Yield Gap Analysis of Toria (*Brassica campestris*) in Barpeta District of Assam

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ABSTRACT

The study was conducted in Barpeta district of Assam where front line demonstrations on HYV of Toria i.e. TS-36 was conducted by Krishi Vigyan Kendra, Barpeta on farmers field. A total of 63 FLDs were evaluated to find out the yield gaps between demonstrated Toria var. TS-36 and variety grown by farmers. Yield attributes of both demonstration and farmers' practice were recorded and their yield gap, technology gap, extension gap and technology index were analysed. Toria yield of demonstration variety (TS-36) registered 29.70 to 42.85 per cent higher over farmers' variet. On an average technology gap was recorded to be 1.93 q/ha. While average extension gap was observed to be 3.51 q/ha. Average technology index was recorded as 16.07 per cent.

Key words: *Yield gap; Technology gap; Extension gap; Technology index; Front line demonstration;*

India is the fourth largest oilseed economy in the world. Among the seven edible oilseed crops cultivated in India, rapeseed-mustard (*Brassica spp.*) contributes 28.6 per cent in the total production of oilseeds. In India, it is the second most important edible oilseed after groundnut sharing 27.8 per cent in the India's oilseed economy. In terms of acerage, oilseeds occupy 14.1 per cent and rapeseed-mustard alone occupies 3 per cent of the total cropped area in the country. The global production of rapeseed-mustard and its oil is around 38–42 million tone and 12–14 million tone, respectively. India produces around 6.7? million tone of rapeseed-mustard next to China (11-12 million tone) and EU (10–13 million tone) with significant contribution in world rapeseed-mustard industry (*Shekhawat et al., 2012*). The rapeseed-mustard group broadly includes Indian mustard, yellow sarson, brown sarson, raya, and toria crops.

In Assam, rapeseed-mustard is cultivated in 2.43 lakh ha with a total production of 1.42 lakh MT, average productivity being 5.85q/ha (2011-12), which is 48.77 per cent lower than the national average (11.42 q/ha). Again, in Barpeta district of Assam, the average productivity of toria is 6.6 q/ha, which is 42.20 per cent lower than the national average. However, with the available improved technologies it is possible to bridge the yield gap and increase the productivity up to the potential level (12.0q/ha). In this context, it deserves mention that participatory Front Line Demonstration (FLD) is an efficient approach for reducing gap between potential yield and farmers yield, dissemination of technology, generation of primary data and collection of feedback for subsequent use in the process of large scale adoption of technology in farmers' field under different agro-ecological and farming situations. As Toria is the major oilseed crop in Barpeta district of Assam, KVK Barpeta has conducted various FLDs on toria. high yielding variety of toria i.e. TS-36 developed by Assam Agricultural University was demonstrated from last six years to increase the productivity and production. Obviously those FLDs need to be evaluated. Hence the study was undertaken to find out effects of FLDs on bridging the yield gap in terms of technology gap, extension gap and technology index.

METHODOLOGY

The study was undertaken in the villages of Barpeta district where Front Line Demonstrations (FLDs) on toria var. TS-36 was conducted by KVK, Barpeta. Ex-post facto research design was used for the study. During the study period, an area of 214 ha

was covered under FLDs involving 514 practicising farmers. Out of the total participating farmers, 100 respondents were selected by following simple random sampling method. Data on yield and yield attributes from both the demonstration and farmers practice were recorded and their technology gap, extension gap and the technology index were worked out using methods developed by *Samui et al.*(2000) as stated below:

$$\text{Tech. gap} = \text{Potential yield} - \text{Demo. plot yield}$$

$$\text{Ext. gap} = \text{Demo. plot yield} - \text{Farmer's plot yield}$$

$$\text{Tech. Index} = \frac{Pi - Di}{Pi} \times 100$$

Where

Pi=Potential yield

Di=Demonstration yield

RESULTS AND DISCUSSION

The differences between the demonstration package including HYV Toria var. TS-36 and existing farmers practice are presented in Table 1.

Table 1. Comparison of demonstration package and farmers practices under FLD on toria

Parameters	Demo. package	Farmers' practice
Farming situation	Irrigated medium land	Rainfed medium land
Variety	TS-36	Traiditional/non-descriptive
Time of sowing	Mid October to mid November	1st fortnight of December
Sowing method	Line sowing	Broadcasting
Seed rate	10 kg/ha	15 kg/ha
Ferti. dose (NPK)	40:35:15	20:20:0
Borax (kg/ha)	10	Nil
Irrigation	One irrigation of 6 cm depth at 50% flowering stage	No scheduled irrigation
PP measures	· Against aphid (*Lipaphis erysimi*) : Foliar spray of 625ml Dimethoate 30EC in 200 litre water per ha	Nil
	· Against saw-fly (*Athalia proxima)*: 1 litre of Malathion 50EC in 200 litre of water per ha against	Nil

Perusal of data (Table 2) revealed that the yield of toria variety TS-36 under FLDs was substantially higher than the variety grown by farmers during all the years. Yield of toria in different demonstration plots ranged between 9.80 q/ha to 10.50 q/ha over the study period , which was 29.70 to 42.85 per cent higher over farmers variety. On an average 34.76 per cent increase in yield was registered in the demonstration plots. Whereas, average farmers field was recorded only 6.56 q/ha. These results are in conformity with the findings of *Mitra and Samajdar (2010)* in FLD on rapeseed and mustard and of *Rathod et al (2013)* in soybean. The poor productivity in farmers practice may be mainly due to factors like use of non descript local variety, late sowing owing to late vacation of field after harvesting of medium to long duration winter paddy and low level of agronomic management in addition to non-availability of resources in time. The results clearly depicts the positive effects of FLDs over the existing practices towards enhancing the yield toria in Barpeta distict with its positive effect on yield attributes (Table 3).

The technology gap were 2.20, 2.20, 2.00, 1.90, 1.50 and 1.77 q/ha during 2007-08, 2008-09, 2009-10, 2010-11, 2011-12 and 2012-13, respectively. The average technology gap was 1.93 q/ha during the period of study (Table 2). The technology gap ranging between 1.50-2.20 q/ha reflected the farmer's cooperation in conducting FLDs with encouraging results in subsequent years. The variation in technology gap observed may be attributed to dissimilarity in soil fertility status and management factors.

Benefit-cost ratio in recommended practice was recorded to be high under demonstration against farmers' practice during all the years (Table 2). The B:C ratio of demonstrated plots were 1.50, 1.75, 2.10, 2.30, 2.50 and 2.25 as compared to the B:C ratio of farmers practice of 1.37, 1.40, 1.40, 1.44, 1.40 and 1.25 during 2007-08, 2008-09, 2009-10, 2010-11, 2011-12 and 2012-13, respectively. Hence, higher B:C ratios proved economic viability of the interventions made under FLD. Similar findings were reported by *Balai at el.(2012)* in repeseed and mustard and *Sharma (2003)* in moth bean.

Extension gap of 3.00, 3.72, 3.10, 3.00, 4.50 and 3.73q/ha were observed during 2007-08, 2008-09, 2009-10, 2010-11,2011-12 and 2012-13, respectively (Table 2). Yeld potential of the non-descriptive varieties may be lost due to contiuous use of those varieties year after years. To increase the productivity and production of toria, seed replacement of non-descriptive varieties by

Table 2. Productivity , technology gap, extension gap and technology index in toria (var. TS 36) under FLDs

Year	Area (ha)	No of farmers	No.of demo.	Seed Yield(q/ha)			% increase over control	Tech. gap (q/ha)	Ext. gap (q/ha)	Tech. index (%)	B:C Ratio	
				P	D	PF					D	FP
2007-08	2	2	2	12.00	9.80	6.80	30.61	2.20	3.00	18.33	1.50	1.37
2008-09	5	7	7	12.00	9.80	6.08	37.95	2.20	3.72	18.33	1.75	1.40
2009-10	4	5	5	12.00	10.00	6.90	31.00	2.00	3.10	16.67	2.10	1.40
2010-11	43	123	12	12.00	10.10	7.10	29.70	1.90	3.00	15.83	2.30	1.44
2011-12	100	253	25	12.00	10.50	6.00	42.85	1.50	4.50	12.50	2.50	1.40
2012-13	60	124	12	12.00	10.23	6.50	36.46	1.77	3.73	14.75	2.25	1.25
Total	214	514	63	-	-	-	-	-	-	-	-	-
Mean	.	.	.	12.00	10.07	6.56	34.76	1.93	3.51	16.07	-	-

P=Potential D=Donstration FP=Farmers' practice

HYVs is very much essential. In this context, front line demonostrations are playing an important role in popularizing the HYV of Toria in the study area.

The present study indicated reduction in technology index from 18.33 per cent during 2007-08 to 12.50 per cent during 2011-12 which exhibited the feasibility of demonstrated technology in the study areas (Table 2). Again, in the year 2012-13, the technology index recorded was 14.75 per cent. This increase in technology index may be attributed to dissimilarity in soil fertility status and management factors. These results are corroborated with the earlier findings of *Mitra and Samajdar (2010)* who opined that lower the value of technology index, more is the feasibility of the technology demonstrated.

CONCLUSION

In the present study yield of demonstrated Toria variety (TS-36) was found higher than the farmers' variety. The study further revealed that FLD on HYV Toria var. TS-36 has reduced the technology gap to a considerable extent. The extension gap (Av. 3.51 q/ha) may be seen due to lack of awareness and non-availability of quality seed. Hence, it can be concluded that more efforts should be made to motivate the farmers for adoption of improved agricultural technologies including HYV to revert the trend of wide extension gap. At the same time, emphasis should be given on production of quality seed of HYV.

Paper received on : Februar 05, 2014
Accepted on : March 21, 2014

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