

WEEDS AS A MAJOR CONSTRAINT IN WHEAT PRODUCTION IN DISTRICT PESHAWAR

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ABSTRACT

A survey was conducted in the months of June and July, 2010 to analyze major problems associated with wheat production as reported by the farmers of the locality of Palosi area; a Union Council of district Peshawar. For this study, some 60 growers of wheat from the villages of union council Palosi were randomly selected and interviewed. Out of the 60 farmers, 20 were each from Palosi, Tarlazi and Regi areas respectively. The main objectives of this study were to examine the nature and extent of different problems faced by wheat growers and to know the percent losses in grain yield of wheat due to each of these problems as per reports of the respondents. The results revealed that weeds, other pests (insect and pathogens etc.), and lack of irrigation water were the main problems that negatively affected the wheat production in the study area. The percentage of the farmers who reported weeds as the major constraint were 22.8%, whereas 21.5% respondents mentioned other pests (insects and pathogens etc.) as the biggest problem for wheat production in the area, however 18.4% of them regarded the lack of irrigation water as the great hurdle associated with wheat production.

Key words: Diagnostic study, Peshawar, survey, *Triticum aestivum*, weeds, wheat.

INTRODUCTION

The economy of Pakistan is basically agrarian and supports more than 130 million population. Agricultural sector provides employment to 45% of the total labor force of the country and contributes more than 21% to the GDP. Agriculture not only supplies raw materials to our industries, contributing substantially to Pakistan's export sector, but is also a large market for industrial products such as fertilizers, tractors, pesticides and agricultural implements (GoP, 2010).

Wheat (*Triticum aestivum* L.) is the cereal of choice in most countries of the world. It is the world's leading food crop and exceeds all crops both in area and production making it a major commodity in the world food trade. The acceptance of wheat as a basic food stuff has led to its widespread and worldwide distribution as food aid to the

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developing countries (Khalil and Jan, 2000). Wheat is the most important cereal crop in the world and is a staple food of about one third of the world's population (Wajid, 2004). Wheat currently fulfills 76% of the food requirements of the country contrary to 95% in the previous years (GoP, 2010). A decrease in wheat production severely affects the economy of a country and increases the miseries of the inhabitants. In Pakistan weed infestation is one of the major causes of low yield of wheat (Nayyar *et al.*, 1995).

Weed control is a major component in the production system of wheat (Young *et al.*, 1996). Weed control has been practiced since long either manually or through animal drawn implements but these laborious and time consuming practices are now expensive due to increasing cost of labour. The increasing mechanization of farm has necessitated chemical weed control which remains the least expensive weed control method in the country. The selection of suitable herbicides, timely application and proper dosage of herbicides are the important consideration for profitable return (Fayad *et al.*, 1998). It has been estimated that weeds cause 17-25% and 17-50% losses in wheat annually (Shad, 1987; Anonymous, 1996). In monetary term weed loss is about 28 billions (Hassan and Marwat 2003). Weeds exploit soil fertility, available moisture, and nutrients and compete for space and light. Different reports are available on the efficacy of herbicides in wheat (Khan *et al.*, 2001) however; recent studies showed that the use of herbicides gave 87.2 to 90.3% weed control with a consequent 19.4 to 20.97% increase in grain yield. To lower weeds losses in wheat an economically feasible, socially acceptable and effective weed management package such as the use of herbicides is encouraging in the wheat growing belt of the country. Currently about two-third, by volume, of the pesticides used worldwide in agricultural production are herbicides (Duke and Lydon, 1993).

During 2003-04 at the national level, the losses due to weeds in wheat, rice, maize, onion, gram and potatoes were 20%, 40%, 38%, 35%, 40% and 38%, respectively (MINFA, 2004). The major weeds competitive with wheat crop in Khyber Pakhtunkhwa province included: *Avena fatua*, *Phalaris minor*, *Cirsium arvense*, *Convolvulus arvensis*, *Ammi visnaga*, *Chenopodium album*, *Carthamus oxycantha* and *Euphorbia helioscopia* (Hassan *et al.*, 2003). For increasing wheat productivity pest management is necessary, as they feed on crop directly (insects), compete with crops for resources (weeds) and cause diseases in crops (pathogens), resulting in a drastic decrease in crops yield (Shahid, 2003). Weeds are one of the major threats to the natural environment. They are destroying native habitats, threatening native plants and animals and choking our natural systems including rivers and forests. The main objectives for this study were to find out major problems of the farmers of study area, find out the impact of

weeds on wheat productivity, and to recommend a suitable solution based on the findings of the survey conducted.

MATERIALS AND METHODS

The present study was conducted during June-July 2010 in order to find out the major problems associated with wheat cultivation. Three villages of district Peshawar namely Palosi Tarlazai, Piran and Regi were selected for the investigative and diagnostic approach of tackling the problems of the local farming community. The total numbers of household in Union Council Palosi are from 15 to 20 thousands.

A total of 60 farmers (20 each from the three villages); wheat growers were purposively selected and interviewed. A comprehensive schedule (questionnaire) to interview the farmers was designed. The interviews were conducted at farmers' homes as well as fields wherever possible. In addition, the farmers were assured of the privacy of the information to convince them to answer the question frankly to the best of their knowledge in order to document an indigenous knowledge of the farmers regarding the problems they have faced.

RESULTS AND DISCUSSION

Farmers generally pinpointed many problems in their fields such as insects, weeds, disease, other pests, and scarcity of irrigation water etc. The data regarding problems associated with wheat crop production are presented in Table-1. Weed problem was the foremost menace for wheat cultivation in the study area which was reported by 28.8% of the respondents. Weeds compete for light, nutrients, moisture and space with the crop and thus cause severe losses to yield. Losses in wheat due to weeds range 17-25% (Shad, 1987). Insect pests were the second major problem of wheat crop as reported by 21.5% of the respondents. In addition, 18.4% of the respondents reported the unavailability of irrigation water as their major problem of resulting in lower wheat production in their fields. Weed infestation is one of the main causes of low wheat yield in Pakistan that reduces its yield by 25-30% (Nayyar *et al.*, 1995). Grain yield in Pakistan may be increased by up to 37% if weeds are properly controlled in wheat (Baluch, 1993). Pests and weeds cause different diseases in crops which results a decrease in its yield. (Shahid, 2003).

Table-2 indicates that most of the farmers i.e. about 26% and 22% farmers applied chemicals (their cost ranging between Rs. 500-1000 and greater than Rs. 1000, respectively) for weed control in the wheat crop. The data in Table-2 indicate that when no herbicides were used, the farmers obtained 2909 kg ha⁻¹; whereas with the application of herbicides the yield increased by 13, 24, and 29% when the farmers

used herbicides of cost less than 500, 500-1000, and greater than Rs. 1000, respectively. Average yield of wheat increased with the increased use of herbicides (Khan, 1988).

Table-3 shows that none of the growers reported 0% or 100% losses. Out of total respondents, 56.66% reported 50% losses, 23.33% respondents reported 25% losses and 20% farmers reported 75% losses in wheat yields due to weeds infestation. Among the three villages, 50% respondents of Tarlazai reported 75% losses followed by 33.33% respondents of Regi and 16.66% of Piran village. Moreover, 50% losses were reported by 38.23% respondents of Regi followed by 35.29% respondents of Piran and 26.47% respondents of Tarlazai. Similarly, 25% losses due to weeds were reported by 42.85 % respondents of Piran followed by 35.71% of Tarlazai and 21.42% respondents of Regi. Relative abundance of the major weed species differed among crop treatments. In general, the most dominant weed species was more suppressed than other species as crop productivity increased (Mohler and Liebman, 1987).

Table-1. Number of respondents (%) to different problems associated with wheat cultivation.

| Problem | Rank of the problem | Number of respondents (%) |
|---------------------------------|---------------------|---------------------------|
| Weeds | 1 st | 28.8 |
| Pests control | 2 nd | 21.5 |
| Irrigation | 3 rd | 18.4 |
| Unavailability of quality seeds | 4 th | 0.6 |
| Storage problems | 5 th | 00 |

Source: Field Survey 2010.

Table-2. Increase in wheat yield (%) due to use of herbicide in the study area.

| Average cost of herbicides (Rs. ha ⁻¹) | Number of respondents (%) | Yield (Kg ha ⁻¹) | Increase in yield over check (%) |
|--|---------------------------|------------------------------|----------------------------------|
| 0 | 7 | 2909 | 0 |
| 380 (< Rs. 500) | 5 | 3286 | 13 |
| 680 (b/w Rs. 500-1000) | 26 | 3602 | 24 |
| 1411 (> 1000) | 22 | 3744 | 29 |

Source: field survey 2010.

Table-3. Number of respondents (%) responded to various % age of losses year⁻¹ from various villages and in total of the study area.

| Losses year ⁻¹ (%) | Tarlazai | Piran | Regi | Total |
|-------------------------------|----------|-------|-------|-------|
| 0.00 | 00 | 00 | 0 | 0.00 |
| 25 | 35.71 | 42.85 | 21.42 | 23.33 |
| 50 | 26.47 | 35.29 | 38.23 | 56.66 |
| 75 | 50.00 | 15.66 | 33.33 | 20.00 |
| 100 | 00 | 00 | 00 | 0.00 |

Source: Field Survey 2010.

CONCLUSION AND RECOMMENDATION

Weeds had a direct effect on wheat production that significantly decreased wheat yield in the areas investigated. Both hand weeding and herbicidal treatments resulted in better control of weeds but due to high cost of labour chemical weed control was preferred by the farming community for improving wheat yield in the agro-climatic conditions of Peshawar. The farmers need proper training by extension personnel regarding the scientific ways of the production technology i.e. sowing time, optimum seed rate, timely weeding and pesticides application, and crop husbandry etc. for improved crop productivity. Shortage of irrigation water is a gradually aggravating problem for wheat production as per remarks of the farmers.

The government should improve the irrigation system to overcome the irrigation water shortage problem. Pre- and post harvest losses may be reduced by using different cultural and chemical methods like crop rotation, timely sowing, using resistant varieties, quality of irrigation water, use of proper pesticides with proper methods and timely application. It is also recommended that modern agro-technical information must be conveyed to the farming community through quality research and strong extension services.

REFERENCES CITED

- Anonymous. 1996. Agricultural Statistics of Pakistan, Government of Pakistan, Ministry of Food and Agriculture and Livestock, Food and Agricultural Division (Planning Unit), Islamabad.
- Baluch, G.M. 1993. Biological control of weeds. Progressive Farming, Pak. Agric. Res. Council, Islamabad 3: 10-18.
- Duke, C.E. and R.S. Lydon. 1993. Biochemical regulation of wheat and wild oat germination and growth by herbicides application and crop residues. Proc. British Crop Prot. Conf. Weeds, 2: 661-668.

- Fayad, T.B., S.R.S. Sabry and E.S.H. Aboul. 1998. Effect of herbicides on weed density, wheat grains yield, and yield component. Conf. Weed Biol. And Control. Stuttgart Hohenheim, Germany, 14-16 March, 1998.
- GoP. 2010. Government of Pakistan. Pakistan Economic Survey Ministry of Finance, Eco. Advisor's Wing, Finance Division, Islamabad, Pakistan.
- Hassan, G., B. Faiz, K.B. Marwat and M. Khan. 2003. Effects of planting methods and tank mixed herbicides on controlling grassy and broadleaf weeds and their effect on wheat cv. Fakhre-Sarhad. Pak. J. Weed Sci. Res. 9(1-2):1-11.
- Khalil, I.A. and A. Jan. 2000. Cereal crops. *In*: Cropping Technology. National Book Foundation Islamabad. Pp.169-203.
- Khan. 1988. Farmers resource status and information availability utilization. Ph.D thesis, Univ. of Illinois, at Urbana Champaign, USA.
- Khan, I., Z. Muhammad, G. Hassan and K.B. Marwat. 2001. Efficacy of different herbicides for controlling weeds in wheat crop: Response of agronomic and morphological traits in wheat variety Ghaznavi-98. Scient. Khyber 14(1): 51-57.
- MINFA. 2004. Ministry of Food and Agriculture, Islamabad-Pakistan.
- Mohler, C.L. and M. Liebman. 1987. Weed Productivity and Composition in Sole Crop and Intercrops of Barley and Field Pea in Thaca New York. J. Applied Ecol. 26: 685-699.
- Nayyar, M.M., M. Shafi, T. Mahmood and A.M. Randhwa. 1995. Effect of herbicides on monocot weeds in wheat. J. Agric. Res. 32: 149-155.
- Shad, R. A. 1987. Status of Weed Science activities in Pakistan. Prog. Farm. 7(1):10-16.
- Shahid, M. 2003. Principles of Insect Pest Management. Dept. Ento. Agric. Univ. Pesh. Pak. pp. 172-173.
- Wajid, S.A. 2004. Modeling development, growth and yield of wheat under different sowing dates, plant populations and irrigation levels. Ph.D. Thesis Dept. of Agron. University of Agriculture, Faisalabad, Pakistan.
- Young, F.L., A.G. Ogg (Jr), D.L. Young and R.I. Papendick. 1996. Weed management for crop production in the northwest wheat region. Weed Sci. 44(2): 429-436.