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Research Note

Economics and gap analysis in isabgol cultivation through frontline demonstrations in Barmer district

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SUMMARY : To increase the productivity of Isabgol (*Plantago ovata*), high yielding isabgol variety RI 89 was evaluated at farmer's field during *Rabi* 2010-11. Thirty demonstrations were conducted at farmer's field at village Balera, Katarala, Rohilla, Bhilo ki Basti, Golia Jaitmal, Bhimda and Nand. Grain yield of Isabgol variety RI 89 under improved practices was 8.32q/ha increased significantly by 25 per cent over farmers practice (control). In terms of monitory return, the net gain per hectare was Rs. 28780/- and was Rs. 6500/- higher by investing additionally Rs. 2300/-. During this period extension activity like field days, farmer's trainings, literature, short messages services, diagnostic visits etc were undertaken which benefitted the farmers. With the improved package of practices fetched a higher B:C ratio of 2.25 while farmers practice gave 2.16. The yield range in improved practice was 4.85 q/ha-10.44 q/ha while under farmers practice it ranged from 4.05 q/ha to 8.28 q/ha. In improved package of practices, input supplied to farmers were improved seed, seed treatment chemicals and bio fertilizers particularly phosphate solubilizing bacteria. During crop period and after harvest the crop period the reaction of farmers about critical input supplied under demonstration was asked and they replied good seed germination and early maturity of the variety than local seeds. While the farmers suggested **s**hattering tolerance varieties should be developed and major constrains was the unavailability of newly released seeds on time.

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KEY WORDS:
Gap analysis, Economics of isabgil, Frontline demonstrations

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India ranks first in isabgol production and the sole supplier of seeds and husk in the international market. Among medicinal plant, isabgol is the first ranking foreign exchange earner for the country. The mucilage content in isabgol seeds cultivated in India is high. Isabgol contains a significant amount of proteins and husk yields colloidal mucilage which are valued for medicinal application. It is an annual herb and cultivated in Rajasthan, Gujarat, Madhya Pradesh and Haryana. Rajasthan is one of the main isabgol producing states of India. The state ranks first in terms of area and production in the country. The plant grows on well-drained sandy loam soil. Cool dry weather is favourable by the crop. It matures in about 120 days (November to March-April). The spikes are harvested when they turn red. The average yield comes to 800-1000 kg/ha. The husk constitutes about 25 per cent of the seed by weight. Generally, no chemical fertiliser is used but if the nutrient contain in soil is very low, 25 kg/ha nitrogen and 25 kg/ha phosphorus are required to be applied as basal doses. Isabgol products available in the market are used as laxative that is particularly beneficial in constipation, chronic ailments and dysentery. Seed prices are not governed by any regulations and are solely dependent upon the farmers. The average price of the seed is around Rs. 35 to Rs. 55 per kg (FAI, 2004-05). The crop covers 214188 hectares with the production of 113344 ton and average productivity of 529 kg/ha (Vital Agriculture Statistics, 2010-11) in the state (Table 1). However, isabgol cultivation under arid condition with sandy

loam soil is a profitable venture, which is gaining popularity among the farmers of western Rajasthan.

A study of 30 frontline demonstrations on isabgol was conducted on farmer's field during 2010-11 in arid region of western Rajasthan to evaluate the economic feasibility of technology transfer and adoption under front line demonstration programme. These demonstrations were conducted at farmer's field in seven village of Barmer district of western Rajasthan *viz.*, Balera, Katarala, Rohilla, Bhilo ki Basti, Golia Jaitmal, Bhimda and Nand. The crop was sown from 2nd week of November to 4th week of November. During this period extension activity like field days, farmer's trainings, literature, SMS, diagnostic visits etc. were undertaken which benefitted the farmers. The farmers selection was made as per guidelines provided by Zonal Project Directorate to bridge the gap existing between state productivity and district productivity (Table 1) and the whole package approach demonstrated to farmers through FLD trials included component such as variety, seed rate, seed treatment, weed management and irrigation through sprinkler, fertilizers and plant protection measures. Under strict supervision of KVK scientists study was conducted from sowing to harvesting. Data on crop yield were recorded by per sq. meter observation method randomly from 3 to 4 place from an acre. The state average is 529 kg/ha which is very lower than the realizable yields in this season to the tune of 12 q ha^{-1}. Front line demonstrations (FLD) on isabgol were conducted under real farm situations to assess the yield gaps existing among potential, demonstrable and farmers yield and also to transfer the improved technology to the farmers of western Rajasthan.

The data generated were utilized for calculating the technology index, technology and extension gaps using the following formula:

$$\text{Technology gap} \frac{\text{Improved yield}}{\text{Farmers yield}}$$

$$\text{Extension gap} \frac{\text{Potential yield}}{\text{Improved yield}}$$

$$\text{Technology index} \frac{\text{Technology gap}}{\text{Potential yield}} \text{x100}$$

The study revealed that improved technology (IT) registered 25 per cent increase in seed yield over the farmers practice (FP). The ranges of average yield were 4.85-10.44 qha^{-1} and 4.05-8.25 qha^{-1} in demonstration and farmers plots, respectively (Table 2). The most favourable one for isabgol when the highest yields of 10.44 and 8.25 qha^{-1} in FLD and farmers plots, respectively were recorded. It was evident from the yield levels recorded in demonstrations that the improved package of practices can boost the yield to the tune of even 2.19 q ha^{-1}. These differences in the packages were in line with the findings of Singh and Varshney (2010); Verma *et al.* (2010); Khan and Chouhan (2005) and Veerasamy *et al*. (2003). These results confirm those obtained by conducting in FLD trials on various pulse crops (Das and Willey, 1991). Overall, the yield of demonstration plots exceeds that of farmer's plots in all FLD. This was attributed to the quality seed used, adequate seed rate, management practices and judicious use of fertilizers. The data revealed that the extension gap existing between the potential and demonstrable yields was not substantial (3.68). Thus, indicating that it was possible to replicate the results obtained in research experiments in real farm situation too. Results also indicate an technological gap between the improved technology and farmers practice (Choudhary and Pagaria, 2012). Due to this, a gap of 1.67 qha^{-1} in yield was there in isabgol which could be overcome by adopting

Table 1 : Area, production and productivity of isabgol in Rajasthan *Rabi* 2010-11

Districts	Area(ha)	Production (tones)	Productivity (kg/ha)
Barmer	60829	19621	323
Jalore	36922	21963	595
Jodhpur	34474	30011	871
Nagaur	40283	23791	591
Jaisalmer	26243	9791	373
Rajasthan	214188	113344	529

Source : Vital Agriculture Statistics 2011-12

Table 2 : Impact of improved technologies on the productivity potential of rainfed isabgol

No. of FLD's	Variety	Mean yield (q/ha^{-1})		Range yield index (q/ha^{-1})		Technology gap (q/ha)	Extension gap (q/ha^{-1})	Technology index (q/ha^{-1})
		Improved practice	Farmers practice	Improved practice	Farmers practice			
2010-11 (30)	RI-89	8.32	6.65	4.85-10.44	4.05-8.28	1.67	3.68	13.9
Potential yield of isabgol -12 q/ha				TG=IP-FP and EG= PY-IP				TI=TG/PI*100

improved varieties and efficient management practices.

Technology index 13.9 per cent gave evidence that there was a scope for further improvement in the productivity of isabgol (Chauchan, 2011). The data on economics of the improved technology indicated that, the cost of production in FLD was higher than that of the local practices (Table 2). However, the farmers could fetch additional returns of Rs. 6050/- by investing Rs. 2300/- more with adopting the improved technology. The per cent increase in net returns was 26.6 and B:C ratio (2.63) (Table 3).

Table 3 : Impact of improved technology on the economics of isabgol cultivation (Rs./ ha)

Sr. No.	Particulars	Year 2010-11
1.	Production cost	
	Improved practice (IP)	12820(8.32)
	Farmers practice (FP)	10520 (6.65)
2.	Additional cost over FP	2300
3.	Gross return	
	IP	41600
	FP	33250
4.	Net return	
	IP	28780
	FP	22730
5.	B:C ratio	
	IP	2.25
	FP	2.16
6.	Additional return	6050
7.	Increase in net return (%)	26.6
8.	B:C on additional input in demonstration	2.63

IP- Improved practice; FP- Farmers practice

The marginal difference between benefit-cost ratio of improved practice and farmer's practice proves of adoption of improved technologies by the farmers. However, to further bridge up the gap between technology developed and technology transferred, there is a need to strengthen the extension network besides emphasis on specific local recommendations.

Reactions and constraints:

An overall study regarding reactions and constraints in adoption of improved practices was also taken after harvest the crop for further improvement. The farmers reacted the seed have good germination and early maturing behavior but they suggest to develop shattering tolerance varieties. The major constrains was timely availability of improved seeds free from weeds seeds.

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