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FARMER PERCEPTION ON THE EFFECTIVENESS OF INTEGRATED WEED MANAGEMENT METHODS IN PUNJAB, PAKISTAN

Abdul Wahhab Arshed*, Khalid Mahmood Ch., Ijaz Ashraf, M Iqbal

Department of Agricultural Extension, University of Agriculture, Chak No. 247 G.B. Tehsil & District Toba Tek Singh, Faisalabad, Pakistan

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ABSTRACT

Weeds reduce crop yield up to a great extent. Farmers use Integrated Weed Management (IWM) to eradicate weeds. The present study was conducted to assess farmer's perception regarding the effectiveness of various weed control methods utilized under the umbrella of IWM in the Punjab province of Pakistan. Information were collected from 150 randomly selected farmers from three divisions of Punjab viz Faisalabad, Rawalpindi and Dera Ghazi Khan. The study revealed chemical methods as the most effective weed control tool followed by cultural methods and mechanical methods. Preventive measures were ranked as 4th and biological methods as the last.

Key words: Integrated Weed Management, Weed Control Methods, Farmer Perception

INTRODUCTION

Agriculture is the back bone of Pakistan's economy, contributing 21% share in GDP and employing 43% of the total labor force (Govt of Pakistan 2011). So, the development in the field of agriculture means the wellbeing of 180 million people in Pakistan.

Wheat, Cotton, Sugarcane and Rice are the major field crops sown in Pakistan. But yield of these crops is very low as compared to other countries (Govt. of Pakistan 2010). For instance yield of wheat in India is about 8t/ha while in Pakistan it is 3-4t/ha. The yields of Sugarcane in Pakistan is 40-45t/ha while India and Egypt produce 66t/ha and 110 t/ha, respectively (FAO 2009). One of the most important factors responsible for low yield in Pakistan is the loss caused by weeds. Annual losses due to weeds on farmlands are far greater than realized. The figures would be alarming if these losses are interpreted in monetary terms. Studies show that the annual crop losses in Pakistan due to weeds range from 17-25%, 20-63%, 10-35% and 13-31% in wheat, rice, sugarcane and cotton crops, respectively (Abbas 2006). Hussain and Shahid (2001) reported that weeds reduce sugarcane yield by 45% and Nayyar *et al*. (1992) reported that weeds reduce wheat yield by 25-30%. If the weeds are allowed to grow unchecked with no control measures the outcome would be cataclysmic (Pacanoski 2007).

Besides quantitative effects on yield, weeds deteriorate the quality of produce through the physical presence of their seeds and debris and also offer competition for water, nutrients, space and sunlight (Anderson 1983). As the weed problems are multi-pronged holistic multi-disciplinary integrated approach would be imperative. In this context, Integrated Weed Management (IWM) may provide a more sustainable approach to weed control (Maity and Mukherje 2009). Integrated weed management (IWM) is the control of weeds through a long-term management approaches, using several weed management techniques such as, Physical, Chemical, Biological, Cultural and preventive measures (Aulakh and Mehra 2006). IWM would help prevent weeds becoming resistant to herbicides on prolong exposure (Sanyal 2008). In Pakistan, farmers use combination of methods under the umbrella of IWM to eradicate weeds. They employ cultural measures (stale method, manual hoeing, crop rotation, burning, grazing), chemical control (use of herbicides), biological method (use of allellopathy and predator), mechanical measures (hoeing with plough or cultivator) and preventive measures (use of clean seed, clean tillage implements and machinery, cleaning of water channels *etc*.) (Riaz *et al.* 2006).

In the present paper an attempt was made to determine farmer perception regarding the comparative effectiveness of different elements of IWM in Punjab, Pakistan.

MATERIALS AND METHODS

Pakistan is comprised of four provinces namely Punjab, Sindh, Baluchistan and NWFP (which is now renamed as Khyber Pakhtoonkhwa) (Sharif

*Corresponding author : wahabextensionist@yahoo.com

2004). The study was conducted in Punjab which comprises of 9 divisions. Through simple random sampling technique 3 divisions namely Faisalabad, Dera Ghazi Khan and Rawalpindi were selected. From these 3 divisions, 50 farmers were selected from each division randomly, thus making total sample of 150 farmers. The data were collected with the help of a well-structured and validated interview schedule (Wingenbach *et al.* 2003). A five point Likert type scale was utilized to record the perceptions of the farmers regarding the effectiveness of various extension education methodologies(Linder *et al*. 2003).

The collected data were analyzed using Statistical Package for Social Sciences (SPSS) (Davis *et al.* 2004). Descriptive statistics were used for the analysis of data (Bonne *et al.* 2002).

RESULTS

The survey revealed the effectiveness of various weed control measures under the umbrella of Integrated weed Management, the chemical methods were rated very good by almost three-fourth of the growers (Table 1).

Very similar results were concluded by (Khan *et al.* 2004) who found that about 75% of the growers rated herbicide use for weed control as effective. More than one-third of the farmers perceived cultural methods as very effective. While thee-tenth of the respondents declared mechanical methods as very effective. Preventive tactics were averagely rated by 28.6% of the farmers. Only few farmers found to be using biological methods.

The weighted score, mean, standard deviation and rank order of the effectiveness of extension methods were calculated by multiplying the relative score values allotted to each category of scale with its frequency count (Table 2)

In terms of the effectiveness of various elements of Integrated Weed Management, Chemical method was found to be the most effective tool with mean value 4.54 and weighted score of 696. These findings are in accordance with those of (Khan *et al.* 2004) who found that use of chemicals to eradicate weeds proved to be the number 1 method among all techniques. Cultural method and mechanical method having mean values 3.71 and 2.52, with weighted scores of 518, and 285 and were ranked as 2nd and 3rd, respectively. Likewise, mean values of effectiveness of preventive measures and biological methods were found to be 0.79 and 0.55, with weighted scores 110 and 8 and their rank orders were 4th and 5th respectively

Table 1: **Distribution of respondents according to the extent of use of various elements of IWM**

IWM method	Response (%)				
	Very poor	Poor	Average	Good	Very Good
Chemical	-	-	9.3	17.4	73.3
Cultural	8.6	9.3	19.4	25.9	36.7
Mechanical	7.7	10.3	21.8	29.5	30.7
Preventive	32.2	39.3	28.6		
Biological	40	60			

Very poor=1, Poor=2, Average=3, Good=4, Very Good=5

Table2. Weighted score, mean, standard deviations (S.D) and rank order of the effectiveness various methods of Integrated Weed Management

IWM methods	Weighted score	Mean	S.D	Rank order
Chemical	696	4.54	0.86	1
Cultural	518	3.71	1.28	2
Mechanical	285	2.52	1.35	3
Preventive	110	1.96	0.79	4
Biological	8	1.6	0.55	5

DISCUSSION

The above results depict information in the perspective of different measures of weed elimination under IWM. Chemical methods were perceived to be very effective because of their quick action and time and labour saving. However, the efficiency of
cultural methods was considered low as compared to chemical controls because of the longer time taken and high labour consumption. Regarding mechanical methods, the full scale control is hindered by non-availabity of machinery and less effectiveness. Preventive methods, although minimize the entry of weeds into the field, do not kill weeds, hence farmers regarded preventive methods not very effective. Overwhelming majority of farmers were unaware of biological methods and those farmers who knew biological control were dissatisfied this method because of lack of information and facilities.

CONCLUSION

Farmers in Pakistan use variety of techniques under Integrated Weed Management strategy. Considering the effectiveness, Chemical method (use of weedicides) was perceived be the most effective method used by growers. Cultural methods (crop rotation, manual hoeing etc.) ranked 2nd and mechanical (use of plough or cultivar) got 3rd position in the eyes of farming community. Preventive measures were ranked 5th and biological

measures being used only by a few members of farming community was ranked at last position.

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