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FACTORS RESPONSIBLE FOR LOW WHEAT PRODUCTIVITY IN CENTRAL PUNJAB

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The study was carried out to explore the factors responsible towards low wheat productivity in the study area. The data revealed that a significant proportion of small farmers (78.6 %) sowed their wheat crop in November 2002, which was high across the other farm size groups, whereas, the small farmers (9 %) who sowed their wheat crop in October 2002 obtained more yield than other farm size groups who sowed wheat in November and December 2002 in the study area. The data also revealed that the large farmers (100 %) sowed Inqlab-91 followed by Uqab-2000 (45.6 %), Iqbal-2000 (36 %) and M.H-97 (27 %) varieties. The large farmers obtained 5.14 tones/hectare, 4.01 tones/hectare, 4.15 tones/hectare and 3.69 tones/hectare wheat yield during the years 2000,2001,2002 and 2003 respectively in the study area. It was also found that average wheat yield reduction was 1.00 tones/ha during the year2002-03 in the study area. More small farmers (40 %), (32 %),(55 %), (14 %) and (9 %) than other farm size groups reported no use of weedicdes, lodging, hailstorm in area, attack of aphids/rust and poor management respectively were the main factors, causing low wheat productivity during the year 2002-03 in the study area.
Key words: Wheat, variety, factors, yield, responsible

INTRODUCTION

Wheat is the main staple food of the country's population and the largest grain crop of the country. It contributes 12.5 % to the value added in agriculture and 3.1 % to GDP. Wheat crop was cultivated on an area of 8.06 million hectares, showing 0.1 % increase over last year i.e., 2001-02, the estimate of wheat production was much lower than target because the crop was affected by aphids and rust attacks in wheat growing areas, as well as, high temperature stress at grain formation affected the productivity of the wheat crop (Govt. of Pak., 2003).

However, the wheat yield per hectare in Pakistan is 2491 kilogrammes, which was far below than that of many other wheat-producing countries of the world (FAO, 2000).

The decline in wheat production may mainly attribute to shortage of irrigation water, delayed planting, poor plant protection, imbalanced fertilizer use, inappropriate soil management and poor land preparation. Low wheat productivity is also the result of outdated technology prevalent on farm sector particularly among the farmers.

The modern technology, improved sowing methods, fertilizers, pesticides, weedicides, certified seed and farm machinery are not properly used and diffused and widely adopted by the farmers.

Therefore, there is need to explore the factors responsible towards low wheat productivity during the year 2002-03.The policy makers are keen to identify these factors in order to introduce remedial measures.

MATERIALS AND METHODS

A farm level survey was conducted during June 2003 in Faislabad division, which comprised of Faislabad, Jhang and T.T. Singh districts. From each district, one tehsil and three villages from each tehsil, were selected at random. From each village, 10 farmers were selected at random as respondents. Thus, the total number of respondents was 90. The data were collected through farmers' interviews using a well-structured questionnaire. The data thus obtained were analyzed using simple statistics to estimate the various responses and draw conclusions for pertinent recommendations.

The respondents were classified into categories of small, medium and large farms according to size of their operational land holdings. The farmers operating a farm of less than 5 hectares were termed as small farmers, those with an operational land holding between 5 hectares to 10 hectares were placed under medium farmers, whereas the farmers having more than 10 hectares were classified as large farmers. The distribution of the sample farmers is presented in Table 1.

Table 1. Distribution of the sample farmers by farm size.

Districts	Farm size groups			All (Percent)
	Small (Percent)	Medium (Percent)	Large (Percent)	
T. T. Singh	10 (17.9%)	13 (56.5%)	7 (63.6%)	30 (33.3%)
Jhangh	22 (39.9%)	4 (17.4%)	4 (36.4%)	30 (33.3%)
Faisalabad	24 (42.9%)	6 (26.1%)	N.A N.A	30 33.3%
Total	56 (100%)	23 (100%)	11 (100%)	90 (100%)

* (%) Shows percentage, N.A. Not available.

Empirical Analysis

General wheat production practices in study area

The Table 2 revealed that the average area of wheat crop was 3.57 hectares during 2002-03. The average operational land holding of the respondents was 7.52 hectares in the study area. The large farmers (15.4 %) and (23.1 %) sowed their wheat crop in October and December 2002 respectively. A majority of the farmers (75.6 %) sowed their wheat crop in November 2002 and the seed rate was used 124.34 kgs/ hectares by the farmers of the study area

The Table 2 also revealed that farmers of the study area applied weedicide to wheat crop only once and the average numbers of irrigation (4.58) applied to wheat crop by respondents of study area.

The majority of small farmers were slow in adopting new varieties. These results are similar with (Byerlee, 1993) who found that Pakistan is one of the countries where wheat varietal substitution has been very slow. These results are also consistent with Heisey (ed.) 1988 who found that the majority of small farmers are slow in adopting new cultivars because of limited availability of seed and lack of knowledge of new varieties of wheat.

Fertilizer application to wheat crop in the study area

Fertilizer is one of the key inputs that play a pivotal role in productivity of the crops. The Table 3 depicted that respondents of the study area applied 21.31 tones/hectare Farm Yard Manure (FYM) and about

Table 2. General information about wheat production practices in study area

Wheat production practices	Farm Size Groups			
	Small	Medium	Large	All
Wheat (Hectare)	1.60	4.40	11.81	3.57
Operational land holding (Hectare)	3.00	8.07	29.96	7.52
Sowing time				
October, 2002 (Percent Farmers)	7.1	9.5	15.4	8.9
November, 2002(Percent Farmers)	78.6	76.2	61.5	75.6
December, 2002(Percent Farmers)	14.3	14.3	23.1	15.6
Seed Rate (Kgs/ha)	124.41	119.72	133.60	124.34
Weedicides (Nos./ ha)	1.35	1.17	1.18	1.28
Irrigation (Nos.)	4.61	4.60	4.36	4.58

Wheat varieties sown in the study area

The introduction of high yielding varieties and the rate at which they are diffused to farmer's fields indicate the speed of transferring the benefits of breeding efforts to farmers. The large farmers (100 %) sowed Inqlab-91, Uqab-2000 (45.5 %), Iqbal-2000 (36.4 %) and M.H-97 (27.3 %) varieties. Medium farmers (13.0 %) sowed Chenab-2000 variety, which was high as compared to other farm size groups. Only small farmers (30.4 %) and medium farmers (30.4 %) sowed Wattan variety.

174.01 kgs/hectare Phosphorous to wheat crop. Medium farmers applied 243.27 kgs/hectare of Nitrogen to wheat crop, which was higher than other farm size groups. The data also showed that more quantity of Potash (111.15 kgs/ hectare) was applied by small farmers to wheat crop which was high as compared to other farm size groups.

Table 6. Factors contributing towards low wheat productivity during 2003

(Percent Farmers)

Factors	Farm Size Groups			
	Small	Medium	Large	All
No use of weedicdes	39.60	17.40	9.10	21.90
Lodging	32.10	30.40	18.20	26.90
Hailstorm in area	54.60	52.10	18.20	41.63
Shortage of water	25.00	69.60	36.40	43.66
Late sowing	14.30	17.40	18.20	16.63
Attack of aphids/rust	14.30	4.30	00.00	6.20
Poor management	9.00	00.00	1.90	3.63

Impact of sowing months on wheat's yield during 2002-03

The Table 4 depicts that (9 %), (76 %) and (15 %) farmers sowed their wheat crop in October, November and December 2002 respectively and correspondingly obtained yield 4.05 tones/hectare, 3.66 tones/hectare and 3.46 tones/hectare respectively. The results show that the farmers who sowed their wheat crop in October 2002 obtained higher yield than other farmers sowing wheat in November and December 2002.

Table 4. Sowing months and wheat yield obtained during 2002-03

Sowing months	Farmers (Percent)	Yield (tones/hectare)
October, 2002	9	4.05
November, 2002	76	3.66
December, 2002	15	3.46
Total	100	3.56

Wheat yields obtained during 2003 in the study area

The Table 5 depicts that large farmers of the study area obtained 5.14 tones/hectare, 4.01 tones/hectare, 4.15 tones/hectare and 3.69 tones/hectare, wheat yields during the years 2000,2001,2002 and 2003 respectively, which was higher as compared to other farm size groups. The Table 5 further depicted that small farmers obtained 4.95 tones/hectare, 3.92 tones/hectare, 3.71 tones/hectare and 3.57 tones/hectare wheat yield in corresponding years.

Yield reduction during 2003

The over all wheat crop situation was apparently better at boot stage during the year 2003.The farmers were expecting more wheat yield than that of obtained during the last year 2002.

Despite all these expectation, wheat crop was subjected to various vagaries such as pests, diseases, lodging by winds and grain shriveling due to sudden rise in temperature at grain maturity stage etc. The experienced farmers can easily anticipate the extent of reduction in output caused by these problems. The Table 5 also depicted that medium farmers estimated the reduction in wheat yield by 1.18 tones/hectare. It was also revealed that average wheat yield reduction was 1.00 tones/hectare in the study area.

Table 5. Wheat yields obtained during 2003 in the study area

Yield (tones/hectare)	Farm Size Groups			
	Small	Medium	Large	All
During 2000	4.95	4.94	5.14	5.03
During 2001	3.92	3.81	4.01	3.90
During 2002	3.71	3.61	4.15	3.74
During 2003	3.57	3.49	3.69	3.56
Yield reduction during 2003 (tones/ha)	0.92	1.18	1.02	1.00

Factors responsible towards low wheat productivity during 2003

The Table 6 depicted that a significant proportion of small farmers (39.60 %), (32.10 %), (54.60 %), (14.30 %) and (9.00 %) reported no use of weedicdes, lodging, hailstorm in area, attack of aphids/ rust and poor management respectively as the causal factors to low wheat productivity during 2003. These results are similar with Sadiq (1977) who found that when weeds were allowed to grow for longer period in wheat crop, yield decreased by (16 %) and Randawa et al (1986) also found that more than (10 %) wheat yield decreased due to rust in wheat. A significant proportion of medium farmers (69.60 %) reported that shortage of water was the main factor responsible towards low wheat productivity. The data also depicted that large farmers (18.20 %) reported that late sowing was also the factor towards low wheat productivity.

CONCLUSIONS

- Average area of wheat crop per farm was 3.57 during 2002-03, whereas, seed rate was used 124.34 kgs/ha.
- The large farmers (15.4 %) and (23.1 %) sowed their wheat crop in October and December 2002 respectively, whereas, a majority of small farmers (78.6 %) sowed their wheat crop in November 2002.
- Respondents of the study area applied 21.31 tones/hectare Farm Yard Manure (FYM) and about 174.01 kgs/hectare Phosphorous. Medium farmers applied 243.27 kgs/hectare Nitrogen to wheat crop, which was higher than other farm size groups.
- Farmers who had sown wheat crop in October, Nov. and December 2002 obtained 4.05 tones/hectare, 3.66 tones/hectare and 3.46 tones/hectare respectively.
- Large farmers obtained 5.14 tones/hectare, 4.01 tones/hectare, 4.15 tones/hectare and 3.69 tones/hectare wheat yields during the years 2000,2001,2002 and 2003 respectively.
- It was also found that average wheat yield reduction was 1.00 tones/hectare in the study area.
- A fraction of small farmers 39.60% 32.10%, 54.60%, 14.30% and 9.00% reported non use of weedicdes, lodging, hailstorm in area, attack of aphids/ rust and poor management respectively were the main factors contributing towards low wheat productivity during 2002-03.

RECOMMENDATIONS

- Timely sowing of wheat in November would improve productivity.
- Zero tillage and other cost saving technologies must be quantified to reduce time saving for wheat cultivation.
- Certified and pure seed is key to increase wheat productivity.
- Balanced use of fertilizer is necessary to improve the wheat yield.
- Judicious use of irrigation water and timeliness would improve the wheat productivity.

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