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Disseminating Weed Management Technology for Changing Economic Scenario of Farmers

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ABSTRACT

Improved weed management techniques must be an important component of crop production strategies to cut down production cost. How the introduction of modern weed management techniques could change the adoption behaviour towards other farming technologies, and consequent economic benefit of the farmers have been reported in this paper. The study was conducted in an agricuturally backward village Tagar-mahagawa under Panagar Block of Jabalpur district in Madhya Pradesh in the year 2008. Prior to adoption, rice-wheat system was the major cropping pattern of the village, and none of the farmers practiced commercial cultivation of vegetables and other cash crops due to severe weed problem. In general the farmers practiced manual weeding during *kharif* season and no weeding operation was practiced during *rabi* season. The action plan was initiated by conducting demonstrations for showing performance, practicability and profitability of improved weed management technologies to the villagers. The villagers especially the youth responded very positively after seeing the performance of the given technological interventions, and consequently started adopting weed management technologies in paddy, wheat, soybean, chick-pea and vegetable crops. Due to this the farmers were getting on an average 10-38% higher yield with an additional average profit of Rs.12000-15000 per hectare. The success achieved in the cultivation of cereals has also changed the view of farmers about the overall agricultural practices. The farmers' have also started growing vegetables in commercial scale from last couple of years. All these successes have created an environment of diversification in agriculture in this village. From a meagre 4-5 % prior to adoption, the level of weed management in crops using improved technologies increased to 85 % in the given village within a three year time span. There was a visible increase in the area under various crops. The outcome of the technological support gave a confidence and new ardour to them and they are now seriously occupied in agriculture.

The agricultural technology transfer is a process wherein the proven agricultural technologies are demonstrated with an aim to increase crop productivity and thereby enhancing farmer's income level. Weeds are more problematic to crop production than insects and diseases, as a crop may or may not be attacked by the latter agents but it is invariably infested by former one which causes invisible damage till the crop is harvested. It is a widespread biological constraint and is responsible for reduction in crop yield as well as quality of produce. Improved weed management techniques must be an important component of crop production strategies to cut down production cost (Dharmalingam 2008). The Directorate of Weed Science Research (DWSR) has developed crop- and situation-specific weed management technologies involving chemical, non-chemical and biological approaches. The real benefit and significance of these technologies could be observed once the farmers adopt these technologies. Hence, an attempt was made by the Directorate of Weed Science Research, Jabalpur (MP), to visibly and significantly change the economic situation of the farmers of an agriculturally backward village by transferring some weed management technologies, keeping in view the local needs in terms of practicability and commercial viability. The present paper outlines how transfer of weed management technologies helped village people to improve their crop production, secure livelihood and become economically prosperous.

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METHODOLOGY

A village named Tagar-mahagawa under the Block Panagar of district Jabalpur in Madhya Pradesh was adopted with an objective to make the farmers aware about importance of weed management for increasing the crop yield and income level. Prior to adoption, this agriculturally backward village was totally untouched by modern weed management technological interventions. Rice-wheat system was the major cropping pattern of the village, and none of the farmers practiced commercial cultivation of vegetables and other cash crops due to severe weed problem. In general the farmers practiced manual weeding during *kharif* season and no weeding operation was practiced by them during *rabi* season.

Detail survey was made through personal interaction with the villagers to assess various aspects like population, size of holding, socio-economic status, prevailing agricultural and horticultural practices, knowledge level about weed management and other agricultural technologies, animal husbandry, etc.

On the basis of survey data, the real situation was analysed and accordingly strategies to transfer the improved weed management technologies were formulated. At the outset, the action plan was initiated by conducting few preliminary demonstrations for showing performance, practicability and profitability of improved weed management technologies to the villagers. The villagers especially the youth showed high enthusiasm and responded very positively after seeing the performance of the given technological interventions. Consequently, DWSR initiated massive awareness programme, group discussion, farm & home visits, technical campaign and need based trainings on regular basis, and further intensified field demonstrations, with an objective to bring the whole village under weed free village concept in the year 2008.

RESULTS AND DISCUSSION

The efforts made by the Directorate and the cooperation extended by the villagers to the weed free village campaign have given highly encouraging outcome (Table 1). The level of weed management in crops increased to 85 % in Tagar village in the year 2010 from its earlier level of 4-5 % prior to its adoption. The area under soybean and vegetable crops was also increased from 0.6 % to 8 % and 1 % to 7 %, respectively.

Table 1: Situation before and after adoption of village (Total cultivated land 200 hectare)

Particulars	**Status**		
Crop coverage (hectare)	**2008**	**2009**	**2010**
Paddy	88	136	164
Vegetable	2	4	14
Soybean	1.2	4.8	16
Wheat	24	96	148
Chick-pea	4	12	20
Other crop	0.6	4	10
Increase in use of improved weed management Technology (%)	5	30	85
Use of improved seeds (%)	2	40	95

Changes after adoption of the village

(A) Increased area under cultivation

The farmers of the Tagar village have started adopting weed management technology in paddy, wheat, soybean, chick-pea and vegetable crops and getting on an average 10-38% higher yield (Table 2) which is giving an additional average profit of Rs.12000-15000 per hectare since 2008. The *kharif* cropping area increased from 89.2 ha (45%) in 2008 to 180 ha (90%) in 2010, and similarly the area under *rabi* season crops increased drastically from 30.6 ha (16%) as recorded in 2008 to 192 ha (96%) in 2010. Similar to the given finding, an increase in total area under cultivation due to successful transfer of weed management technologies was earlier reported by Singh et al. (2005). This has happened due to confidence building in them that they can manage weeds effectively. Earlier, through traditional weeding practices, the cultivation of rice, wheat and other crops was difficult.

Table 2: Crop Productivity scenario before and after adoption of village

Particulars	Improve Weed Management Technology	Average productivity status (q/ha)			
		BAV	AAV		
		FP	2008	2009	2010
Rice	Chlorimuron + Metsulfuron methyl fb Fenoxaprop - p-ethyl @ 4 + 60 g ai/ha (PO)	30	33	37	42
	Pretilachlor @ 750 g ai /ha (PE)				
	Bisbyribac sodium @ 25 g ai /ha (PO)				
Soybean	Chlorimuron + Fenoxaprop @ 10 + 75 g ai /ha (PO)	9	10.5	12	14
	Imazethapyr @ 100 g ai /ha (PO)				
Maize	Atrazine @ 1000 g ai /ha (PE)	29	32	36	40
Wheat	Clodinofop + Metsulfuron methyl @ 60 + 4 g ai /ha (PO)				
	Isoproturon + 2, 4-D @ 500 + 500 g ai /ha (PO)				
	Sulfosulfuron + Metsulfuron methyl 25+4 g ai /ha (PO)	18	20	23	27
Chick-pea	Pendimethalin @ 1000 g ai / ha (PE)	10	11.5	13	14
Average Increased in yields **(%)**		-	**10-12**	**23-25**	**38-40**

* BAV – Before adoption of village, AAV-After adoption of village, FP-Farmer's practice

Rior to adoption, majority of the farmers of Tagar village almost gave up cultivating wheat due to heavy infestation of *Phalaris minor*, wild oat and other broad leave weeds. Demonstration of zero tillage technology in combination with chemical weed management techniques encouraged the farmers to use zero till seed drill machine and herbicides like, clodinafop, sulfosulfuron, 2,4-D & isoproturon in wheat. Inspired by the performance of the above technologies, virtually the entire farming community of this village shifted to large scale cultivation of wheat and currently harvesting an average yield of 26 q/ha.

(B) Vegetable cultivation

The success achieved in the cultivation of cereals has also changed the view of farmers about the overall agricultural practices. Earlier they grew some vegetables in their kitchen garden for household consumption only. DWSR demonstrated Soil Solarization technique for weed free seed bed preparation and also introduced the farmers of this adopted village to many other agricultural agencies like state agriculture/horticulture department, Mahyco Seed company, IFFCO, etc. Consequently, along with the improved weed management techniques, many farmers have also adopted other modern agricultural technologies and started growing vegetables in commercial scale from last couple of years. The findings thus showed that the adoption of one technology may create the enthusiasm among the farmers to follow other related technologies. Similar observation was also reported by Reddy and Ratnakar (2006).

Presently by spending about a sum of Rs. 10,000 for cultivation of brinjal, cauliflower, cabbage, tomato and chilli, the farmers are earning a profit of approximately Rs. 34,000 per hectare. Cultivation of Brinjal alone gave a return of Rs. 35,000 per hectare to a successful farmer for an investment of only Rs.8000/-. All these successes have created an environment of diversification in agriculture in this village.

(C) Social change in the village

Prior to the adoption of Tagar village by DWSR, the villagers mainly the youth were migrating to town areas due to unprofitable farming and consequent unemployment in this village. The outcome of the technological support provided by the directorate gave a confidence and new ardor to them and they are now seriously occupied in agriculture. A decrease in the migration of rural youth was earlier noticed by Jayaraman (2005) due to successful transfer of fruit and vegetable cultivation technologies in Tamil Nadu.

CONCLUSION

Weed causes on an average of 37% damage to the crop productivity. The extent of loss may even go up to total crop failure. The success made in Tagar-mahagawa clearly indicates that the weed menace, which compelled the farmers to leave the fields un-cropped, could well be managed through adoption of improved technologies. Systematic implementation of strategies to transfer improved weed management and other technologies has infused enthusiasm in farmers towards agriculture and discouraged the youngsters for migrating to towns. Besides more than two and six folds increase respectively in khariff and rabi cropping areas, a significant increase in the productivity by 11-40 % in Rice, Soybean, Maize, Wheat and Chick-pea crops was also achieved in Tagar village within a short span of 3 years of its adoption by DWSR.

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