclerotinina rot, alternaria leaf spot, white rust are the major pest

of mustard in the district. The major cropping pattern are Winter Rice-Rape & Mustard, Winter Rice-Potato, winter rice-Summer paddy. Non-availability of seeds at right time, low adoption of early maturing varieties, late sowing, pests and diseases infestations the major constraints with respect to agriculture. The Telahi, Dhakuakhana, Ghilamora, Narayanpur and Dhakuakhana blocks of district have been selected for project activities.

Bongaigaon: This district comprises of 172592 ha area, having 5 blocks. Total cropped area of the district is 1,17,685 ha. and paddy, jute, black gram and kharif vegetables, rapeseed and mustard, maize, potato, lentil, wheat and rabi vegetables are the major crops. The district is considered as flood prone having alluvial soil. About 8,487 ha area is under mustard crop aphids, and sawfly are the major pest of mustard in the district. The major cropping pattern are sali paddy – mustard – summer paddy, sali paddy – potato – summer paddy and sali paddy – maize – summer paddy. lack of appropriate high yielding variety for rice and mustard, pest and disease problems and shortage of agriculture implements in farmers the major constraints with respect to agriculture. The Manikpur, Patiladoha and Bidyapur blocks of district have been selected for project activities.

Barpeta: This district comprises of 264500 ha area, having 11 blocks. Total cropped area of the district is 249307 ha. and paddy, Jute, maize, seasamum and rapeseed and mustard, potato, lentil, linseed, wheat and rabi vegetables are the major crops. The district is considered as normal / flood prone having sandy soil. About 18,850 ha ha area is under mustard crop and aphids and mustard sawfly are the major pest of mustard in the district. The major cropping pattern are sali paddy–mustard–summer paddy sali paddy–potato–summer paddy. Lack of appropriate variety for rice and mustard, pest and disease problems, shortage of agriculture implements are the major constraints with respect to agriculture. The Bajali, Bhawanipur, Barpeta, Chenga, Pakabethbari, Sarukhetri, Mandia, Chakachaka, Rupshi, and Gumafulbari blocks of district have been selected for project activities.

Dhemaji: This district comprises of 3,23700 ha area, having 5 blocks. Total cropped area of the district is 2,02,730 ha. paddy maize, rapeseed and mustard, potato, Blackgram, turmeric and arecanut, are the major crops. The district is considered as flood prone having sandy loam. About 22,456 ha area is under mustard crop aphids, mustard sawfly, bihar hairy caterpillar, pea leaf are the major pest of mustard in the district. The major cropping pattern are sali rice - ahu rice - toria, rice-vegetables and rice- fallow. Flood, non-availability of quality seeds at right time, non- adoption of modern technology, non-availability of input dealers, pests and diseases infestations, improper use of fertilizer and chemicals, lack of knowledge of production technology are the major constraints with respect to agriculture. The Sissiborgaon, MSTD and Machkhowa blocks of district have been selected for project activities.

Nalbari: This district comprises of 100957 ha area, having 7 blocks. Total cropped area of the district is 1,03,231 ha. paddy, maize, rapeseed and mustard, potato, vegetables are the major crops. The district is considered as flood prone having clay, loamy and sandy. About 8020 ha area is under mustard crop aphids and mustard sawfly are the major pest of mustard in the district.The major cropping pattern are, sali paddy- mustard- summer paddy, sali paddy- vegetables -ahu paddy and jute-mustard-summer paddy. Non-availability of improved variety on time, non-availability of fertilizers on time and lack of knowledge about pests and disease scenario and management of the same are the major constraints with respect to agriculture. The Barkhetri and Borigog-Banbhag block of district have been selected for project activities.

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1.4 Weather

The climate of Assam is typically 'tropical monsoon rainfall' type, with high levels of humidity and heavy rainfall. In the monsoon season, the whole state comes alive with the beauty of nature. Assam is well known for its diverse sub-Himalayan agro-climatic conditions, which is suitable for the growth of varieties of crops across the districts. The climate varies slightly from region to region within the state. While the plains of Assam have tropical climate with high humidity, the hills have a sub-alpine type climate. In the state, the average minimum and maximum temperature were recorded 23.6 and 30.6 in the month of February and June 2022 respectively.

Weather parameters play major role in determining the crop growth, development and yield because weather strongly influences the physical expression of genetic potential of the crop. Any significant deviation of this parameter from the optimum value become detrimental for the crop productivity. Weather has direct effect on growth and development of plants. All the physio-chemical and biological activities of the plants are governed by the weather variables prevailing in the area. In case of rapeseed-mustard, maximum temperature plays an important role for germination of crop in late October to second week of November. If the maximum temperature during this period remains low (27-35ºC), the germination of the seed is not affected.

1.4.1. Upper Brahmaputra Valley Zone (UBVZ).

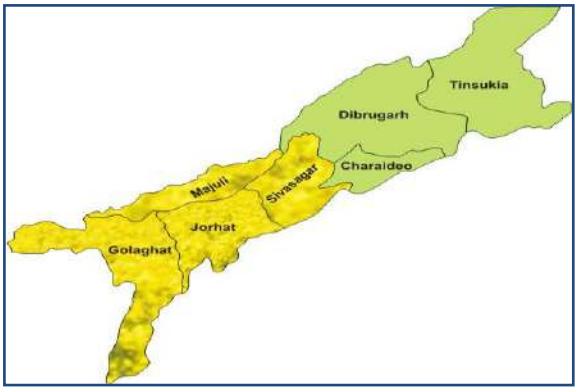

Figure 2 shows the monthly maximum minimum temperature, rainfall and number of rainy days in the Upper Brahmaputra Valley Zone (UBVZ). The analysis of the temperature profile during January to June 2022 in the zone shows that the maximum temperature ranged from 23.3 to 31.2 ºC and minimum temperature from 9.6 to 24.0 ºC. The minimum 18.9 mm and maximum rainfall 321.8 mm were recorded in the months January and June 2022 respectively. In the Zone the maximum 19 rainy days were recorded in the month of June 2022.

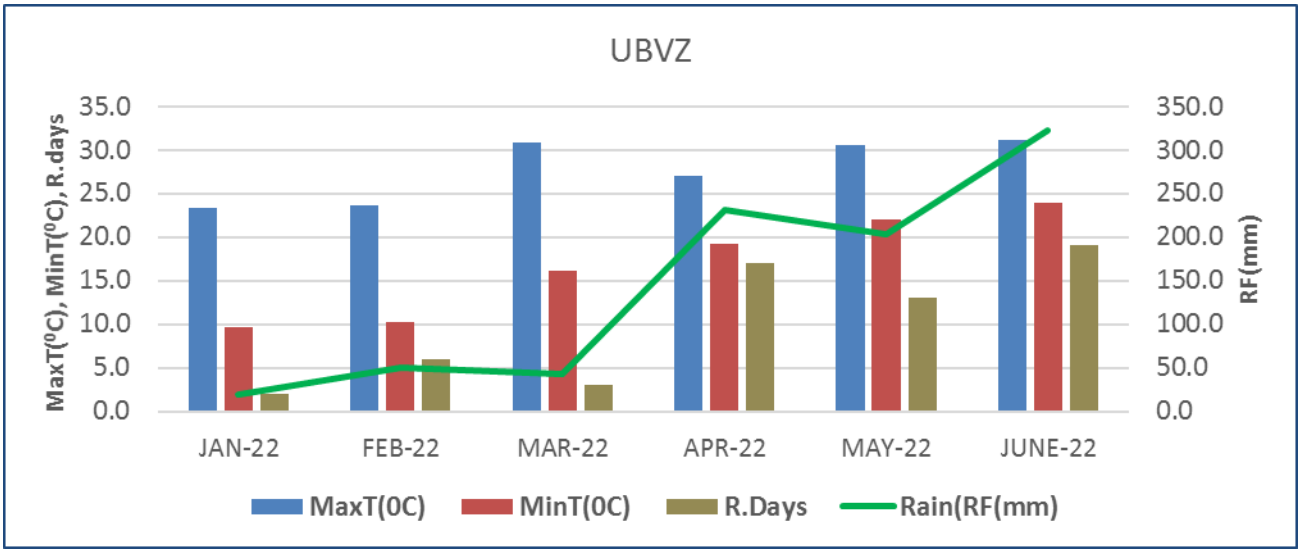

Fig 2: Maximum & Minimum temperature and rainfall in UBVZ

1.4.2. Central Brahmaputra Valley Zone (CBVZ).

Figure 3 shows the monthly maximum, minimum temperature and rainfall in the Central Brahmaputra Valley Zone (CBVZ). The temperature profile in the zone shows that the maximum temperature ranged from 23.4 to 31.8 ^{o}C and minimum from 10.6 to 24.6 ^{o}C. The Zone received minimum 16.6mm rainfall in month of March and maximum 386.2 mm in the months June 2022. The maximum 17 rainy days were recorded in the month of June 2022

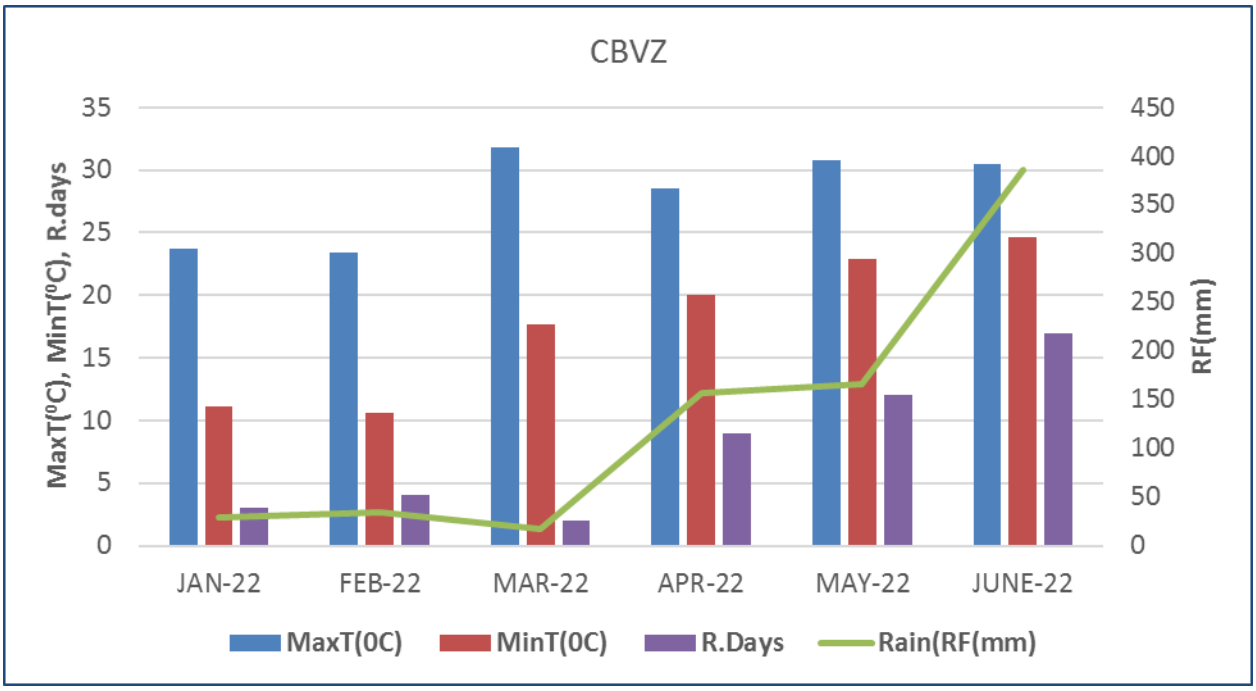

Fig 3: Maximum & Minimum temperature and rainfall in CBVZ

1.4.3. Lower Brahmaputra Valley Zone (LBVZ).

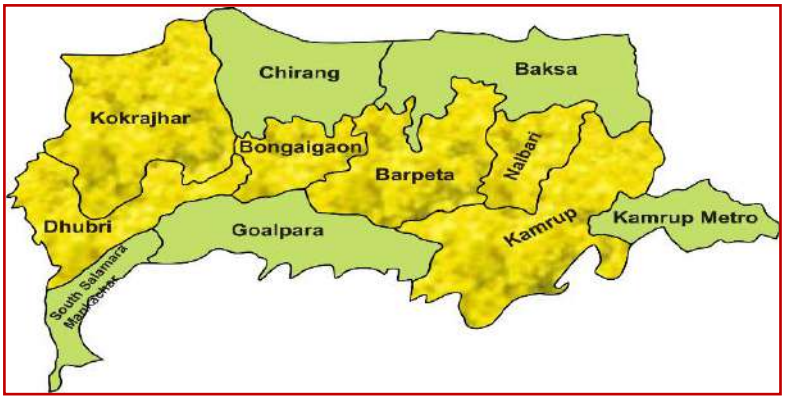

Figure 4 shows the monthly maximum, minimum temperature, rainfall and number of rainy days in the Lower Brahmaputra Valley Zone (LBVZ). The temperature profile in the zone shows that the maximum temperature ranged from 24.2 to 32.3 ^{o}C and minimum from 8.9 to 23.8 ^{o}C during Jan to June 2022. The Zone received minimum 5.0mm rainfall in month of January and maximum 1662.9 mm in the months June 2022. The maximum 23 rainy days were recorded in the month of June 2022.

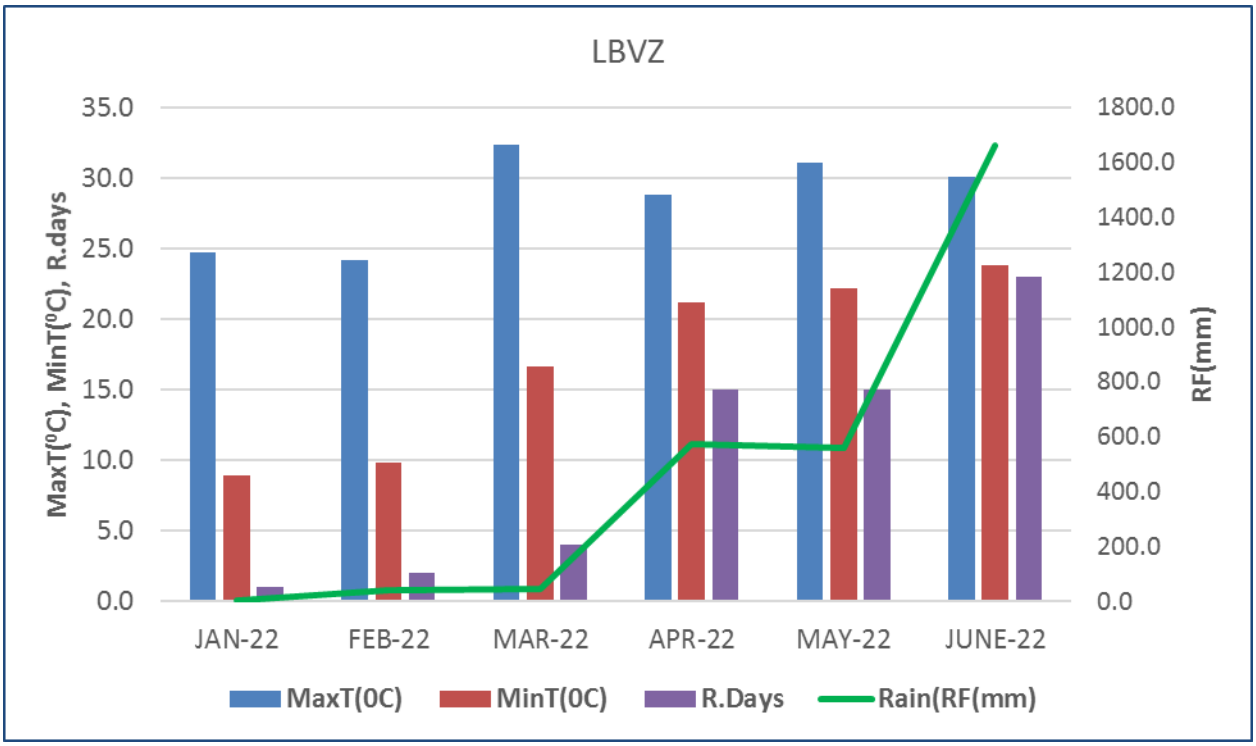

Fig 4: Maximum & Minimum Temperature and Rain fall in LBVZ

1.4.4. North Bank Plain Zone (NBPZ).

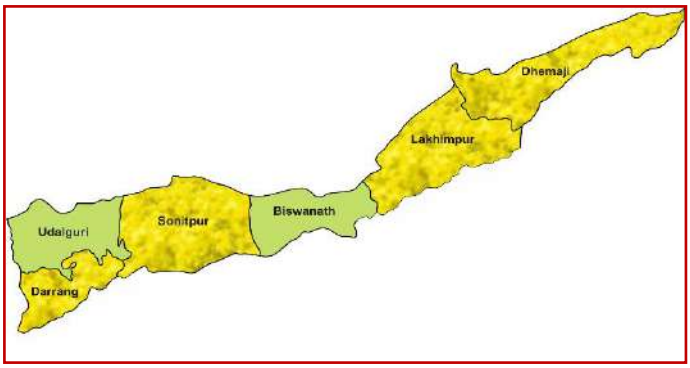

Figure 5 shows the monthly maximum minimum temperature and rain fall in the North Bank Plain Zone (NBPZ). The temperature profile in the zone shows that the maximum temperature ranged from 23.2 to 30.6 ^{0}C and minimum temperature from 8.0 to 22.7 ^{0}C. It can be seen that the NBPZ gets highest rainfall 420.0 mm in the month of June 2022. The minimum almost no rain fall received in month of January. The maximum 21 rainy days were recorded in the month of June 2022.

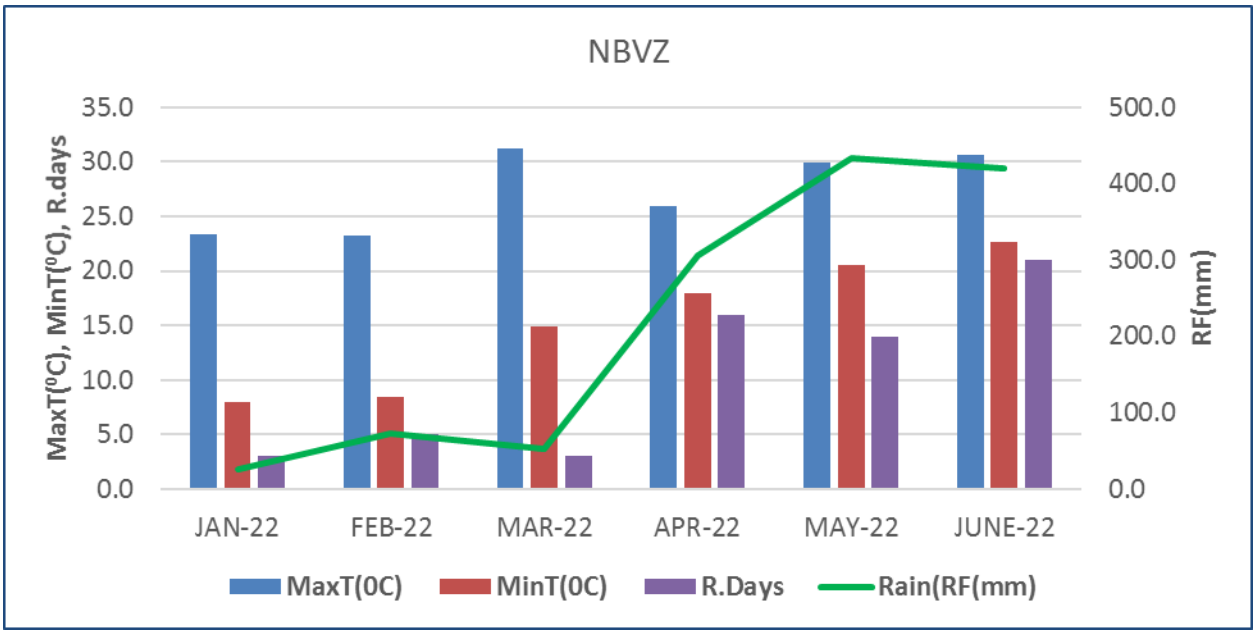

Fig 5: Maximum & Minimum Temperature and Rain fall in NBPZ

Almost all zones received heavy rainfall in the months of June. The average minimum and maximum temperature in all zones were about 16.7 ^{o}C and 27.9 ^{o}C respectively. Lower Brahmaputra Valley Zone (LBVZ) received maximum rainfall 1662.7mm in the month of June. Rain along with hailstorms in the month of April and may damage several acres of rapeseed-mustard crop in the state.

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Chapter 2: Technical Report

2. PROGRESS OF THE PERIOD JANUARY- JUNE 2022

2.1 Crop demonstrations: Crop demonstration is the method of motivating farmers for adoption of new varieties and techniques by showing their distinctly superior result. Crop demonstration shows the advantages and applicability of a newly recommended practice in farmer's own situation. Demonstrations are conducted on the farm of selected farmers and are utilized to educate and motivate groups of people in their neighborhood. This is very effective method for the transfer of technology and build up confidence in the farmers and extension agents. Demonstrations may stimulate farmers to try out innovations themselves or may even replace a test of the innovation by the farmers. They can show the causes of problems and their possible solutions without complicated technical details. Under the project, it was planned to organize mustard crop demonstrations on small plots of 0.25 ha area along with 0.05 ha. of control plot to provide practical learning situation and show the production potential of newly released varieties and crop management and protection practices of rapeseed-mustard to farmers, extension personnel and all other stakeholders at farmers' field.

The selection of the sites for conducting demonstrations was done by ATMA personnel of respective districts in consultation with concerned stakeholders and Research Associates/SRF of the project keeping in view of that it should be easily accessable to farmers of neighboring villages and extension workers coming from different parts of the district. Identification of beneficiaries for demonstration was carried out by the Implementing agency with the help of FPC/FPOs working in the district as per the requirement/aptitude of the farmers to conduct the demonstrations. Preference for demonstration was given to the socio-economically backward / small/ marginal / ST / SC / OBC farmers. The selected demonstrating farmers are progressive one with lead and who is easily approachable by other farmers & extension workers. During 2021-22, 5000 mustard crop demonstrations were approved. Accordingly a total of 5000 mustard crop demonstrations in different clusters of 15 districts were laid out (Table 2). Along with mustard crop demonstrations, 9000 minikit demonstrations in the selected clusters to strengthen mustard value chain- production were also laid out. In each minikit, one Kg seed was provided to each farmer to compare it with other existing varieties.The minikit demonstrations are accelerating informal dissemination of scientific cultivation of mustard from farmer to farmer through the introduction, exposure, experience, for acceptance of new varieties. These minikits would help farmers and other stakeholders to grow, observe and experience the performance of the introduced variety and develop learning for self and the associated community. This intends to create awareness in the region and thereby producing demand and a market for the variety for the future. This will also make seeds available in the next season.

Table 2: Progress of crop demonstrations and minikits during crop season 2021-22.

SN	Activities	Target	Achieved
1.	Climate resilient production demonstrations	5000	5000
2	Minikit demonstrations	9000	9000

Based on the climatic situation, cultivation of rapeseed-mustard, prevailing cropping pattern and resources, these demonstrations were conducted with three improved varieties of Indian mustard viz. NRCHB-101 (1700), PM-28 (1690) and DRMR-150-35 (350) and one variety of toria, viz. TS-38 (1260) along with crop management and protection technologies like line sowing, proper seed rate, seed treatment, proper plant population, thinning, weeding, intercultural operations, management of pest and diseases, etc. against the control plot. The seed of these improved varieties were supplied by ICAR-DRMR to DAOs / PD ATMA of 15 selected APART mustard districts. The seed was made available to them timely. The seed of demonstrated variety along with required fertilizers and need based fungicides/pesticides were given to selected farmers for crop demonstration. Under minikit demonstrations, only one kg seed of improved varieties viz. NRCHB-101 (5435) and PM-28 (2465) of Indain mustard and one variety of toria, viz. TS-38 (1100) was supplied to the farmers. The details of components of demonstrated technology against the control plot or farmers practice is given in table 3 and district wise details of varieties in mustard crop demonstrations and minikit demonstrations are given in table 4.

Table 3: Components of demonstrated technology against the control plot

Components of demonstrated technology	**Prevailing farmers practices against demonstrated technology**
Improved varieties (NRCHB-101/PM-28/DRMR-150-35/TS-38)	Local varieties used by farmers
Proper seed rate	Higher seed rate
Balanced use of fertilizers	Imbalance use of fertilizers
Line sowing	Broadcasting
Proper spacing	No proper spacing
Thinning/Weeding	No thinning/Weeding
Proper plant protection measures	Generally not used plant protection measures

Table 4: Distribution of varieties in mustard crop demonstrations and minikit demonstrations.

SN	District (No. of clusters)	Total crop demo (CP)	Failed	Varietal distribution of crop and minikit demonstrations							
				NRCHB-101		PM-28		DRMR-150-35		TS-38	
				No. of Demo		No. of Demo		No. of Demo		No. of Demo	
				CP	Failed	CP	failed	CP	failed	CP	failed
1.	Barpeta (10)	300	23	100	04	100	04	20	10	80	05
2.	Bongaigaon (3)	300	00	100	00	140	00	20	00	40	00
3.	Darrang (3)	300	00	140	00	60	00	20	00	80	00
4.	Dhemaji (3)	400	25	150	17	100	03	20	00	130	05
5.	Dhubri (5)	400	00	170	00	130	00	20	00	80	00
6.	Golaghat (3)	200	44	00	00	100	24	30	02	70	18
7.	Jorhat (3)	300	07	100	00	100	06	30	01	70	00
8.	Kamrup (4)	500	193	170	89	200	104	30	00	100	00
9.	Kokrajhar (3)	300	00	100	00	100	00	20	00	80	00
10.	Lakhimpur (4)	500	00	150	00	200	00	20	00	130	00
11.	Morigaon (2)	200	16	100	06	00	00	20	10	80	00
12.	Nagaon (4)	400	2	150	00	100	00	20	02	130	00
13.	Nalbari (2)	200	25	70	05	60	00	20	20	50	00
14.	Sivsagar (2)	200	19	00	00	100	9	30	00	70	10
15.	Sonitpur (7)	500	00	200	00	200	00	30	00	70	00
	Total	**5000**	**354**	**1700**	**121**	**1690**	**150**	**350**	**45**	**1260**	**38**

The high temperature in the month of November and late harvesting of Sali rice caused delay in sowing of the crops at some places. Keeping in view of temperature, rainfall and land preparation in different clusters, the sowing was completed by 2nd half of December 2021.

The broadcasting method of sowing of mustard was prevailing in the Assam. The line sowing of mustard has several advantages, therefore, effort was done to adopt the line sowing method for

conducting mustard crop demonstrations. Line sowing was adopted by many farmers with the efforts of ICAR-DRMR. However, majority of farmers adopted broadcasting method due to non-availability of proper seed drill in their locality.

Regular visits and monitoring of the crop demonstrations and minikit demonstrations are being done by Research Associates, ATMA personnel to educate and motivate the farmers to adopt crop management practices like thinning, intercultural operations, weeding, applying irrigation, management of insects and diseases, etc. The monitoring and supervision of crop demonstrations and activities are also being done by Resident Consultant and experts of ICAR-DRMR.

Cluster wise information for crop demonstration: A total of 5000 demonstrations were laid out in 581 villages of 58 clusters in 15 selected districts, identified by APART for mustard cultivation. There were 4031 male and 969 female beneficiaries for crop demonstrations. Crop demonstrations were distributed for different social categories as 1743 (Gen), 1572 (OBC), 478 (SC) and 1207 (ST) beneficiaries. Out of 5000 demonstrations conducted, 4646 demonstrations were successful, wheras a total of 354 demonstrations were failed in different districts due to poor germination, cattle grazing, drought, hail storms, etc.

In successful demonstrations, three varieties namely NRCHB-101 (1579), PM-28 (1540) and DRMR-150-35 (305) of Indian mustard and TS-38 (1222) of toria were used in crop demonstration in different districts. Therefore, the yield analysis of 1222 successful demonstrations on toria and 3424 susscssful demonstrations on Indian mustard has been presented in the report (Table 5).

Table 5: The cluster wise details of beneficiaries and varieties in successful mustard crop demonstrations during 2021-22

Districts	Cluster	No of villages	Beneficiaries (No.)						Total no. of Demons	No. of successful crop demonstrations on varieties				No. of CD vitiated
			Gender		Social Category					NRCHB -101	PM-28	DRMR-150-35	TS-38	
			M	F	Gen	OBC	SC	ST						
Barpeta	Bajali	12	45	5	50	0	0	0	50	50	0	0	0	0
	Bhawanipur	18	43	7	50	0	0	0	50	46	0	0	0	4
	Barpeta	07	10	10	17	2	0	1	20	0	0	10	0	10
	Chenga	03	36	4	12	7	21	0	40	0	0	0	35	5
	Chakachaka	12	27	13	16	22	2	0	40	0	0	0	40	0
	Gumafulbari	08	13	7	20	0	0	0	20	0	20	0	0	0
	Mandia	02	14	6	20	0	0	0	20	0	20	0	0	0
	Pakabethbari	05	14	6	20	0	0	0	20	0	20	0	0	0
	Rupshi	10	16	4	20	0	0	0	20	0	16	0	0	4
	Sarukehetri	03	13	7	20	0	0	0	20	0	20	0	0	0
	Total	**80**	**231**	**69**	**245**	**31**	**23**	**1**	**300**	**96**	**96**	**10**	**75**	**23**
Bongaigaon	Manikpur	4	85	15	72	16	4	8	100	33	46	7	14	0
	Patiladoha	2	80	20	64	28	6	2	100	34	46	7	13	0
	Bidyapur	2	70	30	84	6	4	6	100	33	48	6	13	0
	Total	**08**	**235**	**65**	**220**	**50**	**14**	**16**	**300**	**100**	**140**	**20**	**40**	**0**
Darrang	Sipajhar	5	56	42	49	49	0	0	100	46	23	6	27	0
	Bachimari	5	95	5	36	33	26	5	100	48	17	7	28	0
	Pachim-mangaldai	5	77	25	53	47	2	0	100	46	20	7	25	0
	Total	**15**	**228**	**72**	**138**	**129**	**28**	**5**	**300**	**140**	**60**	**20**	**80**	**0**
Dhemaji	Machkhowa	10	117	16	0	53	7	73	133	47	33	7	43	3
	MSTD	30	118	16	0	3	0	131	134	40	32	6	39	17
	Sissiborgaon	06	73	60	0	3	5	125	133	46	32	7	43	5
	Total	**46**	**308**	**92**	**0**	**59**	**12**	**329**	**400**	**133**	**97**	**20**	**125**	**25**

Districts	Cluster	No of villages	Beneficiaries (No.)						Total no. of Demons	No. of successful crop demonstrations on varieties				No. of CD vitiated
			Gender		Social Category					NRCHB -101	PM-28	DRMR-150-35	TS-38	
			M	F	Gen	OBC	SC	ST						
Dhubri	Gauripur	04	53	28	63	18	0	0	81	34	25	4	18	0
	Rupshi	02	79	6	38	47	0	0	85	34	30	4	17	0
	Agomani	05	73	5	54	3	20	1	78	34	25	4	15	0
	Chaper - Salkocha	07	68	10	78	0	0	0	78	34	25	4	15	0
	Mahamaya	03	68	10	78	0	0	0	78	34	25	4	15	0
	Total	**21**	**341**	**59**	**311**	**68**	**20**	**1**	**400**	**170**	**130**	**20**	**80**	**0**
Golaghat	Podumoni	02	9	1	5	5	0	0	10	0	0	10	0	00
	Kakodonga	07	50	0	35	4	1	10	50	0	39	10	0	01
	Bokakhat	18	130	10	22	32	2	84	140	0	37	08	52	43
	Total	**27**	**189**	**11**	**62**	**41**	**3**	**94**	**200**	**0**	**76**	**28**	**52**	**44**
Jorhat	Kaliapani	21	36	4	2	26	1	2	40	12	8	7	6	7
	Majuli	18	116	14	23	35	21	51	130	44	46	11	29	0
	Ujanimajuli	17	121	9	14	26	0	90	130	44	40	11	35	0
	Total	**56**	**273**	**27**	**39**	**87**	**22**	**143**	**300**	**100**	**94**	**29**	**70**	**7**
Kamrup	Kamalpur	15	48	52	40	60	0	0	100	0	0	0	50	0
	Bihdiya Jajikona	9	151	19	103	44	3	20	170	81	0	0	50	26
	Bongshor	1	27	3	16	12	2	0	30	0	0	30	0	0
	Chandrapur	7	156	44	20	69	111	0	200	0	96	0	0	167
	Total	**32**	**382**	**118**	**179**	**185**	**116**	**20**	500	81	96	30	100	193
Kokrajhar	Kokrajhar	17	90	56	12	28	0	106	146	63	47	11	25	0
	Dotma	13	110	32	32	29	0	81	142	37	41	9	55	0
	Kachugaon	02	10	2	0	8	0	4	12	0	12	0	0	0
	Total	**32**	**210**	**90**	**44**	**65**	**0**	**191**	**300**	**100**	**100**	**20**	**80**	**0**
Lakhimpur	Telahi	5	37	0	0	7	1	29	37	9	1	0	27	0
	Narayanpur	9	126	2	0	1	6	121	128	88	40	0	0	0
	Dhakuakhana	18	123	47	9	132	29	0	170	27	65	0	78	0
	Ghilamara	32	120	45	1	89	2	73	165	26	94	20	25	0
	Total	**64**	**406**	**94**	**10**	**229**	**38**	**223**	**500**	**150**	**200**	**20**	**130**	**0**
Morigaon	Mayong	13	94	6	25	30	17	28	100	36	0	10	40	14
	Bhurbandha	24	76	24	34	33	9	24	100	58	0	0	40	2
	Total	**37**	**170**	**30**	**59**	**63**	**26**	**52**	**200**	**94**	**0**	**10**	**80**	**16**

Districts	Cluster	No of villages	Beneficiaries (No.)						Total no. of Demons	No. of successful crop demonstrations on varieties				No. of CD vitiated
			Gender		Social Category					NRCHB -101	PM-28	DRMR-150-35	TS-38	
			M	F	Gen	OBC	SC	ST						
Nagaon	Batadrava	04	107	8	98	0	17	0	115	35	25	3	50	2
	Koliabor	17	93	12	51	43	0	11	105	35	25	5	40	0
	Khagorijan	08	63	27	42	15	33	0	90	40	25	5	20	0
	Raha	12	32	58	35	32	20	3	90	40	25	5	20	0
	Total	**41**	**295**	**105**	**226**	**90**	**70**	**14**	**400**	**150**	**100**	**18**	**130**	**2**
Nalbari	Barkhetri	17	92	8	83	4	8	5	100	30	23	0	22	25
	Borigog-Banbhag	20	83	17	58	35	7	0	100	35	37	0	28	0
	Total	**37**	**175**	**25**	**141**	**39**	**15**	**5**	**200**	**65**	**60**	**0**	**50**	25
Sivsagar	Demow	15	128	2	6	71	0	53	130	0	66	0	55	9
	Gaurisagar	11	64	6	7	55	2	6	70	0	25	30	5	10
	Total	**26**	**192**	**8**	**13**	**126**	**2**	**59**	**200**	**0**	**91**	**30**	**60**	**19**
Sonitpur	Dhekiajuli	10	40	39	0	36	28	15	79	30	28	6	15	0
	Bihaguri	13	48	31	2	41	31	5	79	30	28	6	15	0
	Gabharu	09	74	5	15	64	0	0	79	30	28	6	10	0
	Balipara	05	68	7	1	64	0	10	75	30	32	4	10	0
	Chaiduar	02	44	20	1	60	1	2	64	28	28	3	5	0
	Rangapara	07	60	0	11	28	0	21	60	24	28	2	10	0
	Biswanath	13	62	2	26	17	20	1	64	28	28	3	5	0
	Total	**59**	**396**	**104**	**56**	**310**	**80**	**54**	**500**	**200**	**200**	**30**	**70**	**0**
	Grand total	**581**	**4031**	**969**	**1743**	**1572**	**478**	**1207**	**5000**	**1579**	**1540**	**305**	**1222**	**354**

2.1.1 Distribution of crop demonstrations conducted in different situation during 2021-22

The Crop demonstrations included whole package technology components like use of improved variety, balanced use of fertilizers, micronutrients, proper spacing, weeding/thinning, need based plant protection and other cultural practices in comparison to farmers' practices of crop cultivation.

All 4646 successfull crop demonstrations were conducted in different situations viz. Irrigated (1077) and rainfed (3569) situations during 2021-22. District wise details of successful and failed crop demonstrations under irrigated and rainfed condition is presented in table 6.

Table 6: List of successful mustard crop demonstrations during 2021-22 under different situations

District (Number of clusters)	Number of crop demonstrations				
	Total conducted	Irrigated	Rainfed	Demons. successful	Demons. Failed/vitiated
Barpeta (10)	300	27	250	277	23
Bongaigaon (3)	300	24	276	300	00
Darrang (3)	300	89	211	300	00
Dhemaji (3)	400	00	375	375	25
Dhubri (5)	400	400	00	400	00
Golaghat (3)	200	00	156	156	44
Jorhat (3)	300	00	293	293	7
Kamrup (4)	500	158	149	307	193
Kokrajhar (3)	300	69	231	300	00
Lakhimpur (4)	500	00	500	500	00
Morigaon (2)	200	36	148	184	16
Nagaon (4)	400	114	284	398	2
Nalbari (2)	200	81	94	175	25
Sivsagar (2)	200	00	181	181	19
Sonitpur (7)	500	79	421	500	00
	5000	**1077**	**3569**	**4646**	**354**

2.1.2. Performance of technology package crop demonstrations in different districts of Assam during 2021-22.

The performance of crop demonstrations conducted in different districts were analysed and presented in Table 7. The results included the mean seed yield (kg/ha) for both, the improved plot (IP) with improved technology and the farmers' plot (FP) with farmers' practice, Besides yield superiority of improved technology (%), cost of cultivation (CoC), gross monetary return (GMR) and additional net monetary return (ANMR) in Rs/ha from the IP and benefit: cost (B:C) ratio for both the IP and FP. These were calculated as follows:

$$1.\ \text{YIOFP}\ (\%) = \frac{\text{Yield of IP} - \text{Yield of FP}}{\text{Yield of FP}} \times 100$$

$$2.\ \text{ANMR} = [\text{GMR (IP)} - \text{GMR(FP)}] - [\text{CoC (IP)} - \text{CoC (FP)}]$$

$$3.\ \text{B: C ratio} = \frac{\text{GMR}}{\text{CoC}}$$

$$4.\ \text{GMR} = \text{Seed Yield} \times \text{Market price of produce}$$

The overall performance of of crop demonstrations along with YIOFP (%), cost of cultivation, gross monetary return, additional net monetary return and B:C ratio across the districts in both situation viz. irrigated and rainfed condition presented in table 7, 8 and 9 shows that mean seed yield from IP ranged from 839 (Morigaon) to 1396 kg/ha (Dhubri), whereas from FP ranged from 532 (Morigaon) to 855 kg/ha (Dhubri). The yield increase due to IP ranged from 32.9% in Jorhat to 119% (Sonitpur) (Fig.6). The cost of cultivation of IP ranged from Rs. 20105 (Bongaigaon) to Rs 32485 /ha (Dhubri), while for FP it ranged from Rs. 16741 (Bongaigaon)) to Rs 24560 /ha (Sivsagar). The maximum additional cost Rs. 7925/ha for IP incurred (Dhubri), while minimum Rs. 2281/ha (Kamrup). The maximum ANMR of Rs 34348 /ha was reported due to the improved practices in Sonitpur, while minimum of Rs 13403 /ha was in Nalbari. All IP had positive ANMR (Table 7).The Gross Monetary Return for IP ranged from Rs. 54535/ ha in Morigaon to Rs. 90740/ha in Dhubri, while in FP ranged from Rs. 34580/ha in Morigaon to Rs 56160/ ha in Dhubri (Table 7). The B:C ration for IP ranged from 2.26 (Morigaon) to 3.19 (Barpeta), while for FP it ranged from 1.60 (Sivsagar) to 2.39 (Bongaigaon) (table 7) The higher gross monetary return (GMR) and B:C ratio of demonstrated technology and positive additional net monetary return (ANMR) in all districts evidently show that demonstrated technology of rapeseed-mustard during 2021-22 was economically viable and profitable for the farmers of Assam.

The performance of of crop demonstrations in irrigated and rainfed situation across the districts presented in table 8 and 9 along with fig. 7 and 8, respectively.

Table 7: Overall district-wise performance of crop demonstrations in both situation viz. irrigated and rainfed during 2021-22

Districts	Varieties used	FLDs	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Barpeta	PM-28, NRCHB 101, DRMR-150-35, TS-38	277	1136 (600-1635)	643 (410-9680	76.7	23138	19536	73840	41795	28443	3.19	2.13
Bongaigaon	PM-28, NRCHB 101, DRMR-150-35, TS-38	300	948 (510-1230)	618 (370-870)	53.4	20105	16741	61620	40170	18086	3.06	2.39
Darrang	PM-28, NRCHB 101, TS-38,DRMR 150-35	300	969 (489-1520)	633 (451-989)	53.1	25542	21226	62985	41145	17524	2.46	1.93
Dhemaji	PM-28, NRCHB-101, TS38, DRMR-150-35	375	1056 (545-1412)	695 (420-915)	51.9	25076	21484	68640	45175	19873	2.74	2.10
Dhubri	PM-28, NRCHB 101, DRMR-150-35 TS-38	400	1396 (954-1736)	864 (165-1085)	61.6	32485	24560	90740	56160	28655	2.79	2.28
Golaghat	DRMR-150-35 PM-28, TS-38	156	1094 (764-1316)	703 (480-900)	55.6	26941	19236	67049	42978	16366	2.48	2.23
Jorhat	PM-28, NRCHB 101, DRMR-150-35, TS-38	293	1090 (710-1695)	820 (454-1150)	32.9	27381	23587	70850	53300	13756	2.58	2.25
Kamrup	PM-28, NRCHB 101, DRMR-150-35, TS38	307	1158 (416-1820)	795 (300-1150)	45.7	25944	23663	75270	51675	21314	2.90	2.18
Kokrajhar	PM-28, NRCHB 101, DRMR-150-35, TS-38	300	982 (690-1410)	708 (615-1120)	38.7	27663	21412	63830	46020	11559	2.30	2.14
Lakhimpur	PM-28, NRCHB 101, DRMR-150-35, TS-38	500	893 (572-1270)	551 (220-650)	62.1	24659	20383	58045	35815	17954	2.35	1.75
Morigaon	DRMR-150-35 NRCHB 101, TS-38	184	839 (356-1850)	532 (307-1280)	57.7	24146	21161	54535	34580	16970	2.26	1.63
Nagaon	PM-28, NRCHB 101, DRMR-150-35, TS-38	398	1043 (590-2000)	735 (350-1010)	41.9	23934	20214	67795	47775	16300	2.83	2.36
Nalbari	NRCHB 101 PM-28, TS-38	175	1046 (670-1755)	764 (510-1155)	36.9	28681	23754	67990	49660	13403	2.37	2.09
Sivasagar	DRMR-150-35 PM-28, TS-38	181	1139 (897-1407)	559 (431-707)	104.0	30472	22609	74035	36335	29837	2.42	1.60
Sonitpur	PM-28, NRCHB 101, DRMR-150-35, TS-38	500	1167 (787-1735)	532 (345-700)	119.0	26115	21439	75855	34580	36599	2.90	1.61

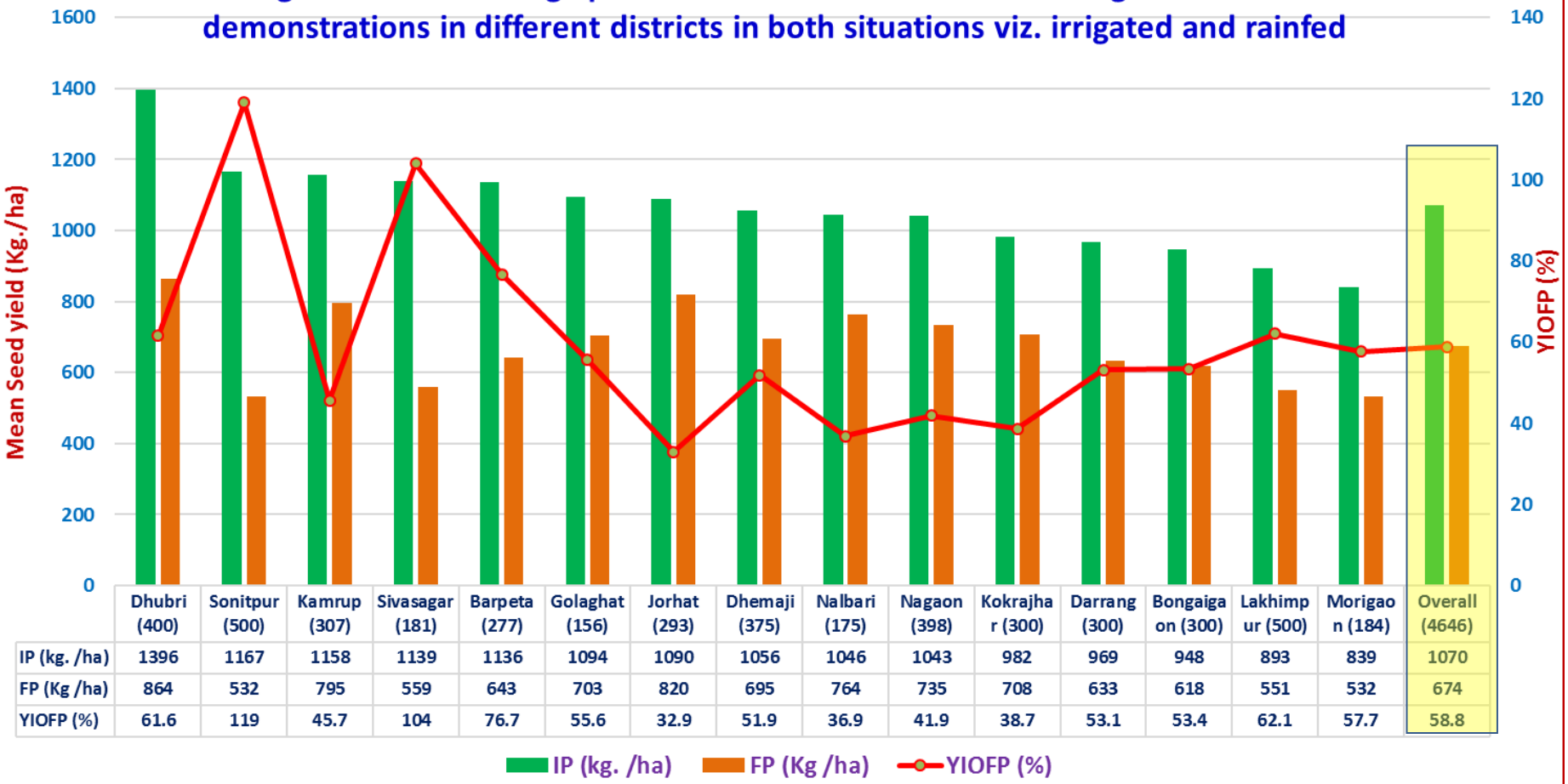
Table 8: Overall district-wise performance of crop demonstrations in irrigated situation during 2021-22

Districts	Crops	FLDs	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Barpeta	NRCHB 101 PM-28, TS-38	27	1457 (1300-1635)	775 (683-968)	88.0	27350	22152	94705	50375	39132	3.46	2.27
Bongaigaon	DRMR-150-35 NRCHB-101 PM-28,TS-38	24	1102 (788-1230)	657 (503-800)	67.7	22068	17368	71630	42705	24225	3.24	2.45
Darrang	NRCHB 101 PM-28, TS-38	89	1162 (925-1520)	731 (598-989)	59.0	29146	22421	75530	47515	21290	2.59	2.11
Dhubri	DRMR-150-35 NRCHB- 101 PM-28	400	1396 (954-1736)	864 (165-1085)	61.6	32485	24560	90740	56160	28655	2.79	2.28
Kamrup	DRMR-150-35 NRCHB 101 PM-28, TS-38	183	1340 (943-1820)	879 (559-1150)	52.5	27639	24984	87100	57135	27310	3.15	2.29
Kokarajgar	DRMR-150-35 NRCHB-101 PM-28, TS-38	69	1258 (995-1410)	845 (616-1120)	48.9	32621	24524	81770	54924	18749	2.50	2.23
Morigaon	DRMR150-35 NRCHB-101 TS-38	36	1190 (899-1850)	702 (615-1280)	69.5	27368	23100	77350	45630	27452	2.83	1.98
Nagaon	DRMR-150-35 NRCHB 101 PM-28, TS-38	114	1324 (920-2000)	866 (710-1010)	52.9	27665	23349	86066	56290	25460	3.11	2.41
Nalbari	NRCHB 101 PM-28, TS-38	81	1165 (825-1755)	870 (630-1155)	33.9	30483	24666	75725	56550	13358	2.48	2.29
Sonitpur	DRMR-150-35 NRCHB-101 PM-28, TS-38	80	1407 (1125-1735)	574 (410-697)	145.0	28088	22407	91455	37310	48464	3.25	1.66

Table 9: Overall district-wise performance of crop demonstrations in rainfed situation during 2021-22

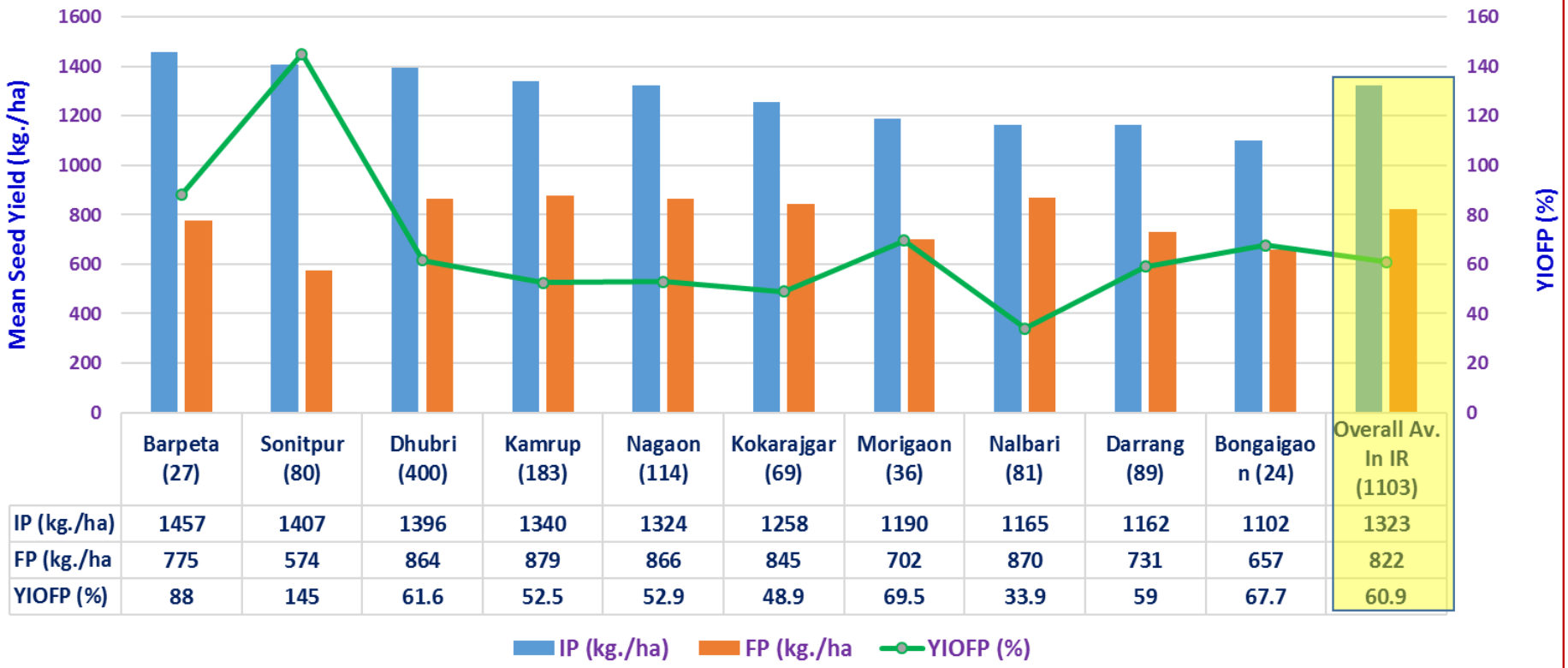
Districts	Crops	FLDs	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Barpeta	DRMR-150-35 NRCHB 101 PM-28, TS-38	250	1074 (728-1455)	615 (473-960)	74.6	22527	19429	69810	39975	26737	3.09	2.05
Bongaigaon	DRMR-150-35 NRCHB 101 PM-28, TS-38	276	935 (510-1125	538 (370-870)	73.8	19935	16698	60775	34970	22568	3.04	2.09
Darrang	DRMR 150-35 NRCHB 101 PM-28, TS-38	211	888 (590-1480)	591 (451-960)	50.3	24021	20719	57720	38415	16003	2.40	1.85
Dhemaji	DRMR-150-35 NRCHB- 101 PM-28TS-38	375	1056 (545-1412)	695 (420-915)	51.9	25076	21484	68640	45175	19873	2.74	2.10
Golaghat	DRMR-150-35 PM-28, TS-38	156	1094 (764-1316)	703 (480-900)	55.6	26941	19236	67049	42978	16366	2.48	2.23
Jorhat	DRMR-150-35 NRCHB 101, PM-28	293	1090 (710-1695)	820 (454-1150)	32.9	27381	23587	70850	53300	13756	2.58	2.25
Kamrup	PM-28, TS-38	124	891 (416-1186)	671 (300-920)	32.8	23442	21344	57915	43615	12202	2.47	2.04
Kokarajhar	DRMR-150-35 NRCHB-101 PM-28, TS-38	231	899 (690-1360)	640 (615-820)	40.5	26183	20482	58435	41600	11134	2.23	2.19
Lakhimpur	DRMR 150-35 NRCHB 101 PM-28, TS-38	500	893 (572-1270)	551 (220-650)	62.1	24659	20383	58045	35815	17954	2.35	1.75
Morigaon	DRMR-150-35 NRCHB 101, TS-38	148	754 (356-1033)	490 (307-675)	53.8	23208	20606	49010	31850	14558	2.11	1.54
Nagaon	DRMR-150-35 NRCHB 101 PM-28, TS-38	284	931 (590-1380)	683 (350-905)	36.3	22436	18955	60515	44395	16120	2.69	2.34
Nalbari	NRCHB 101 PM-28, TS-38	94	949 (670-1310)	672 (510-800)	41.2	27128	22968	61685	43680	13845	2.27	1.90
Sivasagar	DRMR-150-35 PM-28, TS-38	181	1139 (897-1407)	559 (431-707)	104.0	30472	22609	74035	36335	29837	2.42	1.60
Sonitpur	DRMR-150-35 NRCHB 101 PM-28, TS-38	420	1122 (787-1605)	525 (345-700)	113.0	25714	21257	72930	34125	34348	2.83	1.60

Fig. 6 : Overall average performance of IP demonstrations against the FP demonstrations in different districts in both situations viz. irrigated and rainfed



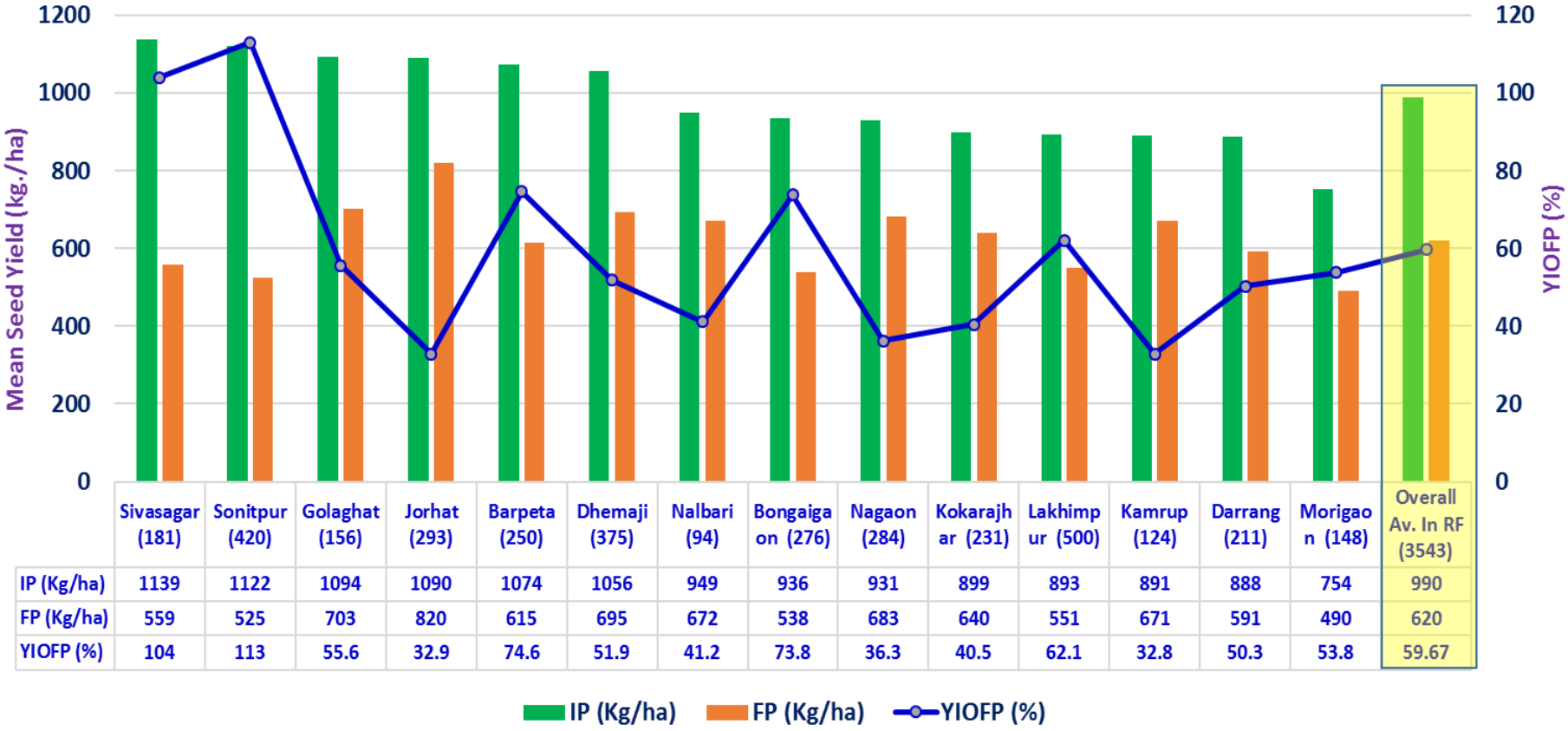
	Dhubri (400)	Sonitpur (500)	Kamrup (307)	Sivasagar (181)	Barpeta (277)	Golaghat (156)	Jorhat (293)	Dhemaji (375)	Nalbari (175)	Nagaon (398)	Kokrajhar (300)	Darrang (300)	Bongaigaon (300)	Lakhimpur (500)	Morigaon (184)	Overall (4646)
IP (kg. /ha)	1396	1167	1158	1139	1136	1094	1090	1056	1046	1043	982	969	948	893	839	1070
FP (Kg /ha)	864	532	795	559	643	703	820	695	764	735	708	633	618	551	532	674
YIOFP (%)	61.6	119	45.7	104	76.7	55.6	32.9	51.9	36.9	41.9	38.7	53.1	53.4	62.1	57.7	58.8

Fig. 7 : Overall average performance of IP demonstrations against the FP demonstrations in different districts in irrigated situation



	Barpeta (27)	Sonitpur (80)	Dhubri (400)	Kamrup (183)	Nagaon (114)	Kokarajgar (69)	Morigaon (36)	Nalbari (81)	Darrang (89)	Bongaigaon (24)	Overall Av. In IR (1103)
IP (kg./ha)	1457	1407	1396	1340	1324	1258	1190	1165	1162	1102	1323
FP (kg./ha	775	574	864	879	866	845	702	870	731	657	822
YIOFP (%)	88	145	61.6	52.5	52.9	48.9	69.5	33.9	59	67.7	60.9

Fig. 8: Overall average performance of IP demonstrations against the FP demonstrations in different districts in rainfed situation



	Sivasagar (181)	Sonitpur (420)	Golaghat (156)	Jorhat (293)	Barpeta (250)	Dhemaji (375)	Nalbari (94)	Bongaigaon (276)	Nagaon (284)	Kokarajhar (231)	Lakhimpur (500)	Kamrup (124)	Darrang (211)	Morigaon (148)	Overall Av. In RF (3543)
IP (Kg/ha)	1139	1122	1094	1090	1074	1056	949	936	931	899	893	891	888	754	990
FP (Kg/ha)	559	525	703	820	615	695	672	538	683	640	551	671	591	490	620
YIOFP (%)	104	113	55.6	32.9	74.6	51.9	41.2	73.8	36.3	40.5	62.1	32.8	50.3	53.8	59.67

2.1.3. Performance of crop demonstrations in Barpeta district of Assam during 2021-22

In Barpeta, 300 crop demonstrations (CD) were conducted in 80 villages of ten clusters viz. Bajali (50 CD), Bhawanipur (50 CD), Barpeta (20 CD), Chenga (40 CD), Chakachaka (40 CD), Gumafulbari (20 CD), Mandia (20 CD), Pakabethbari (20 CD), Rupshi (20 CD), Sarukehetri (20 CD) with NRCHB-101 (100 CD), PM-28 (100 CD), DRMR-150-35 (20 CD) varieties of Indian mustard and TS-38 (80 CD) variety of toria under both irrigated (32 CD) and rainfed (268 CD) conditions Out of 300 crop demonstrations, 23 crop demonstrations (10 of DRMR-150-35, 4 of PM-28 , 4 of NRCHB-101 and 5 of TS-38) had failed because of poor germination due to lack of moisture, poor management by farmers, delayed sowing. Some farmers harvested premature mustard crop due to sowing of boro paddy. (Table 5 and 6).

The prevailing cropping pattern was rice-mustard, jute-mustard, fellow-mustard and rice-vegetables (potato/pumpkin). The sowing time spread from November 20 to December 30, 2021 and harvesting period spread from March 10 to April 6, 2022. Some incidence of painted bug, mustard sawfly, mustard aphid, white rust, Alterneria bight and phyllody (especially in PM-28 variety) was observed.

The demonstrated improved technologies (IP) in 277 successful crop demonstrations gave an average seed yield of 1136 kg/ha against 643 kg/ha in FP with a yield improvement of 76.7% (Table 7).-The cost of cultivation of Rs. 23138/ha in IP against the Rs. 19536/ha in FP was recorded that fetched GMR of Rs. 73840 /ha in IP against the Rs. 41795/ha in FP. An ANMR of Rs. 28443 /ha was realized against the additional cost of Rs. 3602/ha incurred due to demonstrated technology and the higher B:C ratio of IP (3.19) than that of FP (2.13) clearly indicates that demonstrated technologies in Barpeta district was economically viable and profitable.

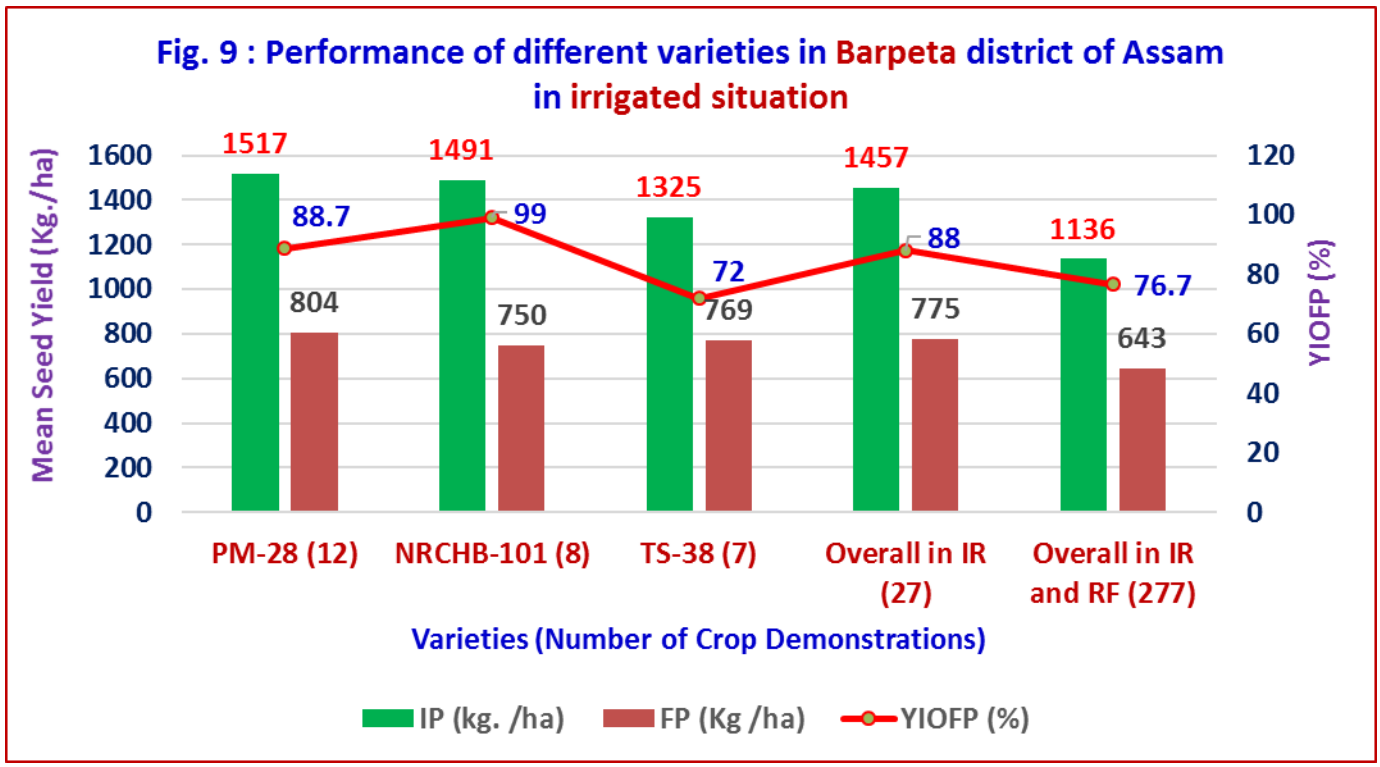
Under irrigated condition, the overall performance of demonstrated technologies in 27 successful crop demonstrations with three varieties (NRCHB-101, PM-28 and TS-38) recorded an average seed yield of 1457 kg/ha against 775 kg/ha in FP with a yield improvement of 88.0% (Table 8). The cost of cultivation of Rs. 27350/ha in IP against the Rs. 22152/ha in FP was recorded that fetched GMR of Rs. 94705 /ha in IP against the Rs. 50375/ha in FP. An ANMR of Rs. 39132 /ha was realized against the additional cost of Rs. 5198/ha incurred due to demonstrated technology and the higher B:C ratio of IP (3.46) than that of FP (2.27).

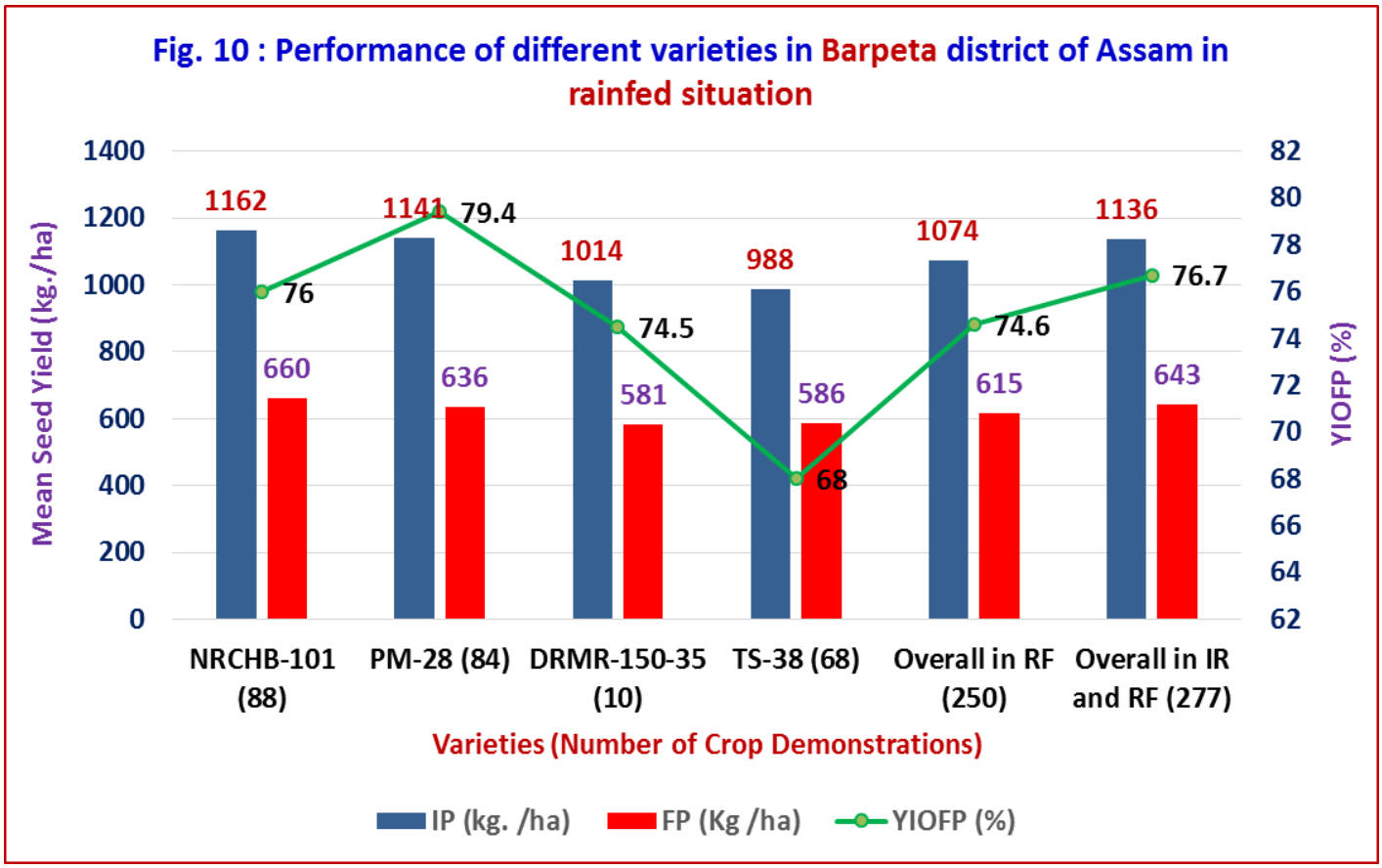
The variety-wise analysis under irrigated condition (Fig. 9) shows that IP demonstrations with PM-28 (12 CD) recorded highest average seed yield of 1517 kg/ha against 804 kg/ha in FP with a yield improvement of 88.7% against the additional cost of cultivation of Rs. 5618/ha, while demonstrations with NRCHB-101 (8 CD) had an average seed yield of 1491 kg/ha against 750 kg/ha in FP with highest yield improvement of 99.0%. The IP demonstrations with TS-38 (7 CD) had an average seed yield of 1325 kg/ha against 769 kg/ha in FP with a yield improvement of 72.0%. The maximum ANMR (Rs. 41855 /ha) was reported from NRCHB-101 variety, while minimum (Rs. 33160 /ha) from TS-38. The cost of cultivation in IP ranged from Rs. 24539 /ha with TS-38 to Rs. 28752/ha with PM-28, while in FP it ranged from Rs. 21506 /ha with TS-38 to Rs. 23134/ha with PM-28. All demonstrated varieties had higher B:C ratio than that of FP.

Under rainfed condition, the overall performance of demonstrated technologies in 250 successful crop demonstrations with all four varieties recorded average seed yield of 1074 kg/ha against 615 kg/ha in FP with yield improvement of 74.6% (Table 9). The cost of cultivation of Rs. 22527/ha in IP against the Rs. 19429/ha in FP was recorded that fetched GMR of Rs. 69810 /ha in

IP against the Rs. 39975/ha in FP. An ANMR of Rs. 26737/ha was realized against the additional cost of Rs. 3098/ha incurred due to demonstrated technology and the higher B:C ratio of IP (3.09) than that of FP (2.05).

The variety-wise analysis under rainfed condition (Fig. 10)–shows that IP demonstrations with NRCHB-101 (88 CD) recorded highest average seed yield of 1162 kg/ha against 660 kg/ha in FP with a yield improvement of 76.0% against the additional cost of cultivation of Rs. 3535/ha, while demonstrations with PM-28 (84 CD) recorded an average seed yield of 1141 kg/ha against 636 kg/ha in FP with highest yield improvement of 79.4%. The IP demonstrations with DRMR-150-35 (10 CD) had an average seed yield of 1014 kg/ha against 581 kg/ha in FP with a yield improvement of 74.5%. The IP demonstrations with TS-38 (68 CD) had an average seed yield of 988 kg/ha against 586 kg/ha in FP with a yield improvement of 68.0%. The maximum ANMR (Rs. 29095 /ha) from NRCHB-101 variety, while minimum (Rs. 23088 /ha) from TS-38 was reported. The cost of cultivation in IP ranged from Rs. 21472 /ha with TS-38 to Rs. 23242/ha with NRCHB-101, while in FP it ranged from Rs. 18430 /ha with TS-38 to Rs. 20291/ha with DRMR-150-35. All demonstrated varieties had higher B:C ratio than that of FP.





2.1.4. Performance of crop demonstrations in Bongaigaon district of Assam during 2021-22

In Bongaigaon, 300 crop demonstrations (CD) were conducted in 8 villages of three clusters viz. Bidyapur (100 CD), Manikpur (100 CD) and Patiladoha (100) with PM-28 (140 CD), NRCHB-101 (100 CD), DRMR-150-35 (20 CD) varieties of Indian mustard and TS-38 (40 CD) variety of toria under both irrigated (24 CD) and rainfed (276 CD) conditions. (Table 5 and 6).

The prevailing cropping pattern was rice-mustard, jute-mustard, fellow-mustard and rice-vegetables (potato/pumpkin) . The sowing time spread from November 20 to December 30, 2021 and harvesting period spread from March 10 to April 13, 2022. Some incidence of painted bug, mustard sawfly, mustard aphid, white rust, Alterneria bight was observed.

The demonstrated improved technologies (IP) in 300 successful crop demonstrations gave an average seed yield of 948 kg/ha against 618 kg/ha in FP with a yield improvement of 53.4% (Table 7). The cost of cultivation of Rs. 20105/ha in IP against the Rs. 16741/ha in FP was recorded that fetched GMR of Rs. 61620 /ha in IP against the Rs. 40170/ha in FP. An ANMR of Rs. 18086 /ha was realized against the additional cost of Rs. 3364/ha incurred due to demonstrated technology and the higher B:C ratio of IP (3.06) than that of FP (2.39) clearly indicates that demonstrated technologies in Bongaigaon district was economically viable and profitable.

Under irrigated condition, the overall performance of demonstrated technologies in 24 successful crop demonstrations with all four varieties (NRCHB-101, PM-28, DRMR-150-35 and TS-38) recorded an average seed yield of 1102 kg/ha against 657 kg/ha in FP with a yield improvement

of 67.7% (Table 5). The cost of cultivation of Rs. 22068/ha in IP against the Rs. 17368/ha in FP was recorded that fetched GMR of Rs. 71630 /ha in IP against the Rs. 42705/ha in FP. An ANMR of Rs. 24225 /ha was realized against the additional cost of Rs. 4700/ha incurred due to demonstrated technology and the higher B:C ratio of IP (3.24) than that of FP (2.45).

The variety-wise analysis under irrigated condition (Fig. 11) shows that IP demonstrations with NRCHB-101 (5 CD) recorded highest average seed yield of 1154 kg/ha against 553 kg/ha in FP with highest yield improvement of 108.6% against the additional cost of cultivation of Rs. 6266/ha, while demonstrations with PM-28 (13 CD) had an average seed yield of 1078 kg/ha against 670 kg/ha in FP with a yield improvement of 60.8%. The IP demonstrations with DRMR-150-35 (3 CD) had an average seed yield of 1010 kg/ha against 665 kg/ha in FP with a yield improvement of 51.8%. The maximum ANMR (Rs. 32799 /ha) was reported from NRCHB-101 variety, while minimum (Rs. 19683 /ha) from DRMR-150-35. The cost of cultivation in IP ranged from Rs. 19920 /ha with DRMR-150-35 to Rs. 23738/ha with NRCHB-101, while in FP it ranged from Rs. 17178 /ha with DRMR-150-35 to Rs. 17520/ha with TS-38. All demonstrated varieties had higher B:C ratio than that of FP.

Under rainfed condition, the overall performance of demonstrated technologies in 276 successful crop demonstrations with all four varieties recorded average seed yield of 935 kg/ha against 538 kg/ha in FP with yield improvement of 73.8% (Table 9). The cost of cultivation of Rs. 19935/ha in IP against the Rs. 16698/ha in FP was recorded that fetched GMR of Rs. 60775 /ha in IP against the Rs. 34970/ha in FP. An ANMR of Rs. 22568/ha was realized against the additional cost of Rs. 397/ha incurred due to demonstrated technology and the higher B:C ratio of IP (3.04) than that of FP (2.09).

The variety-wise analysis under rainfed condition (Fig. 12)–shows that IP demonstrations with NRCHB-101 (95 CD) recorded highest average seed yield of 970 kg/ha against 605 kg/ha in FP with highest yield improvement of 60.3% against the additional cost of cultivation of Rs. 2880/ha, while demonstrations with PM-28 (127 CD) recorded an average seed yield of 953 kg/ha against 630 kg/ha in FP with a yield improvement of 51.3%. The IP demonstrations with DRMR-150-35 (17 CD) had an average seed yield of 752 kg/ha against 528 kg/ha in FP with a yield improvement of 42.4%. The IP demonstrations with TS-38 (37 CD) had an average seed yield of 870 kg/ha against 609 kg/ha in FP with a yield improvement of 42.8%. The maximum ANMR (Rs. 20935 /ha) from NRCHB-101 variety, while minimum (Rs. 10545 /ha) from DRMR-150-35 was reported. The cost of cultivation in IP ranged from Rs. 18920 /ha with TS-38 to Rs. 20129/ha with PM-28, while in FP it ranged from Rs. 15871 /ha with DRMR-150-35 to Rs. 17200/ha with NRCHB-101. All demonstrated varieties had higher B:C ratio than that of FP.

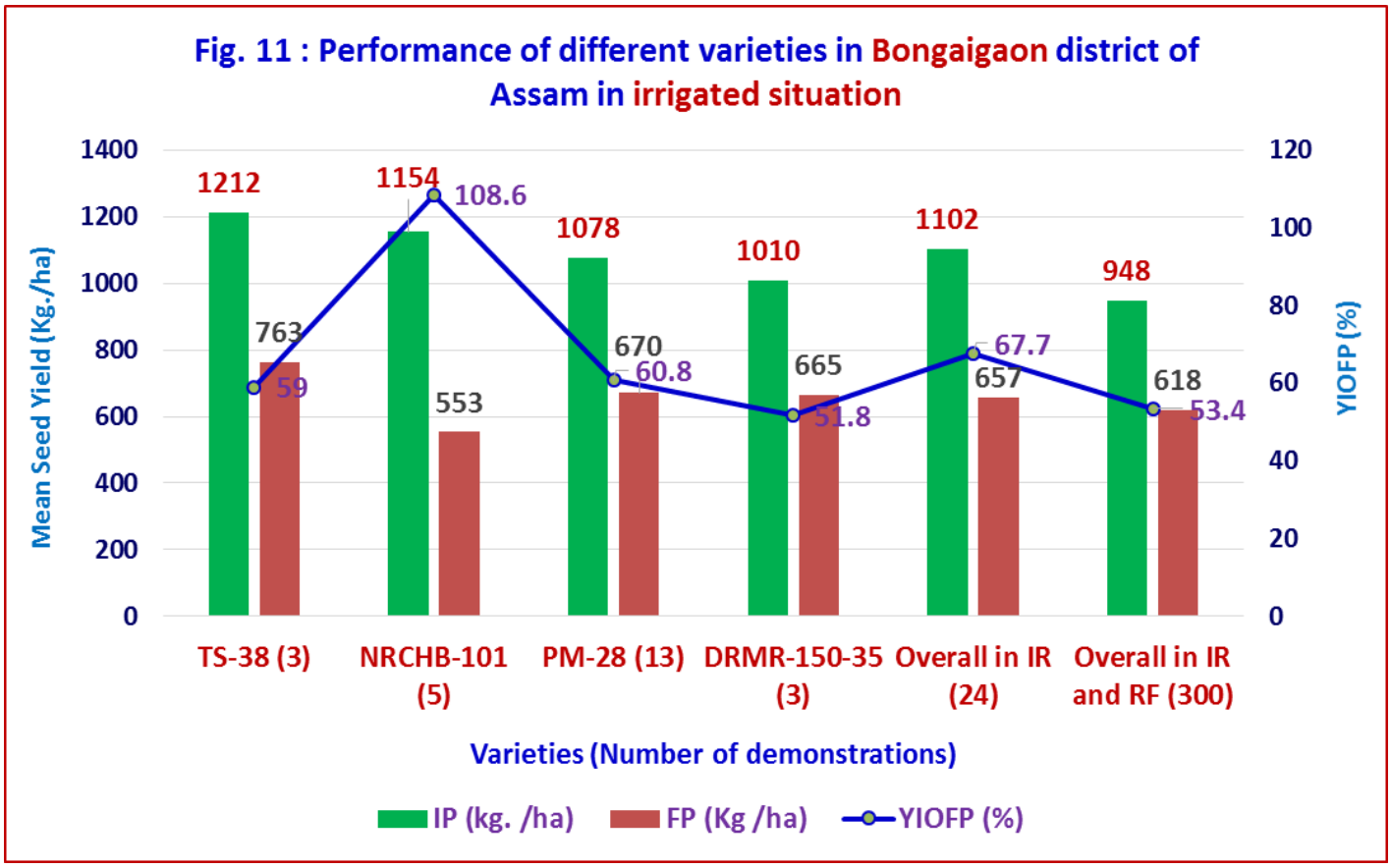


Fig. 11 : Performance of different varieties in Bongaigaon district of Assam in irrigated situation
Mean Seed Yield (Kg./ha)
YIOFP (%)
1400
1200
1000
800
600
400
200
0
120
100
80
60
40
20
0
1212
763
59
1154
108.6
553
1078
670
60.8
1010
665
51.8
1102
67.7
657
948
618
53.4
TS-38 (3)
NRCHB-101 (5)
PM-28 (13)
DRMR-150-35 (3)
Overall in IR (24)
Overall in IR and RF (300)
Varieties (Number of demonstrations)
IP (kg. /ha)
FP (Kg /ha)
YIOFP (%)

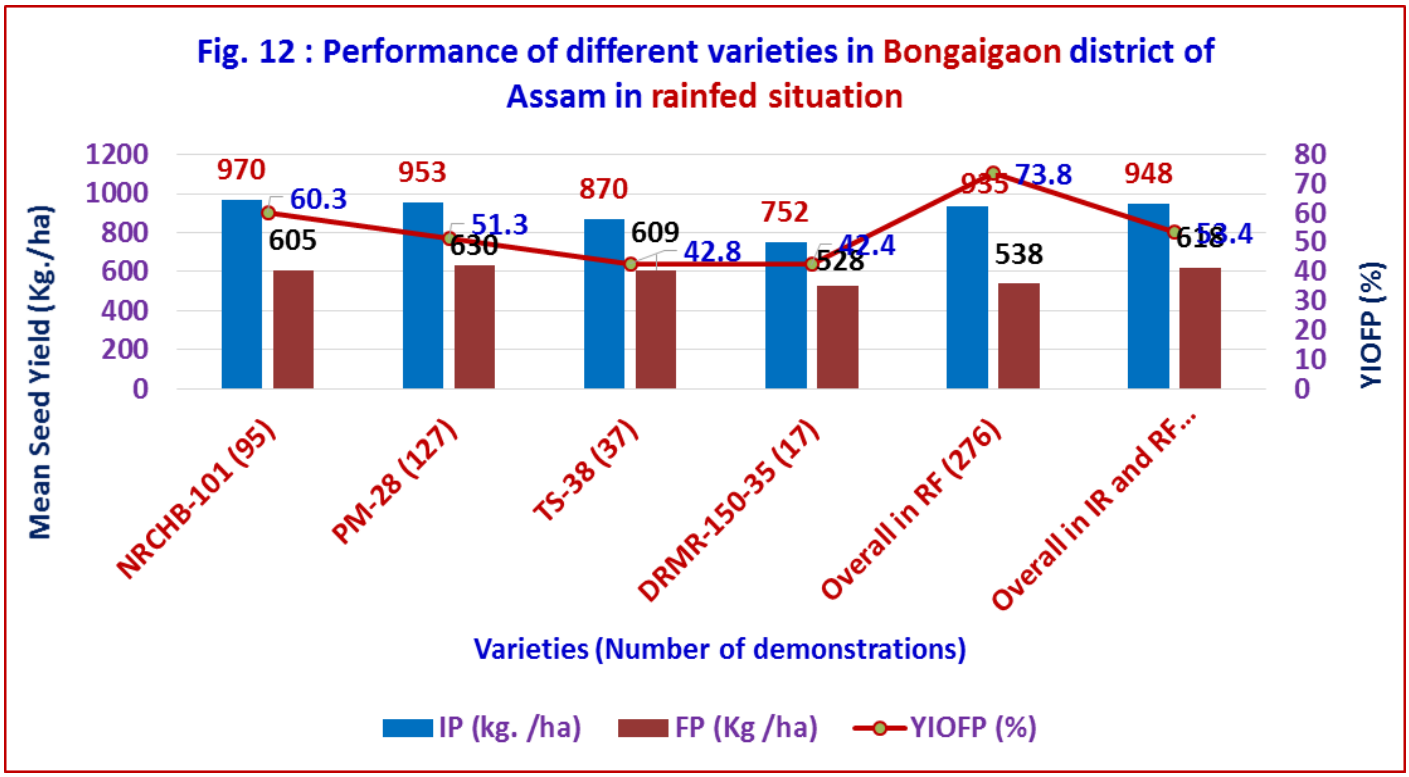


Fig. 12 : Performance of different varieties in Bongaigaon district of Assam in rainfed situation
Mean Seed Yield (Kg./ha)
YIOFP (%)
1200
1000
800
600
400
200
0
80
70
60
50
40
30
20
10
0
970
60.3
605
953
51.3
630
870
609
42.8
752
42.4
528
935
73.8
538
948
618
58.4
NRCHB-101 (95)
PM-28 (127)
TS-38 (37)
DRMR-150-35 (17)
Overall in RF (276)
Overall in IR and RF...
Varieties (Number of demonstrations)
IP (kg. /ha)
FP (Kg /ha)
YIOFP (%)

2.1.5. Performance of crop demonstrations in Darrang district of Assam during 2021-22.

In Darrang, 300 crop demonstrations (CD) were conducted in 15 villages of three clusters viz. Sipajhar (100 CD), Bachimari (100 CD) and Pachim-Mangaldai (100 CD) with NRCHB-101 (140 CD), PM-28 (60 CD), DRMR-150-35 (20 CD) varieties of Indian mustard and TS-38 (80 CD) variety of toria under both irrigated (89 CD) and rainfed (211 CD) conditions (Table 5 and 6).

The prevailing cropping pattern was paddy-mustard-vegetables, paddy-mustard-maize and sali paddy-maize/potato. The sowing time spread from first to second fortnight of November 2021 and harvesting period spread from second fortnight of February to first fortnight of March 2022. There was no severe infestation of pest and diseases. Some incidence of mustard saw fly and Alterneria bight was observed but there was no loss to yield.

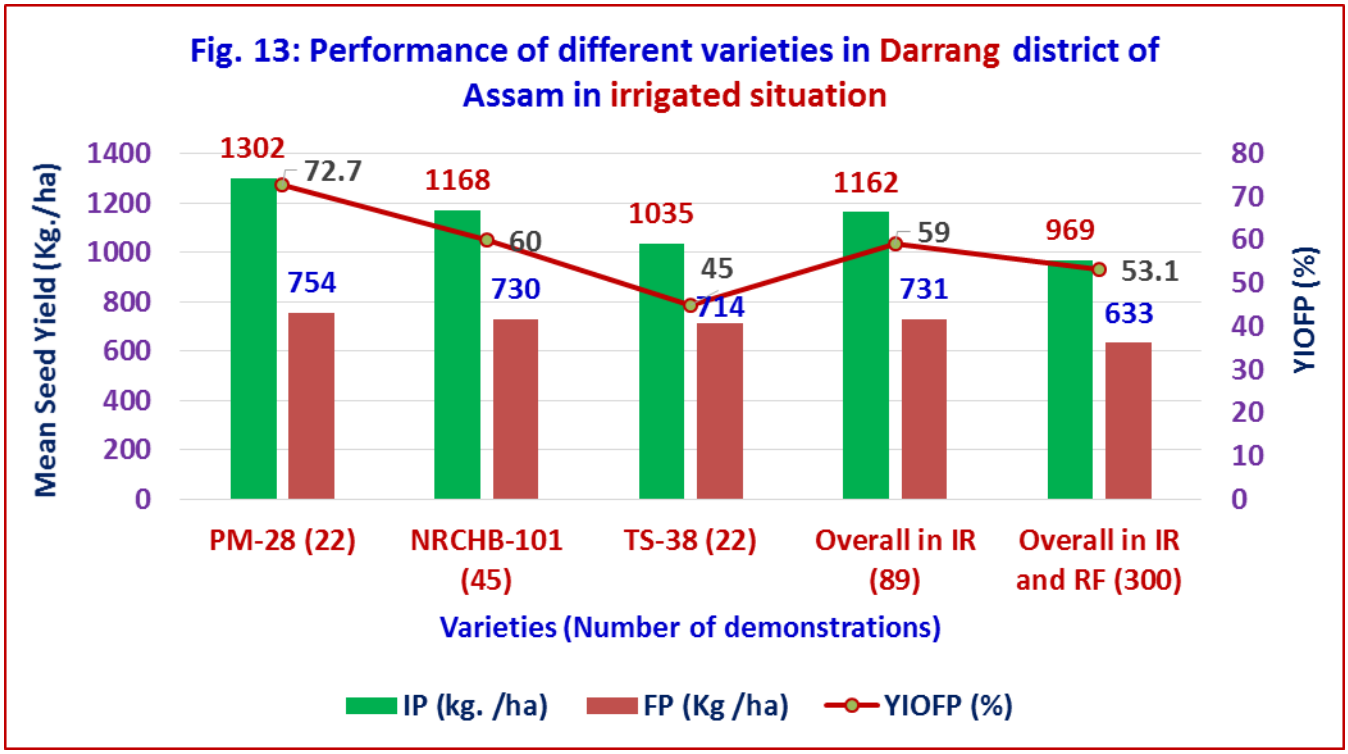
The demonstrated improved technologies (IP) in 300 demonstrations gave an average seed yield of 969 kg/ha against 633 kg/ha in FP with a yield improvement of 53.1% (Table 7). The cost of cultivation of Rs. 25542/ha in IP against the Rs. 21226/ha in FP was recorded that fetched GMR of Rs. 62985 /ha in IP against the Rs. 41145/ha in FP. An ANMR of Rs. 17524 /ha was realized against the additional cost of Rs. 4316 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.46) than that of FP (1.93) clearly indicates that demonstrated technologies in Darrang district was economically viable and profitable.

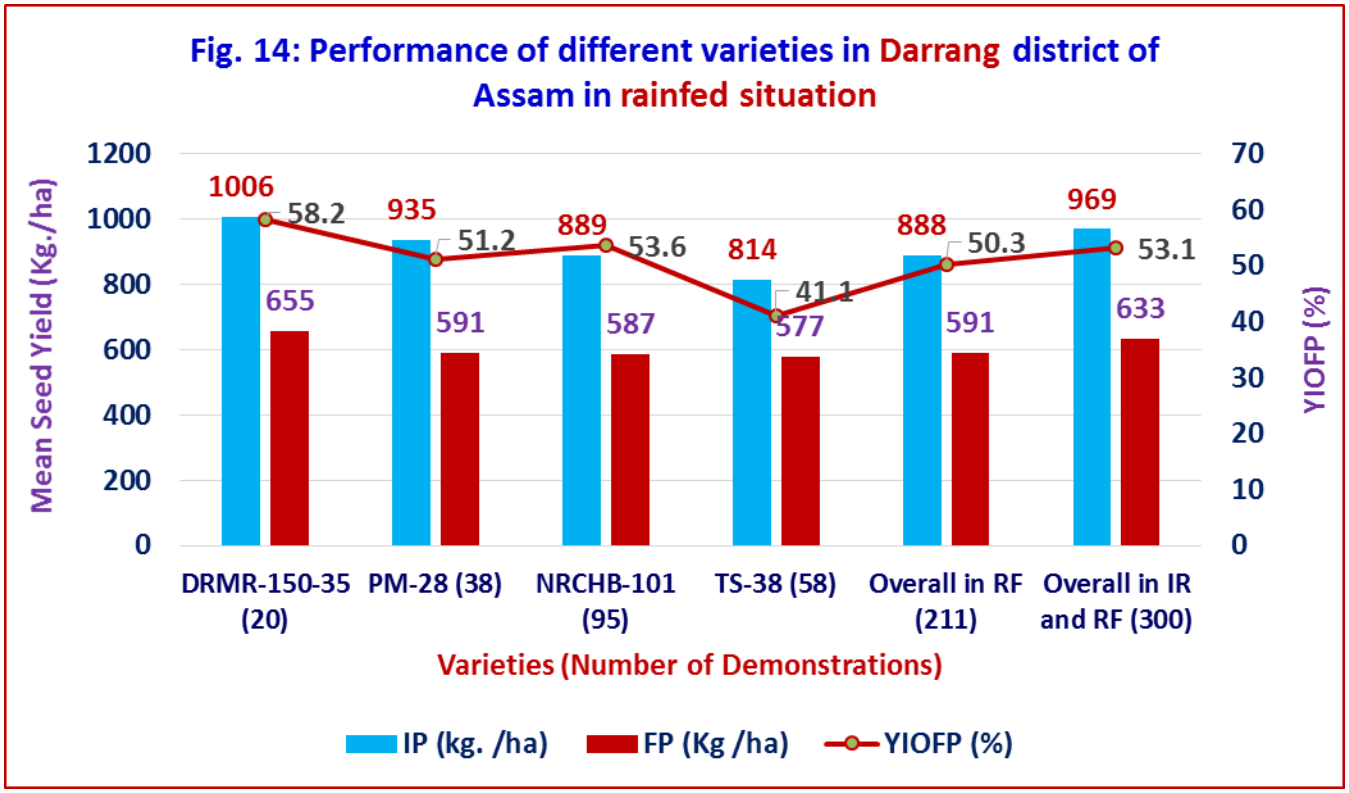
Under irrigated condition, the overall performance of demonstrated technologies in 89 demonstrations with three varieties (NRCHB-101, PM-28 and TS-38) recorded an average seed yield of 1162 kg/ha against 731 kg/ha in FP with a yield improvement of 59.0% (Table 8). The cost of cultivation of Rs. 29146/ha in IP against the Rs. 22421/ha in FP was recorded that fetched GMR of Rs. 75530 /ha in IP against the Rs. 47515/ha in FP. An ANMR of Rs. 21290 /ha was realized against the additional cost of Rs. 6725 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.59) than that of FP (2.11).

The variety-wise analysis under irrigated condition (Fig. 13) shows that IP demonstrations with PM-28 (22 CD) recorded highest average seed yield of 1302 kg/ha against 754 kg/ha in FP with highest yield improvement of 72.7% against the additional cost of cultivation of Rs. 6841/ha, while demonstrations with NRCHB-101 (45 CD) had an average seed yield of 1168 kg/ha against 730 kg/ha in FP with a yield improvement of 60.0%. The IP demonstrations with TS-38 (22 CD) had an average seed yield of 1035 kg/ha against 714 kg/ha in FP with a yield improvement of 45.0%. The maximum ANMR (Rs. 28779 /ha) was reported from PM-28 variety, while minimum (Rs. 14698 /ha) from TS-38. The cost of cultivation in IP ranged from Rs. 28993 /ha with TS-38 to Rs. 29041/ha with PM-28, while in FP it ranged from Rs. 22200 /ha with PM-28 to Rs. 22826/ha with TS-38. All demonstrated varieties had higher B:C ratio than that of FP.

Under rainfed condition, the overall performance of demonstrated technologies in 211 demonstrations with all four varieties (DRMR-150-35, NRCHB-101, PM-28 and TS-38) recorded an average seed yield of 888 kg/ha against 591 kg/ha in FP with a yield improvement of 50.3% (Table 9). The cost of cultivation of Rs. 24021/ha in IP against the Rs. 20719/ha in FP was recorded that fetched GMR of Rs. 57720 /ha in IP against the Rs. 38415/ha in FP. An ANMR of Rs. 16003 /ha was realized against the additional cost of Rs. 3302/ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.40) than that of FP (1.85).

The variety-wise analysis under rainfed condition (Fig. 14) shows that IP demonstrations with DRMR-150-35 (20 CD) recorded highest average seed yield of 1006 kg/ha against 655 kg/ha in FP with highest yield improvement of 58.2% against the additional cost of cultivation of Rs. 3598/ha, while demonstrations with PM-28 (38 CD) recorded an average seed yield of 935 kg/ha against 591 kg/ha in FP with a yield improvement of 51.2%. The IP demonstrations with NRCHB-101 (95 CD) had an average seed yield of 889 kg/ha against 587 kg/ha in FP with a yield improvement of 53.6%. The IP demonstrations with TS-38 (58 CD) had an average seed yield of 814 kg/ha against 577 kg/ha in FP with a yield improvement of 41.1%. The maximum ANMR (Rs. 19217 /ha) from DRMR-150-35 variety, while minimum (Rs. 12620 /ha) from TS-38 was reported. The cost of cultivation in IP ranged from Rs. 23394 /ha with TS-38 to Rs. 24336/ha with PM-28, while in FP it ranged from Rs. 20374 /ha with DRMR-150-35 to Rs. 20922/ha with PM-28. All demonstrated varieties had higher B:C ratio than that of FP.





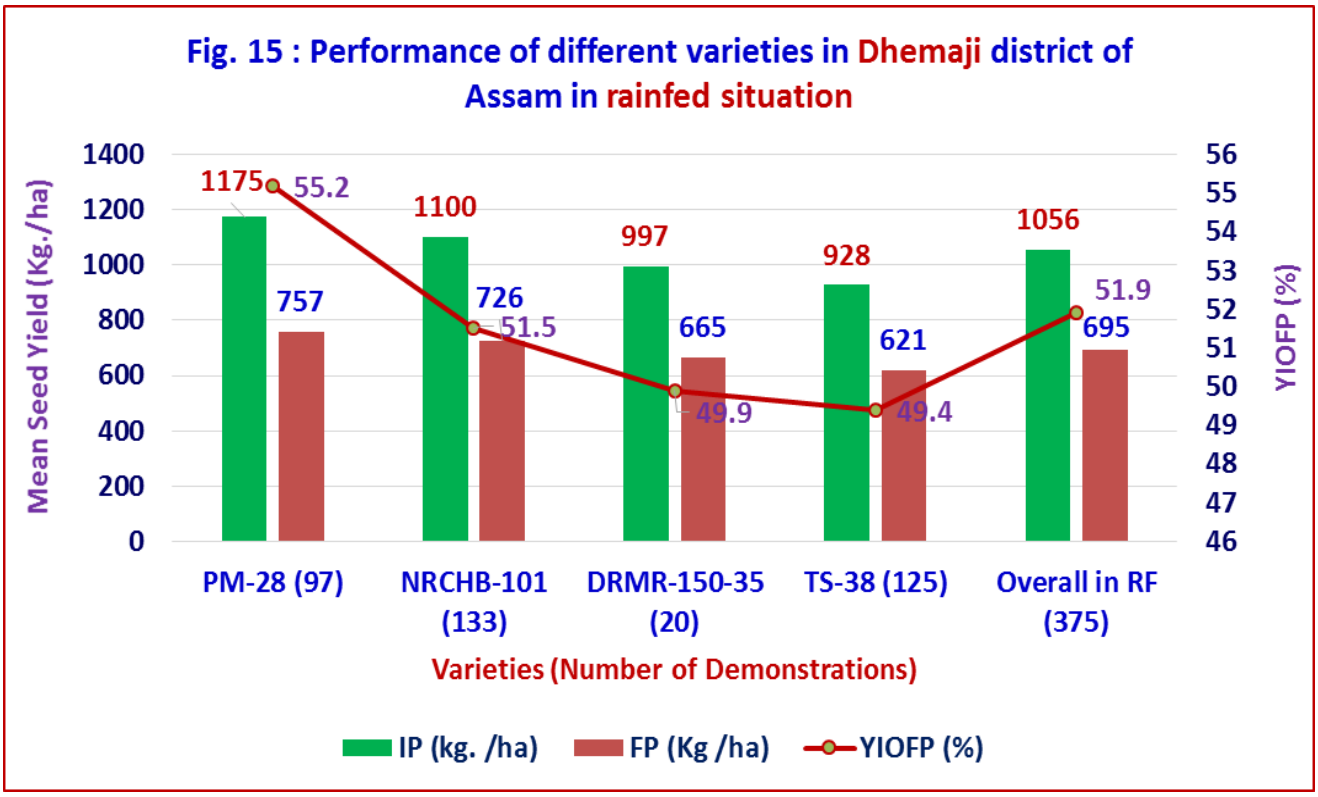
2.1.6. Performance of crop demonstrations in Dhemaji district of Assam during 2021-22.

In Dhemaji, 400 crop demonstrations (CD) were conducted in 46 villages of three clusters viz. Machkhowa (133 CD), MSTD (134 CD) and Sissiborgaon (133 CD) with NRCHB-101 (150 CD), PM-28 (100 CD), DRMR-150-35 (20 CD) varieties of Indian mustard and TS-38 (130 CD) variety of toria only under rainfed condition. Out of 400 crop demonstrations, 25 crop demonstrations (17 of NRCHB-101, 3 of PM-28 and 5 of TS-38) had failed because of poor germination, late sowing of the crop due to late harvesting of sali paddy and poor management by farmers. (Table 5 and 6).

The prevailing cropping pattern was sali paddy-fallow, sali paddy-toria/ rabi vegetables and summer green gram–potato/ toria/ summer rice-rabi vegetables. The sowing time spread from November 6 to December 10, 2021 and harvesting period spread from February 10 to March 25, 2022. There was no severe infestation of pest and diseases. The infestation of mustard sawfly, mustard aphid, Alternaria blight and Sclerotinia Rot were found, however no major damage was observed.

Under rainfed condition, the demonstrated improved technologies (IP) in 375 successful crop demonstrations gave an average seed yield of 1056 kg/ha against 695 kg/ha in FP with a yield improvement of 51.9% (Table 9). The cost of cultivation of Rs. 25076/ha in IP against the Rs. 21484/ha in FP was recorded that fetched GMR of Rs. 68640 /ha in IP against the Rs. 45175/ha in FP. An ANMR of Rs. 19873 /ha was realized against the additional cost of Rs. 3592 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.74) than that of FP (2.10) clearly indicates that demonstrated technologies in Dhemaji district was economically viable and profitable.

The variety-wise analysis under rainfed condition (Fig. 15) shows that IP demonstrations with PM-28 (97 CD) recorded highest average seed yield of 1175 kg/ha against 757 kg/ha in FP with highest yield improvement of 55.2% against the additional cost of cultivation of Rs. 4030/ha, while demonstrations with NRCHB-101 (133 CD) recorded an average seed yield of 1100 kg/ha against 726 kg/ha in FP with a yield improvement of 51.5%. The IP demonstrations with DRMR-150-35 (20 CD) had an average seed yield of 997 kg/ha against 665 kg/ha in FP with a yield improvement of 49.9%. The IP demonstrations with TS-38 (125 CD) had an average seed yield of 928 kg/ha against 621 kg/ha in FP with a yield improvement of 49.4%. The maximum ANMR (Rs. 23140/ha) from PM-28 variety, while minimum (Rs. 16843 /ha) from TS-38 was reported. The cost of cultivation in IP ranged from Rs. 23530 /ha with TS-38 to Rs. 26437/ha with PM-28, while in FP it ranged from Rs. 20418 /ha with TS-38 to Rs. 22407/ha with PM-28. All demonstrated varieties had higher B:C ratio than that of FP.



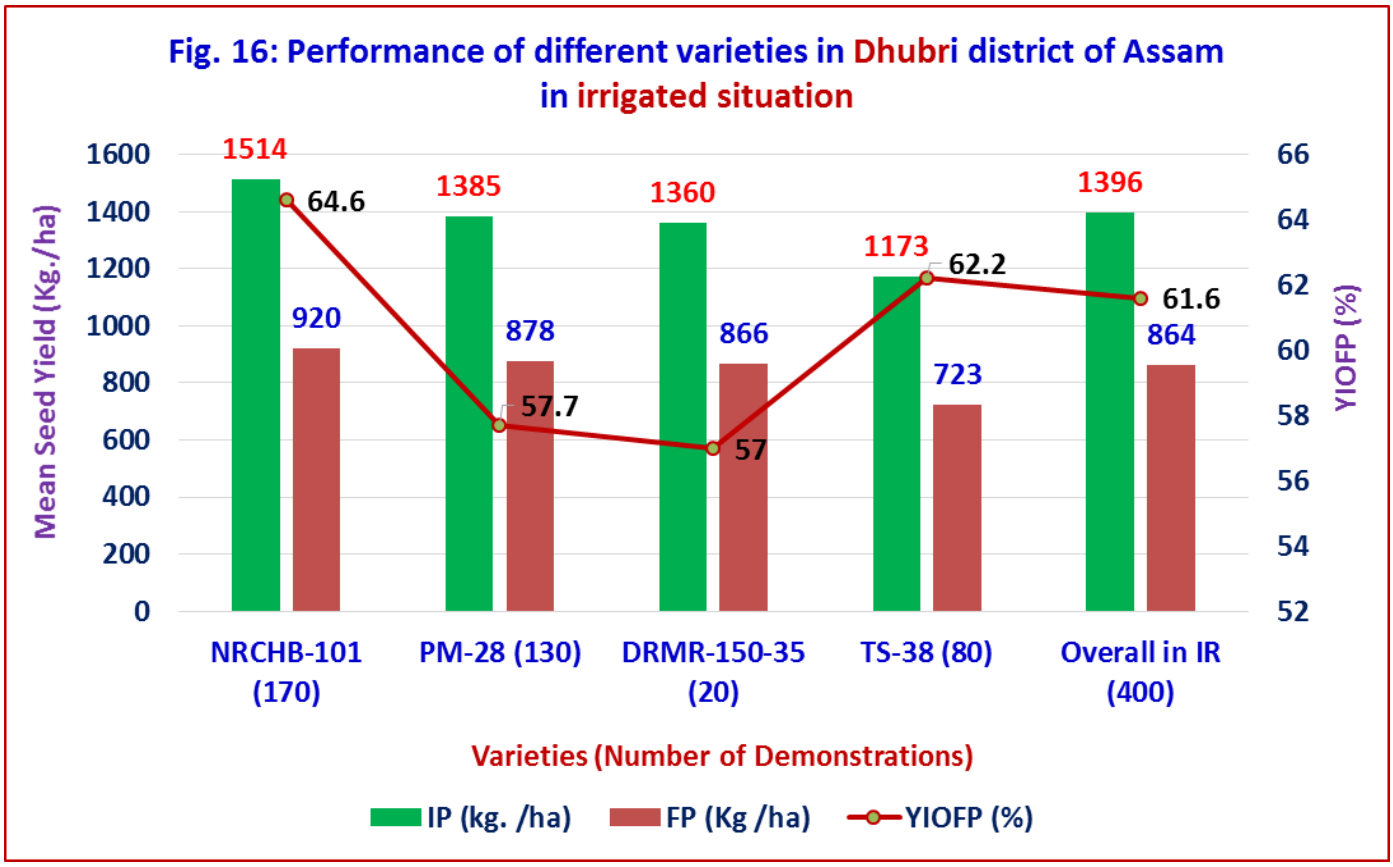
2.1.7. Performance of crop demonstrations in Dhubri district of Assam during 2021-22.

In Dhubri, 400 crop demonstrations (CD) were conducted in 21 villages of four clusters viz. Gauripur (81 CD), Chapar Salkocha (78 CD), Mahamaya (78 CD), Agomani (78 CD), Rupshi (85 CD) with NRCHB-101 (170 CD), PM-28 (130 CD), DRMR-150-35 (20 CD) varieties of Indian mustard and TS-38 (80 CD) variety of toria only under irrigated condition (Table 5 and 6).

The prevailing cropping pattern summer paddy-rapeseed/mustard-vegetables, summer paddy-black gram- Vegetables and jute- mustard-sali paddy. The sowing time spread from November 2 to 25, 2021 and harvesting period spread from February 10 to March 28, 2022. There was no severe infestation of pest and diseases. Some mild infestation of Sclerotinia Rot were was observed.

Under irrigated condition, the demonstrated improved technologies (IP) in 400 successful demonstrations with all four varieties gave an average seed yield of 1396 kg/ha against 864 kg/ha in FP with a yield improvement of 61.6% (Table 8). The cost of cultivation of Rs. 32485/ha in IP against the Rs. 24560/ha in FP was recorded that fetched GMR of Rs. 90740/ha in IP against the Rs. 56160/ha in FP. An ANMR of Rs. 28655 /ha was realized against the additional cost of Rs. 7925 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.79) than that of FP (2.28) clearly indicates that demonstrated technologies in Dhubri district was economically viable and profitable.

The variety-wise analysis under irrigated condition (Fig. 16) shows that IP demonstrations with NRCHB-101 (170 CD) recorded highest average seed yield of 1514 kg/ha against 920 kg/ha in FP with highest yield improvement of 64.6% against the additional cost of cultivation of Rs. 10210/ha, while demonstrations with PM-28 (130 CD) recorded an average seed yield of 1385kg/ha against 878 kg/ha in FP with a yield improvement of 57.7 %. The IP demonstrations with DRMR-150-35 (20 CD) had an average seed yield of 1360 kg/ha against 866 kg/ha in FP with a yield improvement of 57.0 %. The IP demonstrations with TS-38 (80 CD) had an average seed yield of 1173 kg/ha against 723 kg/ha in FP with a yield improvement of 62.2%. The maximum ANMR (Rs. 28400/ha) from NRCHB-101 variety, while minimum (Rs. 22856 /ha) from TS-38 was reported. The cost of cultivation in IP ranged from Rs. 29354/ha with TS-38 to Rs. 35454/ha with NRCHB-101, while in FP it ranged from Rs. 22960 /ha with TS-38 to Rs. 25244/ha with NRCHB-101. All demonstrated varieties had higher B:C ratio than that of FP.



2.1.8. Performance of crop demonstrations in Golaghat district of Assam during 2021-22.

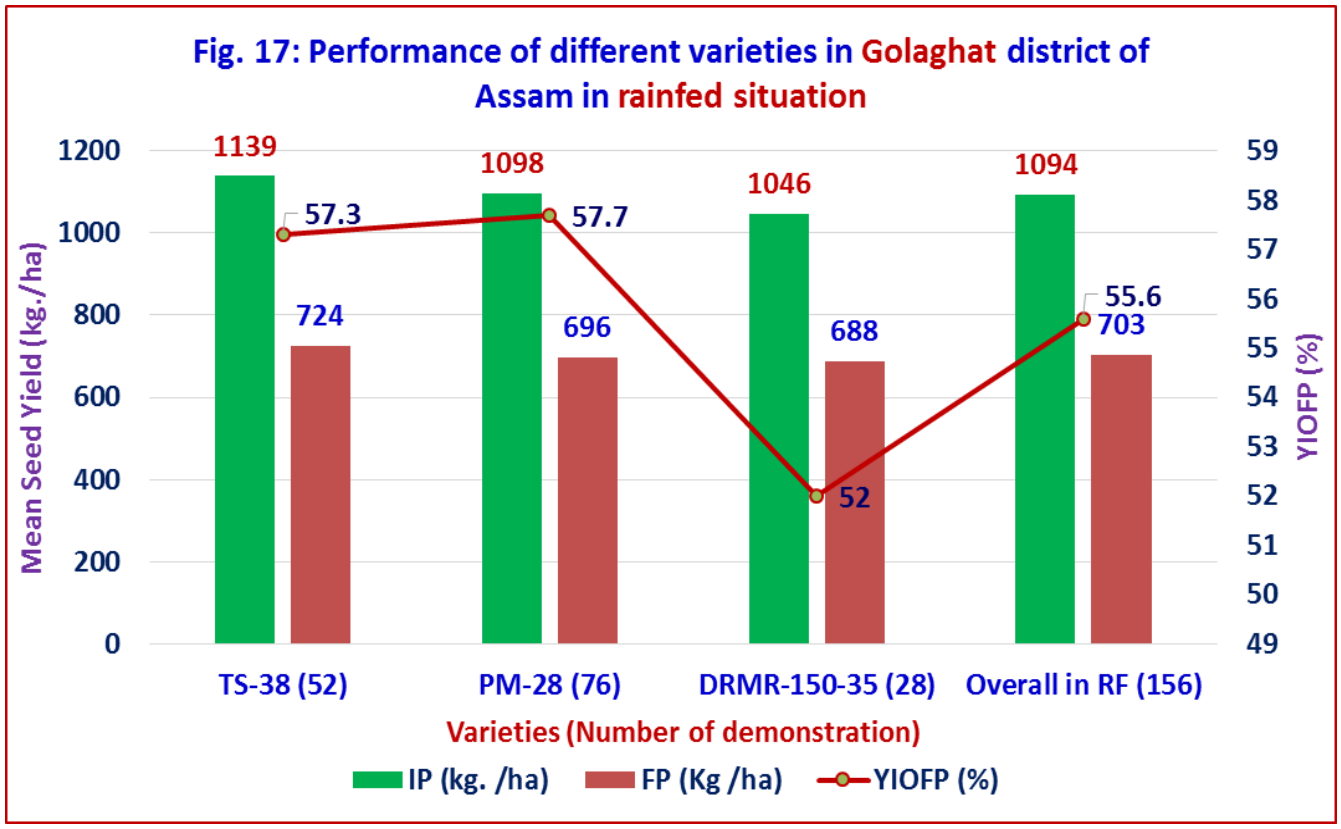
In Golaghat district, 200 crop demonstrations (CD) were conducted in 27 villages of three clusters viz. Bokakhat (140 CD), Kakodonga (50 CD) and Podumoni (10 CD) with three varieties viz. PM-28 (100 CD), DRMR-150-35 (30 CD) of Indian mustard and TS-38 (70 CD) variety of toria only under rainfed conditions. Out of total 200 crop demonstrations, 44 crop demonstrations (24 nos. of PM-28, 02 nos. of DRMR-150-35 and 18 nos. of TS-38) had failed due to lack of irrigation facilities during critical growth phase of mustard crop, poor agronomic practices by some farmers and heavy hailstorm in some villages (Table 5 and 6).

The prevailing cropping pattern was sali paddy-fallow, sali paddy-toria/ rabi vegetables, boro paddy-toria/ potato/ black gram and summer vegetables-rapeseed-mustard/ potato/ rabi vegetables. The sowing time spread from November 6 to 23, 2021 and harvesting period spread from February 9 to March18, 2022. The mild infestation of mustard sawfly at early stage and severe infestation of Sclerotinia rot especially in Indian mustard was observed in some plots.

Under rainfed condition, the demonstrated improved technologies (IP) in successful 156 crop demonstrations gave an average seed yield of 1094 kg/ha against 703 kg/ha in FP with a yield improvement of 55.6 % (Table 9).The cost of cultivation of Rs. 26941/ha in IP against the Rs. 19236/ha in FP was recorded that fetched GMR of Rs. 67049/ha in IP against the Rs. 42978/ha in FP. An ANMR of Rs. 16366 /ha was realized against the additional cost of Rs. 7705 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.48) than that of FP (2.23) clearly

indicates that demonstrated technologies in Golaghat district was economically viable and profitable.

The variety-wise analysis of Indian mustard under rainfed condition (Fig. 17) shows that IP demonstrations with PM-28 (76CD) recorded highest average seed yield of 1098 kg/ha against 696 kg/ha in FP with a yield improvement of 57.75% against the additional cost of cultivation of Rs. 7624/ha, while demonstrations with variety DRMR-150-35 (28 CD) recorded an average seed yield of 1046 kg/ha against 688 kg/ha in FP with a yield improvement of 52.0%. The IP demonstrations of improved toria variety, TS-38 (52 CD) had an overall highest average seed yield of 1139 kg/ha against 724 kg/ha in FP with a yield improvement of 57.3%. The maximum ANMR (Rs.17994/ha) from TS-38 variety, while minimum (Rs. 14542 /ha) from DRMR-150-35 was reported. The cost of cultivation in IP ranged from Rs. 26077 /ha with PM-28 to Rs. 27772/ha with DRMR-150-35, while in FP it ranged from Rs. 18453 /ha with PM-28 to Rs. 20074/ha with DRMR-150-35. All demonstrated varieties had higher B:C ratio than that of FP.



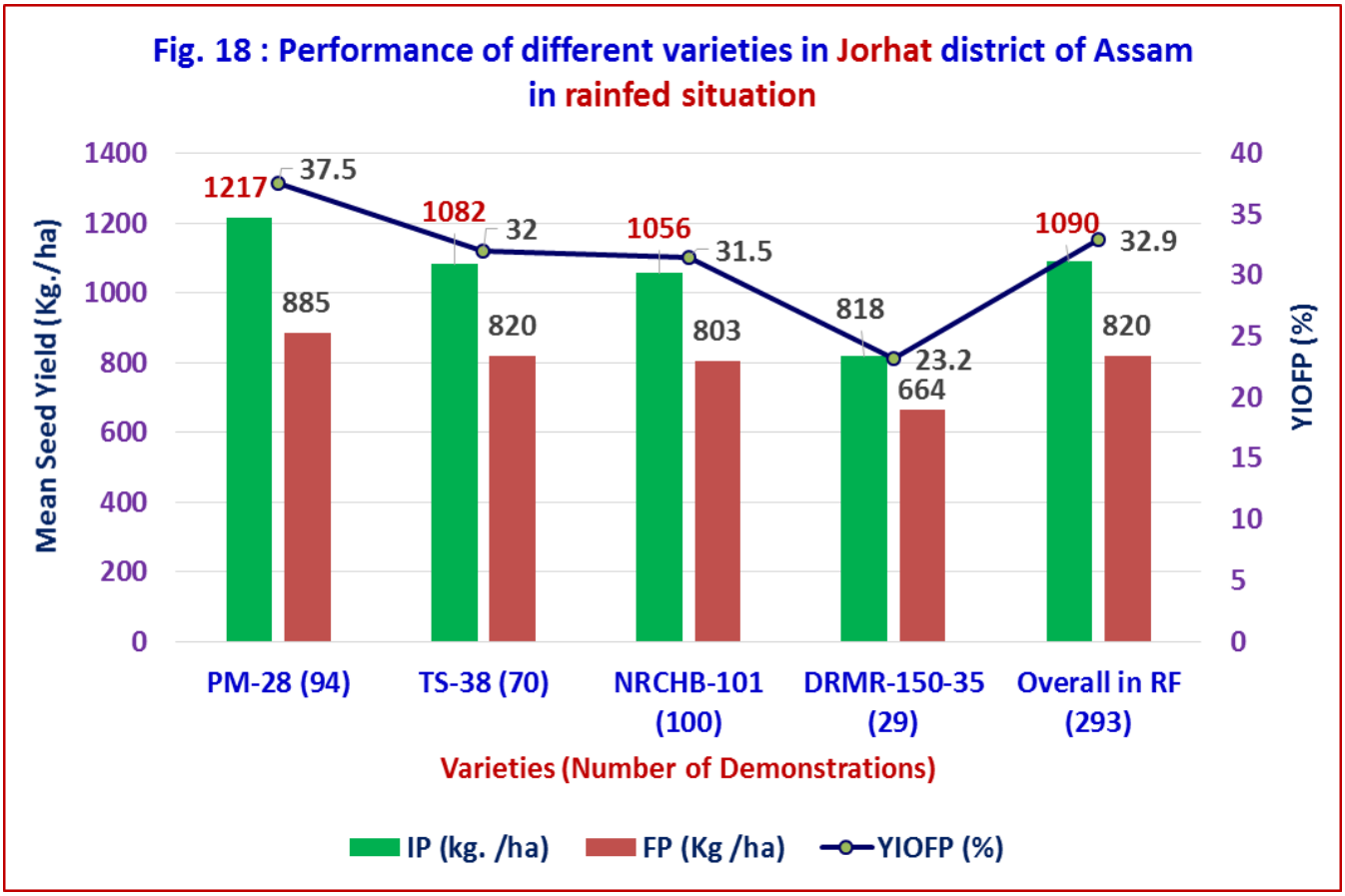
2.1.9. Performance of crop demonstrations in Jorhat district of Assam during 2021-22.

In Jorhat, 300 crop demonstrations (CD) were conducted in 56 villages of three clusters viz. Majuli (130 CD), Ujani Majuli (130 CD), and Kaliapani (40 CD) with NRCHB-101 (100 CD), PM-28 (100 CD), DRMR-150-35 (30 CD) varieties of Indian mustard and TS-38 (70 CD) variety of toria only under rainfed condition. Out of 300 crop demonstrations, 7 crop demonstrations (6 of PM-28 and 1 of DRMR-150-35) had failed because of poor germination due to very late sowing of the crop (Table 5 and 6).

The prevailing cropping pattern was sali paddy-fallow, sali paddy-toria/ rabi vegetables and sali paddy-maize/sugarcane. The sowing time spread from November 1 to December 18, 2021 and harvesting period spread from February 8 to March 31, 2022. There was no severe infestation of pest and diseases.

Under rainfed condition, the demonstrated improved technologies (IP) in 293 successful crop demonstrations gave an average seed yield of 1090 kg/ha against 820 kg/ha in FP with a yield improvement of 32.9% (Table 9). The cost of cultivation of Rs. 27381/ha in IP against the Rs. 23587/ha in FP was recorded that fetched GMR of Rs. 70850 /ha in IP against the Rs. 53300/ha in FP. An ANMR of Rs. 13756 /ha was realized against the additional cost of Rs. 3794/ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.58) than that of FP (2.25) clearly indicates that demonstrated technologies in Jorhat district was economically viable and profitable.

The variety-wise analysis under rainfed condition (Fig. 18) shows that IP demonstrations with PM-28 (94 CD) recorded highest average seed yield of 1217 kg/ha against 885 kg/ha in FP with highest yield improvement of 37.5% against the additional cost of cultivation of Rs. 3929/ha, while demonstrations with NRCHB-101 (100 CD) recorded an average seed yield of 1056kg/ha against 803 kg/ha in FP with a yield improvement of 31.5%. The IP demonstrations with DRMR-150-35 (29 CD) had an average seed yield of 818 kg/ha against 664 kg/ha in FP with a yield improvement of 23.2%. The IP demonstrations with TS-38 (70 CD) had an average seed yield of 1082 kg/ha against 820 kg/ha in FP with a yield improvement of 32.0%. The maximum ANMR (Rs. 17651/ha) from PM-28 variety, while minimum (Rs. 6495 /ha) from DRMR-150-35 was reported. The cost of cultivation in IP ranged from Rs. 26544 /ha with TS-38 to Rs. 27755/ha with PM-28, while in FP it ranged from Rs. 22787 /ha with TS-38 to Rs. 23859/ha with NRCHB-101. All demonstrated varieties had higher B:C ratio than that of FP.



2.1.10. Performance of crop demonstrations in Kamrup district of Assam during 2021-22.

In Kamrup, 500 crop demonstrations (CD) were conducted in 32 villages of four clusters viz. Chandrapur (263 CD), Kamalpur (50 CD), Bihdiya jajikona (157) and Bongshore (30 CD) with PM-28 (200 CD), NRCHB-101 (170 CD), DRMR-150-35 (30 CD) varieties of Indian mustard and TS-38 (100 CD) variety of toria under both irrigated (225 CD) and rainfed (275 CD) conditions (Table 5 and 6). Out of 500 crop demonstrations, 193 crop demonstrations (104 of PM-28 and 89 of NRCHB-101) had failed especially due to wrong selection of beneficiary farmers. Farmers were not made aware about the duration of mustard varieties, therefore some farmers even did not sow the mustard crop and some uprooted plant. In Chandrapur block, fertilizers were not supplied in time so farmers could not to apply fertilizer in their field. Some demonstrations were failed due to poor management by farmers and in some places hail storms damaged the crop heavily.

The prevailing cropping pattern was sali paddy-vegetable-rapeseed/mustard, sali paddy-boro paddy, fallow (summer)-vegetable/ mustard, summer vegetable-toria/rabi vegetables. The sowing time spread from first week of November to second week of December 2021 and harvesting period spread from first week of February to last week of March 2022. There was no severe infestation of pest and diseases. Some incidence of mustard sawfly, mustard aphid and Alterneria bight and Sclerotinia rot was observed below economic threshold level.

The demonstrated improved technologies (IP) in 307 successful crop demonstrations gave an average seed yield of 1158 kg/ha against 795 kg/ha in FP with a yield improvement of 45.7 %

(Table 7). The cost of cultivation of Rs. 25944/ha in IP against the Rs. 23663/ha in FP was recorded that fetched GMR of Rs. 75270 /ha in IP against the Rs. 51675/ha in FP. An ANMR of Rs. 21314/ha was realized against the additional cost of Rs. 2281/ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.90) than that of FP (2.18) clearly indicates that demonstrated technologies in Kamrup district was economically viable and profitable.

Under irrigated condition, the overall performance of demonstrated technologies in 183 successful crop demonstrations with all four varieties (NRCHB-101, PM-28, DRMR-150-35 and TS-38) recorded an average seed yield of 1340 kg/ha against 879 kg/ha in FP with a yield improvement of 52.5 % (Table 8). The cost of cultivation of Rs. 27639/ha in IP against the Rs. 24984/ha in FP was recorded that fetched GMR of Rs. 87100 /ha in IP against the Rs. 57135/ha in FP. An ANMR of Rs. 27310 /ha was realized against the additional cost of Rs. 2655/ha incurred due to demonstrated technology and the higher B:C ratio of IP (3.15) than that of FP (2.29).

The variety-wise analysis under irrigated condition (Fig. 19) shows that IP demonstrations with DRMR-150-35 (30 CD) recorded highest average seed yield of 1605 kg/ha against 922 kg/ha in FP with highest yield improvement of 74.1 % against the additional cost of cultivation of Rs. 3815/ha, while demonstrations with NRCHB-101 (81 CD) had an average seed yield of 1333kg/ha against 815 kg/ha in FP with a yield improvement of 63.6%. The IP demonstrations with PM-28 (47 CD) recorded an average seed yield of 1194 kg/ha against 933 kg/ha in FP with a yield improvement of 28.0 %. The IP demonstrations with TS-38 (25 CD) had an average seed yield of 1196 kg/ha against 935 kg/ha in FP with a yield improvement of 27.9 %. The maximum ANMR (Rs. 40580 /ha) was reported from DRMR-150-35 variety, while minimum (Rs. 14971 /ha) from PM-28. The cost of cultivation in IP ranged from Rs. 27042 /ha with PM-28 to Rs. 28066/ha with TS-38, while in FP it ranged from Rs. 24140 /ha with DRMR-150-35 to Rs. 26409/ha with TS-38. All demonstrated varieties had higher B:C ratio than that of FP.

Under rainfed condition, the overall performance of demonstrated technologies in 124 successful crop demonstrations with two varieties (PM-28 and TS-38) recorded average seed yield of 891 kg/ha against 671 kg/ha in FP with yield improvement of 32.8% (Table 9). The cost of cultivation of Rs. 23442/ha in IP against the Rs. 21344/ha in FP was recorded that fetched GMR of Rs. 57915/ha in IP against the Rs. 43615/ha in FP. An ANMR of Rs. 12202 /ha was realized against the additional cost of Rs. 2098/ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.47) than that of FP (2.04).

The variety-wise analysis under rainfed condition (Fig. 20) shows that IP demonstrations with TS-38 (75 CD) recorded highest average seed yield of 963 kg/ha against 709 kg/ha in FP with highest yield improvement of 35.8% against the additional cost of cultivation of Rs. 2002/ha, while demonstrations with PM-28 (49 CD) recorded an average seed yield of 781 kg/ha against 612 kg/ha in FP with a yield improvement of 27.6%. The maximum ANMR (Rs. 14508/ha) from TS-38 variety, while minimum (Rs. 8740/ha) from PM-28 was reported. The cost of cultivation in IP ranged from Rs. 23047 /ha with PM-28 to Rs. 23700/ha with TS-38, while in FP it ranged from Rs. 20802/ha with PM-28 to Rs. 21698/ha with TS-38. All demonstrated varieties had higher B:C ratio than that of FP.

Fig. 19 : Performance of different varieties in Kamrup district of Assam in irrigated situation

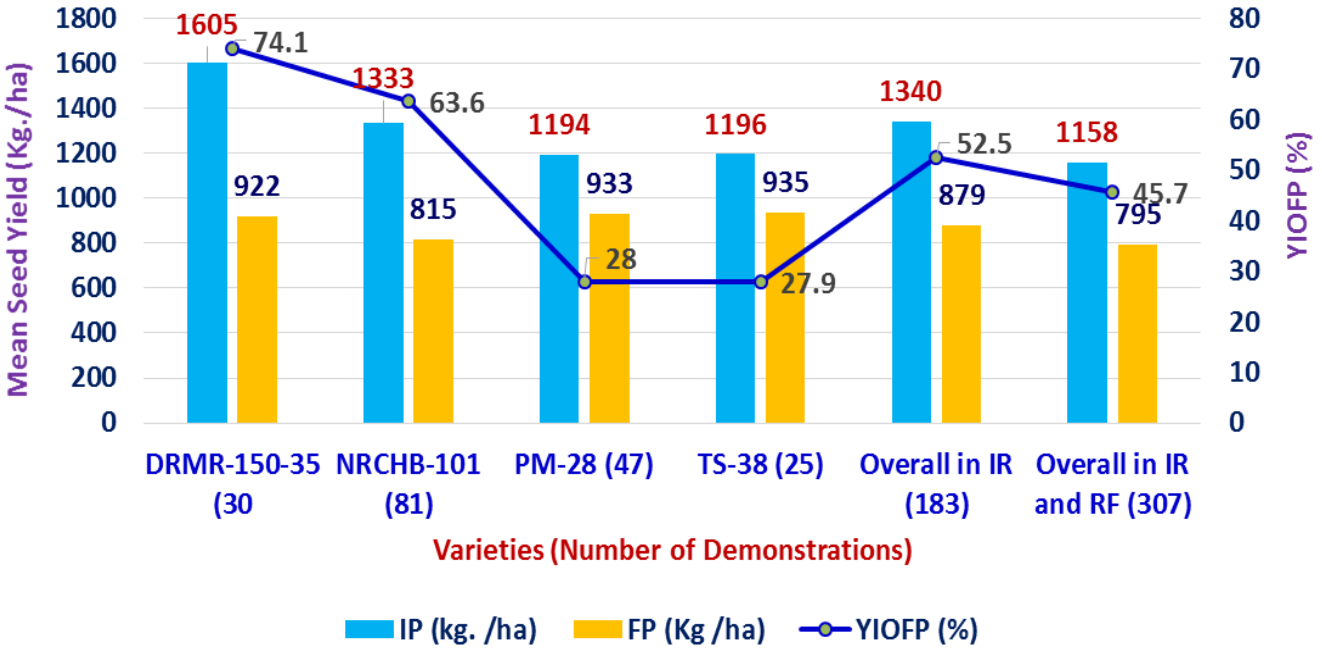
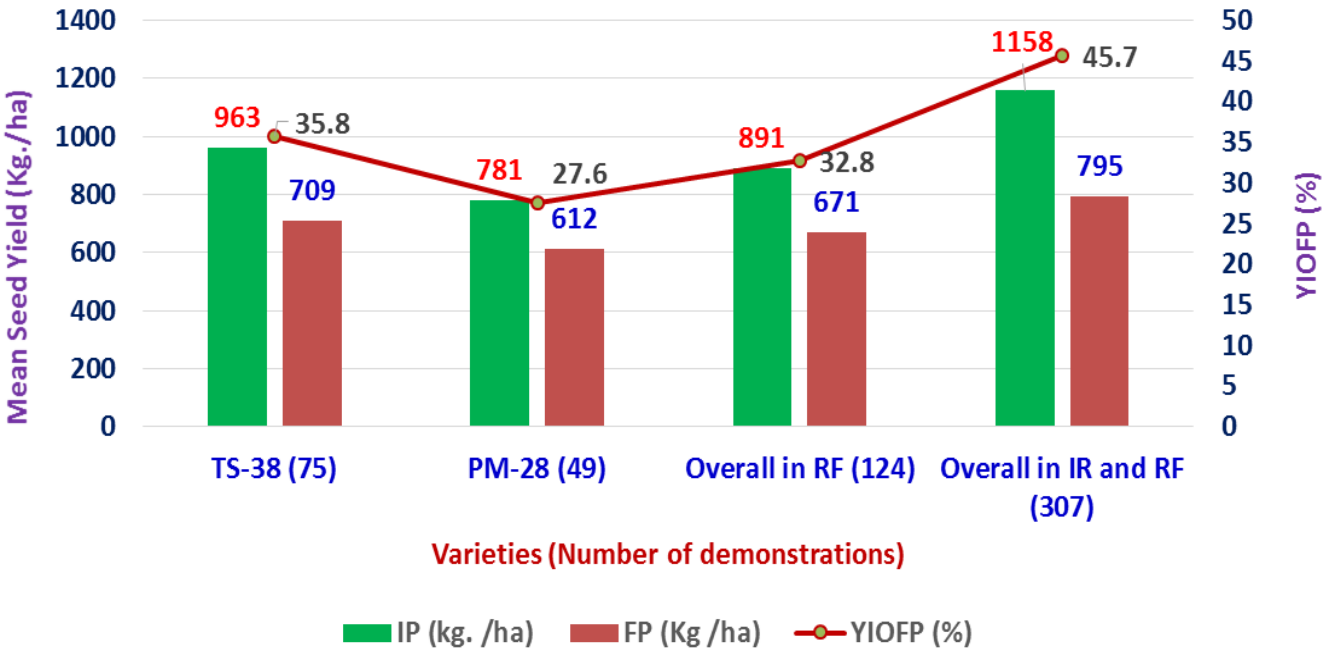


Fig. 20 : Performance of different varieties in Kamrup district of Assam in rainfed situation



2.1.11. Performance of crop demonstrations in Kokrajhar district of Assam during 2021-22.

In Kokrajhar, 300 crop demonstrations (CD) were conducted in 32 villages of three clusters viz. Kokrajhar (146 CD), Dotma (142 CD) and Kachugaon (12 CD) with NRCHB-101 (100 CD), PM-28 (100 CD), DRMR-150-35 (20 CD) varieties of Indian mustard and TS-38 (80 CD) variety of toria under both irrigated (69 CD) and rainfed (231 CD) conditions (Table 5 and 6).

The prevailing cropping pattern was Sali paddy- potato, Sali paddy- rapeseed, sali paddy-rapeseed- maize, sali paddy- wheat-vegetable, Sali paddy - fallow/ vegetable - boro paddy and sali paddy – fallow. The sowing time spread from first to second fortnight of November 2021 and harvesting period spread from second fortnight of February to first fortnight of March 2022. There was no severe infestation of pest and diseases. Some incidence of mustard aphid and Alterneria bight was observed below economic threshold level.

The demonstrated improved technologies (IP) in 300 demonstrations gave an average seed yield of 982 kg/ha against 708 kg/ha in FP with a yield improvement of 38.7% (Table 7).-The cost of cultivation of Rs. 27663/ha in IP against the Rs. 21412/ha in FP was recorded that fetched GMR of Rs. 63830 /ha in IP against the Rs. 46020/ha in FP. An ANMR of Rs. 11559 /ha was realized against the additional cost of Rs. 6251/ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.30) than that of FP (2.14) clearly indicates that demonstrated technologies in Kokrajhar district was economically viable and profitable.

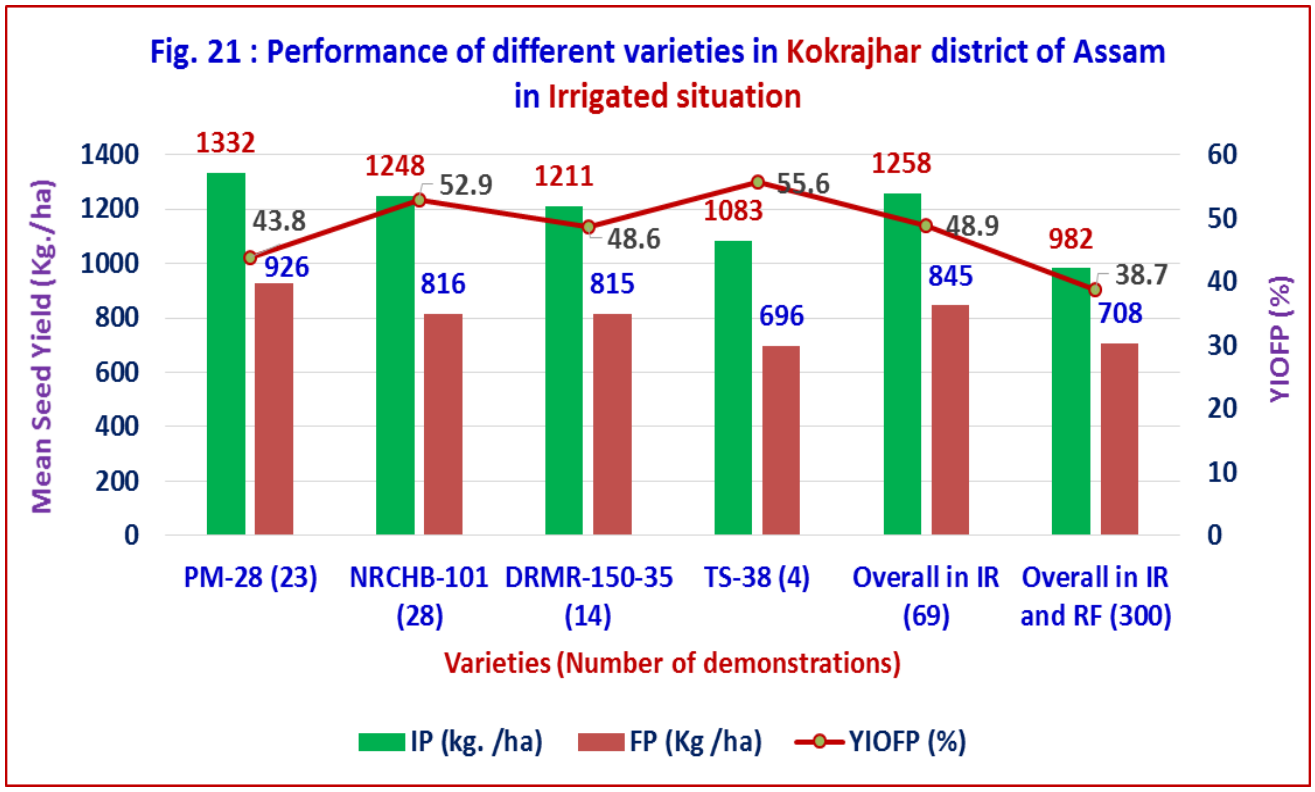
Under irrigated condition, the overall performance of demonstrated technologies in 69 demonstrations with all four varieties (NRCHB-101, PM-28, DRMR-150-35 and TS-38) recorded an average seed yield of 1258 kg/ha against 845 kg/ha in FP with a yield improvement of 48.9% (Table 8). The cost of cultivation of Rs. 32621/ha in IP against the Rs. 24524/ha in FP was recorded that fetched GMR of Rs. 81770 /ha in IP against the Rs. 54924/ha in FP. An ANMR of Rs. 18749 /ha was realized against the additional cost of Rs. 8097/ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.50) than that of FP (2.23).

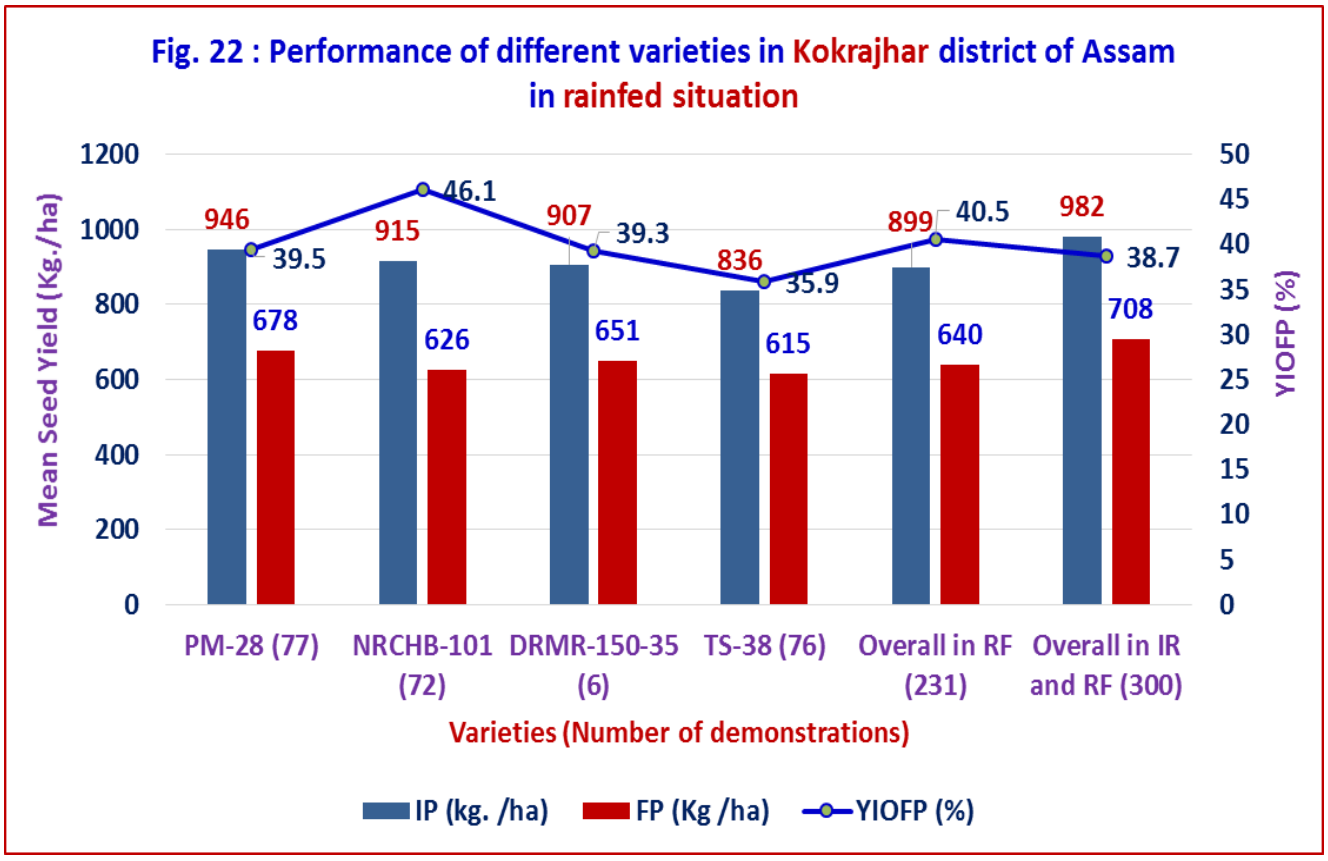
The variety-wise analysis under irrigated condition (Fig. 21) shows that IP demonstrations with PM-28 (23 CD) recorded highest average seed yield of 1332 kg/ha against 926 kg/ha in FP with a yield improvement of 43.8% against the additional cost of cultivation of Rs. 6945/ha, while demonstrations with NRCHB-101 (28 CD) had an average seed yield of 1248 kg/ha against 816 kg/ha in FP with a yield improvement of 52.9%. The IP demonstrations with DRMR-150-35 (14 CD) recorded an average seed yield of 1211 kg/ha against 815 kg/ha in FP with a yield improvement of 48.6%. The IP demonstrations with TS-38 (4 CD) had an average seed yield of 1083kg/ha against 696 kg/ha in FP with highest yield improvement of 55.6%. The maximum ANMR (Rs. 19452 /ha) was reported from NRCHB-101 variety, while minimum (Rs. 14671 /ha) from TS-38. The cost of cultivation in IP ranged from Rs. 32456 /ha with DRMR-150-35 to Rs. 32811/ha with PM-28, while in FP it ranged from Rs. 21997 /ha with TS-38 to Rs. 25866/ha with PM-28. All demonstrated varieties had higher B:C ratio than that of FP.

Under rainfed condition, the overall performance of demonstrated technologies in 231 demonstrations with all four varieties recorded average seed yield of 899 kg/ha against 640 kg/ha in FP with yield improvement of 40.5% (Table 9). The cost of cultivation of Rs. 26183/ha in IP against the Rs. 20482/ha in FP was recorded that fetched GMR of Rs. 58435 /ha in IP against the Rs. 41600/ha in FP. An ANMR of Rs. 11134 /ha was realized against the additional cost of Rs. 5701/ha

incurred due to demonstrated technology and the higher B:C ratio of IP (2.23) than that of FP (2.19).

The variety-wise analysis under rainfed condition (Fig. 22) shows that IP demonstrations with PM-28 (77 CD) recorded highest average seed yield of 946 kg/ha against 678 kg/ha in FP with a yield improvement of 39.5% against the additional cost of cultivation of Rs. 5735/ha, while demonstrations with NRCHB-101 (72 CD) recorded an average seed yield of 915 kg/ha against 626 kg/ha in FP with highest yield improvement of 46.1%. The IP demonstrations with DRMR-150-35 (6 CD) had an average seed yield of 907 kg/ha against 651 kg/ha in FP with a yield improvement of 39.3%. The IP demonstrations with TS-38 (76 CD) had an average seed yield of 836 kg/ha against 615 kg/ha in FP with a yield improvement of 35.9%. The maximum ANMR (Rs. 12832 /ha) from NRCHB-101 variety, while minimum (Rs. 8968 /ha) from TS-38 was reported. The cost of cultivation in IP ranged from Rs. 26020 /ha with TS-38 to Rs. 26440/ha with DRMR-150-35, while in FP it ranged from Rs. 20344 /ha with NRCHB-101 to Rs. 20623/ha with TS-38. All demonstrated varieties had higher B:C ratio than that of FP.





2.1.12. Performance of crop demonstrations in Lakhimpur district of Assam during 2021-22.

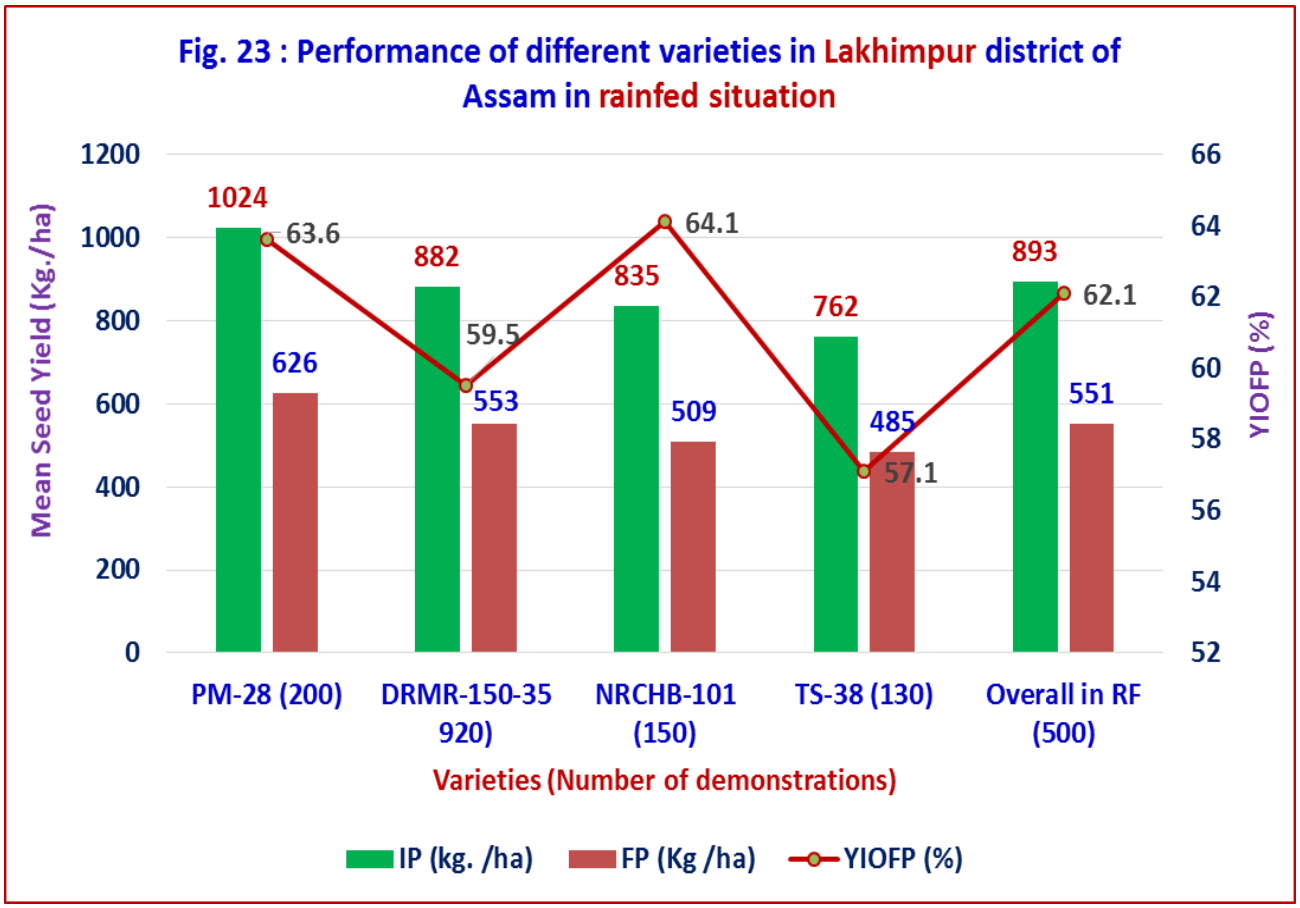
In Lakhimpur, 500 crop demonstrations (CD) were conducted in 64 villages of four clusters viz. Telahi (37 CD), Narayanpur (128 CD), Dhakuakhana (170) and Ghilamara (165 CD) with NRCHB-101 (150 CD), PM-28 (200 CD), DRMR-150-35 (20 CD) varieties of Indian mustard and TS-38 (130 CD) variety of toria only under rainfed conditions (Table 5 and 6).

The prevailing cropping pattern was winter rice-rapeseed & mustard, winter rice-potato, winter rice-summer paddy, winter rice as mono crop, and rapeseed & mustard as mono crop. The sowing time spread from second to fourth week of November 2021 and harvesting period spread from last week of February to last week of March 2022. There was no severe infestation of pest and diseases. The infestation of mustard sawfly, mustard aphid and Alternaria blight were found in some areas, however no major damage was observed. Rodent attacks on mustard were also reported in some fields of Dhakuakhana and Ghilamara blocks of the district.

Under rainfed condition, the demonstrated improved technologies (IP) in 500 demonstrations gave an average seed yield of 893 kg/ha against 551 kg/ha in FP with highest yield improvement of 62.1 % (Table 9). The cost of cultivation of Rs. 24767/ha in IP against the Rs. 20442/ha in FP was recorded that fetched GMR of Rs. 58045 /ha in IP against the Rs. 35815/ha in FP. An ANMR of Rs. 17954/ha was realized against the additional cost of Rs. 4325 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.35) than that of FP (1.75) clearly

indicates that demonstrated technologies in Lakhimpur district was economically viable and profitable.

The variety-wise analysis under rainfed condition (Fig. 23)–shows that IP demonstrations with PM-28 (200 CD) recorded highest average seed yield of 1024 kg/ha against 626 kg/ha in FP with a yield improvement of 63.6% against the additional cost of cultivation of Rs. 4827/ha, while demonstrations with DRMR-150-35 (20 CD) recorded an average seed yield of 882 kg/ha against 553 kg/ha in FP with a yield improvement of 59.5%. The IP demonstrations with NRCHB-101 (150 CD) had an average seed yield of 835 kg/ha against 509 kg/ha in FP with highest yield improvement of 64.1%. The IP demonstrations with TS-38 (130 CD) had an average seed yield of 762 kg/ha against 485 kg/ha in FP with a yield improvement of 57.1%. The maximum ANMR (Rs. 21043 /ha) from PM-28 variety, while minimum (Rs. 15145 /ha) from TS-38 was reported. The cost of cultivation in IP ranged from Rs. 22790 /ha with TS-38 to Rs. 26257/ha with PM-28, while in FP it ranged from Rs. 19930 /ha with TS-38 to Rs. 21430/ha with PM-28. All demonstrated varieties had higher B:C ratio than that of FP.



2.1.13. Performance of crop demonstrations in Morigaon district of Assam during 2021-22.

In Morigaon, 200 crop demonstrations (CD) were conducted in 37 villages of two clusters viz. Mayong (100 CD) and Bhurbandha (100 CD) with NRCHB-101 (100 CD), DRMR-150-35 (20 CD) varieties of Indian mustard and TS-38 (80 CD) variety of toria under both irrigated (40 CD) and rainfed (160 CD) conditions (Table 5 and 6). Out of 200 crop demonstrations, 16 crop demonstrations (10 of DRMR-150-35 and 6 of NRCHB-101) had failed especially due to wrong selection of beneficiary farmers. Farmers were not made aware about the duration of mustard varieties, therefore some farmers even did not sow the mustard crop and some uprooted plant. Some demonstrations were failed due to poor management by farmers and in some places hail storms damaged the crop heavily.

The prevailing cropping pattern was sali paddy-rapeseed/mustard-vegetables, jute-mustard/rapeseed-jute, sali paddy–rapeseed–Boro paddy, sali paddy- mustard/rapeseed- Jute. The sowing time spread from October 10, to December 3, 2021 and harvesting period spread from February 1, to March 25, 2022. There was no severe infestation of pest and diseases. Some incidence of mustard sawfly, mustard aphid and Alternaria bight was observed below economic threshold level.

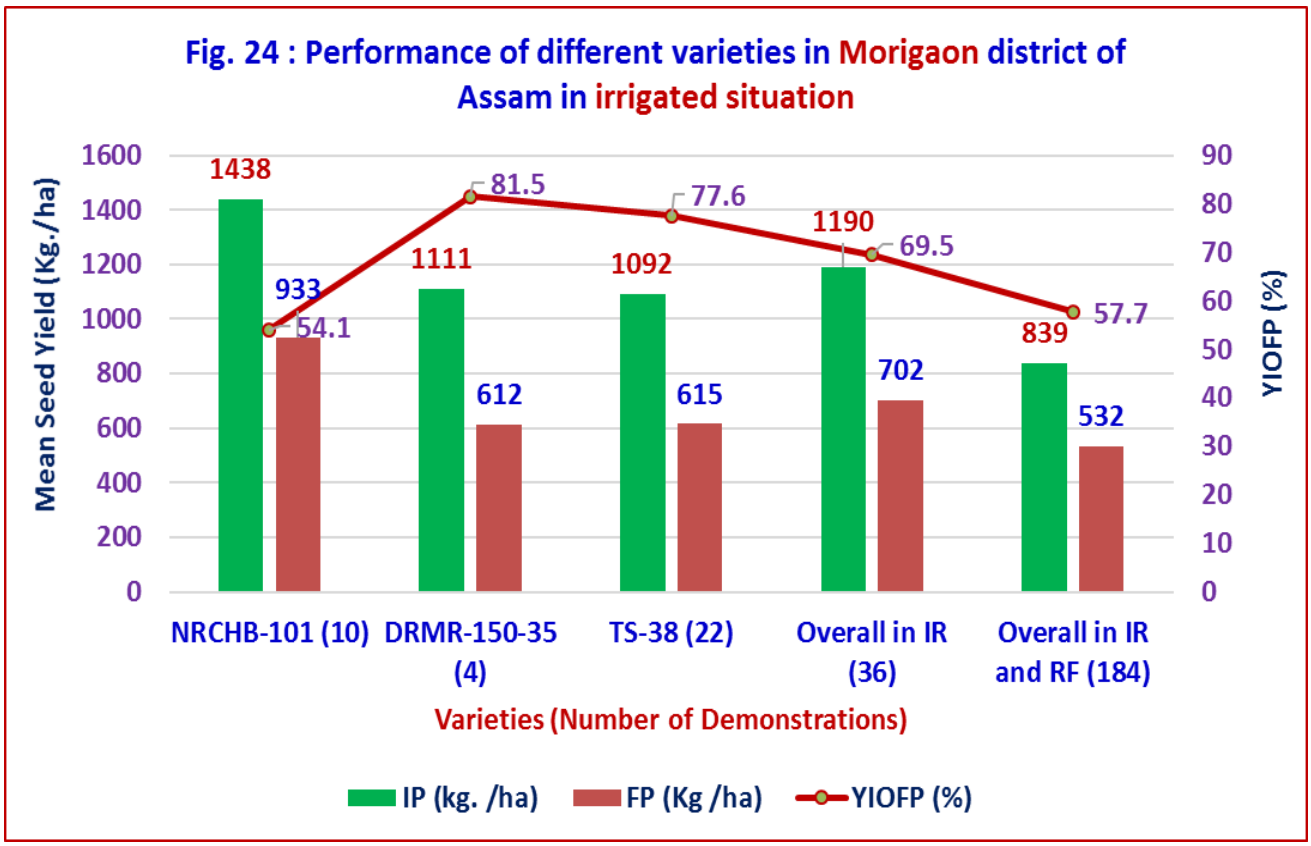
The demonstrated improved technologies (IP) in 184 successful crop demonstrations gave an average seed yield of 839 kg/ha against 532 kg/ha in FP with a yield improvement of 57.7% (Table 7).The cost of cultivation of Rs. 24146/ha in IP against the Rs. 21161/ha in FP was recorded that fetched GMR of Rs. 54535 /ha in IP against the Rs. 34580/ha in FP. An ANMR of Rs. 16970/ha was realized against the additional cost of Rs. 2985/ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.26) than that of FP (1.63) clearly indicates that demonstrated technologies in Morigaon district was economically viable and profitable.

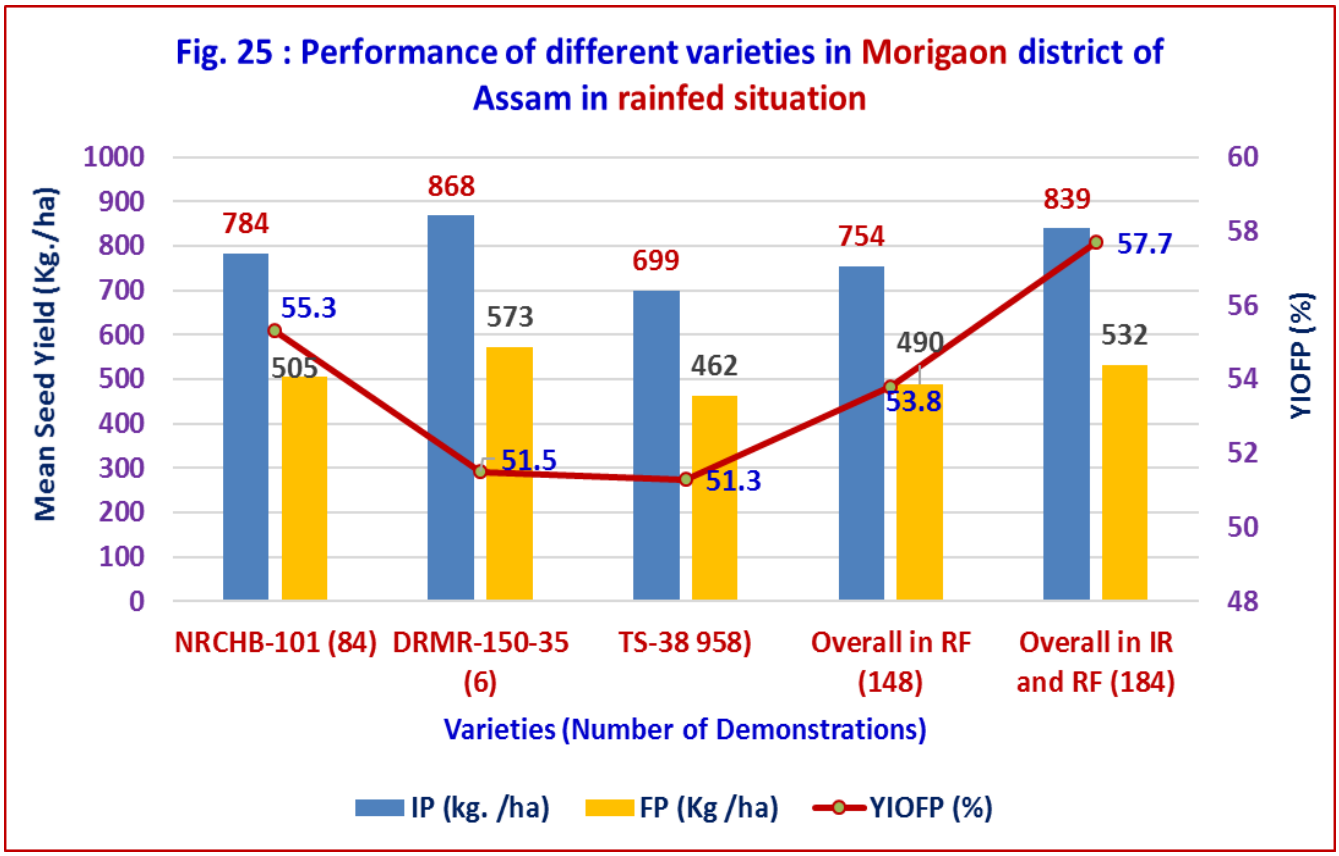
Under irrigated condition, the overall performance of demonstrated technologies in 36 successful crop demonstrations with three varieties (NRCHB-101, DRMR-150-35 and TS-38) recorded an average seed yield of 1190 kg/ha against 702 kg/ha in FP with a yield improvement of 69.5 % (Table 8). The cost of cultivation of Rs. 27368/ha in IP against the Rs. 23100/ha in FP was recorded that fetched GMR of Rs. 77350 /ha in IP against the Rs. 45630/ha in FP. An ANMR of Rs. 27452/ha was realized against the additional cost of Rs. 4268/ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.83) than that of FP (1.98).

The variety-wise analysis under irrigated condition (Fig. 24) shows that IP demonstrations with NRCHB-101 (10 CD) recorded highest average seed yield of 1438 kg/ha against 933 kg/ha in FP with a yield improvement of 54.1 % against the additional cost of cultivation of Rs. 3912/ha, while demonstrations with DRMR-150-35 (4 CD) had an average seed yield of 1111 kg/ha against 612 kg/ha in FP with highest yield improvement of 81.5%. The IP demonstrations with TS-38 (22 CD) had an average seed yield of 1092 kg/ha against 615 kg/ha in FP with a yield improvement of 77.6 %. The maximum ANMR (Rs. 28913 /ha) was reported from NRCHB-101 variety, while minimum (Rs. 27541 /ha) from DRMR-150-35. The cost of cultivation in IP ranged from Rs. 26553/ha with TS-38 to Rs. 29274/ha with NRCHB-101, while in FP it ranged from Rs. 23357 /ha with TS-38 to Rs. 25362/ha with NRCHB-101. All demonstrated varieties had higher B:C ratio than that of FP.

Under rainfed condition, the overall performance of demonstrated technologies in 148 successful crop demonstrations with three varieties (NRCHB-101, DRMR-150-35 and TS-38) recorded average seed yield of 754 kg/ha against 490kg/ha in FP with yield improvement of 53.8% (Table 9). The cost of cultivation of Rs. 23208/ha in IP against the Rs. 20606/ha in FP was recorded that fetched GMR of Rs. 49010/ha in IP against the Rs. 31850/ha in FP. An ANMR of Rs. 14558 /ha was realized against the additional cost of Rs. 2602/ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.11) than that of FP (1.54).

The variety-wise analysis under rainfed condition (Fig. 25) shows that IP demonstrations with NRCHB-101 (84 CD) recorded highest average seed yield of 784 kg/ha against 505 kg/ha in FP with highest yield improvement of 55.3% against the additional cost of cultivation of Rs. 2728/ha, while demonstrations with DRMR-150-35 (6 CD) recorded an average seed yield of 868 kg/ha against 573 kg/ha in FP with a yield improvement of 51.5%. The IP demonstrations with TS-38 (58 CD) had an average seed yield of 699 kg/ha against 462 kg/ha in FP with a yield improvement of 51.3 %. The maximum ANMR (Rs. 16408/ha) from DRMR-150-35 variety, while minimum (Rs. 12822/ha) from TS-38 was reported. The cost of cultivation in IP ranged from Rs. 22796 /ha with TS-38 to Rs. 24084/ha with DRMR-150-35, while in FP it ranged from Rs. 20213 /ha with TS-38 to Rs. 21317/ha with DRMR-150-35. All demonstrated varieties had higher B:C ratio than that of FP.





2.1.14. Performance of crop demonstrations in Nagaon district of Assam during 2021-22.

In Nagaon, 400 crop demonstrations (CD) were conducted in 41 villages of four clusters viz. Raha (90 CD), Khagorijan (90 CD), Koliabor (105 CD) and Batadraba (115 CD) with NRCHB-101 (150 CD), PM-28 (100 CD), DRMR-150-35 (20 CD) varieties of Indian mustard and TS-38 (130 CD) variety of toria under irrigated (114 CD) and rainfed (284 CD) conditions (Table 5 and 6). Out of 400 crop demonstrations, 2 demonstrations with DRMR-150-35 were failed due to cattle grazing.

The prevailing cropping patterns were sali/winter rice-toria-boro rice, sali /winter rice-toria/mustard- vegetables, sali/winter rice (Mono-cropping)-Fallow, sali/winter rice- toria/mustard-jute. The sowing time spread from second fortnight of November to first fortnight of December 2021 and harvesting period spread from second fortnight of February - second fortnight of March 2022. The infestation of mustard sawfly, mustard aphid, rhizoctonia root rot, alternaria leaf spot, downy mildew was observed in Nagaon.

The demonstrated improved technologies (IP) in successful 398 demonstrations gave an average seed yield of 1043 kg/ha against 735 kg/ha in FP with a yield improvement of 41.9% (Table 7). The cost of cultivation of Rs. 23934/ha in IP against the Rs. 20214/ha in FP was recorded that fetched Rs. 67795 /ha in IP against the Rs. 47775/ha in FP. An ANMR of Rs. 16300 /ha was realized against the additional cost of Rs. 3720 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.83) than that of FP (2.36) clearly indicates that demonstrated technologies in Nagaon district was economically viable and profitable.

Under irrigated condition, the overall performance of demonstrated technologies in 114 demonstrations with all four varieties recorded an average seed yield of 1324 kg/ha against 866 kg/ha in FP with a yield improvement of 52.9% (Table 8). The cost of cultivation of Rs. 27665/ha in IP against the Rs. 23349/ha in FP was recorded that fetched Rs. 86066 /ha in IP against the Rs. 56290/ha in FP. An ANMR of Rs. 25460 /ha was realized against the additional cost of Rs. 4316 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (3.11) than that of FP (2.41).

The variety-wise analysis under irrigated condition (Fig. 26) shows that IP demonstrations with DRMR-150-35 (5 CD) recorded highest average seed yield of 1476 kg/ha against 918 kg/ha in FP with a yield improvement of 60.8% against the additional cost of cultivation of Rs. 6067/ha, while demonstrations with PM-28 (53 CD) had an average seed yield of 1467 kg/ha against 875 kg/ha in FP with highest yield improvement of 67.7%.The IP demonstrations with NRCHB-101 (18 CD) recorded an average seed yield of 1174 kg/ha against 867 kg/ha in FP with a yield improvement of 35.4%. The IP demonstrations with TS-38 (38 CD) had an average seed yield of 1177 kg/ha against 848 kg/ha in FP with a yield improvement of 38.8%. The maximum ANMR (Rs. 33763 /ha) was reported from PM-28 variety, while minimum (Rs. 15555 /ha) from NRCHB-101. The cost of cultivation in IP ranged from Rs. 25566 /ha with TS-38 to Rs. 29775/ha with DRMR-150-35, while in FP it ranged from Rs. 22080 /ha with TS-38 to Rs. 24904/ha with NRCHB-101. All demonstrated varieties had higher B:C ratio than that of FP.

Under rainfed condition, the overall performance of demonstrated technologies in 284 demonstrations with all four varieties recorded an average seed yield of 931 kg/ha against 683 kg/ha in FP with a yield improvement of 36.3% (Table 9). The cost of cultivation of Rs. 22436/ha in IP against the Rs. 18955/ha in FP was recorded that fetched Rs. 60515 /ha in IP against the Rs. 44395/ha in FP. An ANMR of Rs. 16120 /ha was realized against the additional cost of Rs. 3481 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.69) than that of FP (2.34).

The variety-wise analysis under rainfed condition (Fig. 27) shows that IP demonstrations with PM-28 (47 CD) recorded highest average seed yield of 1034 kg/ha against 717 kg/ha in FP with highest yield improvement of 44.2% against the additional cost of cultivation of Rs. 3803/ha, while demonstrations with NRCHB-101 (132 CD) recorded an average seed yield of 864 kg/ha against 645 kg/ha in FP with a yield improvement of 33.9%. The IP demonstrations with DRMR-150-35 (13 CD) had an average seed yield of 819 kg/ha against 611 kg/ha in FP with a yield improvement of 34.0%. The IP demonstrations with TS-38 (92 CD) had an average seed yield of 991kg/ha against 729 kg/ha in FP with a yield improvement of 35.9%. The maximum ANMR (Rs. 16802 /ha) from PM-28 variety, while minimum (Rs. 10081 /ha) from DRMR-150-35 was reported. The cost of cultivation in IP ranged from Rs. 20534 /ha with TS-38 to Rs. 23729/ha with PM-28, while in FP it ranged from Rs. 17734 /ha with TS-38 to Rs. 19926/ha with PM-28. All demonstrated varieties had higher B:C ratio than that of FP.

Fig. 26: Performance of different varieties in Nagaon district of Assam in irrigated situation

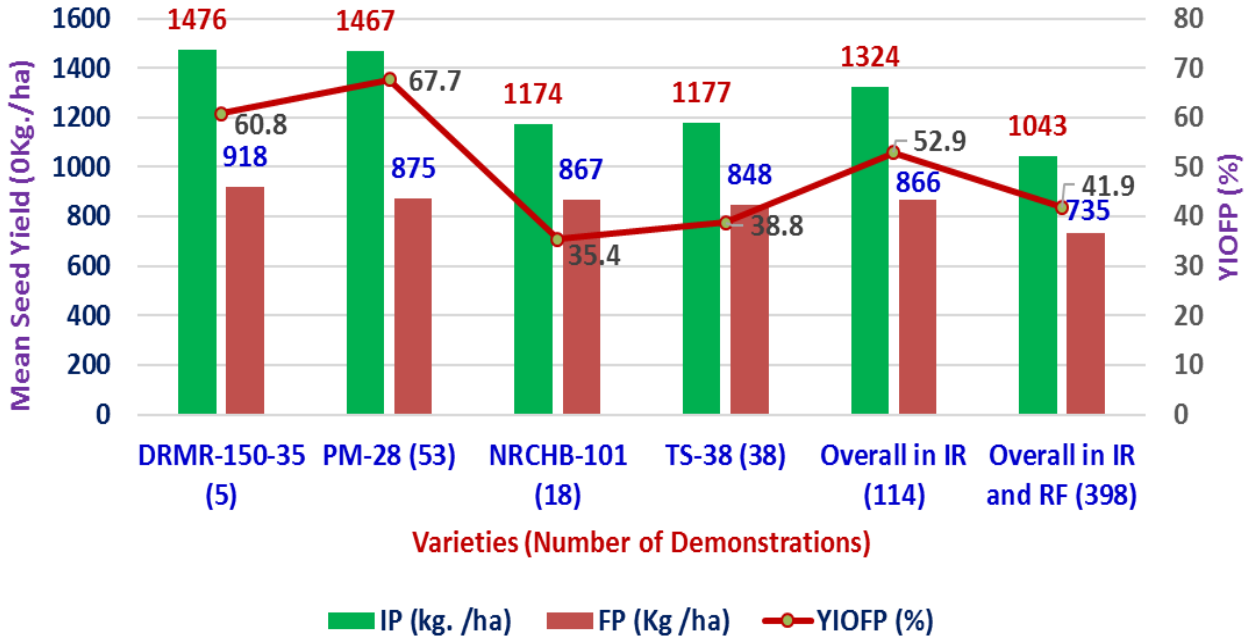
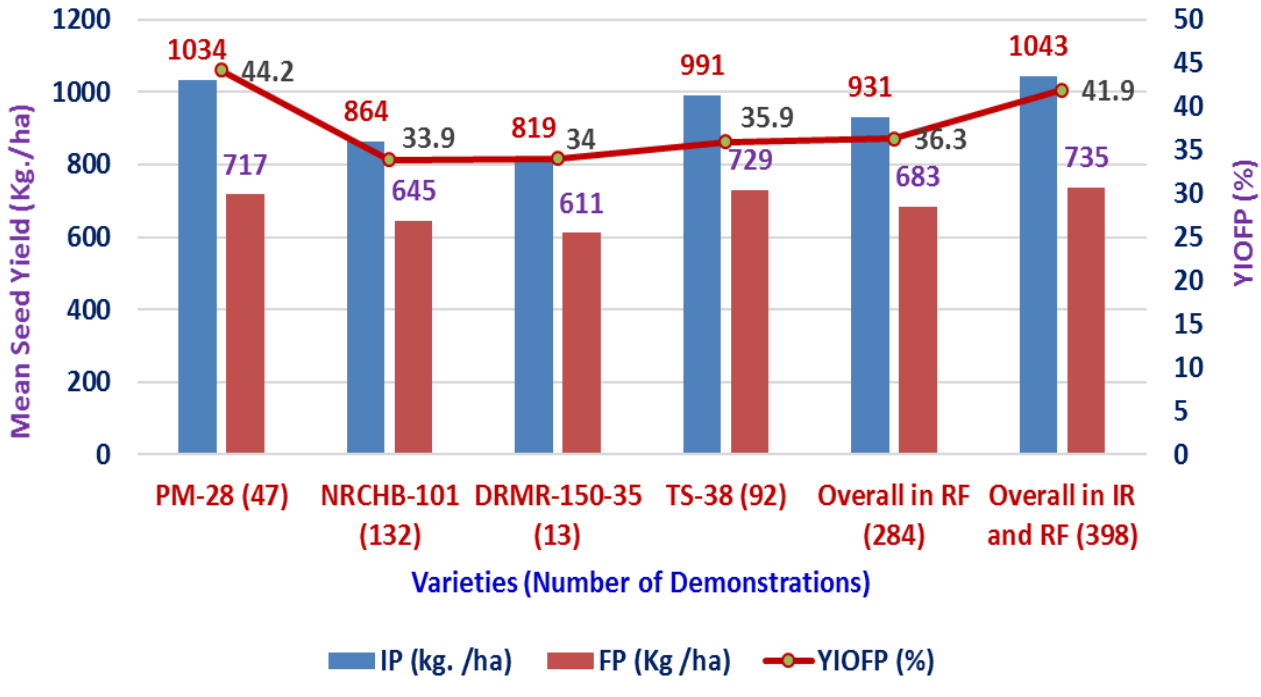


Fig. 27: Performance of different varieties in Nagaon district of Assam in rainfed situation



2.1.15. Performance of crop demonstrations in Nalbari district of Assam during 2021-22.

In Nalbari, 200 crop demonstrations (CD) were conducted in 37 villages of two clusters viz. Borigog-Banbhag (100 CD) and Barkhetri (100 CD) with NRCHB-101 (70 CD), PM-28 (60 CD), DRMR-150-35 (20 CD) varieties of Indian mustard and TS-38 (50 CD) variety of toria under irrigated (90 CD) and rainfed (110 CD) conditions (Table 5 and 6). Out of 200 crop demonstrations, 25 crop demonstrations (20 of DRMR-150-35 and 5 of NRCHB-101) had failed because of poor germination which occurs due to poor land preparation, late sowing of the crop and also due to lack of moisture in the field.

The prevailing cropping pattern was sali paddy-mustard/ rabi vegetables, jute-mustard-summer paddy and sali paddy-mustard-summer paddy. The sowing time spread from November 7, 2021 to December 17, 2021 and harvesting period spread from February 15, 2022 to April 6, 2022. There was no severe infestation of pest and diseases. Minor infestation of mustard aphid and sawfly was observed in some fields.

The demonstrated improved technologies (IP) in successful 175 crop demonstrations gave an average seed yield of 1046 kg/ha against 764 kg/ha in FP with a yield improvement of 36.9% (Table 7). The cost of cultivation of Rs. 28681/ha in IP against the Rs. 23754/ha in FP was recorded that fetched GMR of Rs. 67990 /ha in IP against the Rs. 49660/ha in FP. An ANMR of Rs. 13403 /ha was realized against the additional cost of Rs. 4927 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.37) than that of FP (2.09) clearly indicates that demonstrated technologies in Nalbari district was economically viable and profitable.

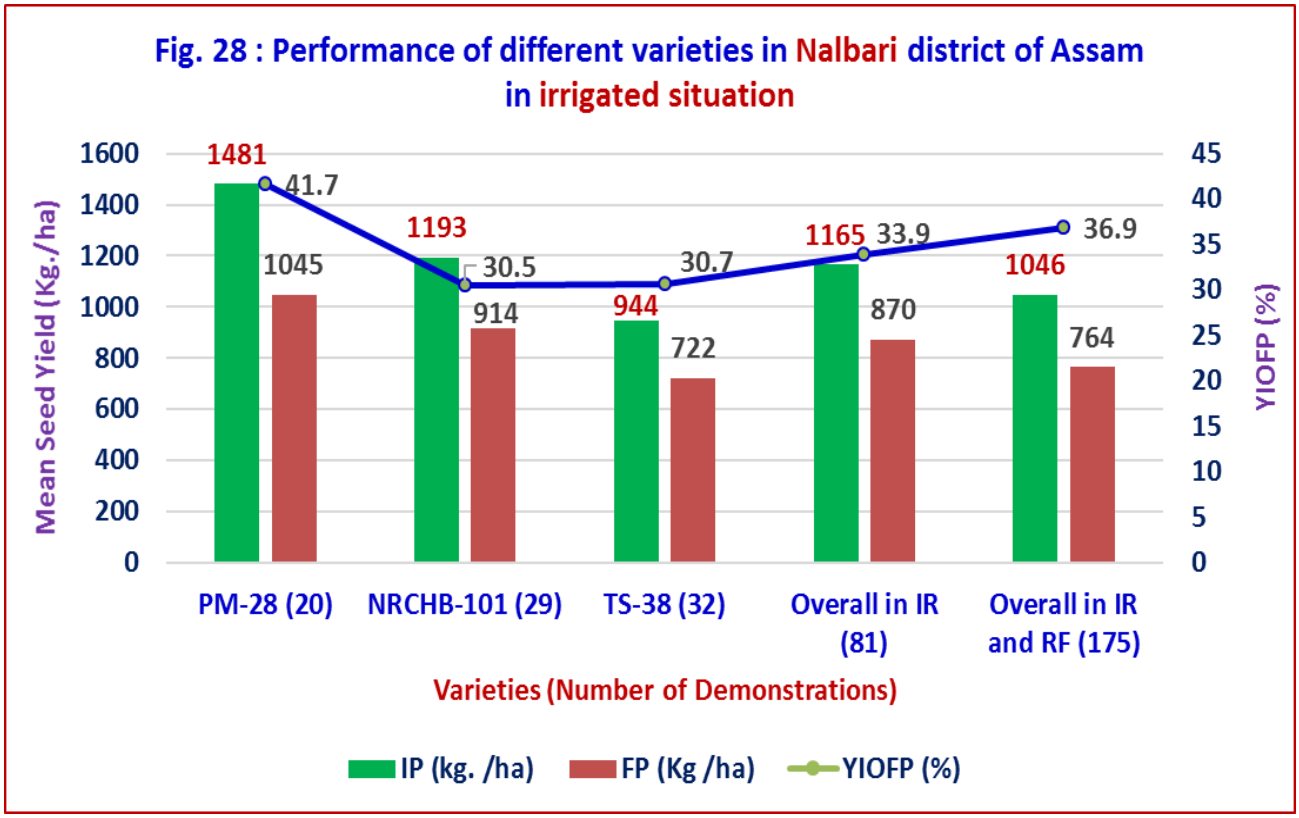
Under irrigated condition, the overall performance of demonstrated technologies in 81 demonstrations with three varieties (NRCHB-101, PM-28 and TS-38) recorded an average seed yield of 1165 kg/ha against 870 kg/ha in FP with a yield improvement of 33.9% (Table 8). The cost of cultivation of Rs. 30483/ha in IP against the Rs. 24666/ha in FP was recorded that fetched GMR of Rs. 75725 /ha in IP against the Rs. 56550/ha in FP. An ANMR of Rs. 13358 /ha was realized against the additional cost of Rs. 5817 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.48) than that of FP (2.29).

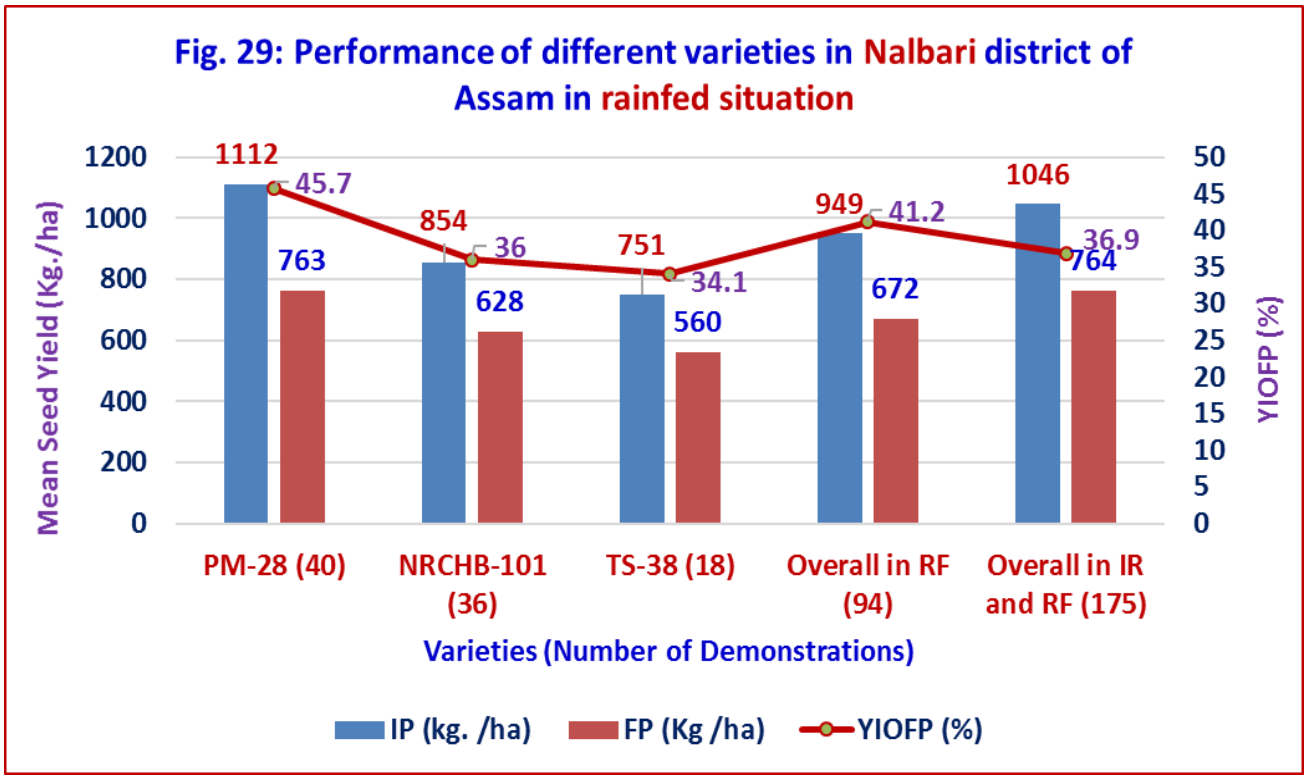
The variety-wise analysis under irrigated condition (Fig. 28) shows that IP demonstrations with PM-28 (20 CD) recorded highest average seed yield of 1481 kg/ha against 1045 kg/ha in FP with highest yield improvement of 41.7% against the additional cost of cultivation of Rs. 7020/ha, while demonstrations with NRCHB-101 (29 CD) had an average seed yield of 1193 kg/ha against 914 kg/ha in FP with a yield improvement of 30.5%. The IP demonstrations with TS-38 (32 CD) had an average seed yield of 944 kg/ha against 722 kg/ha in FP with a yield improvement of 30.7%. The maximum ANMR (Rs. 24052 /ha) was reported from NRCHB-101 variety, while minimum (Rs. 9456 /ha) from TS-38. The cost of cultivation in IP ranged from Rs. 29632 /ha with TS-38 to Rs. 32594/ha with PM-28, while in FP it ranged from Rs. 24050 /ha with NRCHB-101 to Rs. 25574/ha with PM-28. All demonstrated varieties had higher B:C ratio than that of FP.

Under rainfed condition, the overall performance of demonstrated technologies in 94 demonstrations with all three varieties recorded an average seed yield of 949 kg/ha against 672kg/ha in FP with a yield improvement of 41.2% (Table 9). The cost of cultivation of Rs. 27128/ha in IP against the Rs. 22968/ha in FP was recorded that fetched GMR of Rs. 61685 /ha in IP against the Rs. 43680/ha in FP. An ANMR of Rs. 13845 /ha was realized against the additional cost of Rs.

4160 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.27) than that of FP (1.90).

The variety-wise analysis under rainfed condition (Fig. 29)–shows that IP demonstrations with PM-28 (40 CD) recorded highest average seed yield of 1112 kg/ha against 763 kg/ha in FP with highest yield improvement of 45.7% against the additional cost of cultivation of Rs. 4185/ha, The IP demonstrations with NRCHB-101 (36 CD) had an average seed yield of 854 kg/ha against 628 kg/ha in FP with a yield improvement of 36.0%. The IP demonstrations with TS-38 (18 CD) had an average seed yield of 751 kg/ha against 560 kg/ha in FP with a yield improvement of 34.1%. The maximum ANMR (Rs. 18500 /ha) from PM-28 variety, while minimum (Rs. 8207 /ha) from TS-38 was reported. The cost of cultivation in IP ranged from Rs. 26645 /ha with NRCHB-101 to Rs. 27724/ha with PM-28, while in FP it ranged from Rs. 22537 /ha with NRCHB-101 to Rs. 23539/ha with PM-28. All demonstrated varieties had higher B:C ratio than that of FP.





2.1.16. Performance of crop demonstrations in Sivasagar district of Assam during 2021-22.

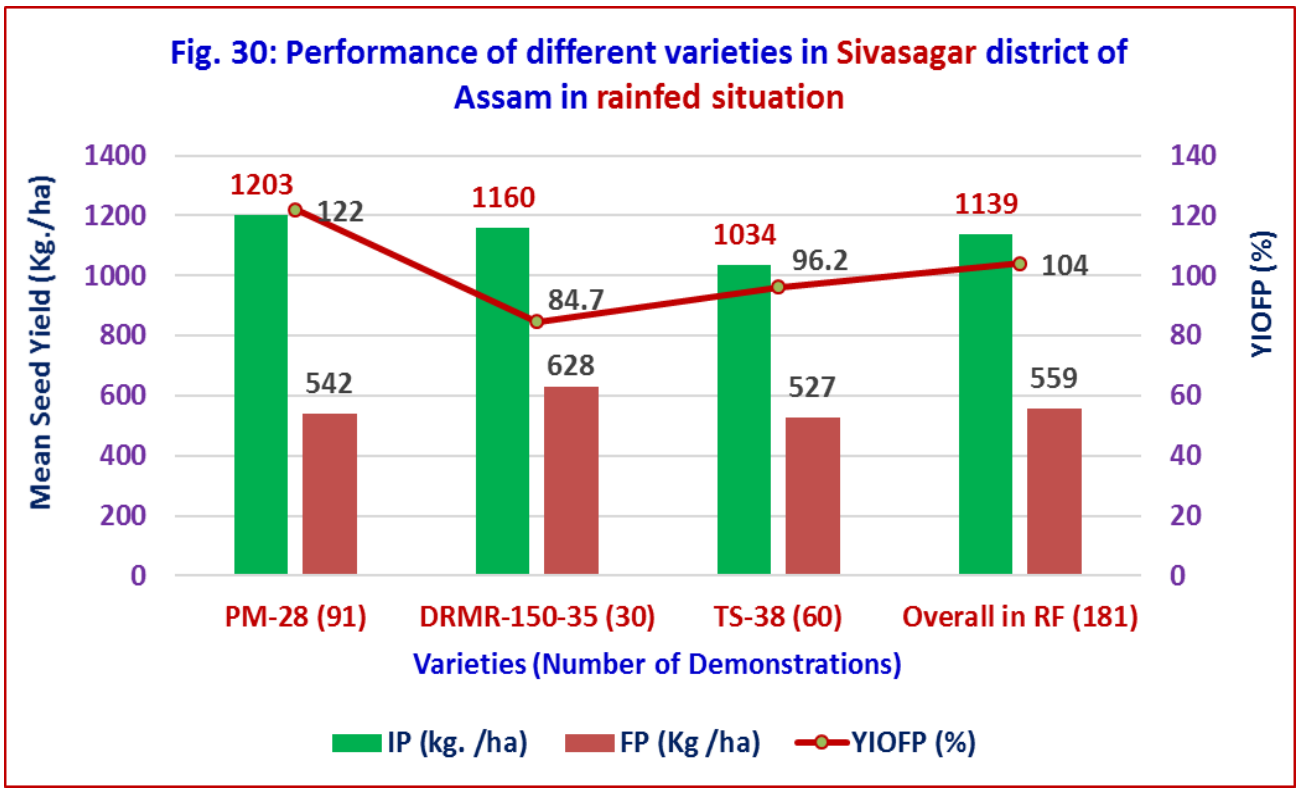
In Sivasagar, 200 crop demonstrations (CD) were conducted in 26 villages of two clusters viz. Demow (130 CD) and Gaurisagar (70 CD) with PM-28 (100 CD), DRMR-150-35 (30 CD) varieties of Indian mustard and TS-38 (70 CD) variety of toria only under rainfed condition. Out of 200 crop demonstrations, 19 crop demonstrations (9 of PM-28 and 10 of TS-38) had failed due to cattle grazing in some demonstrations. There was good growth and proper germination, but drought like conditions arose in the field later on and no irrigation was applied (Table 5 and 6).

The prevailing cropping pattern rice-fallow-rice and fallow-mustard-fallow. The sowing time spread from first week to last week of November 2021 and harvesting period spread from second week of February to third week of March 25, 2022. There was no severe infestation of pest and diseases. Some mild infestation of mustard sawfly, mustard aphid, and Sclerotinia Rot were was observed.

Under rainfed condition, the demonstrated improved technologies (IP) in 181 successful demonstrations gave an average seed yield of 1139 kg/ha against 559 kg/ha in FP with a yield improvement of 104.0% (Table 9). The cost of cultivation of Rs. 30472/ha in IP against the Rs. 22609/ha in FP was recorded that fetched GMR of Rs. 74035/ha in IP against the Rs. 36335/ha in FP. An ANMR of Rs. 29837 /ha was realized against the additional cost of Rs. 7863 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.42) than that of FP (1.60) clearly

indicates that demonstrated technologies in Sivasagar district was economically viable and profitable.

The variety-wise analysis under rainfed condition (Fig. 30)–shows that IP demonstrations with PM-28 (91 CD) recorded highest average seed yield of 1203 kg/ha against 542 kg/ha in FP with highest yield improvement of 122.0% against the additional cost of cultivation of Rs. 9559/ha, while demonstrations with DRMR-150-35 (30 CD) recorded an average seed yield of 1160 kg/ha against 628 kg/ha in FP with a yield improvement of 84.7%. The IP demonstrations with TS-38 (60 CD) had an average seed yield of 1034 kg/ha against 527 kg/ha in FP with a yield improvement of 96.2%. The maximum ANMR (Rs. 33406/ha) from PM-28 variety, while minimum (Rs. 26125 /ha) from DRMR-150-35 was reported. The cost of cultivation in IP ranged from Rs. 27125/ha with TS-38 to Rs. 32382/ha with PM-28, while in FP it ranged from Rs. 22131 /ha with DRMR-150-35 to Rs. 22823/ha with PM-28. All demonstrated varieties had higher B:C ratio than that of FP.



2.1.17. Performance of crop demonstrations in Sonitpur district of Assam during 2021-22.

In Sonitpur, 500 crop demonstrations (CD) were conducted in 29 villages of seven clusters viz. Dhekiajuli (79 CD), Bihaguri (79 CD), Gabharu (79 CD), Balipara (75 CD), Chaiduar (64 CD), Rangapara (60 CD) and Biswanath (640 CD) with NRCHB-101 (200 CD), PM-28 (200 CD), DRMR-150-35 (30 CD) varieties of Indian mustard and TS-38 (70 CD) variety of toria under irrigated (80 CD) and rainfed (420 CD) conditions (Table 5 and 6).

The prevailing cropping pattern was rice–mustard–pumpkin/rabi vegetables and rice-mustard-maize. The sowing time spread from November 5, 2021 to December 5, 2021 and harvesting period spread from first week of March 2022 to first week of April 2022. The infestation of

mustard sawfly and bihar hairy caterpillar at vegetative growth and mustard aphid at flowering stage was observed.

The demonstrated improved technologies (IP) in 500 demonstrations gave an average seed yield of 1167 kg/ha against 532 kg/ha in FP with a yield improvement of 119% (Table 7). The cost of cultivation of Rs. 26115/ha in IP against the Rs. 21439/ha in FP was recorded that fetched GMR of Rs. 75855 /ha in IP against the Rs. 34580/ha in FP. An ANMR of Rs. 36599 /ha was realized against the additional cost of Rs. 4676 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.90) than that of FP (1.61) clearly indicates that demonstrated technologies in Sonitpur district was economically viable and profitable.

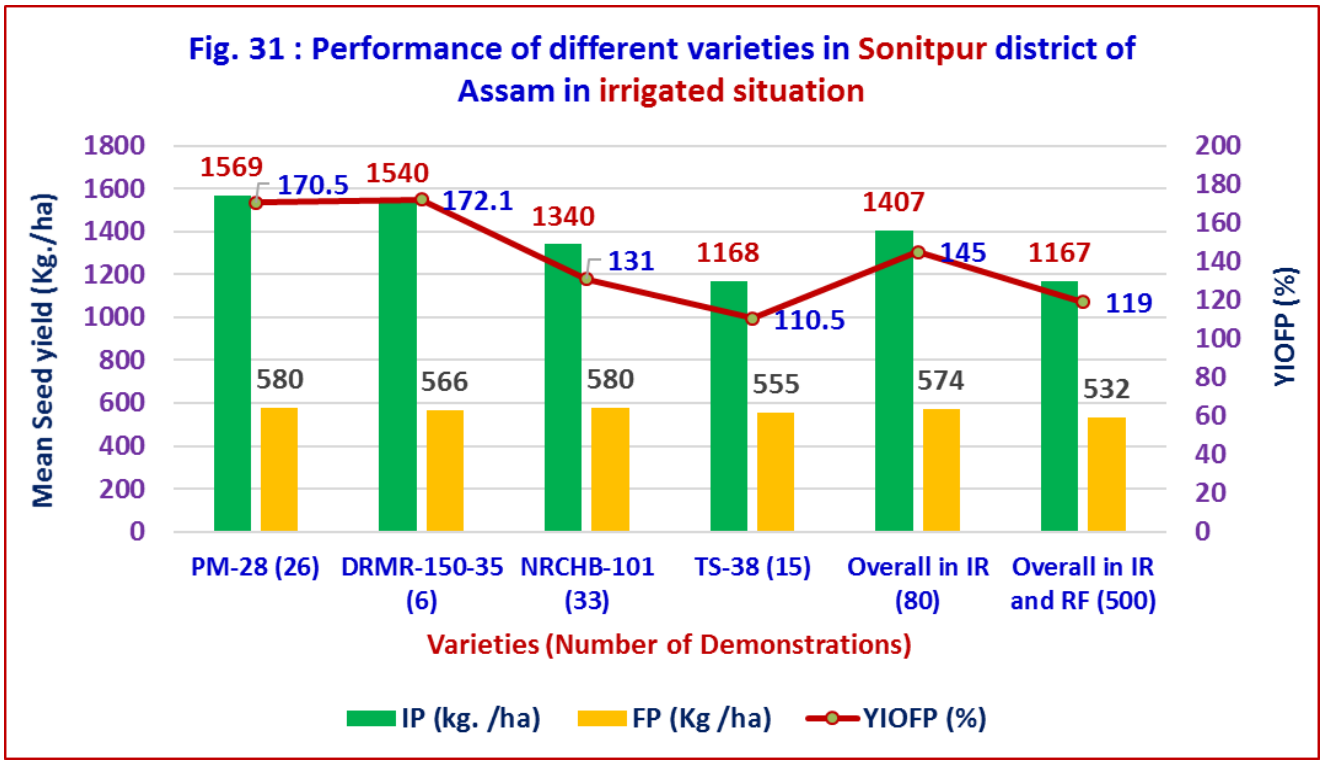
Under irrigated condition, the overall performance of demonstrated technologies in 80 demonstrations with all four varieties recorded an average seed yield of 1407 kg/ha against 574 kg/ha in FP with a yield improvement of 145.0% (Table 8). The cost of cultivation of Rs. 28088/ha in IP against the Rs. 22407/ha in FP was recorded that fetched GMR of Rs. 91455 /ha in IP against the Rs. 37310/ha in FP. An ANMR of Rs. 48464 /ha was realized against the additional cost of Rs. 5681 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (3.25) than that of FP (1.66).

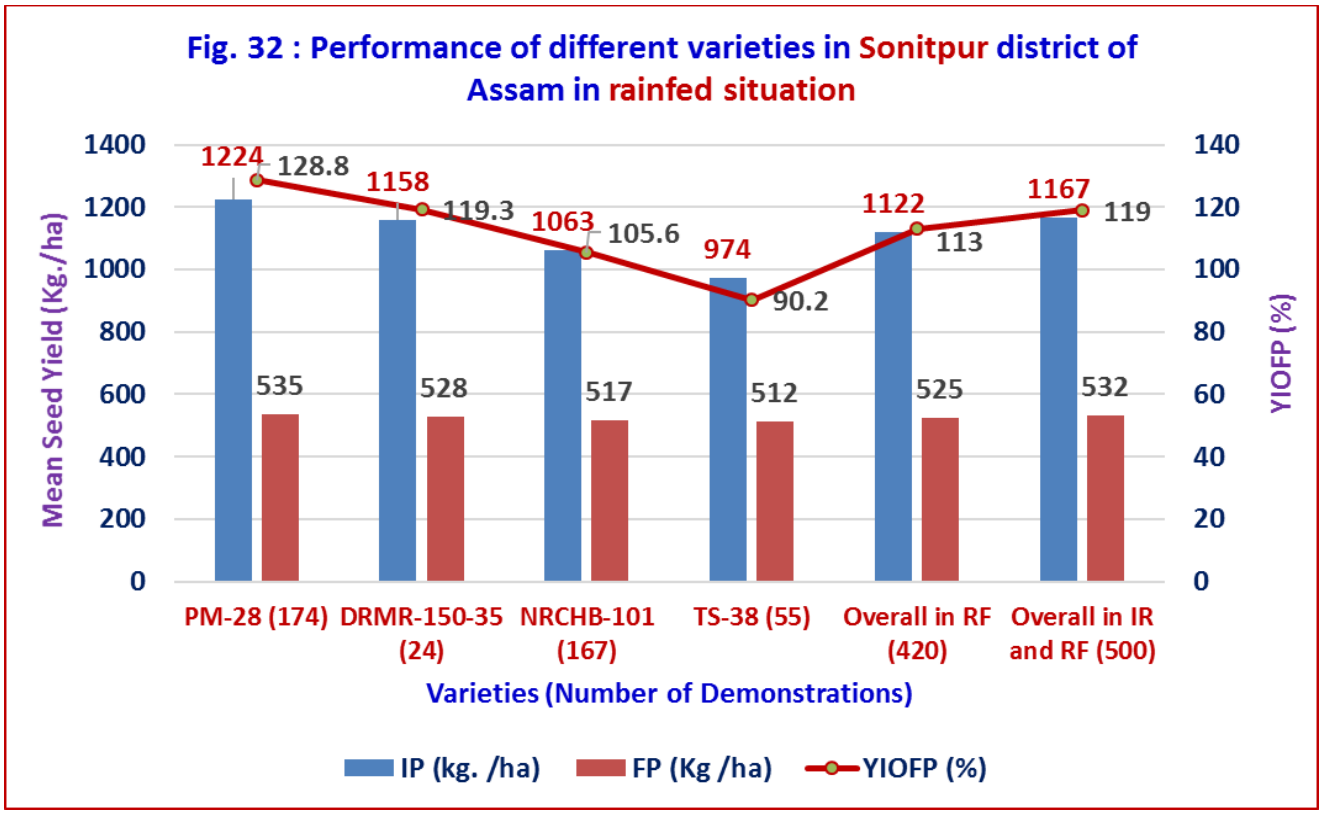
The variety-wise analysis under irrigated condition (Fig. 31) shows that IP demonstrations with PM-28 (26 CD) recorded highest average seed yield of 1569 kg/ha against 580 kg/ha in FP with a yield improvement of 170.5% against the additional cost of cultivation of Rs. 5829/ha, while demonstrations with DRMR-150-35 (6 CD) had an average seed yield of 1540 kg/ha against 566 kg/ha in FP with highest yield improvement of 172.1%.The IP demonstrations with NRCHB-101 (33 CD) recorded an average seed yield of 1340 kg/ha against 580 kg/ha in FP with a yield improvement of 131.0%. The IP demonstrations with TS-38 (15 CD) had an average seed yield of 1168 kg/ha against 555 kg/ha in FP with a yield improvement of 110.5%. The maximum ANMR (Rs. 58456 /ha) was reported from PM-28 variety, while minimum (Rs. 34037 /ha) from TS-38. The cost of cultivation in IP ranged from Rs. 28210 /ha with TS-38 to Rs. 28320/ha with DRMR-150-35, while in FP it ranged from Rs. 22402 /ha with TS-38 to Rs. 22418/ha with PM-28. All demonstrated varieties had higher B:C ratio than that of FP.

Under rainfed condition, the overall performance of demonstrated technologies in 420 demonstrations with all four varieties recorded an average seed yield of 1122 kg/ha against 525 kg/ha in FP with a yield improvement of 113.0% (Table 9). The cost of cultivation of Rs. 25714/ha in IP against the Rs. 21257/ha in FP was recorded that fetched GMR of Rs. 72930 /ha in IP against the Rs. 34125/ha in FP. An ANMR of Rs. 34348 /ha was realized against the additional cost of Rs. 4457 /ha incurred due to demonstrated technology and the higher B:C ratio of IP (2.83) than that of FP (1.60).

The variety-wise analysis under rainfed condition (Fig. 32) shows that IP demonstrations with PM-28 (174 CD) recorded highest average seed yield of 1224 kg/ha against 535 kg/ha in FP with highest yield improvement of 128.8% against the additional cost of cultivation of Rs. 4515/ha, while demonstrations with DRMR-150-35 (24 CD) recorded an average seed yield of 1158 kg/ha against 528 kg/ha in FP with a yield improvement of 119.3%. The IP demonstrations with NRCHB-101 (167 CD) had an average seed yield of 1063 kg/ha against 517kg/ha in FP with a yield improvement of 105.6%. The IP demonstrations with TS-38 (55 CD) had an average seed yield of 974 kg/ha against 512 kg/ha in FP with a yield improvement of 90.2%. The maximum ANMR (Rs.

40270 /ha) from PM-28 variety, while minimum (Rs. 25592 /ha) from TS-38 was reported. The cost of cultivation in IP ranged from Rs. 25694 /ha with NRCHB-101 to Rs. 25858/ha with DRMR-150-35, while in FP it ranged from Rs. 21180 /ha with PM-28 to Rs. 21449/ha with DRMR-150-35. All demonstrated varieties had higher B:C ratio than that of FP.





2.1.18. Comparison of the performance of improved varieties in different districts.

A total of 3 improved varieties of Indian mustard namely, NRCHB101, PM-28 and DRMR-150-35 of Indian mustard and one of toria namely, TS-38 were used in crop demonstrations conducted in 581villages covering 58 clusters of fifteen districts of Assam under irrigated and rainfed condition.

Under irrigated situation, the improved variety PM-28 (Fig.33) recorded an overall average yield of 1375 kg./ha with yield improvement of 53.6% over local practice, demonstrated in 346 crop demonstrations in nine districts viz. Barpeta (12), Bongaigaon (13), Darrang (22), Dhubri (130), Kamrup (47), Kokrajhar (23), Nagaon (53), Nalbari (20) and Sonitpur (26). The district wise analyses shows that PM-28 variety in IP recorded highest average yield of 1569 kg/ha with a yield improvement of 170.5% over local (FP) practice in 26 demonstrations in Sonitpur followed by average seed yield of 1517 kg/ha with a yield improvement of 88.7% in 12 demonstrations in Barpeta. The minimum average yield of 1078 kg/ha was recorded in 13 demonstrations in Bongaigaon.

Under rainfed situation, the improved variety PM-28 (Fig.34) recorded an overall average yield of 1085 kg./ha with yield improvement of 66.2% over local practice, demonstrated in 1194 crop demonstrations in thirteen districts viz. . Barpeta (84), Bongaigaon (127), Darrang (38), Dhemaji (97), Golaghat (76), Jorhat (94), Kamrup (49), Kokrajhar (77), Lakhimpur (200), Nagaon (46), Nalbari (40), Sivsagar (91) and Sonitpur (174). The district wise analyses shows that PM-28 variety in IP recorded highest average yield of 1224 kg/ha with a yield improvement of 128.8% over local (FP) practice in 174 demonstrations in Sonitpur followed by average seed yield of 1217 kg/ha with a yield improvement of 37.5% in 94 demonstrations in Jorhat. The minimum average yield of 781 kg/ha was recorded in 49 demonstrations in Kamrup.

Under irrigated situation, the improved variety DRMR 150-35 (Fig.35) recorded an overall average yield of 1420 kg./ha with yield improvement of 69.0 % over local practice, demonstrated in 82 crop demonstrations in seven districts viz. Bongaigaon (3), Dhubri (20), Kamrup (30), Kokrajhar (14), Morigaon (4), Nagaon (5), and Sonitpur (6). The district wise analyses shows that DRMR-150-35 variety in IP recorded highest average yield of 1605 kg/ha with a yield improvement of 74.1 % over local (FP) practice in 30 demonstrations in Kamrup followed by average seed yield of 1540 kg/ha with a yield improvement of 172.1% in 6 demonstrations in Sonitpur. The minimum average yield of 1010 kg/ha was recorded in 3 demonstrations in Bongaigaon.

Under rainfed situation, the improved variety DRMR 150-35 (Fig. 36) recorded an overall average yield of 977 kg./ha with yield improvement of 58.1% over local practice, demonstrated in 223 crop demonstrations in twelve districts viz. Barpeta (10), Bongaigaon (17), Darrang (20), Dhemaji (20), Golaghat (28), Jorhat (29), Kokrajhar (6), Lakhimpur (20), Morigaon (6), Nagaon (13), Sivsagar (30) and Sonitpur (24). The district wise analyses shows that DRMR 150-35 variety in IP recorded highest average yield of 1160 kg/ha with a yield improvement of 84.7 % over local (FP) practice in 30 demonstrations in Sivasagar followed by average seed yield of 1158 kg/ha with a yield improvement of 119.3% in 24 demonstrations in Sonitpur. The minimum average yield of 752 kg/ha was recorded in 17 demonstrations in Bongaigaon.

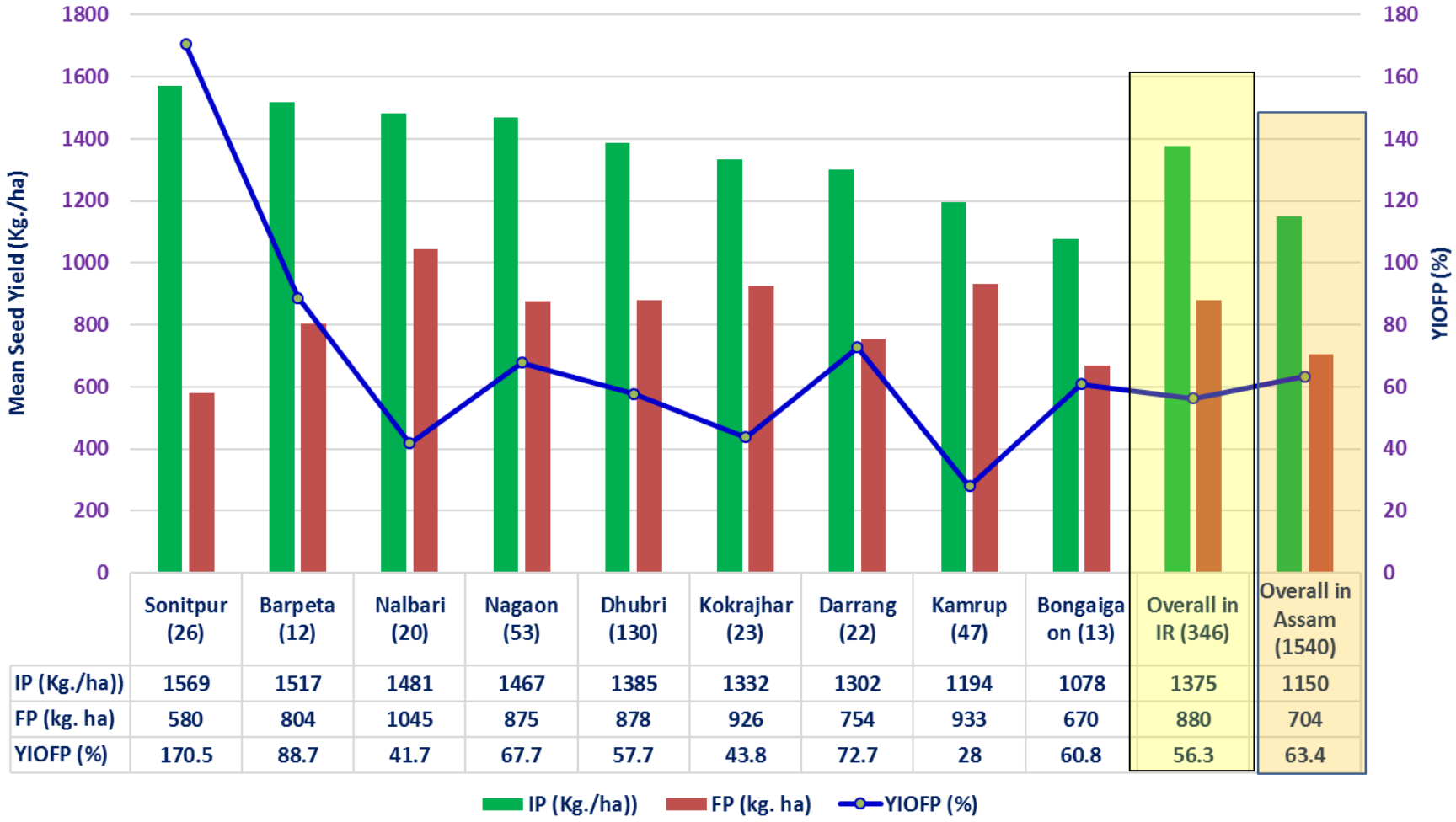
Under irrigated situation, the improved variety NRCHB-101 (Fig.37) recorded an overall average yield of 1370 kg./ha with yield improvement of 63.7% over local practice, demonstrated in 427 crop demonstrations in ten districts viz. Barpeta (8), Bongaigaon (5), Darrang (45), Dhubri (170), Kamrup (81), Kokrajhar (28), Morigaon (10), Nagaon (18), Nalbari (29) and Sonitpur (33). The district wise analyses shows that NRCHB-101 variety in IP recorded highest average yield of 1514 kg/ha with a yield improvement of 64.6% over local (FP) practice in 170 demonstrations in Dhubri followed by average seed yield of 1491 kg/ha with a yield improvement of 99% in 8 demonstrations in Barpeta. The minimum average yield of 1154 kg/ha was recorded in 5 demonstrations in Bongaigaon.

Under rainfed situation, the improved variety NRCHB-101 (Fig.38) recorded an overall average yield of 964 kg./ha with yield improvement of 57.3% over local practice, demonstrated in 1152 crop demonstrations in eleveen districts viz. . Barpeta (88), Bongaigaon (95), Darrang (95), Dhemaji (133), Jorhat (100), Kokrajhar (72), Lakhimpur (150), Morigaon (84), Nagaon (132), Nalbari (36) and Sonitpur (167). The district wise analyses shows that NRCHB 101 variety in IP recorded highest average yield of 1162 kg/ha with a yield improvement of 76% over local (FP) practice in 88 demonstrations in Barpeta followed by average seed yield of 1100 kg/ha with a yield improvement of 51.5% in 133 demonstrations in Dhemaji. The minimum average yield of 784 kg/ha was recorded in 84 demonstrations in Morigaon.

Under irrigated situation, the improved variety TS-38 (Fig.39) recorded an overall average yield of 1335 kg./ha with yield improvement of 79.43 % over local practice, demonstrated in 248 crop demonstrations in ten districts viz. Barpeta (7), Bongaigaon (3), Darrang (22), Dhubri (80), Kamrup (25), Kokrajhar (4), Morigaon (22), Nagaon (38), Nalbari (32) and Sonitpur (15). The district wise analyses shows that TS-38 variety in IP recorded highest average yield of 1325 kg/ha with a yield improvement of 72.0 % over local (FP) practice in 7 demonstrations in Barpeta followed by average seed yield of 1212 kg/ha with a yield improvement of 59.0% in 3 demonstrations in Bongaigaon. The minimum average yield of 944 kg/ha was recorded in 32 demonstrations in Nalbari.

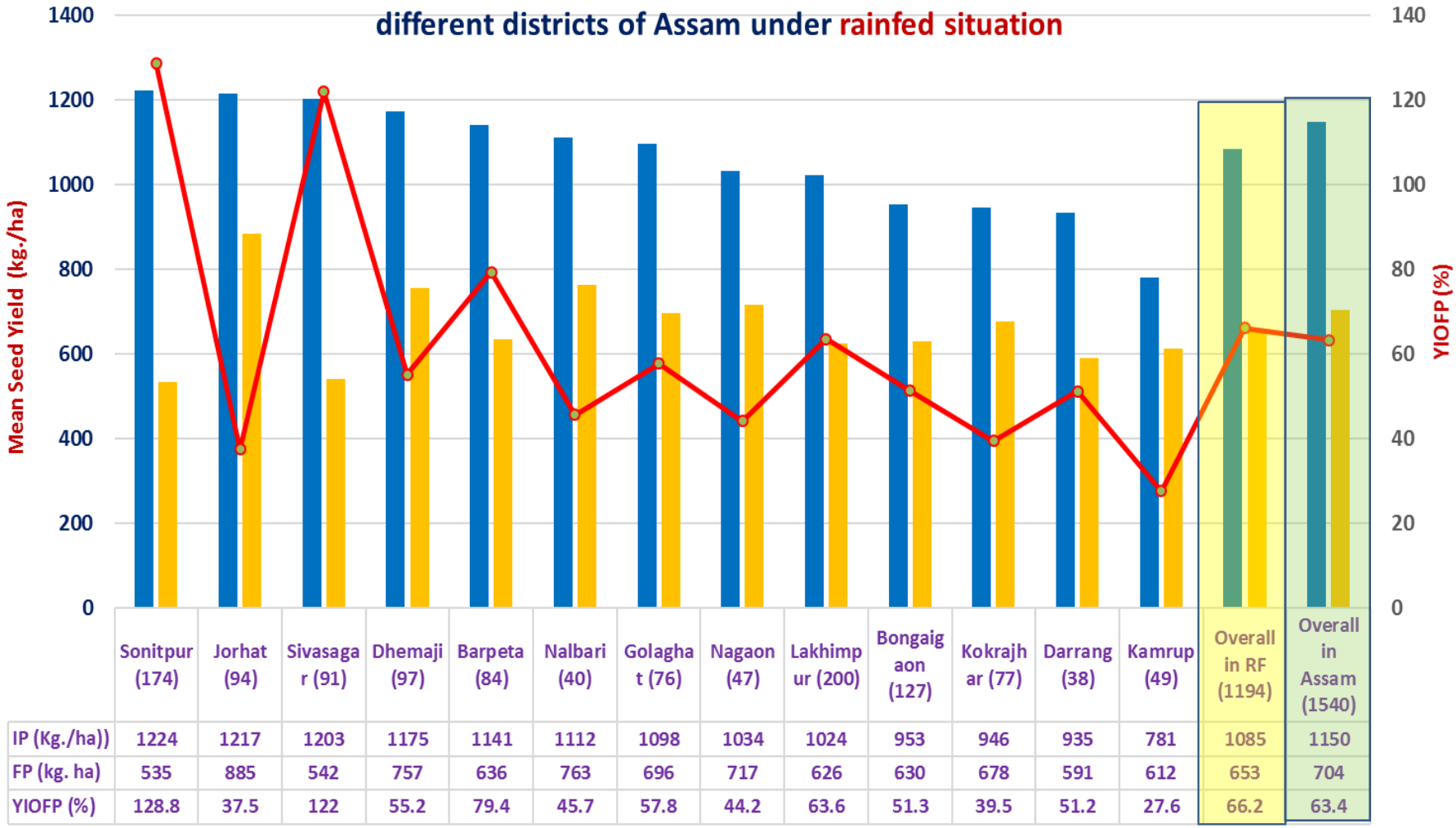
Under rainfed situation, the improved variety TS-38 (Fig.40) recorded an overall average yield of 917 kg./ha with yield improvement of 50.1% over local practice, demonstrated in 974 crop demonstrations in twelve districts viz. Barpeta (68), Bongaigaon (37), Darrang (58), Dhemaji (125), Golaghat (52), Jorhat (70), Kokrajhar (76), Lakhimpur (130), Morigaon (58), Nagaon (92), Sivsagar (60) and Sonitpur (55). The district wise analyses shows that TS-38 variety in IP recorded highest average yield of 1139 kg/ha with a yield improvement of 57.3 % over local (FP) practice in 52 demonstrations in Golaghat followed by average seed yield of 1082 kg/ha with a yield improvement of 32.0 % in 70 demonstrations in Jorhat. The minimum average yield of 699 kg/ha was recorded in 58 demonstrations in Morigaon.

Fig. 33: District-wise average performance of PM-28 variety of Indian mustard in different districts of Assam under irrigated situation



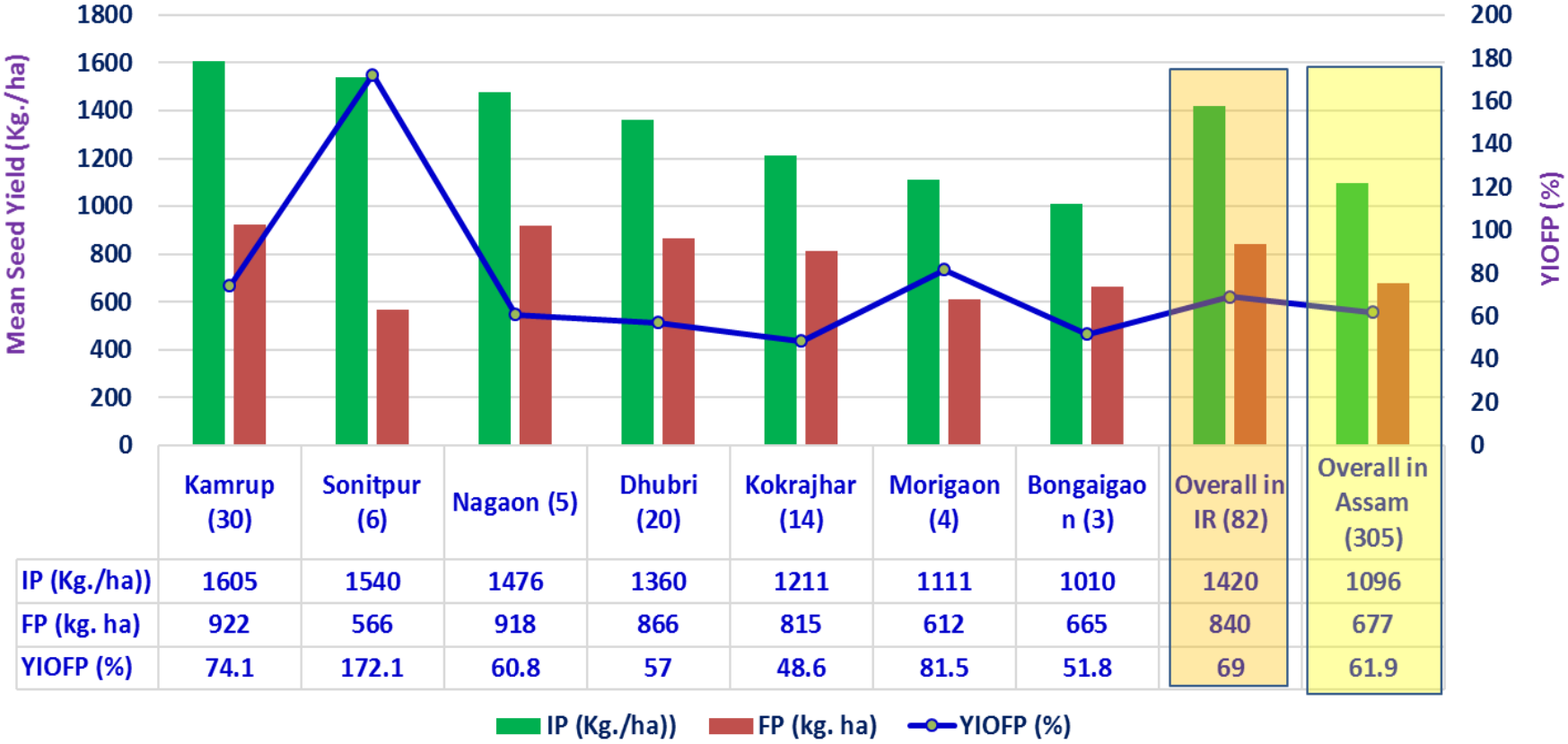
	Sonitpur (26)	Barpeta (12)	Nalbari (20)	Nagaon (53)	Dhubri (130)	Kokrajhar (23)	Darrang (22)	Kamrup (47)	Bongaigaon (13)	Overall in IR (346)	Overall in Assam (1540)
IP (Kg./ha))	1569	1517	1481	1467	1385	1332	1302	1194	1078	1375	1150
FP (kg. ha)	580	804	1045	875	878	926	754	933	670	880	704
YIOFP (%)	170.5	88.7	41.7	67.7	57.7	43.8	72.7	28	60.8	56.3	63.4

Fig. 34 : District-wise average performance of PM-28 variety of Indian mustard in different districts of Assam under rainfed situation



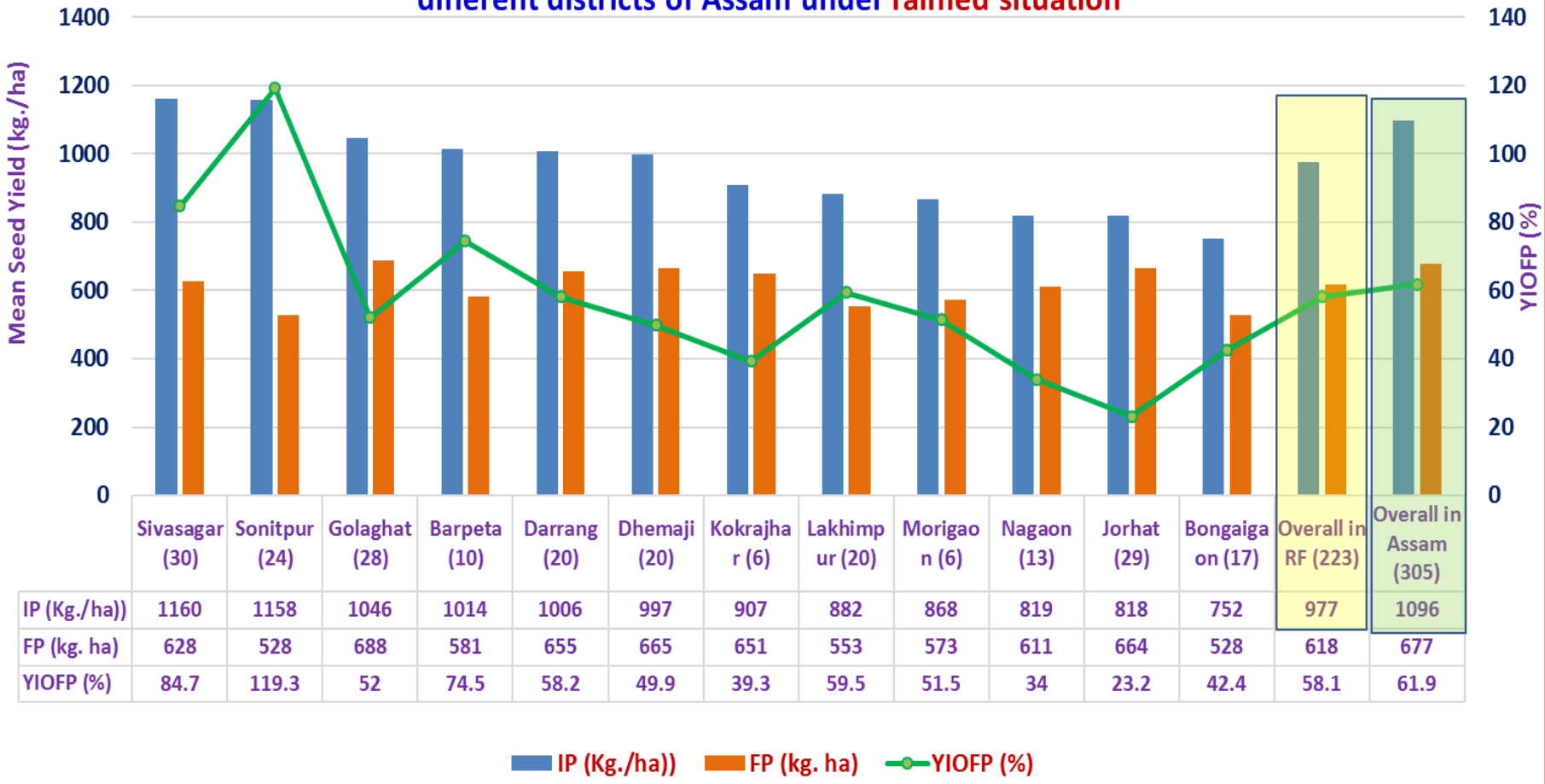
	Sonitpur (174)	Jorhat (94)	Sivasagar (91)	Dhemaji (97)	Barpeta (84)	Nalbari (40)	Golaghat (76)	Nagaon (47)	Lakhimpur (200)	Bongaigaon (127)	Kokrajhar (77)	Darrang (38)	Kamrup (49)	Overall in RF (1194)	Overall in Assam (1540)
IP (Kg./ha))	1224	1217	1203	1175	1141	1112	1098	1034	1024	953	946	935	781	1085	1150
FP (kg. ha)	535	885	542	757	636	763	696	717	626	630	678	591	612	653	704
YIOFP (%)	128.8	37.5	122	55.2	79.4	45.7	57.8	44.2	63.6	51.3	39.5	51.2	27.6	66.2	63.4

Fig. 35: District-wise average performance of DRMR-150-35 variety of Indian mustard in different districts of Assam under irrigated situation



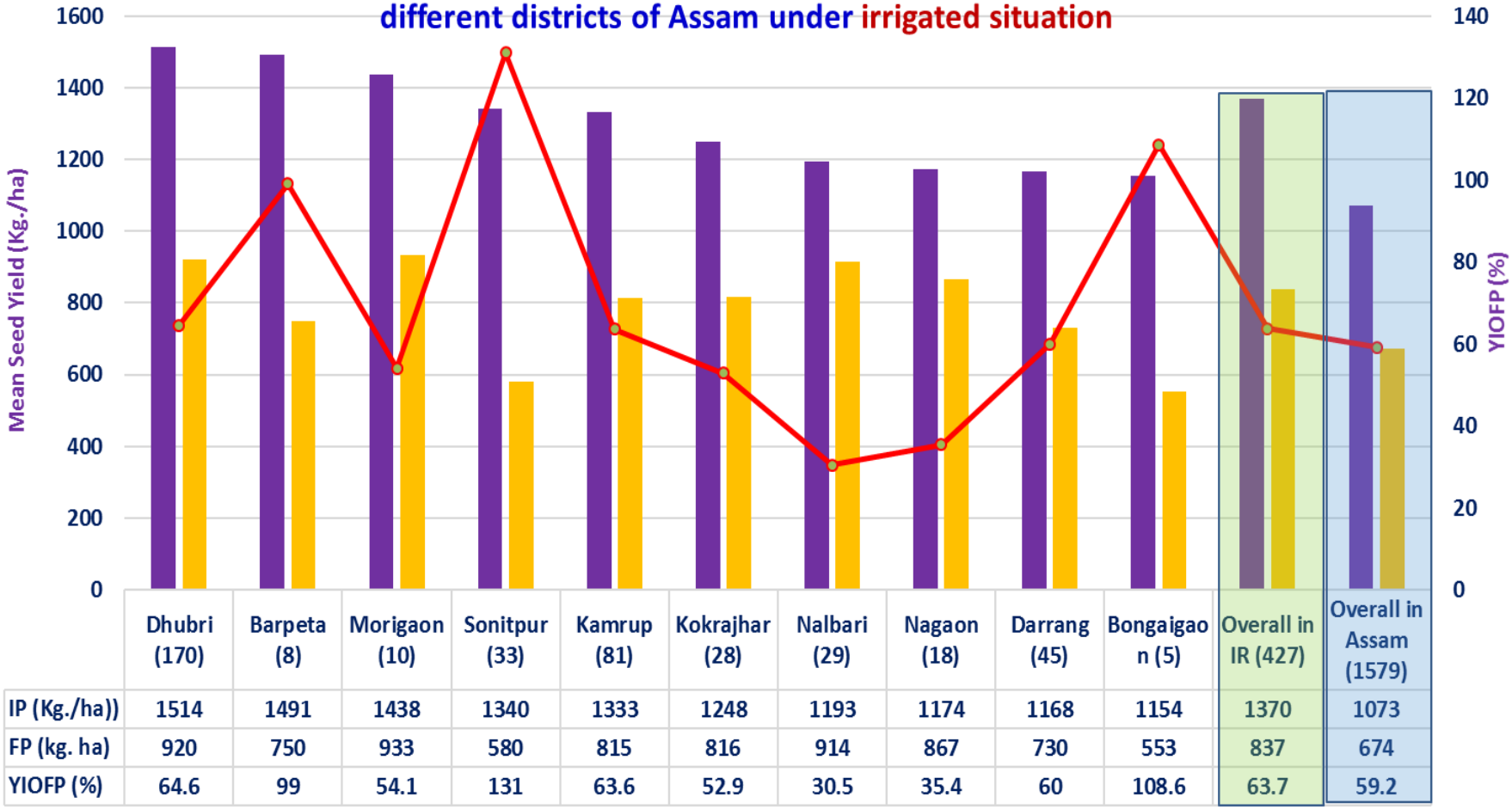
	Kamrup (30)	Sonitpur (6)	Nagaon (5)	Dhubri (20)	Kokrajhar (14)	Morigaon (4)	Bongaigaon (3)	Overall in IR (82)	Overall in Assam (305)
IP (Kg./ha))	1605	1540	1476	1360	1211	1111	1010	1420	1096
FP (kg. ha)	922	566	918	866	815	612	665	840	677
YIOFP (%)	74.1	172.1	60.8	57	48.6	81.5	51.8	69	61.9

Fig.36 : District-wise average aerformance of DRMR-150-35 variety of Indian mustard in different districts of Assam under rainfed situation



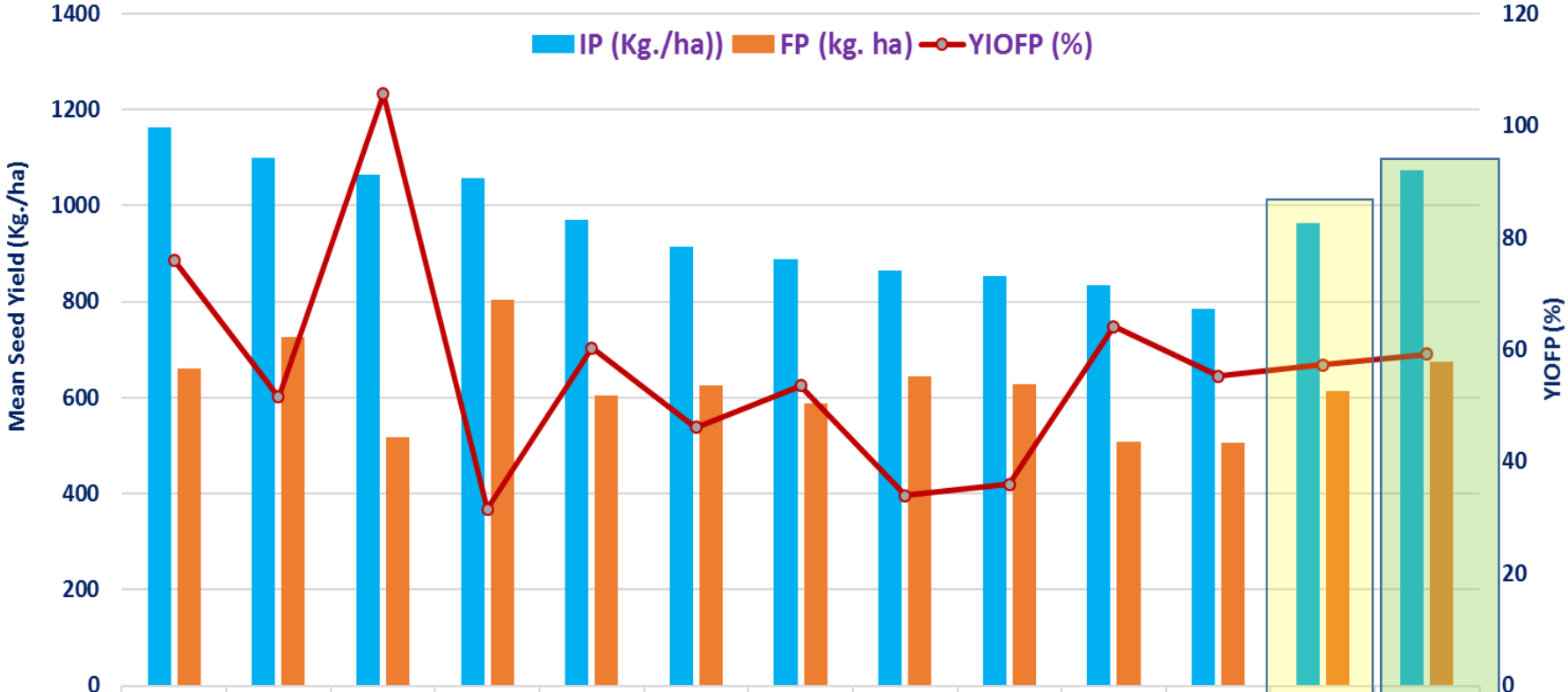
	Sivasagar (30)	Sonitpur (24)	Golaghat (28)	Barpeta (10)	Darrang (20)	Dhemaji (20)	Kokrajhar (6)	Lakhimpur (20)	Morigaon (6)	Nagaon (13)	Jorhat (29)	Bongaigaon (17)	Overall in RF (223)	Overall in Assam (305)
IP (Kg./ha))	1160	1158	1046	1014	1006	997	907	882	868	819	818	752	977	1096
FP (kg. ha)	628	528	688	581	655	665	651	553	573	611	664	528	618	677
YIOFP (%)	84.7	119.3	52	74.5	58.2	49.9	39.3	59.5	51.5	34	23.2	42.4	58.1	61.9

Fig. 37 : District-wise average performance of NRCHB-101 variety of Indian mustard in different districts of Assam under irrigated situation



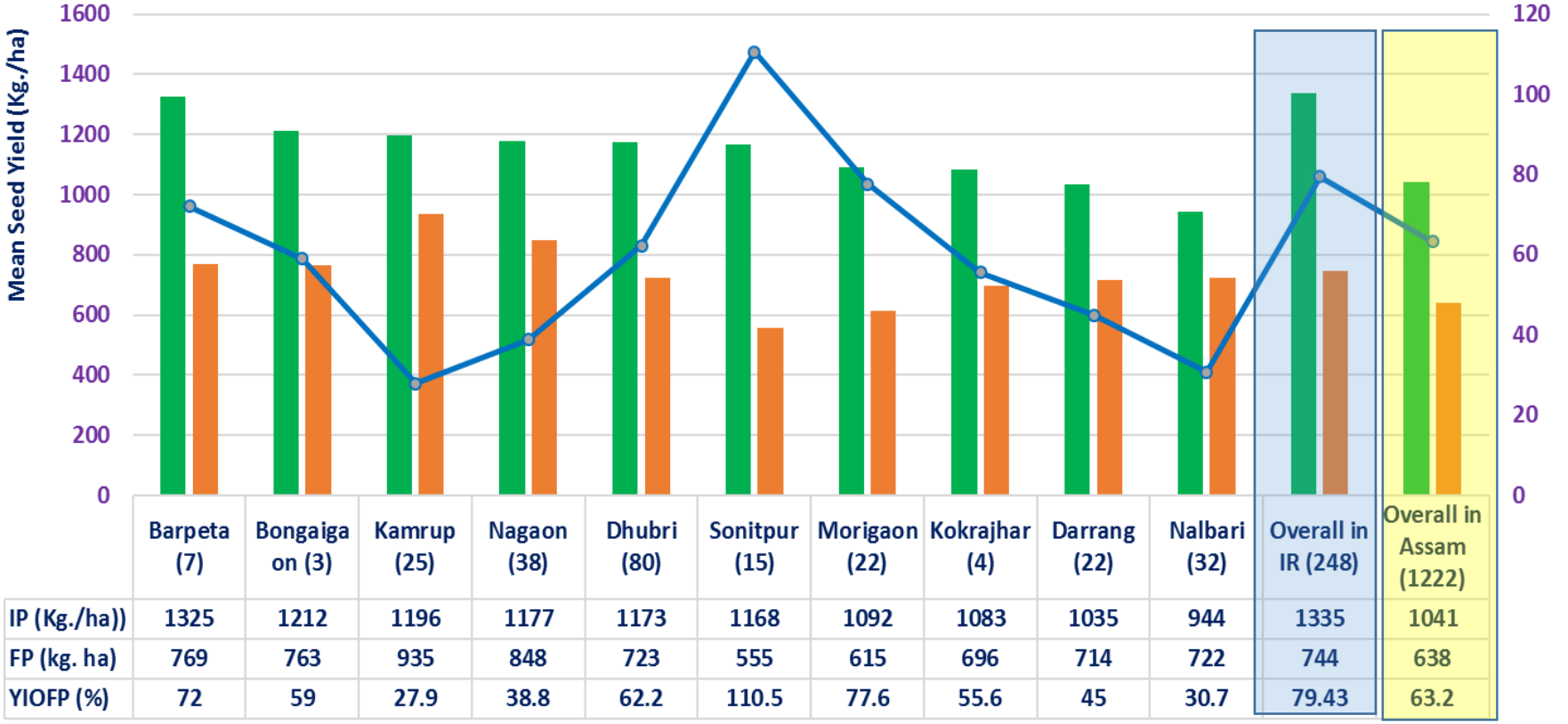
	Dhubri (170)	Barpeta (8)	Morigaon (10)	Sonitpur (33)	Kamrup (81)	Kokrajhar (28)	Nalbari (29)	Nagaon (18)	Darrang (45)	Bongaigaon (5)	Overall in IR (427)	Overall in Assam (1579)
IP (Kg./ha))	1514	1491	1438	1340	1333	1248	1193	1174	1168	1154	1370	1073
FP (kg. ha)	920	750	933	580	815	816	914	867	730	553	837	674
YIOFP (%)	64.6	99	54.1	131	63.6	52.9	30.5	35.4	60	108.6	63.7	59.2

Fig. 38 : District-wise average performance of NRCHB-101 variety of Indian mustard in different districts under rainfed situation



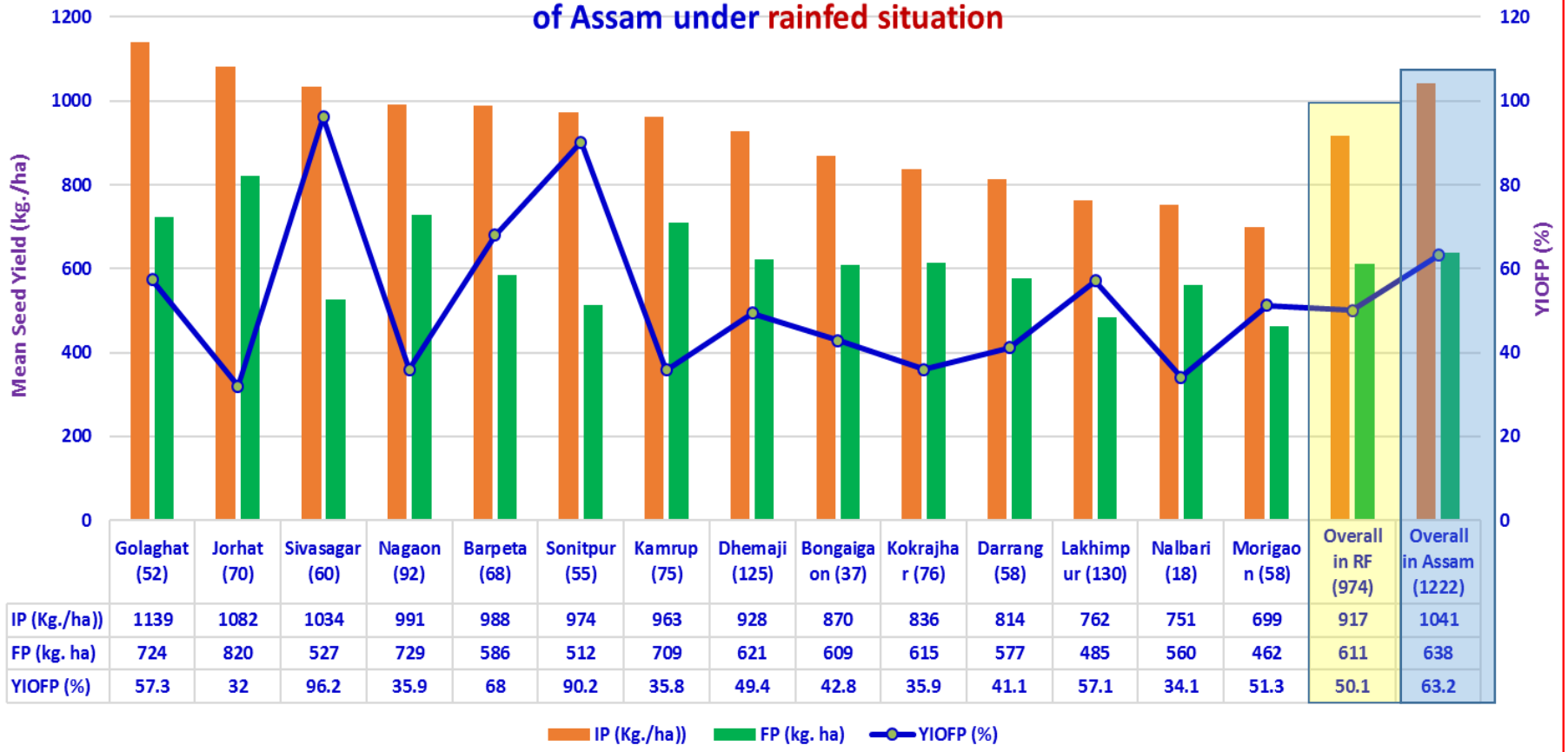
	Barpeta (88)	Dhemaji (133)	Sonitpur (167)	Jorhat (100)	Bongaigaon (95)	Kokrajhar (72)	Darrang (95)	Nagaon (132)	Nalbari (36)	Lakhimpur (150)	Morigaon (84)	Overall in RF (1152)	Overall in Assam (1579)
IP (Kg./ha))	1162	1100	1063	1056	970	915	889	864	854	835	784	964	1073
FP (kg. ha)	660	726	517	803	605	626	587	645	628	509	505	613	674
YIOFP (%)	76	51.5	105.6	31.5	60.3	46.1	53.6	33.9	36	64.1	55.3	57.3	59.2

Fig. 39: District-wise average performance of TS-38 variety of toria in different districts of Assam under irrigated situation



	Barpeta (7)	Bongaigaon (3)	Kamrup (25)	Nagaon (38)	Dhubri (80)	Sonitpur (15)	Morigaon (22)	Kokrajhar (4)	Darrang (22)	Nalbari (32)	Overall in IR (248)	Overall in Assam (1222)
IP (Kg./ha))	1325	1212	1196	1177	1173	1168	1092	1083	1035	944	1335	1041
FP (kg. ha)	769	763	935	848	723	555	615	696	714	722	744	638
YIOFP (%)	72	59	27.9	38.8	62.2	110.5	77.6	55.6	45	30.7	79.43	63.2

Fig. 40: District-wise average performance of TS-38 variety of toria in different districts of Assam under rainfed situation



	Golaghat (52)	Jorhat (70)	Sivasagar (60)	Nagaon (92)	Barpeta (68)	Sonitpur (55)	Kamrup (75)	Dhemaji (125)	Bongaigaon (37)	Kokrajhar (76)	Darrang (58)	Lakhimpur (130)	Nalbari (18)	Morigaon (58)	Overall in RF (974)	Overall in Assam (1222)
IP (Kg./ha))	1139	1082	1034	991	988	974	963	928	870	836	814	762	751	699	917	1041
FP (kg. ha)	724	820	527	729	586	512	709	621	609	615	577	485	560	462	611	638
YIOFP (%)	57.3	32	96.2	35.9	68	90.2	35.8	49.4	42.8	35.9	41.1	57.1	34.1	51.3	50.1	63.2

2.1.19. Overall performance of improved varieties in IP against the FP across the districts.

The figure 41 shows the overall performance of improved practices (IP) including all the varieties against the farmers' practices (FP) across the fifteen districts in both viz. irrigated and rainfed situation In overall demonstrations (4646), the IP had the average seed yield of 1070 kg./ha against the 674 kg./ha (FP) with an yield improvement of 58.8% across the fifteen districts.

The average cost of cultivation of Rs. 27313/ha in IP of fifteen districts against the Rs. 21395/ha in FP was recorded. An ANMR of Rs. 19822 /ha was realized against the additional cost of Rs. 5918 /ha incurred due to demonstrated technology (Fig. 42).

The figure 43 shows the overall performance of different improved varieties in IP against the FP across the fifteen districts in both viz. irrigated and rainfed situations. Improved variety PM-28 was demonstrated in 1540 demonstrations across fourteen districts viz. Barpeta (10), Bongaigaon (20), Darrang (20), Dhubri (20), Dhemaji (97), Golaghat (76), Jorhat (94), Kamrup (96), Kokrajhar (100), Lakhimpur (200), Nagaon (100), Nalbari (60), Sivsagar (91) and Sonitpur (200). In overall demonstrations (1540), the variety in IP recorded average yield of 1150 kg/ha with a yield improvement of 63.4% over farmers' practices (FP) across the fourteen districts.

Improved variety DRMR-150-35 was demonstrated in 305 demonstrations across fourteen districts viz., Barpeta (96), Bongaigaon (140), Darrang (60), Dhubri (130), Dhemaji (20), Golaghat (28), Jorhat (29), Kamrup (30), Kokrajhar (20), Lakhimpur (20), Morigaon (10), Nagaon (18), Sivsagar (30) and Sonitpur (30). In overall demonstrations (305), the variety in IP recorded average yield of 1096 kg/ha with a yield improvement of 61.9% over local practice (FP) across the fourteen districts (Fig. 43).

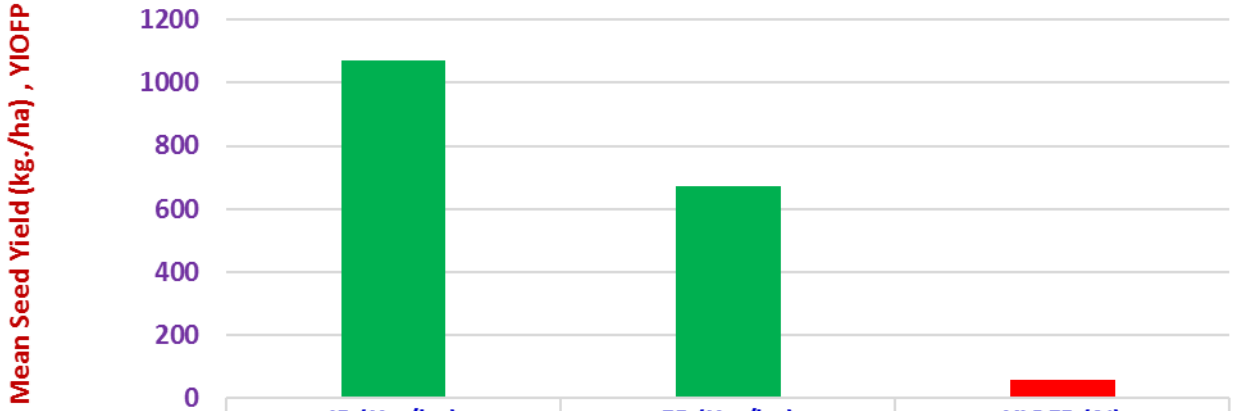
Improved variety NRCHB-101 was demonstrated in 1579 demonstrations in thirteen districts viz., Barpeta (96), Bongaigaon (100), Darrang (140), Dhubri (170), Dhemaji (133), Jorhat (100), Kamrup (81), Kokrajhar (100), Lakhimpur (150), Morigaon (94), Nagaon (150), Nalbari (65) and Sonitpur (200). In overall demonstrations (1579), the variety in IP recorded average yield of 1073 kg/ha with a yield improvement of 59.2% over local practice (FP) across the thirteen districts (Fig. 43).

The TS-38 variety of toria was demonstrated in 1222 demonstrations across fifteen districts viz. Barpeta (75), Bongaigaon (40), Darrang (70), Dhubri (80), Dhemaji (125), Golaghat (52), Jorhat (70), Kamrup (100), Kokrajhar (80), Lakhimpur (130), Morigaon (80), Nagaon (130), Nalbari (50), Sivsagar (60) and Sonitpur (70). In overall demonstrations (1222), the variety in IP recorded average yield of 960 kg/ha with a yield improvement of 50.4 % over local practice (FP) across the fifteen districts (Fig. 43).

The overall performance of different varieties under irrigated situation (Fig. 44) shows that IP demonstrations with DRMR-150-35 (82 CD) recorded highest average seed yield of 1420 kg/ha against 840 kg/ha in FP with highest yield improvement of 69%, while demonstrations with PM-28 (346 CD) had an average seed yield of 1375 kg/ha against 880 kg/ha in FP with a yield improvement of 56.3%. The IP demonstrations with NRCHB-101 (427 CD) had an average seed yield of 1370 kg/ha against 837 kg/ha in FP with a yield improvement of 63.7%. The IP demonstrations with TS-38 (248 CD) recored an average seed yield of 1129 kg/ha against 744 kg/ha in FP with a yield improvement of 51.7%.

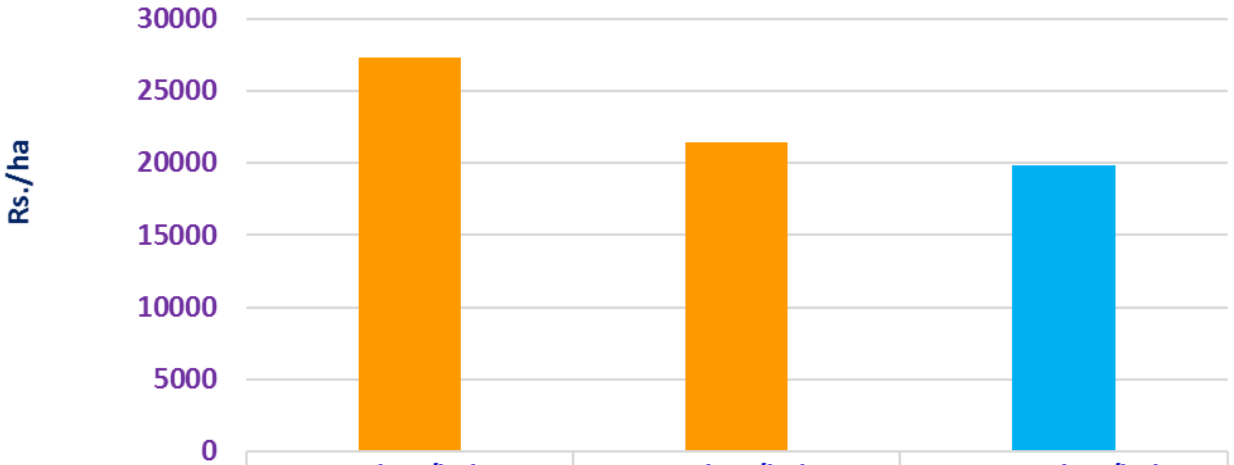
. The overall performance of different varieties under rainfed situation (Fig. 45) shows that IP demonstrations with PM-28 (1194 CD) recorded highest average seed yield of 1085 kg/ha against 653 kg/ha in FP with highest yield improvement of 66.2%, while demonstrations with DRMR-150-35 (223 CD) had an average seed yield of 977 kg/ha against 618 kg/ha in FP with a yield improvement of 58.1%. The IP demonstrations with NRCHB-101 (1152 CD) had an average seed yield of 964 kg/ha against 613 kg/ha in FP with a yield improvement of 57.3%. The IP demonstrations with TS-38 (974 CD) recored an average seed yield of 917 kg/ha against 611 kg/ha in FP with a yield improvement of 50.1%.

Fig. 41: Overall average performance of IP demonstrations against FP across fifteen districts of Assam



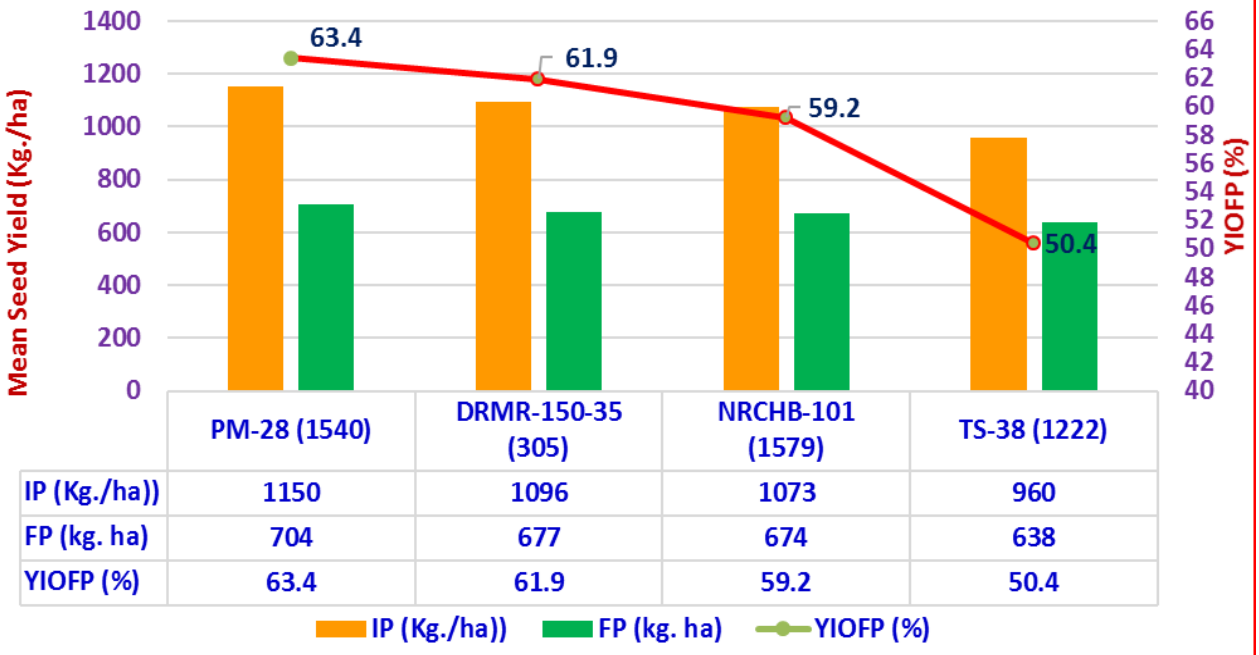
	IP (Kg./ha)	FP (Kg./ha)	YIOFP (%)
No. of CD (4646)	1070	674	58.8

Fig. 42: Overall CoC and ANMR across the fifteen districts of Assam



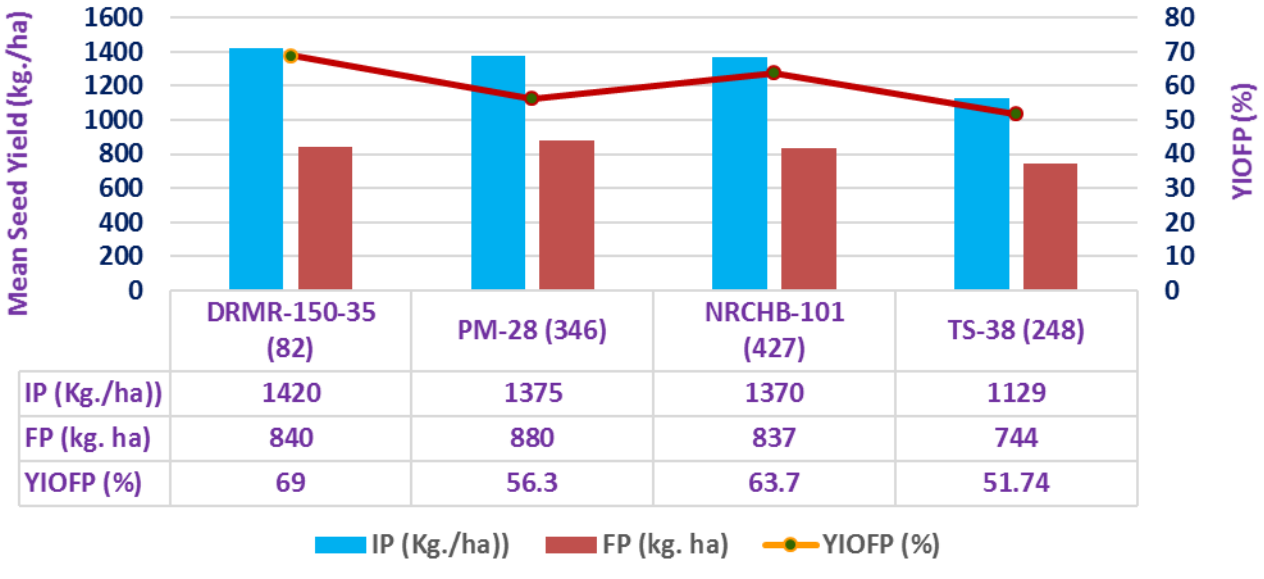
	IP (Kg./ha)	FP (Kg./ha)	ANMR (Rs./ha)
No. of CD (4646)	27313	21395	19822

Fig. 43: Overall average performance of different varieties in both situations across the fifteen districts of Assam



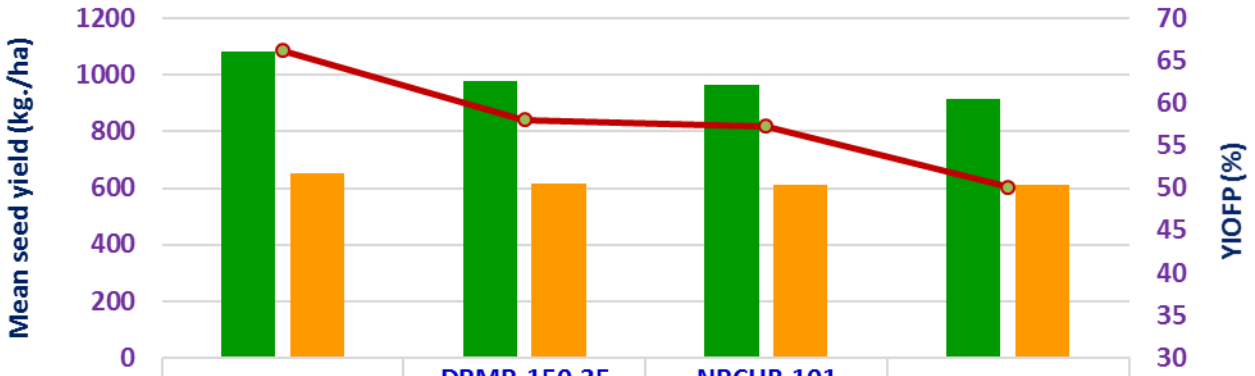
	PM-28 (1540)	DRMR-150-35 (305)	NRCHB-101 (1579)	TS-38 (1222)
IP (Kg./ha))	1150	1096	1073	960
FP (kg. ha)	704	677	674	638
YIOFP (%)	63.4	61.9	59.2	50.4

Fig. 44: Overall average performance of different varieties in irrigated situation across the fifteen districts of Assam



	DRMR-150-35 (82)	PM-28 (346)	NRCHB-101 (427)	TS-38 (248)
IP (Kg./ha))	1420	1375	1370	1129
FP (kg. ha)	840	880	837	744
YIOFP (%)	69	56.3	63.7	51.74

Fig. 45: Overall average performance of different varieties in rainfed situation across the fifteen districts of Assam



	PM-28 (1194)	DRMR-150-35 (223)	NRCHB-101 (1152)	TS-38 (974)
IP (Kg./ha))	1085	977	964	917
FP (kg. ha)	653	618	613	611
YIOFP (%)	66.2	58.1	57.3	50.1

IP (Kg./ha)) FP (kg. ha) YIOFP (%)

Glimpses of monitoring of Crop Demonstrations by Experts in Morigaon

Glimpses of monitoring of Crop Demonstrations by Experts in Nagaon

Glimpses of monitoring of Crop Demonstrations by Experts in Darrang

Glimpses of monitoring of Crop Demonstrations by Experts in Nalbari

Glimpses of monitoring of Crop Demonstrations by Experts in Kamrup

Glimpses of monitoring of Crop Demonstrations by Experts in Sivasagar

Glimpses of monitoring of Crop Demonstrations by Experts in Jorhat

Glimpses of monitoring of Crop Demonstrations by Experts in Golaghat






2.2. Technical trainings programmes organized during the period reported.

The technical trainings were organized at different crop stages in four phases to provide practical exposure and timely advice to the farmers about scientific production and protection technology of mustard. The first phase on "Scientific production technology of rapeseed-mustard", and second phase on "Improved agronomic practices of rapeseed-mustard for higher production" were completed up to Dec. 2021. The third phase of technical training was conducted on "Integrated pest and disease management in rapeseed-mustard" during January 2022. The report of these three technical trainings was submitted in last progress report.

The fourth phase of technical training was conducted on "Harvesting, threshing and storage management practices in rapeseed-mustard cultivation" during last week of January to second week of Feb. 2022 at the time of pod stage of the crop at farmers filed in each of the selected clusters. The technical knowledge and skill about maturity of crop, harvesting methods, drying, threshing packing and proper storage were provided to the participants by ICAR-DRMR during fourth phase of technical training. A total of 1654 farmers and farm women participated in 22 technical trainings of fourth phase. The district wise detailed information and summary of fourth phase technical trainings is shown in table 10 and 11, respectively.

Table 10: List of fourth phase technical trainings conducted on "Harvesting, threshing and storage management of rapeseed-mustard" during 2021-22.

SN	District	Name of cluster	Place/Village	Date	Beneficiaries (Number)
1	Kamrup	Chandrapur	Govali	17.01.2022	20
			Ghoramarjanpam	20.01.2022	24
		Kamalpur	Baruajani	29.01.2022	26
		Bongshor	Bongshor	30.01.2022	30
		Bihdiya jajikona	Ganakjer	31.01.2022	26
			Joykuchi	01.02.2022	20
2	Barpeta	Bajali	Bargandubi	30.01.2022	20
		Bhawanipur	Kalbari	29.01.2022	20
3	Dhemaji	Machkhowa	Phatai Bam	27.01.2022	20
			Kaitong Phukan Gaon	28.01.2022	20
		MSTD	Nalbari gaon	29.01.2022	22
		Sissiborgaon	Amguri Ayengia	31.01.2022	31
			Demgaon	01.02.2022	30
4	Golaghat	Bokakhat	Bhakat Chapori	28.01.2022	27
			Dhudang	29.01.2022	23
5	Nagoan	Kaliabor	Noltoli	21.01.2022	25
		Batadraba	Sologuri	25.01.2022	28
		Khagorijan	Baligaon Senchowa	26.01.2022	20
		Raha	Raha chaki	09.02.2022	25
6	Lakhimpur	Dhakuakhana	Jiamoria Village	21.01.2022	26
		Narayanpur	7 No. Bothakhana Ward (I)	22.01.2022	23
			Kamalpur	27.01.2022	23
			7 No. Bothakhana	29.01.2022	20

			Ward (II)		
		Ghilamara	Ghanhi Gaon	24.01.2022	20
			1 No. Ghilamara	28.01.2022	21
		Telahi	Salmora	25.01.2022	28
7	Morigaon	Bhurbandha	Hahchora	10.02.2022	17
		Mayong	Jagiguhaichuki	08.02.2022	13
8	Sivasagar	Gaurisagar	1no. Chintamonigarh	28.01.2022	29
		Demow	Nemuguri	02.02.2022	20
9	Nalbari	Borigog-Banbhag	Burburi	14.02.2022	25
10	Kokrajhar	Kokrajhar	Kauniabhasa	08.02.2022	26
		Dotma	Baghmara	11.02.2022	26
		Kochugaon	Gardenpur	11.02.2022	22
11	Sonitpur	Bihaguri Dev. Block	Puthimari gaon	28.01.2022	29
		Dhekiajuli Dev. Block	Maz Roumari gaon	31.01.2022	25
		Balipara Dev.Block	Roumari Mansiri gaon	30.01.2022	22
		Gabhoru Dev.Block	Da- Besseria gaon	25.01.2022	23
12	Darrang	Sipajhar	Gharwa Soapar	07.02.2022	32
		Bachimari	Bachimari	08.02.2022	28
		Pachim Mangaldai	Barkumarpara	29.01.2022	34
13	Dhubri	Mahamaya	Patakata-PT-II	21.01.2022	28
			Boalkamuri PT-II	22.01.2022	29
			Patakata-PT-I	22.01.2022	26
			Patakata-PT-II	22.01.2022	27
		Agomani	Digholtari	25.01.2022	28
			Kaimari-PT-II	26.01.2022	30
			Kaimari-PT-V	27.01.2022	25
			Kharbari-PT-I	28.01.2022	31
		Chapar- Salkocha	Lalkura	30.01.2022	26
			Simlabari	30.01.2022	28
			Fauzdarchar	31.01.2022	25
			Fauzdarchar	31.01.2022	29
		Rupshi	East Gaikhowa PT-1	29.01.2022	22
			Sukhatikhata	30.01.2022	23
			Palpara LP School	30.01.2022	26
			Akhtar House	31.01.2022	29
		Gauripur	Dubirpar	24.01.2022	30
			Tisterpar	24.01.2022	27
			Madhusoulmari-Part-I	27.01.2022	29
			Kismat Hasdaha	31.01.2022	26
14	Bongaigaon	Patiladoha	Lungjhar	21.01.2022	25
		Manikpur	Jhanbari	15.02.2022	24
		Bidyapur	Dangtol	15.02.2022	22
15	Jorhat & Majuli	Kaliapani	Japong Gaon	07.02.2022	15
		Majuli	Mahorichuk	08.02.2022	20
		Ujani Majuli	Mudoibil	08.02.2022	15
	Total				**1654**

Table 11: Summary of fourth phase technical trainings organized by ICAR-DRMR during 2021-22.

SN	Activity	Target (No.)	Achieved (No.)	Beneficiaries (No.)	Beneficiaries (No.)						
					Gender		Social Category				Total
1	Technical training	60	67	1654	Male	Female	Gen	OBC	SC	ST	1654
					1107	547	758	522	106	268	

Glimpses of fourth phase Technical Training programmes

Barpeta

Barpeta

Bongaigaon

Bongaigaon

Darrang

Darrang

Glimpses of fourth phase Technical Training programmes

Dhemaji

Dhemaji

Dhubri

Dhubri

Golaghat

Golaghat

Glimpses of fourth phase Technical Training programmes

Jorhat

Jorhat

Kamrup

Kamrup

Kokrajhar

Kokrajhar

Glimpses of fourth phase Technical Training programmes

Lakhimpur

Lakhimpur

Morigaon

Morigaon

Nagaon

Nagaon

Glimpses of fourth phase Technical Training programmes

 Nalbari	 Nalbari
 Sivasagar	 Sivasagar
 Sonitpur	 Sonitpur

2.3 Field days organized during 2021-22

Field day is one of the group extension teaching methods used in extension services in order to disseminate information and stimulate adoption of improved agriculture technology by farmers. Field day is a method of motivating the farmers to adopt a new practice by showing what has actually been achieved by applying the practice under field condition. Field days are arranged to demonstrate new technologies in front of a large manageable group of interested farmers. Through this activity farm experts, extension workers and farmers are involved and learn from each other. The field days found to contribute in promoting the adoption of improved agricultural technologies. Farmers get the opportunity to see the performance of demonstrated new varieties and technologies in real field situation and learn new information about the demonstrated technology components. Keeping in view the importance of field days, 250 field days (5 per cent of 5000 demonstrations) were organized during the period.

A total of 250 field days were organized in 58 clusters of 15 selected districts at maturity stage during February-March 2022 at the demonstrated fields of selected farmers under the project. The extension officers, ATM, BTM, Research Associates and farmers of the villages participated in these field days. Farmers got the opportunity to see the impact of new mustard varieties and technologies in real field situation and learnt about the applicability of the demonstrated mustard technologies/ practices in their own situation. They were motivated to adopt the improved mustard technologies and practices by showing its performance and profitability under field conditions. These helped in removing the doubts, superstitions and unfavourable attitude of the farmers about the scientific technologies of mustard cultivation. Interaction of farmers with extension personnel helped them in understand the importance of proper land preparation, timely sowing, selection of suitable varieties, proper sowing method, spacing, inter-culture operations, insect- disease management and proper harvesting of rapeseed- mustard crop. A total of 10047 farmers and farm women participated in these 250 field days. The summary and detail information of field days are presented in table 12 and table 13, respectively.

Table 12: Summary of Field days organized during 2021-22.

SN	Activity	Target (No.)	Achieved (No.)	Beneficiaries (No.)	Beneficiaries (No.)						
					Gender		Social Category				Total
1	Field day	250	250	10047	Male	Female	Gen	OBC	SC	ST	10047
					6983	3064	4305	2835	961	1946	

Table 13: Details of Field days organized during 2021-22.

SN	District	Name of Cluster	Place/Village	Date	Beneficiaries (No.)	Beneficiaries (No.)						
						Gender		Social Category				Total
						Male	Female	GEN	OBC	SC	ST	
1	Barpeta	Gumafulbari	Bor-suha	15-02-2022	52	22	30	52	0	0	0	52
		Chenga	Batgaon	21-02-2022	50	40	10	32	0	18	0	50
			Kakdhua	25-02-2022	51	43	8	51	0	0	0	51
		Chakchaka	Kismatdwarika	28-02-2022	50	38	12	1	48	1	0	50
		barpeta	kharupara	04-03-2022	50	34	16	50	0	0	0	50
		Pakabethbari	KayakuchiPathar	05-03-2022	50	32	18	50	0	0	0	50
		Rupshi	Amguri	07-03-2022	50	37	13	50	0	0	0	50
		Sarukhetari	Baniakuchi	07-03-2022	50	41	9	39	4	3	4	50
		Chakchaka	Feharukhowa	08-03-2022	50	34	16	0	23	27	0	50
		Mandia	Dakhsinsitole	11-03-2022	50	38	12	50	0	0	0	50
		Bajali	Uparroi	09-03-2022	50	39	11	45	5	0	0	50
			Dharamtal	27-03-2022	50	41	9	43	7	0	0	50
		Bhawanipur	Pubhati	22-03-2022	50	37	13	46	3	1	0	50
			Kalbari	22-03-2022	50	44	6	37	8	1	4	50
			Kalbari	28-03-2022	50	38	12	34	2	13	1	50
2	Bongaigaon	Manikpur	Bechimari	28-02-2022	50	38	12	18	32	0	0	50
			Kahibari	02-03-2022	51	41	10	1	47	0	3	51
			Jhowbari	07-03-2022	51	43	8	0	51	0	0	51
			Salabila no 3	10-03-2022	51	49	2	51	0	0	0	51
			Beshimari	22-03-2022	51	41	10	20	31	0	0	51
		Patiladoha	Lungjhar	22-03-2022	53	53	0	53	0	0	0	53
			Lungjhar	23-03-2022	54	54	0	54	0	0	0	54
			Lungjhar	24-03-2022	52	50	2	52	0	0	0	52
			Salabila	25-03-2022	50	42	8	50	0	0	0	50
			Salabila	26-03-2022	50	45	5	50	0	0	0	50
		Bidyapur	Durgamari	08-03-2022	50	47	3	50	0	0	0	50
			Durgamari	22-03-2022	50	49	1	50	0	0	0	50
			Durgamari	24-03-2022	50	28	22	50	0	0	0	50
			Hollaguri	25-03-2022	50	33	17	27	22	0	1	50
			Hollaguri	26-03-2022	50	46	4	2	45	0	3	50

3	Darrang	Bechimari	NizDalgaon	17-02-2022	50	43	7	11	30	9	0	50
			No.1 Borgorakhuli	19-02-2022	45	33	12	38	7	0	0	45
			No2 Barjhar	22-02-2022	50	44	6	11	29	8	2	50
			No2 Barjhar	23-02-2022	50	30	20	9	31	6	4	50
			No1 Borgorakhuli	02-03-2022	50	42	8	41	9	0	0	50
		PachimMangaldoi	Gariapara	27-01-2022	50	36	14	39	0	11	0	50
			Barkumarpara	29-01-2022	50	41	9	32	18	0	0	50
			Keotpara	22-02-2022	50	46	4	43	7	0	0	50
			Upathipara	27-02-2022	48	39	9	42	6	0	0	48
			Balopara	07-03-2022	50	32	18	28	14	8	0	50
		Sipajhar	GharowaSonapur	02-02-2022	50	38	12	28	22	0	0	50
			No2 Chengapara	23-02-2022	50	34	16	32	18	0	0	50
			No2 Chengapara	25-02-2022	50	31	19	33	17	0	0	50
			Titkuchi	14-03-2022	50	28	22	31	7	12	0	50
			Titkuchi	15-03-2022	50	30	20	33	8	9	0	50
4	Dhemaji	Sissiborgaon	AmguriAyengiya	09-02-2022	50	32	18	0	1	0	49	50
			Dem gaon	11-02-2022	50	17	33	0	4	0	46	50
			DighaliChapori	21-02-2022	50	38	12	0	1	0	49	50
			DighaliChapori	22-02-2022	50	38	12	0	0	0	50	50
			DighaliChapori	24-02-2022	50	35	15	0	1	0	49	50
			AmguriAyengiya	10-03-2022	50	27	23	0	3	0	47	50
		Machkhowa	Sissimukh grazing	10-02-2022	50	34	16	0	8	12	30	50
			BegenagarahLagachu	12-02-2022	50	32	18	0	2	0	48	50
			1 No. Phatia bam	21-02-2022	50	26	24	0	0	1	49	50
			2 No. Phatia bam	22-02-2022	50	26	24	0	0	0	50	50
			Begenagarah Grazing	23-02-2022	50	31	19	0	1	0	49	50
			Kaitongphukan Gaon	05-03-2022	50	29	21	0	18	0	32	50
			BorpakKonch Gaon	07-03-2022	50	31	19	13	35	1	1	50
		MSTD	Borimuri	06-02-2022	41	38	3	0	3	0	38	41
			Magurmari	11-02-2022	39	34	5	0	0	0	39	39
			UluChapori	12-02-2022	39	35	4	0	0	0	39	39
			Borimuri	18-03-2022	37	29	8	0	0	0	37	37
			Seren Nepali	20-03-2022	33	22	11	0	7	1	25	33
			2 No. Hasong	21-03-2022	42	34	8	0	2	0	40	42
			Magurmari	22-03-2022	37	31	6	0	0	0	37	37

5	Dhubari	Mahamaya	Patakata- PT- II	26-01-2022	50	28	22	50	0	0	0	50
			Patakata- PT- I	08-02-2022	50	27	23	50	0	0	0	50
			Boalkamuri PT-II	11-02-2022	50	31	19	50	0	0	0	50
			Patakata- PT-I	26-02-2022	50	26	24	50	0	0	0	50
		Agomani	Kaimari- PT-II	10-02-2022	50	36	14	50	0	0	0	50
			Kharbari- PT-I	23-02-2022	50	38	12	28	22	0	0	50
			Kaimari-PT-V	25-02-2022	50	30	20	33	17	0	0	50
			Digholtari	28-02-2022	50	44	6	42	8	0	0	50
		Chapar- Salkocha	Fauzdar char	04-02-2022	50	40	10	50	0	0	0	50
			Simlabari	13-02-2022	50	26	24	50	0	0	0	50
			Fauzdar char	15-02-2022	50	32	18	50	0	0	0	50
			Simlabari	19-02-2022	50	35	15	50	0	0	0	50
		Rupshi	Sukhatikhata	29-01-2022	50	38	12	32	16	2	0	50
			East Gaikhowa PT-1	22-02-2022	50	26	24	12	38	0	0	50
			Palpara LP School	24-02-2022	50	42	8	18	20	12	0	50
			Sukhatikhata	27-02-2022	50	40	10	42	7	1	0	50
		Gauripur	Tisterpar	28-01-2022	50	32	18	50	0	0	0	50
			Dubirpar	08-02-2022	50	33	17	50	0	0	0	50
			KismatHasdaha	11-02-2022	50	39	11	9	41	0	0	50
			Madhusoulmari-Part-I	19-02-2022	50	28	22	32	18	0	0	50
6	Golaghat	Bokakhat	Chinakan	10-02-2022	50	42	8	4	40	3	3	50
			Naramari	14-02-2022	50	36	14	1	1	0	48	50
			Missimiati	18-02-2022	50	43	7	10	10	0	30	50
			BhakatChapori	19-02-2022	50	29	21	5	0	0	45	50
			Namtemera	16-03-2022	50	42	8	5	3	0	42	50
			Borpak	21-03-2022	50	39	11	14	34	0	2	50
		Kakodonga	MisingGaon, NatunChapori	07-03-2022	47	33	14	0	0	1	46	47
			Shristika	08-03-2022	46	37	9	30	0	12	4	46
			Lam Chapori	09-03-2022	46	46	0	45	1	0	0	46
		Podumoni	Bengenakhowa	28-02-2022	40	40	0	1	38	0	1	40

			JapongGaon	07-02-2022	21	11	10	0	0	0	21	21
			JapongGaon	07-02-2022	15	8	7	0	0	0	15	15
		Kaliapani	Ghurasorapothar	21-02-2022	21	15	6	2	18	0	1	21
			Ghurasorapothar	21-02-2022	24	21	3	23	1	0	0	24
			JapongGaon	22-02-2022	19	5	14	0	0	0	19	19
			Jelengitup	22-02-2022	22	16	6	2	19	0	1	22
		Ujaini	Mudoioil	08-02-2022	15	12	3	5	4	0	6	15
7	Jorhat&Majuli		Mudoibil	15-02-2022	13	10	3	3	5	0	5	13
			Matharichuk	08-02-2022	20	10	10	0	0	0	20	20
			Jamuguri	09-02-2022	19	15	4	6	10	1	2	19
			Bhakatchapon	09-02-2022	15	10	5	0	15	0	0	15
		Majuli	Jamuguri	10-02-2022	20	15	5	0	16	0	4	20
			Bhakatchapon	12-02-2022	22	17	5	0	22	0	0	22
			Adielengi	14-02-2022	19	11	8	13	6	0	0	19
			Adielengi	15-02-2022	20	13	7	14	6	0	0	20
			Tatimara	07-02-2022	35	25	10	35	0	0	0	35
			Ghoramarjanpam	08-02-2022	50	36	14	0	0	50	0	50
			Govali	09-02-2022	50	38	12	8	0	42	0	50
		Chandrapur	Ghoramarjanpam	10-02-2022	30	19	11	0	0	30	0	30
			Tatimara	11-02-2022	32	30	2	32	0	0	0	32
			Dhipujijan pam	12-02-2022	33	25	8	0	0	33	0	33
			Govali	13-02-2022	35	25	10	5	0	30	0	35
			Govali	14-02-2022	24	16	8	10	0	14	0	24
			Ghoramarjan pam	15-02-2022	31	20	11	0	0	31	0	31
8	Kamrup		Govali	16-02-2022	30	25	5	7	0	23	0	30
		Bongshor	Bongshor	07-02-2022	28	28	0	28	0	0	0	28
			Bongshor	09-02-2022	20	17	3	15	5	0	0	20
			Kalakuchi	20-02-2022	35	26	9	15	10	4	6	35
		Kamalpur	Sonapur	25-02-2022	36	24	12	10	20	0	6	36
			Dwigunpar	27-02-2022	34	22	12	10	14	6	4	34
			Baruajani	27-02-2022	30	25	5	11	19	0	0	30
			Ganakjer	26-02-2022	31	31	0	31	0	0	0	31
			Bihdiya	28-02-2022	31	31	0	26	5	0	0	31
		Bihdiyajajikona	Borgaon	28-02-2022	31	31	0	15	16	0	0	31

			Pubparjatiobhangara	01-03-2022	30	23	7	30	0	0	0	30
			Saledol	01-03-2022	30	30	0	30	0	0	0	30
			Borgaon	05-03-2022	29	29	0	20	9	0	0	29
			Joykuchi	15-03-2022	32	32	0	12	20	0	0	32
			Garaka	19-03-2022	27	20	7	0	8	19	0	27
			Pubparjatiobhangara	20-03-2022	27	24	3	1	0	7	19	27
9	Kokrajhar	Kokrajhar	Chedamari	08.03.2022	38	28	10	38	0	0	0	38
			Khauniabhasa	08.03.2022	48	37	11	48	0	0	0	48
			Diajijhiri	15.03.2022	36	27	9	0	11	7	18	36
			Kakoramari	16.03.2022	39	24	15	0	0	0	39	39
			Nayacharapt 4	21.03.2022	50	31	19	0	50	0	0	50
			Nayacharapt 2	22.03.2022	36	13	23	0	36	0	0	36
		Dotma	Umanagar	10.03.2022	44	39	5	0	0	0	44	44
			Chithila	12.03.2022	54	50	4	52	0	2	0	54
			Charagaon	16.03.2022	40	32	8	0	0	0	40	40
			Pratapkatapt 1	17.03.2022	36	33	3	0	36	0	0	36
			Pratapkatapt 2	20.03.2022	48	38	10	48	0	0	0	48
			Baghmara	23.03.2022	45	21	24	0	0	0	45	45
			Bhutiyapara	23.03.2022	42	6	36	0	0	0	42	42
		kochugaon	Panbari no 1	28.02.2022	45	29	16	0	41	0	4	45
			Gardenpur	24.03.2022	36	26	10	0	0	0	36	36
10	Lakhimpur	Dhakuakhana	Sapatia	01-03-2022	36	10	26	0	36	0	0	36
		Narayanpur	Jiamoria	02-03-2022	36	15	21	0	36	0	0	36
			Sapatia	03-03-2022	39	15	24	0	39	0	0	39
			Jiamoria	03-03-2022	27	8	19	0	27	0	0	27
			Dighala	05-03-2022	43	17	26	0	40	0	3	43
			Manikachuk	07-03-2022	42	17	25	0	5	37	0	42
			Harhi	11-03-2022	35	21	14	0	35	0	0	35
			Sapatia	11-03-2022	42	10	32	0	42	0	0	42
			Bahnpara	14-03-2022	35	28	7	0	0	35	0	35
			Chamaguri	05-03-2022	15	12	3	15	0	0	0	15
		Ghilamara	7 no. Bothakhana Ward (I)	16-03-2022	21	19	2	0	0	0	21	21
			7 no. Bothakhana Ward (II)	16-03-2022	29	20	9	0	0	0	29	29

			TikiraiAunibori	19-03-2022	17	15	2	0	0	0	17	17
			TikiraiAunibori	19-03-2022	16	14	2	0	0	0	16	16
			Dakhin	05-03-2022	27	18	9	0	27	0	0	27
		Telahi	Dakhin	07-03-2022	23	17	6	0	23	0	0	23
			1 No. Ghilamara	14-03-2022	31	23	8	0	31	0	0	31
			1 No. Ghilamara	14-03-2022	31	21	10	0	31	0	0	31
			Dakhin	16-03-2022	32	15	17	0	32	0	0	32
			Ghanhigaon	17-03-2022	33	26	7	0	33	0	0	33
			Ghanhigaon	19-03-2022	33	25	8	0	33	0	0	33
			Dakhin	21-03-2022	35	14	21	0	34	0	1	35
			Dakhin	21-03-2022	35	14	21	0	34	0	1	35
			DuworGaon	14-03-2022	33	20	13	0	0	0	33	33
			DuworGaon	14-03-2022	40	34	6	0	0	0	40	40
11	Morigaon	Bhurbandha	Niz- Dandua	20-02-2022	20	11	9	20	0	0	0	20
			Mazgaon	26-02-2022	12	9	3	12	0	0	0	12
			Da-chikabori	28-02-2022	20	12	8	0	9	11	0	20
			Udari	12-03-2022	12	8	4	0	12	0	0	12
			Doloichuba	22-03-2022	20	9	11	20	0	0	0	20
		Mayong	Jagiguhaichuki	13-02-2022	19	8	11	6	13	0	0	19
			Chatabori	02-03-2022	30	24	6	3	7	0	20	30
			Rajamayong	04-03-2022	12	6	6	12	0	0	0	12
			Konwargaon	09-03-2022	17	1	16	0	0	0	17	17
			Manaha	21-03-2022	10	5	5	0	0	0	10	10
12	Nagaon	Koliabor	Naltoli	14-02-2022	50	39	11	38	1	9	2	50
			Madhatari	17-02-2022	50	45	5	23	19	7	1	50
			Keribakori	25-02-2022	50	40	10	2	40	8	0	50
			Hatibondha	05-03-2022	50	39	11	20	4	26	0	50
			Gakhirkhaity	06-03-2022	50	35	15	18	22	10	0	50
		Khagorijan	Baligaon	21-02-2022	53	33	20	18	21	14	0	53
			Senchowa	23-02-2022	50	40	10	25	8	16	1	50
			ChotaRupahi	03-03-2022	50	8	42	50	0	0	0	50
			Kumargaon	04-03-2022	50	37	13	21	18	11	0	50
			Haldhiati	09-03-2022	50	30	20	26	14	4	6	50
		Raha	Garamaj	28-02-2022	50	16	34	22	7	0	21	50

			Rahachaki	01-03-2022	50	10	40	15	26	0	9	50
			Bogoriguri	10-03-2022	50	17	33	5	6	0	39	50
			Khaigarh	11-03-2022	50	32	18	11	26	13	0	50
			Dighaldari	12-03-2022	50	26	24	8	37	1	4	50
		Batadraba	Bangannati	15-03-2022	50	44	6	50	0	0	0	50
			Dhakaibasti	17-03-2022	50	26	24	50	0	0	0	50
			Bilotia	01-03-2022	50	28	22	21	25	4	0	50
			Gayangaon	07-03-2022	52	39	13	52	0	0	0	52
			Sologuri	28-02-2022	50	32	18	50	0	0	0	50
13	Nalbari	Borigog-Banbhag	Naherbari	26-02-2022	50	28	22	32	18	0	0	50
			Bangaon	08-03-2022	46	34	12	11	33	0	2	46
			Borajol	10-03-2022	43	22	21	6	31	1	5	43
			Katara	14-03-2022	37	2	35	5	16	16	0	37
			Burburi	15-03-2022	31	0	31	31	0	0	0	31
		Barkhetri	Bartola	09-03-2022	46	41	5	31	8	0	7	46
			Khalihapara	09-03-2022	45	37	8	30	7	5	3	45
			Mugdi	16-03-2022	47	36	11	35	12	0	0	47
			Mukalmua	16-03-2022	45	38	7	38	7	0	0	45
			KochuaPothar	21-03-2022	46	28	18	35	5	4	2	46
14	Sivasagar	Demow	Sathighoria	07-03-2022	39	5	34	5	29	5	0	39
			Borgaon	08-03-2022	47	10	37	8	30	0	9	47
			GohainPukhuri	16-03-2022	46	32	14	8	36	1	1	46
			KalitaGaon	03-03-2022	36	28	8	8	20	6	2	36
			DihingiaGaon	17-03-2022	43	25	18	10	33	0	0	43
			Demowmukh village	09-02-2022	45	30	15	0	0	0	45	45
		Gaurisagar	Chintamonigarh	10-02-2022	44	41	3	0	44	0	0	44
			1 No. Chintamonigarh	06-03-2022	45	35	10	30	15	0	0	45
			Deogharia	09-02-2022	39	32	7	29	5	5	0	39
			NakataniTeliadunga	3-18-2022	40	35	5	0	25	0	15	40

15	Sonitpur	Bihaguri	Pithakhowa	27-02-2022	38	27	11	13	11	9	5	38
			Baruadoloni	03-03-2022	35	23	12	12	18	5	0	35
			Puthimari	07-03-2022	37	29	8	14	12	9	2	37
			Bapubheti	23-03-2022	32	23	9	10	7	9	6	32
		Dhekiajuli	MazRoumari	08-03-2022	36	23	13	11	8	9	8	36
			Anchaipur	24-03-2022	32	21	11	8	7	9	8	32
			Bengenajuli	14-03-2022	30	22	8	9	8	8	5	30
			Gabhorupar	17-03-2022	29	19	10	9	8	9	3	29
		Balipara	Akabastimiri	18-03-2022	32	23	9	12	10	9	1	32
			Roumari	20-03-2022	38	25	13	7	9	12	10	38
			Nalghagori	21-03-2022	35	26	9	9	8	12	6	35
			DakhinAmloga	25-03-2022	33	21	12	7	8	13	5	33
		Rangapara	Dharikati	19-03-2022	31	22	9	8	9	12	2	31
			Pakhiajhar	26-02-2022	29	19	10	9	7	9	4	29
			Joglani	28-03-2022	35	26	9	10	9	13	3	35
		Chaiduar	Tetunpukhuri	27-02-2022	33	25	8	9	8	9	7	33
			KaribilBengaligaon	19-03-2022	35	26	9	13	11	6	5	35
			Tetunpukhuri	25-03-2022	29	19	10	12	9	6	2	29
		Biswanath	DakhinBhirgaon	12-03-2022	33	22	11	11	9	8	5	33
			Panibharal	15-03-2022	29	19	10	11	8	5	5	29
			Dagaon	27-03-2022	38	24	14	8	12	14	4	38
		Gabhoru	Pukhuria	04-03-2022	40	21	19	11	14	13	2	40
			Da Beseria	05-03-2022	39	21	18	9	12	10	8	39
			Bogaborachuburi	15-03-2022	34	22	12	8	7	14	5	34
			Bhojkhuwa	16-03-2022	33	23	10	10	6	8	9	33
	Total				**10047**	**6983**	**3064**	**4305**	**2835**	**961**	**1946**	**10047**

Glimpses of field days organized in different districts during 2021-22

Barpeta

Barpeta

Bongaigaon

Bongaigaon

Darrang

Darrang

Glimpses of field days organized in different districts during 2021-22

Dhemaji

Dhemaji

Dhubri

Dhubri

Golaghat

Golaghat

Glimpses of field days organized in different districts during 2021-22

Jorhat

Jorhat

Kamrup

Kamrup

Kokrajhar

Kokrajhar

Glimpses of field days organized in different districts during 2021-22

Lakhimpur

Lakhimpur

Morigaon

Morigaon

Nagaon

Nagaon

Glimpses of field days organized in different districts during 2021-22

Nalbari

Nalbari

Sivsagar

Sivsagar

Sonitpur

Sonitpur

2.4. Trainings of post-harvest technology demonstrations of rapeseed-mustard organized during 2021-22.

Post-harvest technology is an inter-disciplinary science and technique applied to agriculture produce after harvest for its protection, conservation, processing, packaging, distribution, and utilization to meet the food and nutritional requirements of the people in relation to their needs. After being harvested, the mustard under goes a series of post-harvest operations such as threshing, cleaning, transportation and storage management.

Proper handling, packaging, transportation and storage reduces the post-harvest losses in mustard. The technology has become a necessity to improve the food safety and strengthen nation's food security. The technology helps to boost export of agricultural commodities in the form of preserved and value added products.

Keeping in view the importance of post-harvest management of mustard, it was planned that ICAR-DRMR would support to APART in organizing at least one PHT (Post-Harvest Technology) demonstration training in each selected cluster with its post-harvest expertise. A total of 47 PHT demonstration trainings were organized against the 45 approved PHT demonstrations for 2021-22, in 58 clusters of 15 selected districts during February-March 2022. Farmers were demonstrated the post-harvest techniques and activities through these trainings. The following aspects were covered during these trainings to impart the knowledge and skill of post-harvest techniques to the participants.

Threshing: Farmers were trained about threshing which should be done when moisture content in seed is between 15-20%. When crop is very dry (6-12 % moisture), it will be tuff to minimize the post-harvest losses. Make bundles of the harvested plants and stalk them in the sun drying for 7-8 days before threshing. Threshing should be done either treading by bullocks or running of tractor over the dried plants or using threshers. Seeds should be separated from chaffs by winnowing.

Importance of Storage: Good storage facilities are important to the farmers all over the world. It helps to ensure household and community food security until the next harvest and commodities for sale can be held back so farmers can avoid being forced to sell at low prices in the glut that often follows a harvest. Though considerable losses occur in the field, both before and during harvest, the greatest losses are noticed during storage. Farmers were trained as how to minimize losses during storage.

i). Loss in quantity: Farmers were imparted knowledge about weight or quantitative losses. Insects, rodents, etc. feeds on the product causing weight loss. These weight losses are not always apparent. For example, some insects eat only the centres of grain kernels so, even though the volume of grain may appear to remain the same, there can be considerable weight loss.

ii). Loss in quality: Losses of this type can be nutritional, chemical, through contamination with toxic molds or foreign matter. Pests that selectively eat a part of the food-stuff (such as the nutritious germ of the grain) can reduce the value of the food-stuff as a whole. Farmers were trained to reduce the qualitative losses.

Storage management: Neat and clean seeds should be stored at appropriate moisture content. An adverse effect observed when seeds of mustard are stored in hot weather with high moisture content. For safe and long viability storage, mustard seeds should be dried at appropriate moisture. For safe storage, moisture content of seeds should be 8%. This can be achieved by sun drying of the threshed seed for approximately one week.

Principles of Storage: In order to reduce the amount of losses, the environment in the storage needs to be controlled so as to lower the possibility of:

- Biological damage by insects, rodents and micro-organisms.
- Chemical damage through rancidity development and flavour changes, etc.
- Physical damage through crushing, breaking, etc.

Good storage thus involves controlling the factors like temperature, moisture, light, pests and hygiene.

i). Temperature

The temperature within a store is affected by the sun, the cooling effect of radiation from the store, outside air temperature, heat generated by the respiration of both the store material and any insect pest present.

ii) Moisture

All micro-organisms, including molds, require moisture to survive and multiply. If the moisture content in a product that is to be stored is low, micro-organisms will be unable to grow, provided that the moisture inside the storage structure is also kept low. Moisture should therefore, be prevented from entering the store.

Precautions for safe storage:

1. Storage facility should be far away from mustard field and it should be neat and clean.
2. Transport vehicles used in mustard transportation such as bullock, truck and tractor trolley etc. should be insect free before storage of mustard seeds.
3. Seeds should be sun dried in the day and in the evening it should be fill in the bags.
4. Packing bags used in should be dried, new and insect free.
5. All cracks and holes in roof and floor should be closed with the cement and flat the floor in storage house.
6. Holes of rats should be closed with the cement in storage house.
7. New seed should not be mixed with old seeds because old seed may have infestation of insects.
8. Insect and disease affected seeds should not be stored.
9. Inspection should be repeated time to time in storage.

Precautions before oil extraction:

- Seed should be neat and clean before oil extraction process.
- Seed should be properly dried.
- There should be no straw and other materials in the seed.

Oil packaging and storage

Use clean, dry containers to pack and store oils. Sealed glass or plastic bottles are adequate for small quantities. Colored containers in a dark box help increase shelf life. Steel or plastic tanks work well for large quantities. The shelf life of oil is usually 6 to 12 months if it is properly packed and kept away from heat and sunlight. A total of 545 farmers and farm women participated in PHT demonstration trainings. The detail information and summary of trainings of PHT demonstrations are presented in table 14 &15, respectively.

Table 14: Detail of of trainings of PHT demonstrations organized during 2021-22.

SN	District	Name of Cluster	Place/Village	Date	Beneficiaries (No.)	Beneficiaries (No.)						
						Gender		Social Category				
						Male	Female	Gen	OBC	SC	ST	Total
1	Kokrajhar	Kochugaon	Panbari no 1	19-04-2022	31	18	13	0	29	0	2	31
		Dotma	Pratapkata no 1	19-04-2022	28	18	10	0	28	0	0	28
		Kokrajhar	Kauniabhasa ujanpara	20-04-2022	31	20	11	21	10	0	0	31
2	Morigaon	Bhurbandha	Hahchora	30-03-2022	30	5	25	0	22	0	8	30
		Mayong	Jagi-guhaichuki	30-03-2022	30	16	14	10	8	12	0	30
3	Barpeta	Gumafulbari	Bor-Suha	26-04-2022	50	25	25	50	0	0	0	50
		Barpeta	Kharupara	26-04-2022	50	44	6	50	0	0	0	50
		Mandia	Dakshin Sitoli	29-03-2022	50	46	4	50	0	0	0	50
4	Nalbari	Borigog-Banbhag	Borajol	05-05-2022	30	16	14	8	12	0	10	30
5	Sivasagar	Gaurisagar	Nakatani Kalu Gaon	04-05-2022	26	23	3	0	26	0	0	26
		Demow	Dihingia Gaon	04-05-2022	30	20	10	0	30	0	0	30
6	Nagaon	Raha	Kumargaon	19-04-2022	30	3	27	1	26	3	0	30
		Khagorijan	Senchowa	20-04-2022	30	29	1	19	7	4	0	30
			Kumargaon	20-04-2022	30	22	8	11	15	4	0	30
		Batadraba	Sologuri	21-04-2022	30	21	9	27	0	3	0	30
		Koliabor	Hatibondha	22-04-2022	30	26	4	23	0	7	0	30
7	Bongaigaon	Manikpur Patiladoha	Bechimari	06-05-2022	30	22	8	5	25	0	0	30
			Lunjghar	28-06-2022	30	29	1	29	0	1	0	30
			Salabila	28-06-2022	49	15	34	49	0	0	0	49
8	Kamrup	Bongshor	Bongshor	08-04-2022	28	28	0	8	20	0	0	28
		Chandrap ur	Ghoramarjanpam	10-04-2022	30	0	30	12	0	18	0	30
		Kamalpur	Bordekpar	11-04-2022	22	21	1	10	12	0	0	22
9	Lakhimpur	Ghilamara	Dakhin	28-04-2022	25	13	12	0	25	0	0	25
		Dhakuakh ana	Jiamoria	29-04-2022	25	7	18	0	25	0	0	25
		Narayanpur	7 no. Bothakhana Ward (I)	30-04-2022	26	12	14	0	0	0	26	26
10	Golaghat	Bokakhat	Barpak	25-04-2022	21	18	3	2	15	2	2	21
		Kakodonga	Chamua Goan Lamcho pari	27-04-2022	30	30	0	30	0	0	0	30
		Podumoni	kathkothiyan Goan	26-04-2022	30	18	12	0	30	0	0	30

11	Sonitpur	Bihaguri	No: 2 Potiapukhuri	02-05-2022	42	20	22	13	11	9	9	42
		Dhekiajuli	Bengenajuli	06-05-2022	36	23	13	11	8	9	8	36
		Balipara	Roumari	10-05-2022	32	23	9	12	10	9	1	32
		Chaiduar	Tetunpukhuri	10-05-2022	30	21	9	9	8	7	6	30
		Gabhoru	Bam Besseria	30-05-2022	20	15	5	8	5	3	4	20
		Rangapra	Jugoni	08-06-2022	23	18	5	10	5	0	8	23
		Biswanath	Dakshin bhirgaon	09-06-2022	25	19	6	12	7	2	4	25
12	Jorhat	Majuli	MRBFPCL Office, Notun Bukura	01-06-2022	35	34	1	16	12	2	5	35
		Ujani Majuli	Jengraimukh	06-06-2022	34	31	3	3	3	0	28	34
			Jengraimukh	06-06-2022	33	31	2	0	5	0	28	33
		Kaliapani	Amtol	11-06-2022	30	19	11	12	11	0	7	30
13	Dhemaji	Sissiborgaon	Amguri Ayengiya	30-05-2022	30	10	20	0	1	1	28	30
		Machkhowa	Borpak Konch Gaon	30-05-2022	30	12	18	0	28	0	2	30
14	Dhubri	Agomoni	Kherbari Pt- I	28-04-2022	30	23	7	27	3	0	0	30
		Chapar Salkocha	Simlabari	29-04-2022	40	27	13	40	0	0	0	40
		Gauripur	Madhusalmari pt I	30-04-2022	30	18	12	15	15	0	0	30
15	Darrang	Bechimari	Bechimari	04-04-2022	50	44	6	43	7	0	0	50
		PachimMangaldoi	Balopara	07-04-2022	50	32	18	28	14	8	0	50
		Sipajhar	Jayantipur	09-04-2022	50	38	12	8	27	2	13	50
	Total				**1532**	**1023**	**509**	**682**	**545**	**106**	**199**	**1532**

Table 15: Summary of PHT demonstrations under ICAR-DRMR-APART project during 2021-22

SN	Activity	Target (No.)	Achieved (No.)	Beneficiaries (No.)	Beneficiaries (No.)						
					Gender		Social Category				Total
					Male	Female	Gen	OBC	SC	ST	
1	**Post-Harvest Management**	45	47	1532	**1023**	**509**	**682**	**545**	**106**	**199**	**1532**

Glimpses of Post harvest technology trainings organized during 2021-22 in different districts of Assam

Barpeta

Barpeta

Bongaigaon

Bongaigaon

Darrang

Darrang

Glimpses of Post harvest technolgy trainings organized during 2021-22 in different districts of Assam

Dhemaji

Dhemaji

Dhubri

Dhubri

Golaghat

Golaghat

Glimpses of Post harvest technology trainings organized during 2021-22 in different districts of Assam

Jorhat

Jorhat

Kamrup

Kamrup

Kokrajhar

Lakhimpur

Glimpses of Post harvest technology trainings organized during 2021-22 in different districts of Assam

Lakhimpur

Lakhimpur

Morigaon

Morigaon

Nagaon

Nagaon

Glimpses of Post harvest technology trainings organized during 2021-22 in different district of Assam

Nalbari

Nalbari

Sivasagar

Sivasagar

Sonitpur

Sonitpur

2.5. Exposure visit-cum-training programme of master trainiers and progressive farmers organized during 22-24 Feb 2022.

Exposure visit is one of the important extension tools to reinforce the confidence of the extension personnel and farmers in new technology, methods, etc. Exposure visits enable farmers from different regions to interact with and learn from each other, allowing them to view practical examples of successful adoption of scientific technology in different farming situation. It motivates farmers by showing what others have been able to achieve. As per the approved activity under ICAR-DRMR-APART programme, one Exposure visit-cum-training of progressive farmers (No. 20) and one exposure visit-cum-training of Master trainiers/ extension personnel (No: 20) to ICAR-DRMR were to be organized during 2021-22**.** Since covid-19 situation was prevailing in the country, therefore, keeping in view the safety of the participants, it was decided to organize 3 days aforesaid visits this year during 22-23 Feb. 2022 at one of the coordinating centers under All India Coordinated Research Project on Rapeseed-Mustard (AICRP-RM) at RARS, Shillongani, Nagaon, Assam, working under ICAR-DRMR and on 24 Feb. 2022 at Gorukhuti, Darrang under ICAR-DRMR-OPIU (Agri)-APART project.

The rapeseed-mustard research experimental trials of plant breeding, agronomy, disease and insect management, crop cafeteria, latest varieties, front line demonstrations, etc. were shown during the exposure visit-cum-training of progressive farmers and Master trainiers/ extension personnel organized simultaneously at RARS, Shillongani, Nagaon during 22-23 February 2022. While on 24th Feb. 2022, the participants viisted different kind of agriculture machinaries at Gorukhuti, Darrang. For these visits, field level extension workers and farmers were nominated by respective DAOs from selected clusters of 15 districts of Assam namely; Golaghat, undivided Jorhat including Majuli, Sivasagar, Darrang, Sonitpur, Morigaon, Dhubri Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup, Lakhimpur, Dhemaji and Nagaon. The programme of exposure visit was designed in such a way that experts from ICAR-DRMR and RARS, Shillongani provided technical knowledge and exposure of latest technological advances in rapeseed-mustard to the participants. Alongwith the lectures, participants were made to visit experimental field/trials of variety development, insect-pest and disease management, agronomical practices, seed production programme, etc at the research farm of RARS, Shillongani. The participants also visited Krishi Vigyan Kendra (KVK) where they got the opportunity to interact with KVK experts and see the different agricultural implements and their uses in farming.

The participants also visited FLDs sites in the nearby villages and interacted with farmers. On 24th Feb. 2021, they participated in farmer's fair organized by ICAR-DRMR at Gorukhuti, Darrang. Besides technological knowledge, the participants got an opportunity to see different kind of agriculture machinaries including combine harvester and practical demonstrations of their use. They understood the gap in technology adoption and explore the feasibility in adoption of new practices in their own situations. Since "seeing is believing", the exposure visit provided better knowledge and understanding of technology, methods and improved the skills of the extension personnel/ master trainers and farmers on scientific production and protection technology of rapeseed-mustard. It exposed them to a new and different situation which would help in changing their outlook and extend their mental horizon. Detailed training schedule is presented in Table 16.

Table 16: Schedule of exposure visit-cum-training of master trainers / extension personnel and progressive farmers at RARS, Shillongani, Nagaon during 22-23 Feb. 2022 and on 24 Feb. 2022 at Gorukhuti, Darrang, Assam

Date	Time	Topics	Speakers
22-02-2022	9:30 AM-10:00 AM	Registration of the participants	Staff of RARS
	10:00 AM-10:15 AM	Inaugural programme	All participants and resource persons
	10:15 AM-10:45 AM	Status of rapeseed-mustard in Assam	Dr. AC Sarmah Incharge, RARS
	10:45 AM-11:30 AM	Scope and challenges of rapeseed-mustard production in Assam	Dr. G.N. Hazarika Resident Consultant
	11:30 AM-12:15 PM	Integrated agro production technology of rapeseed-mustard.	Dr. Ashok Kr. Sharma PS, ICAR-DRMR
	12:15 PM-1:00 PM	Important rapeseed-mustard varieties for Assam	Dr. PK Dev Choudhary PS, RARS
	1:00 PM-2:00 PM	**Lunch break**	
	2:00 PM-3:00 PM	Integrated disease management in rapeseed-mustard	Dr. Ranjana Chakarborty Jr. Scientist, RARS
	3:00 PM-4:00 PM	Integrated insect-pest management in rapeseed-mustard	Dr. B.K. Bora PS, RARS
	4:00 PM-5:00 PM	Use of ICT for enhancing rapeseed-mustard production.	Dr. Vinod Kumar PS, ICAR-DRMR
23-2-2022	10:00 AM-11:00 AM	Integrated nutrient management in rapeseed-mustard	Dr. Ashok Kr. Sharma PS, ICAR-DRMR
	11:00 AM-12:00 N	Data collection and analysis methods	Dr. Vinod Kumar PS, ICAR-DRMR
	12:00 N-1:00 PM	Problems of farmers and their scientific solution	Dr. G.N. Hazarika Resident Consultant
	1:00 PM-2:00 PM	**Lunch break**	**-**
	2:00 PM-3:00 PM	Field visit of experimental trials of RARS and FLDs	All resource persons
	3:00 PM-4:00 PM	Field visit of KVK, Shillongani	Animesh Deka, SMS, KVK
	4:00 PM-5:00 PM	Question-Answer and Valedictory session	Participants and Resource persons
24-2-2022	10:00 AM-5:00 PM	Visit of farmer fair at Shillongani, Nagaon during 22-23 Feb. 2022 and on 24 Feb. 2022 at Gorukhuti, Darrang, Assam	All Participants

Participants of the exposure visit-cum-training programme:

Field and middle level agricultural extension officials from the State Department of Agriculture, Govt. of Assam like BTM/ATM/AEA and Research Associates of ICAR-DRMR-APART Project and selected progressive farmers from all the selected 15 districts, viz. Sivsagar, Jorhat, Golaghat, Nagaon, Morigaon Darrang, Sonitpur, Lakhimpur, Dhemaji, Kamrup, Nalbari, Barpeta, Bongaigaon, Dhubri and Kokrajhar participated in this exposure-cum-training programme. A total of 28 master trainers/extension personnel including research associates and 20 farmers from seven

selected districts participated in the exposure visit-cum-training programme. Table 17 and 18 shows the detailed list of the master trainers and farmer participants.

Table 17: List of master trainers participated in exposure visit-cum-training organized by ICAR-DRMR at RARS, Shillongani, Nagaon during 22-23 Feb. 2022 and on 24 Feb. 2022 at Gorukhuti, Darrang, Assam

SN	Name of Participants	Designation	Place of posting	District	Mobile
1	Mr. Diganta Gohain	BTM-CSS-ATMA	Morongi Dev. Block, Golaghat	Golaghat	8638720980
2	Mr. Pranjit Bhuyan	BTM-CSS-ATMA	Majuli Dev. Block	Majuli	6001272623
3	Priyanka Saikia	BTM-CSS-ATMA	Demow Dev. Block	Sivasagar	8474052005
4	Dr. Mahesh Baruah	ATM-CSS-ATMA	Narayanpur Dev. Block, Lakhimpur	Lakhimpur	8011330828
5	Mr. Nibaran Medok	BTM-CSS-ATMA	MSTD Block	Dhemaji	7002783892
6	Padmanath Doley	BTM-CSS-ATMA	Bihaguri Dev. Block	Sonitpur	7002213734
7	Md. Abdus Salam	ATM, CSS-ATMA	Pachim Mangaldai	Darrang	8011665304
8	Sanjib saikia	BTM-CSS-ATMA	Goroimari Dev. Block	Kamrup	9864077170
9	Pabitra Deuri	BTM-CSS-ATMA	Mayong Dev. Block	Morigaon	9954031402
10	Mrs. Rekha Rani Chetia	BTM, CSS-ATMA	Raha Dev. Block	Nagaon	9101970130
11	Ujjal Saikia	ATM, CSS-ATMA	Koliabor Dev. Block	Nagaon	8638406103
12	Mr. Abdul Aziz	ATM-CSS-ATMA	Borigog-Banbhag Dev. Block, Nalbari	Nalbari	9101036714
13	Dibbyajyoti Das	ATM-CSS-ATMA	Sarukhetri Dev. Block	Barpeta	8720956236
14	Iswar Chandra Roy	ATM-CSS-ATMA	Hatidura Dev. Block	Kokrajhar	9435849122
15	Bhaskar Jyoti Deuri	ATM-CSS-ATMA	Srijangram Dev. Block	Bongaigaon	9101637327
16	Dr. Hadi Husain Khan	RA, ICAR-DRMR	Dhubri	Dhubri	9956140977
17	Dr. Priyakshi Buragohain	RA, ICAR-DRMR	Sivasagar	Sivasagar	9508344918
18	Dr. Bandhan Subba	RA, ICAR-DRMR	Golaghat	Golaghat	8101455138
19	Dr. Joli Dutta	RA, ICAR-DRMR	Lakhimpur	Lakhimpur	7002096622
20	Dr. Vijay Kumar	RA, ICAR-DRMR	Barpeta	Barpeta	8435345597
21	Dipankar Saikia	SRF, ICAR-DRMR	Jorhat	Jorhat	8753949739
22	Mr. Bidyut Pritom Gogoi	SRF, ICAR-DRMR	Dhemaji	Dhemaji	7086560319
23	Dr. Priyanka Sharma	SRF, ICAR-DRMR	Sonitpur	Sonitpur	7060559326
24	Trilochan Karki	SRF, ICAR-DRMR	Kamrup	Kamrup	7002292150
25	Komedity Chamua	SRF, ICAR-DRMR	Nagaon	Nagaon	7002824116
26	Manisha Barman	SRF, ICAR-DRMR	Nalbari	Nalbari	9957275224
27	Himangshu Deka	SRF, ICAR-DRMR	Kokrajhar	Kokrajhar	9706560765

Table 18: List of farmers participated in exposure visit-cum-training programme organized by ICAR-DRMR during at RARS, Shillongani, Nagaon during 22-23 Feb. 2022 and on 24 Feb. 2022 at Gorukhuti, Darrang, Assam

SN	Name of Participants	Category	Village	Cluster	District	Mobile
1.	Mr. Bhaben Gogoi	OBC	Dhuliagaon	Morongi Dev. Block	Golaghat	6000198448
2.	Mr. Bhugeswar Neog	OBC	Notun Bokora Gaon	Majuli Dev. Block	Majuli	6003437674
3.	Mr. Manik Chandra Gogoi	OBC	Majkuri, Palashbari	Kaliapani Dev. Block	Jorhat	9101534329
4.	Sarbeswar Borgohain	OBC	Sesamukh	Demow	Sivasagar	8822545791
5.	Mr. Prasanta Narah	ST	Salmora	Telahi Dev. Block	Lakhimpur	6001526743
6.	Mr. Kukil Ramchiary	ST	Majgaon, Simen Chapori	MSTD Block	Dhemaji	9101581764
7.	Harikanta Das	SC	Bapubheti	Bihaguri	Sonitpur	9101482593
8.	Maheswar Hazarika	OBC	Keotpara	Pachim Mangaldai	Darrang	6003951778
9.	Anish Uz Zaman	GEN	Sutargaon	Bihdia Jajikona	Kamrup	9859323176
10.	Jagat Bora	OBC	Dayangia	Mayang	Morigaon	6002857966
11.	Prabin Goswami	GEN	Mahadeoseal	Raha	Nagaon	7002479556
12.	Nayan Jyoti Borkakoti	GEN	Senchowa	Khagorijan	Nagaon	8638379281
13.	Kushal Sahu	OBC	Karybakori	Koliabor	Nagaon	8399928854
14.	Rohit Baruah	GEN	Senchowa	Khagorijan	Nagaon	8486820331
15.	Mr. Tilak Sarma	GEN	Bilpar	Borigog-Banbhag Block	Nalbari	9864049024
16.	Ramani Barman	GEN	Baniakuchi	Losima Block	Barpeta	8471964818
17.	Mr. Abdul Hashem	GEN	Fouzdarchar,	Chapar Salkocha	Dhubri	7983143706
18.	Mr. Mohar Ali	GEN	Fouzdarchar,	Chapar Salkocha	Dhubri	6002780273 6900940242
19.	Takajjul Islam	GEN	Pratapkata	Dotma	Kokrajhar	8011626264
20.	Purna Kalita	GEN	Bowalimari	Srijangram	Bongaigaon	7086890614

Output of the exposure visit:

The capacity development of Master trainers and farmers in Assam will strengthen the rapeseed-mustard technology dissemination process and builds strong institutional capacity for sustaining the cost-effective technology delivery system. The availability of these trained personnel will ensure that the sustainable dissemination of rapeseed-mustard technology to the large number of farmers even after the exit of the project. The summary of exposure visit-cum-training programme presented in table 19.

Table 19: Summary of exposure visit-cum-training of master trainers / extension personnel and progressive farmers organized at RARS, Shillongani, Nagaon during 22-23 Feb. 2022 and on 24 Feb. 2022 at Gorukhuti, Darrang, Assam

SN	Activity	Target (No.)	Achieved (No.)	Beneficiaries (No.)	Districts covered (No.)
1	Exposure visit-cum-training programme of master trainers	01	01	27	Golaghat, undivided Jorhat including Majuli, Sivasagar, Darrang, Sonitpur, Morigaon, Dhubri Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup, Lakhimpur, Dhemaji and Nagaon
2	Exposure visit-cum-training programme of farmers trainers	01	01	20	

Glimpses of Interaction with experts during Exposure Visit-cum-Training programme organized during Feb. 22-24, 2022

Glimpses of Interaction with experts during Exposure Visit-cum-Training programme organized during Feb. 22-24, 2022

Glimpses of visit of participants to agriculture machinery and KVK, Nagaon during Exposure Visit-cum-Training programme organized during Feb. 22-24, 2022

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Glimpses of visit of participants to research fields during Exposure-Visit-cum-Training programme organized during Feb. 22-24, 2022






Glimpses of Participants of Exposure-Visit-cum-Training programme organized during Feb. 22-24 Feb. 2022

2.6. Farmer Fair organized on February 24, 2022 at Gurukhutti, Darrang, Assam.

Farmers' fairs are playing a pivotal role for dissemination of agricultural and allied sectors information with the objective to create awareness and to educate the farming community. Farmers' fair is an attempt to communicate and demonstrate the latest technologies developed by the Research Institutions, State Agricultural Universities (SAUs), private agencies etc. Keeping in view the importance of farmer fair, ICAR-DRMR organized a farmer fair at Gorukhuti, Darrang, Assam on February 24, 2022 under mustard value chain of ICAR-DRMR-OPIU (Agri)-APART project. The fair was inaugurated by Dr. G.N. Hazarika, Resident Consultant and former Director of Research (Agri), Assam Agricultural University, Assam.

Addressing the farmers, Dr. Hazarika said rapeseed-mustard is grown in substantial area in Assam. However, low and unstable oilseed system productivity is major problem in these areas where cultivation is undertaken mostly on small and marginal agricultural holdings. The vast availability of natural resources and fertile lands offering ample scope to promote oilseed cultivation in Assam. He emphasized that micro level study is needed to identify the cropping pattern and agro-climatic situation so that farmers can choose from toria or Indian mustard accordingly. He said that farmers should grow short duration rice varieties so that mustard crop can be sown timely. Over the last decade, the number of rapeseed-mustard technologies have been developed. Now, there is an urgent need to motivate the farmers to adopt improved varieties and scientific production and protection technologies of rapeseed-mustard in the state.

On this occasion, Dr. Ashok Kumar Sharma, Team Leader, ICAR-DRMR-OPIU (Agri)-APART project said that ICAR-DRMR as a knowledge partner is providing the technological support to the Directorate of Agriculture, Govt. of Assam for augmenting rapeseed-mustard production of farmers of Assam for sustainable livelihood security under mustard value chain programme through organizing demonstrations, trainings, fairs, exhibitions, field days, exposure visits, providing knowledge material, etc. He urged the farmers to utilize the rice-fallow areas through adoption of suitable varieties and scientific technology of rapeseed-mustard to make the state self-sufficient in oilseed production. The field level extension workers need to have the better knowledge and understanding about the scientific technology of rapeseed-mustard so that the can communicate them to the farmers on real time basis. He apprised that different extension activities for promotion of scientific cultivation of rapeseed-mustard under the project are being carried out in 15 undivided districts namely; Jorhat, Sivsagar, Golaghat, Sonitpur, Morigaon, Darrang, Dhubri, Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup, Lakhimpur, Dhemaji, and Nagaon of Assam from this year.

The other dignitaries from different organizations namely Mr. Madhurum Patiri, JDA, DoA, Govt. of Assam & Nodal Officer, OPIU (Agri)-APART; MrJyotish Nath, DAO, Darrang; Dr. Kanwar Singh, Resident Consultant, IRRI; Mr. Sandeep Chaudhary, Product Development Manager, CLASS, Mr. Raosahab Bendre Ag. Specialist, APART and Dr. Vinod Kumar, Pr. Scientist, ICAR-DRMR also expressed their views and urged the farmers for adoption of scientific technology of rapeseed-mustard in the state for overall improvement of rapeseed-mustard productivity.

The fair also provided opportunities for the farmers to share their experiences with the gathering and improve their knowledge by "Seeing is believing" principle by visiting the different stalls, experimental farms, Kisan Ghosties, etc.

Different exhibition stalls and agriculture implements and machinary from different institutes and departments/ NGOs/ private firms were also exhibited on the occasion. More than 250 farmers,

farm women and extension personnel from Jorhat, Sivsagar, Golaghat, Sonitpur, Morigaon, Darrang, Dhubri, Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup, Lakhimpur, Dhemaji, Nagaon etc. districts of Assam participated in the fair. The summary of participants of farmer's fair is presented in table 20.

Table 20: Summary of participants of farmer's fair organized on February 24, 2022 at Gorukhuti, Darrang, Assam

SN	Activity	Target (No.)	Achieved (No.)	Beneficiaries (No.)	Beneficiaries (No.)						
					Gender		Social Category				Total
					Male	Female	Gen	OBC	SC	ST	
1	Farmer's fair	01	01	208	180	28	58	86	43	21	**208**

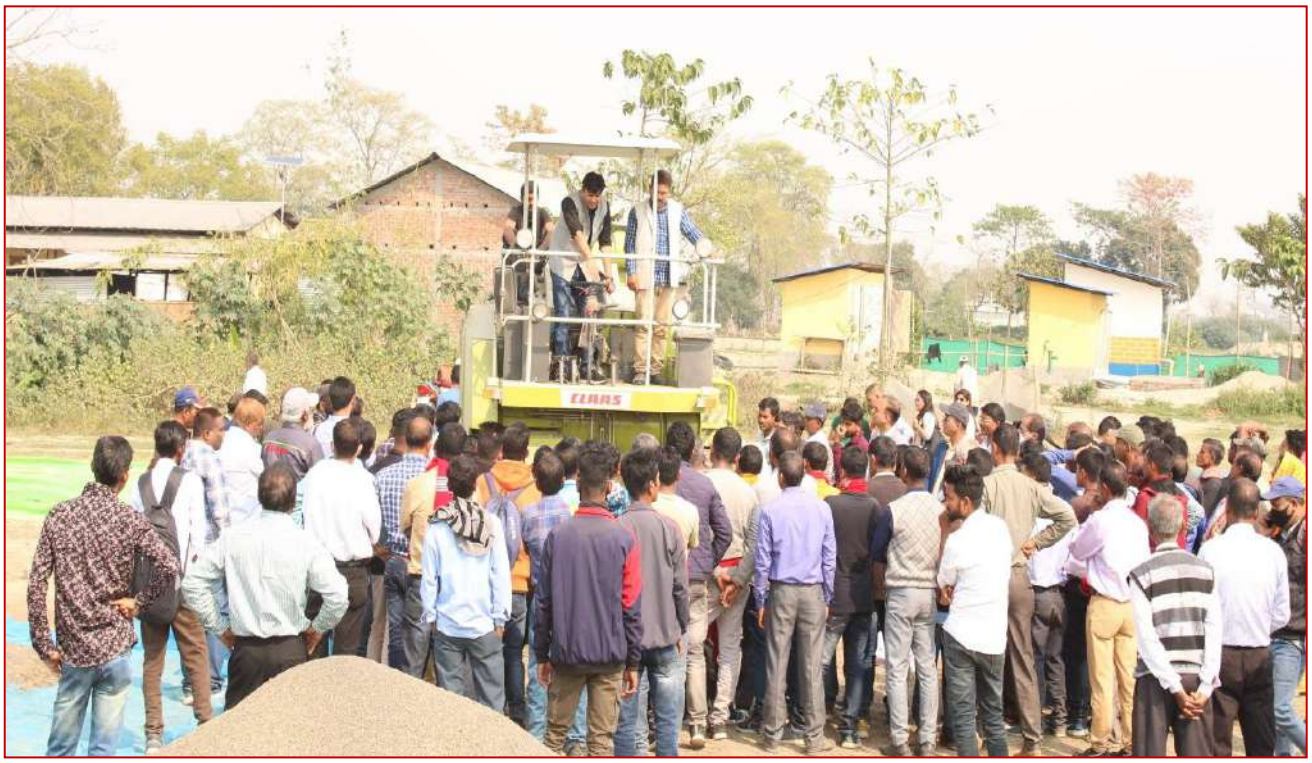
Glimpses of farmers' fair-2022

Glimpses of farmers' fair-2022

Glimpses of farmers' fair-2022

Glimpses of farmers' fair-2022

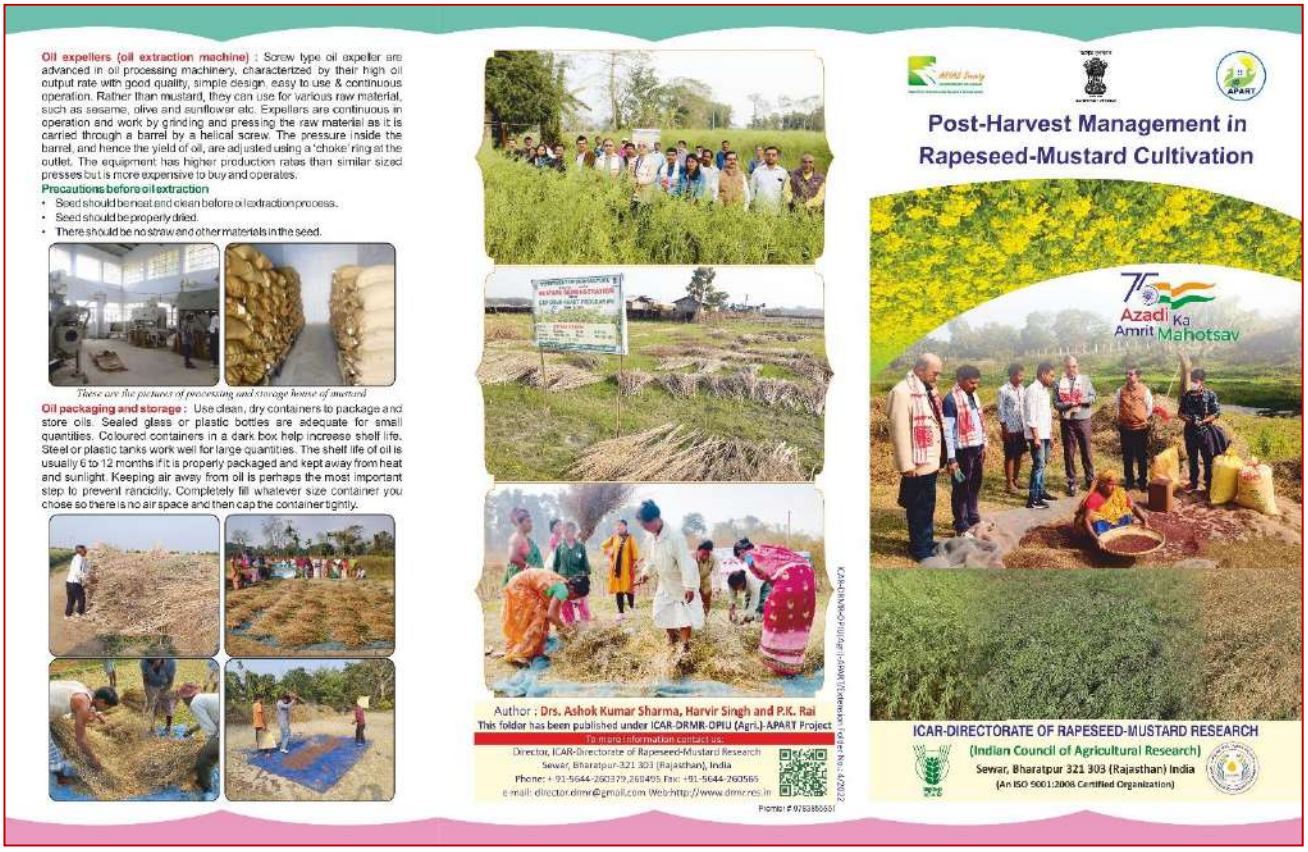
Glimpses of farmers' fair-2022



2.7. Publication of Training Manual on "Post-harvest management in rapeseed-mustard cultivation" during 2021-22.

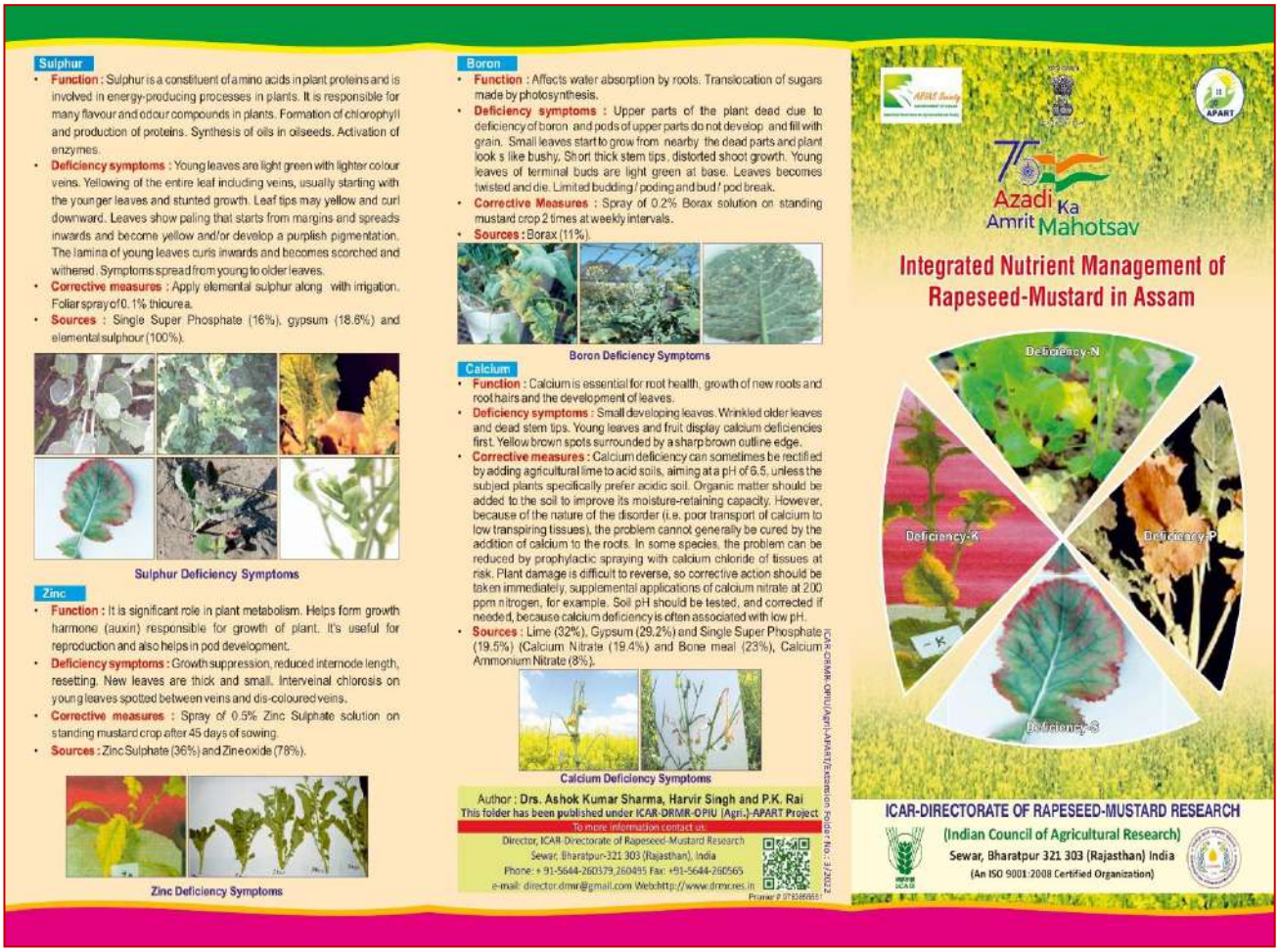
Proper handling, packaging, transportation and storage reduces the post-harvest losses in mustard. The technology has become a necessity to improve the food safety and strengthen nation's food security. Keeping in view the importance of post-harvest management of mustard, it was planned that ICAR-DRMR would support to APART in organizing PHT (Post-Harvest Technology) demonstration training. Farmers were demonstrated the post-harvest techniques and activities through these trainings. There was a need to develop an extension literature/ training manual on post harvest management so that extension personnel and farmers can get clear insight and have a ready reference of scientific practices of post harvest management practices of rapeseed-mustard.

In view of that ICAR-DRMR has developed and published an extension literature on **"Post-harvest management in rapeseed-mustard cultivation"** in the form of training manual that will help the agricultural officials and farmers of the state to focus on the specific requirements and activities needed to address post harvest losses of rapeseed mustard. ICAR-DRMR has developed this training manual in English (Master copy) and that will be translated into local languages by OPIU-Agriculture for printing of multiple copies and distribution to farmers will by District ATMAs. . It will provide support to other extension methods and facilitate use at convenience and will serve as a future reference.



2.8. Publication of technical folder on "Integrated nutrient management of rapeseed-mustard in Assam" during 2021-22.

The simple and actionable farmer-friendly extension material in the form of a **technical folder on "Integrated nutrient management of rapeseed-mustard in Assam"** in English **was** developed and published by ICAR-DRMR (master copy) and translation into local languages will be done by OPIU-Agriculture. Printing of multiple copies and distribution to farmers will be the done by District ATMAs. It will help the extension personnel and farmers of the state to identify the symptoms of nutrient deficiency and better nutrient management in rapeseed-mustard. They are handy that will provide opportunity to farmers and extension workers for reading, learning and/or referring. They are the best method for dissemination of information or a message. They save time and resources in dissemination of information to a large group of people. They can be used at any age. More efficient than oral languages.



Sulphur

- **Function :** Sulphur is a constituent of amino acids in plant proteins and is involved in energy-producing processes in plants. It is responsible for many flavour and odour compounds in plants. Formation of chlorophyll and production of proteins. Synthesis of oils in oilseeds. Activation of enzymes.
- **Deficiency symptoms :** Young leaves are light green with lighter colour veins. Yellowing of the entire leaf including veins, usually starting with the younger leaves and stunted growth. Leaf tips may yellow and curl downward. Leaves show paling that starts from margins and spreads inwards and become yellow and/or develop a purplish pigmentation. The lamina of young leaves curls inwards and becomes scorched and withered. Symptoms spread from young to older leaves.
- **Corrective measures :** Apply elemental sulphur along with irrigation. Foliar spray of 0.1% thiourea.
- **Sources :** Single Super Phosphate (16%), gypsum (18.6%) and elemental sulphour (100%).

Sulphur Deficiency Symptoms

Zinc

- **Function :** It is significant role in plant metabolism. Helps form growth harmone (auxin) responsible for growth of plant. It's useful for reproduction and also helps in pod development.
- **Deficiency symptoms :** Growth suppression, reduced internode length, resetting. New leaves are thick and small. Interveinal chlorosis on young leaves spotted between veins and dis-coloured veins.
- **Corrective measures :** Spray of 0.5% Zinc Sulphate solution on standing mustard crop after 45 days of sowing.
- **Sources :** Zinc Sulphate (36%) and Zinc oxide (78%).

Zinc Deficiency Symptoms

Boron

- **Function :** Affects water absorption by roots. Translocation of sugars made by photosynthesis.
- **Deficiency symptoms :** Upper parts of the plant dead due to deficiency of boron and pods of upper parts do not develop and fill with grain. Small leaves start to grow from nearby the dead parts and plant look s like bushy. Short thick stem tips, distorted shoot growth. Young leaves of terminal buds are light green at base. Leaves becomes twisted and die. Limited budding / poding and bud / pod break.
- **Corrective Measures :** Spray of 0.2% Borax solution on standing mustard crop 2 times at weekly intervals.
- **Sources :** Borax (11%).

Boron Deficiency Symptoms

Calcium

- **Function :** Calcium is essential for root health, growth of new roots and root hairs and the development of leaves.
- **Deficiency symptoms :** Small developing leaves. Wrinkled older leaves and dead stem tips. Young leaves and fruit display calcium deficiencies first. Yellow brown spots surrounded by a sharp brown outline edge.
- **Corrective measures :** Calcium deficiency can sometimes be rectified by adding agricultural lime to acid soils, aiming at a pH of 6.5, unless the subject plants specifically prefer acidic soil. Organic matter should be added to the soil to improve its moisture-retaining capacity. However, because of the nature of the disorder (i.e. poor transport of calcium to low transpiring tissues), the problem cannot generally be cured by the addition of calcium to the roots. In some species, the problem can be reduced by prophylactic spraying with calcium chloride of tissues at risk. Plant damage is difficult to reverse, so corrective action should be taken immediately, supplemental applications of calcium nitrate at 200 ppm nitrogen, for example. Soil pH should be tested, and corrected if needed, because calcium deficiency is often associated with low pH.
- **Sources :** Lime (32%), Gypsum (29.2%) and Single Super Phosphate (19.5%) (Calcium Nitrate (19.4%) and Bone meal (23%), Calcium Ammonium Nitrate (8%).

Calcium Deficiency Symptoms

Author : Drs. Ashok Kumar Sharma, Harvir Singh and P.K. Rai
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Azadi Ka Amrit Mahotsav

Integrated Nutrient Management of Rapeseed-Mustard in Assam

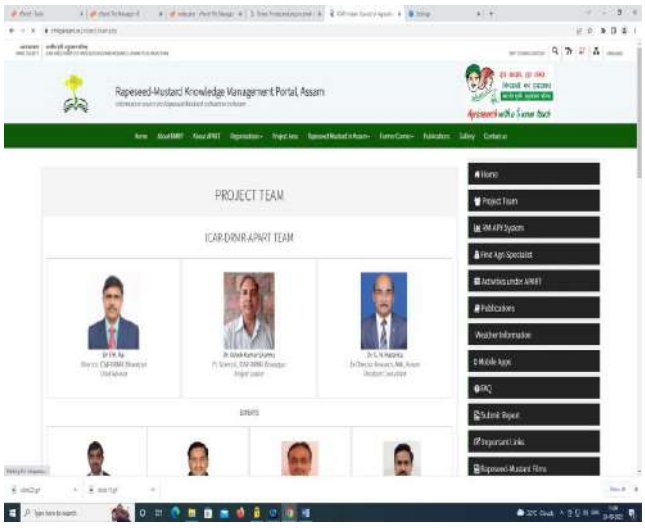
Deficiency-N
Deficiency-K
Deficiency-P
Deficiency-S

ICAR-DIRECTORATE OF RAPESEED-MUSTARD RESEARCH
(Indian Council of Agricultural Research)
Sewar, Bharatpur 321 303 (Rajasthan) India
(An ISO 9001:2008 Certified Organization)

2.9. Development of Website/ Webportal.

Knowledge is necessary to make informed decision, especially in critical situations. New technology especially, the internet and mobile technology have made a huge impact on knowledge management and information dissemination in agriculture research and production. Now a days web portal as a knowledge management and information dissemination system is very popular, which provides compressive links to information resources. In agriculture, crop specific web portals become important because farmers and extension functionary need to access the required information on-line. The main purpose of agriculture portal is to bring the vast information and service resources available from many sources to many users in an effective manner. Thus an agriculture portal provides information and service resources pertinent to agriculture to farmers, agripreneurs, extension workers, scientists and other stakeholders of agricultural development.

In view of that as per the approved activity, ICAR-DRMR has developed a webportal/website "Rapeseed-Mustard Knowledge Management Portal" (www.armkpassam.in). This portal will cater the needs of farmers, extensionists, and other stakeholders of Assam in rapeseed-mustard production and marketing. It offers enormous opportunities to explore web and mobile based access to diverse range of information and knowledge on rapeseed-mustard production and protection technologies, recommended varieties, post-harvest management of rapeseed-mustard, schemes and programmes for farmers, events, publications supported by multimedia, expert systems, and much more. Thus Rapeseed-Mustard Knowledge Management Portal (RMKP) is the *most* comprehensive and one stop shop source for credible, validated, relevant and contextual information on rapeseed-mustard in contexts of Assam state.



3. Workforce involved in the assignment:

In APART, ICAR-DRMR has appointed the key and non-key experts to take care of the project activities during the period. The list of ICAR-DRMR staff engaged in the project and locally appointed staff are given in Tables 21 and 22.

Table 21: Client's ICAR-DRMR staff engaged

SN	Name of Experts	Key or Non-Key	Designation in ICAR-DRMR	Designation in APART	Place of deployment	Date of availability for work in the assignment
1	Dr. P.K. Rai	Key	Director	Chief Advisor	Bharatpur	In place
2	Dr. Ashok Kumar Sharma	Key	Principal Scientist (Ag. Extension)	Team Leader	Bharatpur	In place
3	Dr. Harvir Singh	Key	Scientist (Agronomy)	Expert	Bharatpur	In place
4	Dr. Pankaj Sharma/	Non-key	Pr. Scientist (Plant Pathology)	Expert	Bharatpur	In place
5	Dr. Vinod Kumar/	Non-key	Pr. Scientist (Comp. Appl.)	Expert	Bharatpur	In place
6	Dr. Arun Kumar	Non-key	Pr. Scientist, (Plant Breeding)	Expert	Bharatpur	In place
7	Dr. Narpat Singh	Non-key	Research Associate	Research Associate	Bharatpur	In place
8	Ms. Anita	Non-key	Data entry Operator	Data entry Operator	Bharatpur	In place

Table 22: Client's local staff engaged

SN	Name of Experts	Key or Non-Key	Designation in ICAR-DRMR	Designation in APART	Place of deployment	Date of availability for work in the assignment
1.	Dr. G.N. Hazarika	Key	Resident Consultant	Resident Consultant	Guwahati	In place
2.	Dr. Priyakshi Buragohain	Non-key	Research Associate	Research Associate	Sivsagar	In place
3.	Dr. Bandhan Subha	Non-key	Research Associate	Research Associate	Golaghat	In place
4.	Dr. Vijay Kumar	Non-key	Research Associate	Research Associate	Barpeta	In place
5.	Dr. Joli Dutta	Non-key	Research Associate	Research Associate	Lakhimpur	In place
6.	Ms. Chayanika Borha	Non-key	Sr. Research Fellow	Sr. Research Fellow	Sonitpur	In place
7.	Ms. Sanjana Bora	Non-key	Sr. Research Fellow	Sr. Research Fellow	Darrang	In place
8.	Mr. Mohd. Danish	Non-key	Sr. Research Fellow	Sr. Research Fellow	Dhubri	In place
9.	Mr. Mrinmoy Jyoti Nath	Non-key	Sr. Research Fellow	Sr. Research Fellow	Bongaigaon	In place
10.	Mr. Himangshu Deka	Non-key	Sr. Research Fellow	Sr. Research Fellow	Kokrjhar	In place
11.	Ms. Manisha Barman	Non-key	Sr. Research Fellow	Sr. Research Fellow	Nalbari	In place
12.	Mr.Trilochan Karki Chetri	Non-key	Sr. Research Fellow	Sr. Research Fellow	Kamrup	In place
13.	Ms. Moukham Wakhet	Non-key	Sr. Research Fellow	Sr. Research Fellow	Morigaon	In place
14.	Ms. Komedity Chamua	Non-key	Sr. Research Fellow	Sr. Research Fellow	Nagaon	In place
15.	Mr. Dipankar Saikia	Non-key	Sr. Research Fellow	Sr. Research Fellow	Jorhat	In place
16.	Mr. Bidyut Pritom Gogoi	Non-key	Sr. Research Fellow	Sr. Research Fellow	Dhemaji	In place
17.	Mr. Banikanto Patri	Non-key	Office Assistant cum comp. Operator	Office Assistant cum comp. Operator	Guwahati	In place

4. Consultants Invoice and payment by the client:

Table 23. Invoice details

SN	Invoice No. and Date	Date of submission of invoice to OPIU	Date of clarification sought by OPIU, If any	Date of replies given by the consultant, if any	Date of payment by OPIU
1	ICAR-DRMR/APART/2019-20/4 dated 14-5-2020 Rs. 43.12 lakh	17-6-2020	NA	NA	5-10-2020
2	ICAR-DRMR / TAD / APART / 2020-21 / 86 dated 2-2-2021 Rs. 38.81 Lakh	2-2-2021	NA	NA	20.5-2021
3	ICAR-DRMR/TAD/APART / 2020-21 / 118 dated 28-6-2021 Rs. 30.18 Lakh	28-6-2021	NA	NA	15-7-2021
4	ICAR-DRMR/TAD/APART/2021-22/171 (Rs. 52.03 lakh)	02-12-2021	Nil	Nil	28-12-2021
5	ICAR-DRMR/TAD/APART/2021-22/ 207 (Rs.101.11 lakh)	15-2-2022	Nil	Nil	30-3-2022 (Rs. 94.63 Lakh) and 17-8-2022 (6.48 lakh)

5. Contractual issues (if any) and changes desired: Nil

6. Work plan for the next six months

Table 24: Month-wise work-plan

SN	Month wise activities	Nos.
July 2022		
1	Awareness meetings	30
2	Base line survey	-
August 2022		
1	Awareness meetings	30
2	Base line survey	-
September 2022		
1	Selection of locations for demonstrations	5000
2	Selection of beneficiaries	5000
3	Working out the seed distribution plan	15
October 2022		
1	Training of the farmers	01
2	Training of Master trainers	01
3	Distribution of seeds, fertilizers and other required inputs	5000
4	Organization of technical trainings	50
November 2022		
1	Sowing of crop demonstrations	660
2	Organization of technical trainings	100
December 2022		
1	Organization of technical trainings	50
2	Development of website/mobile app	01
3	Workshop of stakeholders	01
4	Training of the farmers	01
5	Training of Master trainers	01
6	Monitoring of crop demonstrations	5000

7. Summary of the overall progress.

The achievements and results of the period under report are summarised in the table 25, below.

Table 25. Summary of the progress of work done during Jan-June 2021-22

Activities	Unit	Target	Achievement	Remarks
Crop Demonstrations	No.	5000	5000	Completed
Minikit demonstrations	No.	9000	9000	Completed
Field days	No.	250	250	completed
PHM demonstrations	No.	45	47	Completed
Exposure visit-cum-training of progressive farmers	No.	1	1	Completed
Exposure visit-cum-training of extension personnel	No.	1	1	Completed
Farmers Fair	No.	1	1	Completed
Publication of training manual	No.	01	01	Completed
Publication of technical folder	No.	02	02	Completed
Development of Website/Webportal	No.	01	01	Completed

Annexure-I: 133 to 169

Table 1a: Performance of different varieties in crop demonstrations (CD) conducted in Barpeta district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Barpeta	PM-28	12	1517 (1433-1635)	804 (450-968)	88.7	28752	23134	98605	52260	40727	3.42	2.85
	NRCHB-101	8	1491 (1428-1530)	750 (743-835)	99.0	27933	21623	96915	48750	41855	3.47	2.25
	TS-38	7	1325 (1300-1348)	769 (743-818)	72.0	24539	21506	86125	49985	33107	3.51	2.33
Overall IR CD in Barpeta	**NRCHB 101 PM-28, TS-38**	**27**	**1457 (1300-1635)**	**775 (683-968)**	**88.0**	**27350**	**22152**	**94705**	**50375**	**39132**	**3.46**	**2.27**
Rainfed condition												
Barpeta	NRCHB-101	88	1162 (743-1455)	660 (473-828)	76.0	23242	19707	75530	42900	29095	3.24	2.17
	PM-28	84	1141 (705-1500)	636 (450-960)	79.4	23107	19287	74165	41340	29005	3.2	2.14
	DRMR-150-35	10	1014 (675-1200)	581 (495-628)	74.5	22285	20291	65910	37765	26151	2.95	1.85
	TS-38	68	988 (600-1328)	586 (410-810)	68.0	21472	18430	64220	38090	23088	3.0	2.06
Overall RF CD in Barpeta	**NRCHB 101 DRMR-150-35 PM-28, TS-38**	**250**	**1074 (728-1455)**	**615 (473-960)**	**74.6**	**22527**	**19429**	**69810**	**39975**	**26737**	**3.09**	**2.05**
Overall CD in Barpeta	**All varieties in both situations**	**277**	**1136 (600-1635)**	**643 (410-9680**	**76.7**	**23138**	**19536**	**73840**	**41795**	**28443**	**3.19**	**2.13**

Table 1b: Average performance of mustard and toria varieties in Barpeta district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Barpeta	PM-28 NRCHB 101	20	1504 (1428-1635)	777 (450-968)	93.5	28343	22379	97760	50505	41291	3.44	2.25
	TS-38	7	1325 (1300-1348)	769 (743-818)	72.3	24539	21506	86125	49985	33107	3.51	2.32
Rainfed condition												
Barpeta	PM-28, NRCHB-101 DRMR-150-35	182	1106 (675-1500)	626 (450-960)	76.6	22878	19762	71890	40690	28084	3.14	2.05
	TS-38	68	988 (600-1328)	586 (410-810)	68.6	21472	18430	64220	38090	23088	2.99	2.06

Table 2a: Performance of different varieties in crop demonstrations (CD) conducted in Bongaigaon district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Bongaigaon	NRCHB-101	5	1154 (1148-1163)	553 (503-628)	108.6	23738	17472	75010	35945	32799	3.15	2.05
	PM-28	13	1078 (788-1080)	670 (508-800)	60.8	21533	17337	70070	43550	22324	3.25	2.51
	DRMR-150-35	3	1010 (1005-1008)	665 (598-700)	51.8	19920	17178	65650	43225	19683	3.29	2.51
	TS-38	3	1212 (1200-1230)	763 (698-803)	59.0	23756	17520	78780	49595	22949	3.31	2.83
Overall IR CD in Bongaigaon	**DRMR-150-35 NRCHB-101 PM-28,TS-38**	**24**	**1102 (788-1230)**	**657 (503-800)**	**67.7**	**22068**	**17368**	**71630**	**42705**	**24225**	**3.24**	**2.45**
Rainfed condition												
Bongaigaon	NRCHB-101	95	970 (620-1125)	605 (450-870)	60.3	20080	17200	63050	39325	20935	3.13	2.28
	PM-28	127	953 (728-1080)	630 (418-780)	51.3	20129	16539	61945	40950	17405	3.07	2.47
	DRMR-150-35	17	752 (510-998)	528 (370-700)	42.4	19886	15871	48880	34320	10545	2.45	2.16
	TS-38	37	870 (562-1083)	609 (450-795)	42.8	18920	16337	56550	39585	14382	2.98	2.42
Overall RF CD in Bongaigaon	**NRCHB 101 DRMR-150-35 PM-28, TS-38**	**276**	**935 (510-1125**	**538 (370-870)**	**73.8**	**19935**	**16698**	**60775**	**34970**	**22568**	**3.04**	**2.09**
Overall CD in Bongaigaon	**All varieties in both situations**	**300**	**948 (510-1230)**	**618 (370-870)**	**53.4**	**20105**	**16741**	**61620**	**40170**	**18086**	**3.06**	**2.39**

Table 2b: Average performance of mustard and toria varieties in Bongaigaon district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Bongaigaon	DRMR-150-35 NRCHB 101 PM-28	21	1086 (788-1163)	641 (5.3-800)	69.4	21827	17346	70590	41665	24445	3.23	2.40
	TS-38	3	1212 (1200-1230)	763 (698-803)	58.5	23756	17520	78780	49595	22949	3.31	2.83
Rainfed condition												
Bongaigaon	PM-28, NRCHB 101 DRMR-150-35	239	945 (510-1125)	613 (370-870)	54.2	20092	16754	61425	39845	18242	3.05	2.37
	TS-38	37	870 (562-1083)	609 (450-795)	42.8	18920	16337	56550	39585	14382	2.98	2.42

Table 3a: Performance of different varieties in crop demonstrations (CD) conducted in Darrang district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (Kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Darrang	PM-28	22	1302 (1001-1520)	754 (598-989)	72.7	29041	22200	84630	49010	28779	2.91	2.20
	NRCHB-101	45	1168 (1012-1355)	730 (598-690)	60.0	29301	22285	75920	47450	21445	2.59	2.12
	TS-38	22	1035 (925-1183)	714 (604-921)	45	28993	22826	67275	46410	14698	2.32	2.03
Overall IR CD in Darrang	**NRCHB 101 PM-28, TS-38**	**89**	**1162 (925-1520)**	**731 (598-989)**	**59.0**	**29146**	**22421**	**75530**	**47515**	**21290**	**2.59**	**2.11**
Rainfed condition												
Darrang	DRMR-150-35	20	1006 (674-1480)	655 (508-960)	58.2	23972	20374	65390	42575	19217	2.72	2.08
	PM-28	38	935 (730-1260)	591 (456-825)	51.2	24336	20922	60775	38415	18946	2.49	1.83
	NRCHB-101	95	889 (489-1088)	587 (451-790)	53.6	24291	20783	57785	38155	16122	2.37	1.83
	TS-38	58	814 (590-940)	577 (451-643)	41.1	23394	20609	52910	37505	12620	2.26	1.81
Overall RF CD in Darrang	**DRMR 150-35 NRCHB 101 PM-28, TS-38**	**211**	**888 (590-1480)**	**591 (451-960)**	**50.3**	**24021**	**20719**	**57720**	**38415**	**16003**	**2.40**	**1.85**
Overall CD in Darrang	**All varieties in both situations**	**300**	**969 (489-1520)**	**633 (451-989)**	**53.1**	**25542**	**21226**	**62985**	**41145**	**17524**	**2.46**	**1.93**

Table 3b: Average performance of mustard and toria varieties in Darrang district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Darrang	NRCHB 101 PM-28	63	1215 (1001-1520)	739 (598-989)	64.4	29210	22255	78975	48035	23985	2.70	2.16
	TS-38	26	1035 (925-1183)	714 (604-921)	45.0	28993	22826	67275	46410	14698	2.32	2.03
Rainfed condition												
Darrang	DRMR-150-35 NRCHB 101 PM-28	153	916 (674-1480)	597 (451-960)	53.4	24259	20762	59540	38805	17238	2.45	1.87
	TS-38	58	814 (590-940)	577 (451-643)	41.1	23394	20609	52910	37505	12620	2.26	1.82

Table 4a: Performance of different varieties in crop demonstrations (CD) conducted in Dhemaji district of Assam under rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (Kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Rainfed condition												
Dhemaji	PM-28	97	1175 (712-1412)	757 (487-907)	55.2	26437	22407	76375	49205	23140	2.89	2.20
	NRCHB-101	133	1100 (635-1350)	726 (607-915)	51.5	25612	21895	71500	47190	20593	2.79	2.16
	DRMR-150-35	20	997 (780-1200)	665 (495-892)	49.9	24583	20936	64805	43225	17933	2.64	2.06
	TS-38	125	928 (545-1087)	621 (420-810)	49.4	23530	20418	60320	40365	16843	2.56	1.98
Overall RF CD in Dhemaji	**All varieties in rainfed situation**	**375**	**1056 (545-1412)**	**695 (420-915)**	**51.9**	**25076**	**21484**	**68640**	**45175**	**19873**	**2.74**	**2.10**

Table 4b: Average performance of mustard and toria varieties in Dhemaji district of Assam under rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Rainfed condition												
Dhemaji	DRMR-150-35 NRCHB- 101 PM-28	250	1121 (635-1412)	733 (487-915)	52.9	25850	22017	72865	47645	21387	2.82	2.16
	TS-38	125	928 (545-1087)	621 (420-810)	49.4	23530	20418	60320	40365	16843	2.56	1.98

Table 5a: Performance of different varieties in crop demonstrations (CD) conducted in Dhubri district of Assam under irrigated situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Dhubri	NRCHB-101	170	1514 (1101-1736)	920 (675-1085)	64.6	35454	25244	98410	59800	28400	2.78	2.37
	PM-28	130	1385 (1046-1570)	878 (591-1036)	57.7	30774	24726	90025	57070	26907	2.93	2.31
	DRMR-150-35	20	1360 (1109-1604)	866 (686-1010)	57.0	30903	24073	88400	56290	25280	2.86	2.34
	TS-38	80	1173 (954-1398)	723 (165-942)	62.2	29354	22960	76245	46995	22856	2.60	2.05
Overall IR CD in Dhubri	**All varieties in irrigated situation**	**400**	**1396 (954-1736)**	**864 (165-1085)**	**61.6**	**32485**	**24560**	**90740**	**56160**	**28655**	**2.79**	**2.28**

Table 5b: Average performance of mustard and toria varieties in Dhubri district of Assam under irrigated situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Dhubri	DRMR-150-35 NRCHB 101 PM-28	320	1419 (1046-1736)	888 (591-1085)	59.8	32377	24681	92235	57720	26819	2.85	2.34
	TS-38	80	1173 (954-1398)	723 (165-942)	62.2	29354	22960	76245	46995	22856	2.60	2.05

Table 6a: Performance of different varieties in crop demonstrations (CD) conducted in Golaghat district of Assam under rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Rainfed condition												
Golaghat	PM-28	76	1098 (864-1316)	696 (488-880)	57.8	26077	18453	65646	41529	16493	2.51	2.25
	DRMR-150-35	28	1046 (764-1288)	688 (480-864)	52.0	27772	20074	65072	42832	14542	2.34	2.13
	TS-38	52	1139 (960-1312)	724 (580-900)	57.3	26973	19110	70430	44573	17994	2.61	2.33
Overall RF CD in Golaghat	**All varieties in rainfed situation**	**156**	**1094 (764-1316)**	**703 (480-900)**	**55.6**	**26941**	**19236**	**67049**	**42978**	**16366**	**2.48**	**2.23**

Table 6b: Average performance of mustard and toria varieties in Golaghat district of Assam under rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Rainfed condition												
Golaghat	PM-28 DRMR-150-35	104	1072 (764-1316)	692 (480-880)	54.9	26925	19264	65359	42181	15517	2.42	2.18
	TS-38	52	1139 (960-1312)	724 (580-900)	57.3	26973	19110	70430	44573	17994	2.61	2.33

Table 7a: Performance of different varieties in crop demonstrations (CD) conducted in Jorhat including Majuli district of Assam under rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Rainfed Condition												
Jorhat and Majuli	PM-28	94	1217 (885-1695)	885 (454-1150)	37.5	27755	23826	79105	57525	17651	2.85	2.41
	NRCHB-101	100	1056 (710-1372)	803 (515-1054)	31.5	27624	23859	68640	52195	12680	2.48	2.19
	DRMR-150-35	29	818 (667-1113)	664 (667-818)	23.2	27259	23744	53170	43160	6495	1.95	1.82
	TS-38	70	1082 (758-1350)	820 (531-1100)	32.0	26544	22787	70330	53300	13273	2.65	2.34
Overall RF CD in Jorhat and Majuli	**All varieties in rainfed situation**	**293**	**1090 (710-1695)**	**820 (454-1150)**	**32.9**	**27381**	**23587**	**70850**	**53300**	**13756**	**2.58**	**2.25**

Table 7b: Average performance of mustard and toria varieties in Jorhat including Majuli district of Assam under rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Rainfed condition												
Jorhat and Majuli	DRMR-150-35 NRCHB 101 PM-28	223	1093 (667-1695)	820 (454-1150)	33.3	27645	23839	71045	53300	13939	2.57	2.24
	TS-38	70	1082 (758-1350)	820 (531-1100)	32.0	26544	22787	70330	53300	13273	2.65	2.34

Table 8a: Performance of different varieties in crop demonstrations (CD) conducted in Kamrup district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Kamrup	DRMR-150-35	30	1605 (1492-1820)	922 (621-1150)	74.1	27955	24140	104325	59930	40580	3.73	2.48
	NRCHB-101	81	1333 (1039-1780)	815 (559-1142)	63.6	27737	24820	86645	52975	30753	3.12	2.13
	PM-28	47	1194 (943-1350)	933 (850-1060)	28.0	27042	25048	77610	60645	14971	2.87	2.42
	TS-38	25	1196 (958-1350)	935 (719-1110)	27.9	28066	26409	77740	60775	15308	2.77	2.30
Overall IR CD in Kamrup	**NRCHB 101 DRMR-150-35 PM-28, TS-38**	**183**	**1340 (943-1820)**	**879 (559-1150)**	**52.5**	**27639**	**24984**	**87100**	**57135**	**27310**	**3.15**	**2.29**
Rainfed												
Kamrup	TS-38	75	963 (750-1186)	709 (495-920)	35.8	23700	21698	62595	46085	14508	2.64	2.12
	PM-28	49	781 (416-1050)	612 (300-750)	27.6	23047	20802	50765	39780	8740	2.20	1.91
Overall RF CD in Kamrup	**PM-28, TS-38**	**124**	**891 (416-1186)**	**671 (300-920)**	**32.8**	**23442**	**21344**	**57915**	**43615**	**12202**	**2.47**	**2.04**
Overall all CD in Kamrup	**All varieties in both situations**	**307**	**1158 (416-1820)**	**795 (300-1150)**	**45.7**	**25944**	**23663**	**75270**	**51675**	**21314**	**2.90**	**2.18**

Table 8b: Average performance of mustard and toria varieties in Kamrup district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Kamrup	PM-28, NRCHB 101 DRMR-150-35	158	1362 (943-1820)	870 (559-1150)	56.6	27572	24760	88530	56550	29168	3.21	2.28
	TS-38	25	1196 (958-1350)	935 (719-1110)	27.9	28066	26409	77740	60775	15308	2.77	2.30
Rainfed condition												
Kamrup	PM-28	49	781 (416-1050)	612 (300-750)	27.6	23047	20802	50765	39780	8740	2.20	1.91
	TS-38	75	963 (750-1186)	709 (495-920)	35.8	23700	21698	62595	46085	14508	2.64	2.12

Table 9a: Performance of different varieties in crop demonstrations (CD) conducted in Kokrajhar district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Kokrajhar	PM-28	23	1332 (1220-1410)	926 (790-1120)	43.8	32811	25866	86580	60190	19445	2.63	2.32
	NRCHB-101	28	1248 (1125-1360)	816 (620-1060)	52.9	32568	23940	81120	53040	19452	2.49	2.21
	DRMR-150-35	14	1211 (1050-1360)	815 (695-1020)	48.6	32456	24213	78715	52975	17497	2.42	2.18
	TS-38	4	1083 (995-1180)	696 (616-720)	55.6	32481	21997	70395	45240	14671	2.16	2.05
Overall IR CD	**NRCHB 101, DRMR-150-35 PM-28, TS-38**	**69**	**1258 (995-1410)**	**845 (616-1120)**	**48.9**	**32621**	**24524**	**81770**	**54924**	**18749**	**2.50**	**2.23**
Rainfed condition												
Kokrajhar	PM-28	77	946 (740-1150)	678 (540-800)	39.5	26217	20482	61490	44070	11685	2.34	2.15
	NRCHB-101	72	915 (690-1140)	626 (550-810)	46.1	26297	20344	59475	40690	12832	2.26	2.00
	DRMR-150-35	6	907 (755-1360)	651 (610-730)	39.3	26440	20369	58955	42315	10569	2.22	2.07
	TS-38	76	836 (710-960)	615 (540-820)	35.9	26020	20623	54340	39975	8968	2.08	1.93
Overall RF CD	**NRCHB 101 DRMR-150-35 PM-28, TS-38**	**231**	**899 (690-1360)**	**640 (615-820)**	**40.5**	**26183**	**20482**	**58435**	**41600**	**11134**	**2.23**	**2.19**
Overall all CD	**All varieties in both situations**	**300**	**982 (690-1410)**	**708 (615-1120)**	**38.7**	**27663**	**21412**	**63830**	**46020**	**11559**	**2.30**	**2.14**

Table 9b: Average performance of mustard and toria varieties in Kokrajhar district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Kokrajhar	PM-28, NRCHB 101 DRMR-150-35	65	1269 (1050-1410)	854 (620-1120)	48.6	32630	24680	82485	55510	19025	2.53	2.25
	TS-38	4	1083 (995-1180)	696 (616-720)	55.6	32481	21997	70395	45240	14671	2.17	2.06
Rainfed condition												
Kokrajhar	PM-28, NRCHB 101 DRMR-150-35	155	930 (690-1360)	672 (540-810)	38.4	26263	20414	60450	43680	10921	2.30	2.14
	TS-38	76	836 (710-960)	615 (540-820)	27.3	26020	20623	54340	42705	6238	2.09	2.07

Table 10a: Performance of different varieties in crop demonstrations (CD) conducted in Lakhimpur district of Assam under rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Rainfed condition												
Lakhimpur	PM-28	200	1024 (778-1270)	626 (414-645)	63.6	26257	21430	66560	40690	21043	2.53	1.90
	DRMR-150-35	20	882 (730-1035)	553 (456-650)	59.5	25257	20560	57330	35945	16688	2.27	1.75
	NRCHB-101	150	835 (645-1050)	509 (385-620)	64.1	24070	19555	54275	33085	16675	2.25	1.69
	TS-38	130	762 (572-990)	485 (220-650)	57.1	22790	19930	49530	31525	15145	2.17	1.58
Overall RF CD in Lakhimpur	**All varieties in Rainfed situation**	**500**	**893 (572-1270)**	**551 (220-650)**	**62.1**	**24659**	**20383**	**58045**	**35815**	**17954**	**2.35**	**1.75**

Table 10b: Average performance of mustard and toria varieties in Lakhimpur district of Assam under rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Rainfed condition												
Lakhimpur	PM-28 NRCHB- 101 DRMR-150-35	370	913 (645-1270)	562 (385-650)	62.5	25195	20515	59345	36530	18135	2.35	1.78
	TS-38	130	762 (572-990)	485 (220-650)	57.1	22790	19930	49530	31525	15145	2.17	1.58

Table 11a: Performance of different varieties in crop demonstrations (CD) conducted in Morigaon district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Morigaon	NRCHB-101	10	1438 (1160-1850)	933 (742-1280)	54.1	29274	25362	93470	60645	28913	3.19	2.39
	DRMR-150-35	4	1111 (1000-1250)	612 (590-650)	81.5	27512	22618	72215	39780	27541	2.62	1.76
	TS-38	22	1092 (899-1250)	615 (399-795)	77.6	26553	23357	70980	39975	27809	2.67	1.71
Overall IR CD in Morigaon	**NRCHB 101 DRMR150-35 TS-38**	**36**	**1190 (899-1850)**	**702 (615-1280)**	**69.5**	**27368**	**23100**	**77350**	**45630**	**27452**	**2.83**	**1.98**
Rainfed condition												
Morigaon	NRCHB-101	84	784 (546-1033)	505 (320-650)	55.3	23703	20975	50960	32825	15407	2.15	1.56
	DRMR-150-35	6	868 (755-940)	573 (506-650)	51.5	24084	21317	56420	37245	16408	2.34	1.75
	TS-38	58	699 (356-965)	462 (307-675)	51.3	22796	20213	45435	30030	12822	1.99	1.49
Overall RF CD in Morigaon	**NRCHB-101 DRMR-150-35 TS-38**	**148**	**754 (356-1033)**	**490 (307-675)**	**53.8**	**23208**	**20606**	**49010**	**31850**	**14558**	**2.11**	**1.54**
Overall CD in Morigaon	**All varieties in both situations**	**184**	**839 (356-1850)**	**532 (307-1280)**	**57.7**	**24146**	**21161**	**54535**	**34580**	**16970**	**2.26**	**1.63**

Table 11b: Average performance of mustard and toria varieties in Morigaon district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Morigaon	NRCHB-101 DRMR-150-35	14	1345 (1000-1850)	841 (590-1280)	59.9	36631	24578	87425	54665	20707	2.38	2.22
	TS-38	22	1092 (899-1250)	615 (399-795)	77.6	26553	23357	70980	39975	27809	2.67	1.71
Rainfed condition												
Morigaon	NRCHB-101 DRMR-150-35	90	790 (546-1033)	510 (320-650)	54.9	23728	21009	51350	33150	15481	2.16	1.58
	TS-38	58	699 (356-965)	462 (307-675)	51.3	22796	20213	45435	30030	12822	1.99	1.49

Table 12a: Performance of different varieties in crop demonstrations (CD) conducted in Nagaon district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Nagaon	DRMR-150-35	5	1476 (1370-1700)	918 (865-1010)	60.8	29775	23708	95940	59670	30203	3.22	2.51
	PM-28	53	1467 (1202-2000)	875 (710-1010)	67.7	28415	23698	95355	56875	33763	3.35	2.42
	NRCHB-101	18	1174 (975-1600)	867 (770-980)	35.4	29304	24904	76310	56355	15555	2.61	2.26
	TS-38	38	1177 (920-1480)	848 (710-965)	38.8	25566	22080	76505	55120	17899	2.99	2.49
Overall IR CD in Nagaon	**DRMR-150-35 NRCHB 101 PM-28, TS-38**	**114**	**1324 (920-2000)**	**866 (710-1010)**	**52.9**	**27665**	**23349**	**86066**	**56290**	**25460**	**3.11**	**2.41**
Rainfed condition												
Nagaon	PM-28	47	1034 (825-1380)	717 (520-905)	44.2	23729	19926	67210	46605	16802	2.83	2.33
	NRCHB-101	132	864 (590-1260)	645 (503-795)	33.9	23349	19503	56160	41925	10389	2.40	2.14
	DRMR-150-35	13	819 (590-1050)	611 (350-780)	34.0	21969	18530	53235	39715	10081	2.42	2.14
	TS-38	92	991 (820-1280)	729 (510-890)	35.9	20534	17734	64415	47385	14230	3.15	2.69
Overall RF CD in Nagaon	**DRMR-150-35 NRCHB 101 PM-28, TS-38**	**284**	**931 (590-1380)**	**683 (350-905)**	**36.3**	**22436**	**18955**	**60515**	**44395**	**16120**	**2.69**	**2.34**
Overall CD in Nagaon	**All varieties in both situations**	**398**	**1043 (590-2000)**	**735 (350-1010)**	**41.9**	**23934**	**20214**	**67795**	**47775**	**16300**	**2.83**	**2.36**

Table 12b: Average performance of mustard and toria varieties in Nagaon district of Assam under irrigated and rainfed situationduring 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Nagaon	DRMR-150-35 NRCHB 101 PM-28	76	1398 (975-2000)	876 (710-1010)	59.6	28715	23984	90870	56940	29199	3.16	2.37
	TS-38	38	1177 (920-1480)	848 (710-965)	38.8	25566	22080	76505	55120	17899	2.99	2.50
Rainfed condition												
Nagaon	DRMR-150-35 NRCHB 101 PM-28	192	903 (590-1380)	661 (350-905)	36.6	23348	19541	58695	42965	11923	2.51	2.20
	TS-38	92	991 (820-1280)	729 (510-890)	35.9	20534	17734	64415	47385	14230	3.14	2.67

Table 13a: Performance of different varieties in crop demonstrations (CD) conducted in Nalbari district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (Kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Nalbari	PM-28	20	1481 (1210-1755)	1045 (915-1150)	41.7	32594	25574	96265	67925	21320	2.95	2.65
	NRCHB-101	29	1193 (969-1350)	914 (820-1095)	30.5	29967	24050	77545	59410	24052	2.58	2.47
	TS-38	32	944 (825-1167)	722 (630-905)	30.7	29632	24658	61360	46930	9456	2.07	1.90
Overall IR CD in Nalbari	**NRCHB 101 PM-28, TS-38**	**81**	**1165 (825-1755)**	**870 (630-1155)**	**33.9**	**30483**	**24666**	**75725**	**56550**	**13358**	**2.48**	**2.29**
Rainfed condition												
Nalbari	PM-28	40	1112 (810-1310)	763 (510-815)	45.7	27724	23539	72280	49595	18500	2.60	2.10
	NRCHB-101	36	854 (745-990)	628 (520-800)	36.0	26645	22537	55510	40820	10582	2.08	1.81
	TS-38	18	751 (670-860)	560 (510-690)	34.1	26771	22563	48815	36400	8207	1.82	1.61
Overall RF CD in Nalbari	**NRCHB 101 PM-28, TS-38**	**94**	**949 (670-1310)**	**672 (510-800)**	**41.2**	**27128**	**22968**	**61685**	**43680**	**13845**	**2.27**	**1.90**
Overall CD in Nalbari	**All varieties in both situations**	**175**	**1046 (670-1755)**	**764 (510-1155)**	**36.9**	**28681**	**23754**	**67990**	**49660**	**13403**	**2.37**	**2.09**

Table 13b: Average performance of mustard and toria varieties in Nalbari district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean seed Yield (Kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Nalbari	PM-28, NRCHB-101	49	1310 (969-1755)	967 (820-1150)	35.5	31039	24672	85150	62855	15928	2.74	2.55
	TS-38	32	944 (825-1167)	722 (630-905)	30.8	29632	24658	61360	46930	9456	2.07	1.90
Rainfed condition												
Nalbari	PM-28, NRCHB-101	76	990 (745-1310)	699 (510-815)	41.6	27213	23064	64350	45435	14766	2.36	1.97
	TS-38	18	751 (670-860)	560 (510-690)	34.1	26771	22563	48815	36400	8207	1.82	1.61

Table 14a: Performance of different varieties in crop demonstrations (CD) conducted in Sivasagar district of Assam under rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Rainfed condition												
Sivasagar	PM-28	91	1203 (955-1338)	542 (433-700)	122.0	32382	22823	78195	35230	33406	2.41	1.54
	DRMR-150-35	30	1160 (897-1407)	628 (517-707)	84.7	30586	22131	75400	40820	26125	2.47	1.84
	TS-38	60	1034 (802-1127)	527 (431-637)	96.2	27125	22522	67210	34255	28352	2.48	1.52
Overall RF CD in Sivasagar	**All varieties in rainfed situation**	**181**	1139 (897-1407)	559 (431-707)	**104.0**	**30472**	**22609**	**74035**	**36335**	**29837**	**2.42**	**1.60**

Table 14b: Average performance of mustard and toria varieties in Sivasagar district of Assam under rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Rainfed condition												
Sivasagar	DRMR-150-35 PM-28	121	1192 (897-1407)	576 (433-707)	106.9	31936	22652	77480	37440	30756	2.43	1.65
	TS-38	60	1139 (897-1407)	559 (431-707)	96.2	27125	22522	67210	34255	28352	2.48	1.52

Table 15a: Performance of different varieties in crop demonstrations (CD) conducted in Sonitpur district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (Kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Sonitpur	PM-28	26	1569 (1439-1735)	580 (412-690)	170.5	28247	22418	101985	37700	58456	3.61	1.68
	DRMR-150-35	6	1540 (1237-1730)	566 (412-697)	172.1	28320	22416	100100	36790	57406	3.53	1.64
	NRCHB-101	33	1340 (1267-1425)	580 (489-630)	131.0	28262	22398	87100	37700	43536	3.08	1.68
	TS-38	15	1168 (1125-1192)	555 (410-637)	110.5	28210	22402	75920	36075	34037	2.69	1.61
Overall IR CD in Sonitpur	**DRMR-150-35 NRCHB 101 PM-28, TS-38**	**80**	**1407 (1125-1735)**	**574 (410-697)**	**145.0**	**28088**	**22407**	**91455**	**37310**	**48464**	**3.25**	**1.66**
Rainfed condition												
Sonitpur	PM-28	174	1224 (787-1605)	535 (345-698)	128.8	25695	21180	79560	34775	40270	3.09	1.64
	DRMR-150-35	24	1158 (925-1320)	528 (337-690)	119.3	25858	21449	75270	34320	36541	2.91	1.60
	NRCHB-101	167	1063 (790-1335)	517 (360-700)	105.6	25694	21284	69095	33605	31080	2.69	1.57
	TS-38	55	974 (787-1215)	512 (360-682)	90.2	25772	21334	63310	33280	25592	2.45	1.55
Overall RF CD in Sonitpur	**DRMR-150-35 NRCHB 101 PM-28, TS-38**	**420**	**1122 (787-1605)**	**525 (345-700)**	**113.0**	**25714**	**21257**	**72930**	**34125**	**34348**	**2.83**	**1.60**
Overall CD in Sonitpur	**All varieties in both situations**	**500**	**1167 (787-1735)**	**532 (345-700)**	**119.0**	**26115**	**21439**	**75855**	**34580**	**36599**	**2.90**	**1.61**

Table 15b: Average performance of mustard and toria varieties in Sonitpur district of Assam under irrigated and rainfed situation during 2021-22 under ICAR-DRMR-OPIU (APART) project

Name of District	Varieties in IP	No. of CD	Mean Seed Yield (Kg /ha)		YIOFP (%)	COC (Rs/ha)		GMR (Rs/ha)		ANMR (Rs/ha)	B: C Ratio	
			IP	FP		IP	FP	IP	FP		IP	FP
Irrigated condition												
Sonitpur	DRMR-150-35 NRCHB 101 PM-28	64	1463 (1265-1735)	579 (412-697)	152.7	28260	22409	95095	37635	51609	3.37	1.68
	TS-38	15	1168 (1125-1192)	555 (410-637)	110. 5	28210	22402	75920	36075	34037	2.69	1.61
Rainfed condition												
Sonitpur	DRMR-150-35 NRCHB 101 PM-28	361	1147 (787-1605)	527 (337-700)	117.7	25705	21245	74555	34255	35840	2.90	1.61
	TS-38	60	974 (787-1215)	512 (360-682)	90.2	25772	21334	63310	33280	25592	2.46	1.56