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Ghana Kanta Sarma
Subject Matter Specialist, Department of Agriculture Economics, Krishi Vigyan Kendra, Barpeta, Howly, Assam, India

FUA Ahmed
Sr. Scientist and Head, Krishi Vigyan Kendra, Dhubri, Assam, India

RK Saud
Associate Director of Extension Education (P), Assam Agricultural University, Jorhat, Assam, India

M Neog
Associate Director of Extension Education (P), Assam Agricultural University, Jorhat, Assam, India

PK Pathak
Director of Extension Education, Assam Agricultural University, Jorhat, Assam, India

Corresponding Author:
Ghana Kanta Sarma
Subject Matter Specialist, Department of Agriculture Economics, Krishi Vigyan Kendra, Barpeta, Howly, Assam, India

Impact assessment of cluster frontline demonstration (CFLD) programme on oilseed crops: A study in Dhubri district of Assam

Ghana Kanta Sarma, FUA Ahmed, RK Saud, M Neog and PK Pathak

Abstract
Oilseeds are very important crops. It is the second most important determinant crop next to cereals; but still there is a very big gap in the demand and supply of oilseed crops and so, the production of oilseeds in India is considered to be the great importance. The study was conducted with the objectives to know the extent of vertical and horizontal spread of technologies demonstrated under CFLD on oilseeds (crop: Rapeseed) programmes and to analyze the changes of yield and income of oilseed crops after adoption of interventions demonstrated under the programmes. Total three clusters under rapeseed demonstration were randomly selected and the data were collected from 60 numbers of farmers out of which 30 were beneficiary farmers (demonstrated) and the 30 were non-beneficiary farmers. The results revealed that for both beneficiary and non-beneficiary farmers, the area under cultivation (ha) and productivity of the crop (q/ha) was gradually increasing over the years from 2016-1 to 2020-21. The increase in area and productivity of beneficiary farmer were calculated as 239.58 per cent and 9.78 per cent, respectively during 2020-21 over 2016-17 while for non-beneficiary farmers it was 13.91 per cent and 6.83 per cent, respectively. The increase in average net return for beneficiary and non-beneficiary farmers was calculated as 95.57 and 113.31 per cent respectively during 2020-21 over 2016-17**.** The mean technology gap (q/ha) and technology index (%) was calculated as 2.83 and 25.73, respectively.

Keywords: beneficiary, oilseed, productivity, technology, yield

Introduction
In the perspective of the agricultural economy in India, oilseed crops have an important role and are considered as the second most important determinant crop next to cereals. There is a very big gap in the demand and supply of oilseed crops and so, the production of oilseeds in India is considered to be the great importance. As a result, there was increase in import of vegetables oil to 9% during November-December, 2020 as compared to 2019[1]. The demand-supply gap in the edible oils results the huge imports of edible oils and accounted for 60 per cent of the country's requirements. Due to the Yellow Revolution, the production of oilseeds attained the level of self-sufficiency during early 1990's but, it could unable to sustain for a long period. In spite of India being the fifth largest oilseeds producing country in the world, it is also recognized as one of the largest importers of vegetable oils today. In spite of being the commendable performance of oilseeds production of the nine oilseed crops in India, it could hardly fulfill the per capita demand due to increased per capita consumption (18 kg oil per annum) driven by increase in population and enhanced per capita income. The oilseeds include crops in Assam are rapeseed (toria), mustard, linseed, sesamum, Nizer, Soyabean and ground nut and they are recognized as the oilseed crops which occupied about 8.46% of the total cropped area[2]. The programme of Cluster Front Line Demonstration (CFLD) was initiated by the Ministry of Agriculture and Farmer's welfare, GoI, New Delhi under National Mission on Oilseeds and Oil Palm (NMOOP). The division of Agricultural Extension, Indian Council Agricultural Research (ICAR), New Delhi put responsibility to lay out the CFLD on important oilseed crops such as sesamum, rapeseed and linseed to conduct demonstrations through Krishi Vigyan Kendras throughout the country. The programme aimed to increasing the productivity of oilseeds throughout the country. The CFLD programme plays an important role to minimize the adoption gap and increase the productivity amongst the farming community. The study was conducted with the objectives to study extent of vertical and horizontal spread of technologies demonstrated under CFLD programmes and to analyze the changes of yield and income of oilseed crops after adoption of interventions demonstrated under CFLD programmes.

Methodology

The study was conducted in the Dhubri district of Assam. The data was collected for consecutive 5 (five) years from 2016-2017 to 2020-2021.

Selection of clusters: Out of six clusters under demonstration, three clusters were selected randomly to carry out the study.

Selection of respondents: A sample of 10 nos. of participating farmers from each cluster and 10 non-participating farmers from the same area were selected as respondents. In order to assess horizontal spread, four villages were selected from each direction with an aerial distance of <0.5-1km. From three clusters total 30 numbers of practicing farmers and 30 numbers of non-practicing farmers were selected for the study.

Sampling plan

The following sampling plan was for conduct the study.

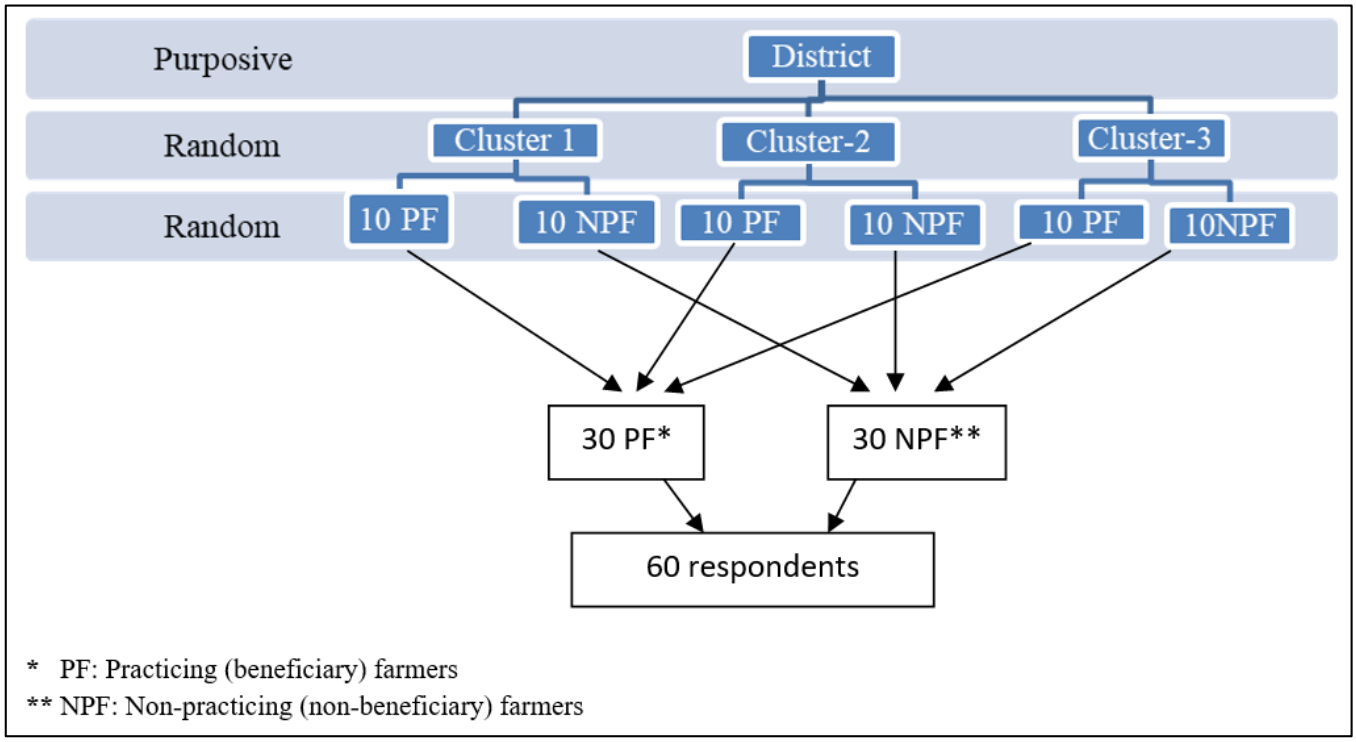

Fig 1: Sampling plan in the study area

Data collection tools

Research Schedule was prepared and tested prior going for data collection. Both sample survey and PRA technique was followed for collection of data.

Data Analysis

Per cent increase in yield (%) = {Yield gain in assessment year (q/ha) - Yield gain in base Year (q/ha)}/Yield gain in base year (q/ha) x 100

The Extension gap (Eg), Technology gap (Tg) and Technology index (Ti) were calculated as suggested by Kadian *et al.*, (1997) [3], Samui *et al.* [4], (2000) and Dayanand *et al.* (2012) [5].

Extension gap (Eg) = Demonstrated yield (Dy) – Farmers' practice yield (Fpy)

Technology gap (Tg) = Potential Yield (Py) - Demonstrated Yield (Dy)

Technology index (Ti in %) = (Py – Dy)/ Py x100

Benefit cost ratio (BCR) = Gross monetary returns (GMR) in Rs. per ha /Gross Monetary expenditure (GME) in Rs. per ha

Results and Discussion

The following results were found from the study.

The name of the clusters where the study was conducted for impact assessment of crop toria has been presented in Table 1. Three clusters namely; Gaurangtari Pt II, Hakama and Rabantari were selected for the study.

Table 1: Name of clusters selected

Cluster I	Gaurangtari Pt II
Cluster II	Hakama
Cluster III	Rabantari

Distribution of farm families according to different categories

The farm families were categorized based on the operational land holding. Distribution of farm families according to different categories has been presented in Table 2. Out of three different clusters in the study area, it was observed that the highest percentage of population was calculated for small farmer category in all the clusters of beneficiary farmers followed by marginal, semi medium and medium category farmers. In case of non-beneficiary farmers, the highest percentage of population was recorded for marginal category farmers in all the clusters followed by small, semi medium and medium category of farmers. It is a very common that 85.56 per cent farmers in the state of Assam are under marginal and small categories. Similar finding was reported by Phukan and Barman (2021) [6].

Table 2: Distribution of farm families according to different categories

Farm Category	Farm Family			% of Farm family		
	Gaurangtari Pt II	Hakama	Rabantari	Gaurangtari Pt II	Hakama	Rabantari
Marginal						
Beneficiary	7	11	9	23.33	36.67	30.00
Non-beneficiary	13	14	12	43.33	46.67	40.00
Small						
Beneficiary	14	12	17	46.67	40.00	56.67
Non-beneficiary	9	10	11	30.00	33.33	36.67
Semi medium						
Beneficiary	5	6	2	16.67	20.00	6.67
Non-beneficiary	5	4	5	16.67	13.33	16.67
Medium						
Beneficiary	4	1	2	13.33	3.33	6.67
Non-beneficiary	3	2	2	10.00	6.67	6.67
Total						
Beneficiary	30	30	30	50.00	50.00	50.00
Non-beneficiary	30	30	30	50.00	50.00	50.00
Total of All	60	60	60	100.00	100.00	100.00

Average size of operational holding (in ha) in the study area

The operational holding (in ha) increases with the increase in the farmers category (Table 3). Out of the total beneficiary farmers, the highest operational holding was recorded for the cluster Gaurangtari Pt II (9.19 ha) followed by Rabantari (9.08 ha) and Hakama cluster (8.93 ha). In case of non-beneficiary farmers, the highest operational holding was recorded for Rabantari cluster (9.07 ha) followed by Gaurangtari Pt. II (9.02 ha) and Hakama cluster (8.80 ha).

Table 3: Distribution of farm families according to average size of operational holding (in Ha)

Farm Category	Farm Families					
	Gaurangtari Pt II	% to the total	Hakama	% to the total	Rabantari	% to the total
Marginal						
Beneficiary	0.78	8.49	0.87	9.74	0.92	10.13
Non-beneficiary	0.65	7.21	0.73	8.30	0.84	9.26
Small						
Beneficiary	1.37	14.91	1.41	15.79	1.57	17.29
Non-beneficiary	1.55	17.18	1.32	15.00	1.39	15.33
Semi medium						
Beneficiary	2.76	30.03	2.47	27.66	2.38	26.21
Non-beneficiary	2.69	29.82	2.32	26.36	2.61	28.78
Medium						
Beneficiary	4.28	46.57	4.18	46.81	4.21	46.37
Non-beneficiary	4.13	45.79	4.43	50.34	4.23	46.64
Total						
Beneficiary	9.19	100.00	8.93	100.00	9.08	100.00
Non-beneficiary	9.02	100.00	8.80	100.00	9.07	100.00

Major cropping pattern

Dhubri district is an agriculturally developed district in the state of Assam. On account of having low lying cropped areas, the cropping pattern becomes varies with land situation. The major cropping patterns identified in the district were given in Table 4.

Table 4: Major cropping pattern in the village

Major Cropping Pattern	Land situation
Summer rice–toria/lentil/rabi maize	Low land
Summer rice – Fallow	Low land
Winter Rice – fallow	Medium low land
Winter Rice – Toria	Medium low land
Winter Rice – Potato	Medium land
Winter Rice – Winter vegetables	Medium land

Year wise Area (ha), production (q), productivity (q/ha) and Extension gap (q/ha):

The year wise area (ha), production (q), productivity (q/ha) and extension gap (q/ha) of toria in the study area has been depicted in Table 5. It is observed from the table that in all clusters the area covered under beneficiary farmers (demonstrated farmers) was less than non-beneficiary farmers during 2016-17 and 2017-18; but the good sign was that the area was gradually increased in every next year till 2020-21. During 2016-17, total 4.8 ha area was covered by the beneficiary farmers and it rose to 16.3 ha area during 2020-21 i.e. there was 239.58 per cent increase in area (vertical spread) for beneficiary farmers against 13.21 per cent increase in area (vertical spread) for non-beneficiary farmers. This indicated that the fellow farmers were influenced with the demonstrated interventions conducted in the cluster and so they extended the area under cultivation. It was a positive aspect of the demonstration.

With the implementation of the cluster frontline demonstration programme and imparting of training on improved method of toria cultivation, during 2016-17, the average yield obtained was 7.77 q/ha for beneficiary farmers

against 7.47 q/ha for non-beneficiary farmers with an average extension gap of 0.30 q/ha in all the three clusters as a whole. The gap should be lessen by using various extension methods like training and awareness programmes by extension personnel, timely dissemination of information through print or electronic media etc. The increased awareness created by the extension functionaries would motivate the farmers to adopt improved practices and thereby reduce the extension gap Singh *et al.* (2001) [7]. Over the years the yield was increased till 2020-21. During 2020-21, the yield rose to 8.53 q/ha for beneficiary farmers and 7.98 q/ha for non-beneficiary farmers with an average extension gap of 0.55 q/ha. There was 9.78 per cent increase in yield from 2016-17 to 2020-21 for beneficiary farmers and 6.83 per cent for non-beneficiary farmers. This implied that both beneficiary and non-beneficiary farmers were adopted and benefitted from the Cluster Frontline Demonstration programmes conducted and the non-beneficiary farmers were influenced with the demonstration programme. Some similar findings were reported by different researchers Samui *et al.* [4], Hiremath *et al.* (2007) [8], Kiresur *et al.* (2020) [9], Kumar and Chauhan (2005) [10], Saikia *et al.* (2018) [11]. In case of production, the total production was 37.46 q for beneficiary farmers and 85.74 q for non-beneficiary farmers during 2016-17 and it gradually increased. During 2020-21, 138.9 q was produced by the beneficiary farmers and 104.74 q by non-beneficiary farmers. In terms of percentage, there was 270.80 per cent increase in production from 2016-17 to 2020-21 for beneficiary farmers and 22.16 per cent for non-beneficiary farmers. This revealed that the beneficiary farmers motivated with the improved cultivation practices of toria cultivation and followed accordingly.

Table 5: Year wise Area (ha), production (q) and productivity (q/ha) of toria in study area

Years and Clusters	Beneficiary			Non-beneficiary			Extension gap (q/ha)
	Area covered (ha)	Production (q)	Productivity (q/ha)	Area covered (ha)	Production (q)	Productivity (q/ha)	
2016-17							
Gaurangtari Pt II	1.07	8.13	7.6	2.9	21.52	7.42	0.18
Hakama	1.33	10.37	7.8	5.4	39.96	7.40	0.40
Rabantari	2.4	18.96	7.9	3.2	24.26	7.58	0.32
Total	4.8	37.46	7.77 (Av.)	11.5	85.74	7.47 (Av.)	0.30 (Av.)
2017-18							
Gaurangtari Pt II	2.2	17.42	7.92	3.0	22.65	7.55	0.37
Hakama	2.4	18.96	7.90	5.4	40.50	7.50	0.40
Rabantari	4.6	37.49	8.15	3.5	26.67	7.62	0.53
Total	9.2	73.87	7.99 (Av.)	11.9	89.82	7.56 (Av.)	0.43 (Av.)
2018-19							
Gaurangtari Pt II	2.6	21.35	8.21	3.0	22.98	7.66	0.55
Hakama	2.7	22.57	8.36	5.5	42.02	7.64	0.72
Rabantari	4.9	40.08	8.18	3.6	27.72	7.70	0.48
Total	10.2	84	8.25 (Av.)	12.1	92.72	7.67 (Av.)	0.58 (Av.)
2019-20							
Gaurangtari Pt II	3.3	27.13	8.22	3.5	27.37	7.82	0.40
Hakama	3.6	29.74	8.26	5.8	44.66	7.70	0.56
Rabantari	6.0	50.52	8.42	3.8	29.64	7.80	0.62
Total	12.9	170.39	8.30 (Av.)	13.1	101.67	7.77 (Av.)	0.53 (Av.)
2020-21							
Gaurangtari Pt II	4.7	40	8.51	3.5	27.65	7.90	0.61
Hakama	5	43.15	8.63	5.8	46.69	8.05	0.58
Rabantari	6.6	55.77	8.45	3.8	30.40	8.00	0.45
Total	16.3	138.9	8.53 (Av.)	13.1	104.74	7.98 (Av.)	0.55 (Av.)
Increase (%) during 2020-21 over 2016-17	239.58	270.80	9.78	13.91	22.16	6.83	

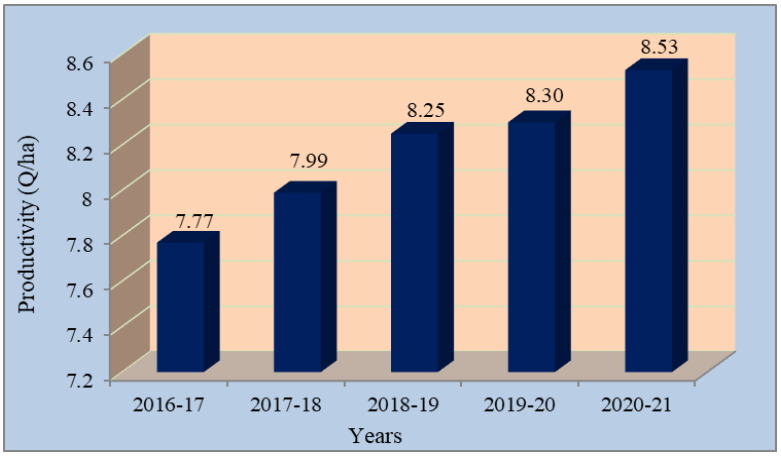

Fig 2: Productivity difference of toria (variety TS 38) over year

Total marketed surplus of toria in the study area

Due to non-availability of traditional and improved processing unit the farmers were unable to consume their produced oilseeds and so, most of the farmers bound to sell their produces in the market. Table 6 shows the total production, total consumption and total marketed surplus of toria in the study area. The table reveals that more than 90 per cent of total produces were sold (marketed surplus) their produces in the market by the beneficiary farmers and the remaining parts were kept for seeds and consumption purposes. The percentage of marketed surplus of the non-beneficiary farmers was comparatively more than the beneficiary farmers.

Table 6: Year wise total marketed surplus of toria in study area

Years and Clusters	Beneficiary	Non-beneficiary	Beneficiary		Non-beneficiary		Beneficiary		Non-beneficiary	
	Production (q)	Production (q)	Total consumed (q)	Total marketed surplus (q)	Total consumed (q)	Total marketed surplus (q)	Total consumed (%)	Total marketed surplus (%)	Total consumed (%)	Total marketed surplus (%)
2016-17										
Gaurangtari Pt II	8.13	21.52	0.79	7.34	0.92	20.6	9.72	90.28	4.28	95.72
Hakama	10.37	39.96	0.94	9.43	0.85	39.11	9.06	90.94	2.13	97.87
Rabantari	18.96	24.26	0.83	18.13	1.00	23.26	4.38	95.62	4.12	95.88
Total	37.46	85.74	2.56	34.9	2.77	82.97	6.83	93.17	3.23	96.77
2017-18										
Gaurangtari Pt II	17.42	22.65	0.69	16.73	0.68	21.97	3.96	96.04	3.00	97.00
Hakama	18.96	40.5	0.82	18.14	0.59	39.91	4.32	95.68	1.46	98.54
Rabantari	37.49	26.67	0.88	36.61	0.88	25.79	2.35	97.65	3.30	96.70
Total	73.87	89.82	2.39	71.48	2.15	87.67	3.24	96.76	2.39	97.61
2018-19										
Gaurangtari Pt II	21.35	22.98	0.82	20.53	0.68	22.3	3.84	96.16	2.96	97.04
Hakama	22.57	42.02	0.77	21.8	0.78	41.24	3.41	96.59	1.86	98.14
Rabantari	40.08	27.72	0.99	39.09	0.95	26.77	2.47	97.53	3.43	96.57
Total	84	92.72	2.58	81.42	2.41	90.31	3.07	96.93	2.60	97.40
2019-20										
Gaurangtari Pt II	27.13	27.37	1.12	26.01	1.1	26.27	4.13	95.87	4.02	95.98
Hakama	29.74	44.66	0.88	28.86	0.82	43.84	2.96	97.04	1.84	98.16
Rabantari	50.52	29.64	0.75	49.77	0.73	28.91	1.48	98.52	2.46	97.54
Total	107.39	101.67	2.75	104.64	2.65	99.02	2.56	97.44	2.61	97.39
2020-21										
Gaurangtari Pt II	40	27.65	0.84	39.16	0.77	26.88	2.10	97.90	2.78	97.22
Hakama	43.15	46.69	0.96	42.19	1.23	45.46	2.22	97.78	2.63	97.37
Rabantari	55.77	30.4	0.69	55.08	0.86	29.54	1.24	98.76	2.83	97.17
Total	138.9	104.74	2.49	136.41	2.86	101.88	1.79	98.21	2.73	97.27

Economics of the demonstrated crop (Rs./ha)

The details of economics of toria cultivation have been presented in Table 7. The gross cost of cultivation of toria was more for beneficiary farmers than the non-beneficiary farmers in all the years from 2016-17 to 2020-21. One of the reasons of such difference was that the farmers in the district did not prepare their land properly. Other reasons might be that there was price hike of inputs over the years. During 2016-17, the average gross cost for all the three clusters was calculated as Rs. 13,940.00 per hectare which was being increased over years and during 2020-21, it reached to Rs. 24,325.00 per hectare i.e. there were 74.50 per cent increase in average gross cost for the beneficiary farmers (demonstrated farmers). In case of non-beneficiary farmers, the average gross cost was calculated as Rs. 12,740.00 per hectare during 2016-17 and during 2020-21, it was increased by 74.41 per cent and it became Rs. 22,220.00.

During 2016-17, the average gross return for all the three clusters of beneficiary farmers was found Rs. 23,310.00. Every year, it had been increasing and it became Rs. 42,650.00 during 2020-21 with the increasing percentage of 82.97 and B-C ratio was increased from 1.67 to 1.75. In case of non-beneficiary farmers, the average gross return for all the three clusters was calculated as Rs. 19,200.00 during 2016-17 and it rose by 87.50 per cent and received Rs. 36,000.00. The B-C ratio was increased from 1.55 to 1.62. There was a very remarkable increase in per hectare gross return and net return for both beneficiary and non-beneficiary farmers because of the increase in price of the seeds.

Table 7: Economics of the demonstrated crop (Rs./ha)

Years and Clusters	Beneficiary					Non-beneficiary				
	Productivity (q/ha)	Gross cost (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	BCR	Productivity (q/ha)	Gross cost (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	BCR
2016-17										
Gaurangtari Pt II	7.6	13750	22800	9050	1.66	6.2	12570	18600	6030	1.48
Hakama	7.8	14100	23400	9300	1.66	6.5	13090	19500	6410	1.49
Rabantari	7.9	13940	23700	9760	1.70	6.5	12580	19500	6920	1.55
Average	7.77	13940	23310	9370	1.67	6.4	12740	19200	6460	1.51

2017-18										
Gaurangtari Pt II	7.92	16210	27720	11510	1.71	6.3	14500	22050	7550	1.52
Hakama	7.9	16360	27650	11290	1.69	6.66	15130	23310	8180	1.54
Rabantari	8.15	17180	28525	11345	1.66	6.68	15100	23380	8280	1.55
Average	7.99	16580	27965	11385	1.69	6.55	14920	22925	8005	1.54
2018-19										
Gaurangtari Pt II	8.21	18910	31198	12288	1.65	6.4	16110	24320	8210	1.51
Hakama	8.36	18800	31768	12968	1.69	6.8	16460	25840	9380	1.57
Rabantari	8.18	18180	31084	12904	1.71	6.56	15580	24928	9348	1.60
Average	8.25	18620	31350	12730	1.68	6.59	16050	25042	8992	1.56
2019-20										
Gaurangtari Pt II	8.22	21760	36990	15230	1.70	6.8	19000	30600	11600	1.61
Hakama	7.89	20300	35505	15205	1.75	7	19940	31500	11560	1.58
Rabantari	8.42	21400	37890	16490	1.77	7.1	19600	31950	12350	1.63
Average	8.18	21155	36810	15655	1.74	6.97	19520	31365	11845	1.61
2020-21										
Gaurangtari Pt II	8.51	24780	42550	17770	1.72	7	22010	35000	12990	1.59
Hakama	8.63	23970	43150	19180	1.80	7.14	21770	35700	13930	1.64
Rabantari	8.45	24280	42250	17970	1.74	7.45	22850	37250	14400	1.63
Average	8.53	24325	42650	18325	1.75	7.2	22220	36000	13780	1.62
Per cent increase during 2020-21 over 2016-17	9.78	74.50	82.97	95.57	4.79	12.50	74.41	87.50	113.31	7.28

Horizontal/Vertical spread of the toria variety TS 38

The farmers in the study area generally grow traditional varieties of toria. After conducting the CFLD programme, the beneficiary and non-beneficiary farmers preferred the variety TS 38 and replaced the traditional variety. Table 8 shows the horizontal and vertical spread of the toria variety TS 38. From the Table it has been observed that the area under toria crop was increased over years for both beneficiary and non-beneficiary farmers. The area under toria during 2016-17 was 4.80 ha for beneficiary farmers and it was increased to 16.30 ha during 2020-21 which was calculated as 239.58 per cent increase in vertical area under toria crop (var. TS 38). In case of non-beneficiary farmers, it was observed that during 2016-17, there was 11.50 ha area for toria cultivation. Initially they grew traditional varieties; but after looking at the performance of the variety TS 38, the replaced the variety with the variety TS 38. During 2020-21, the total area covered was increases to 13.10 ha which was calculated as 13.91 per cent increase in area under the crop.

Table 8: Horizontal spread of toria variety TS 38 (in ha)

Variety	**Clusters**	**Year wise area covered (ha)**								
		2016-17	**2017-18**	**% increase over 2016-17**	**2018-19**	**% increase over 2016-17**	**2019-20**	**% increase over 2016-17**	**2020-21**	**% increase over 2016-17**
Beneficiary	Gaurangtari Pt II	1.07	2.20	105.61	2.60	142.99	3.30	208.41	4.70	339.25
	Hakama	1.33	2.40	80.45	2.70	103.01	3.60	170.68	5.00	275.94
	Rabantari	2.40	4.60	91.67	4.90	104.17	6.00	150.00	6.60	175.00
	TOTAL	4.80	9.20	91.67	10.20	112.50	12.90	168.75	16.30	239.58
Non-Beneficiary	Gaurangtari Pt II	2.90	3.00	3.45	3.00	3.45	3.50	20.69	3.50	20.69
	Hakama	5.40	5.40	0.00	5.50	1.85	5.80	7.41	5.80	7.41
	Rabantari	3.20	3.50	9.38	3.60	12.50	3.80	18.5	3.80	18.75
	Total	11.50	11.90	3.48	12.10	5.22	13.10	13.91	13.10	13.91

Technology Gap and Technology Index in grain yield of Toria

Technology gap is the differences between potential and demonstration yield. Table 9 depicts the Technology Gap and Technology Index in grain yield of Toria in the study area. From the table it has been observed that the average technology gap recorded in toria was 2.83 q/ha. It means that there is still a gap in technology demonstrations in the study area for which the farmers were unable to achieve the potential yield of the variety. There may be various reasons for occurrence of such gap. Some important reasons might be the improper time of sowing, improper tillage operations, improper inters culture operations, fertility status of soil, climatic factors, and irrigation facilities and so on. The result is supported by the findings published by Deka *et al.* (2021)[12].

The technology index shows the feasibility of the evolved technology at the farmer's field. Lower technological index indicates the efficient performance of the technology. The results of the study revealed that the average technological index for toria was 25.73. This indicated that there was a great scope for the efficient use of technology in the study area. Such variations may be due to the difference in fertility status of soil, weather condition, infestation diseases and pests, improper cultivation practices of the crop. Similar findings were reported by some other scientists Singh *et al.* (2001)[7], Saikia *et al.* (2018) [11], Deka *et al.* (2021) [12], Tomer *et al.* (2003) [13], Kirar *et al.* (2016)[14], Mitra and Samajdar (2012) [15], Ojha *et al.* (2020) [16], Chaudhury (2018) [17], Ojha (2020) [18], Bora *et al.* (2020) [19].

Table 9: Technology gap and technology index in grain yield of toria under cluster frontline demonstration

Year and Clusters	Potential yield (q/ha)	Average yield (q/ha)		Technology Gap (TG) (q/ha)	Technology Index (TI) (%)
		Demo Plots (Beneficiary)	Farmer's practice (Non-beneficiary)		
2016-17					
Gaurangtari Pt II	11	7.60	7.42	3.4	30.91
Hakama	11	7.80	7.40	3.2	29.09
Rabantari	11	7.90	7.58	3.1	28.18
Average of clusters	11	7.77	7.47	3.23	29.36
2017-18					
Gaurangtari Pt II	11	7.92	7.55	3.08	28.00
Hakama	11	7.90	7.50	3.10	28.18
Rabantari	11	8.15	7.62	2.85	25.91
Average of clusters	11	7.99	7.56	3.01	27.36
2018-19					
Gaurangtari Pt II	11	8.21	7.66	2.79	25.36
Hakama	11	8.36	7.64	2.64	24.00
Rabantari	11	8.18	7.70	2.82	25.64
Average of clusters	11	8.25	7.67	2.75	25.00
2019-20					
Gaurangtari Pt II	11	8.22	7.82	2.78	25.27
Hakama	11	8.26	7.70	2.74	24.91
Rabantari	11	8.42	7.80	2.58	23.45
Average of clusters	11	8.30	7.77	2.70	24.55
2020-21					
Gaurangtari Pt II	11	8.51	7.90	2.49	22.64
Hakama	11	8.63	8.05	2.37	21.55
Rabantari	11	8.45	8.00	2.55	23.18
Average of clusters	11	8.53	7.98	2.47	22.45
Mean	11.00	8.17	7.69	2.83	25.73

Conclusion

Cluster Frontline Demonstrations is a very good agricultural extension practice to influence the participating farmers and also the fellow farmers in the locality. The demonstrations are conducted under the supervision of the Subject Matter Specialists at farmers' fields and so the results of the programme are found very authentic and more accurate. The farmer's attitude towards the technology demonstrated is found positive. But still there is some technological gap between the farmers practice and the demonstrated interventions which directly affect on the yield of the crop as well as the economy of the farmers as a whole. The ignorance of farmers, their socio-economic conditions, lack of awareness is the prime reasons of such situations. It can be improved using various extension tools like educating the farmers through frequent training on improved cultivation practices, conducting some awareness programmes, demonstration so that the technology index can be minimized. The Government should give more emphasis on production of more oilseeds so that our country as a whole might be self-sufficient in oilseed production.

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