ANALYSIS OF THE ADOPTION OF WHEAT SOWING RECOMMENDATIONS AMONG SMALL FARMERS USING WATER SAVING INTERVENTIONS

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ABSTRACT

Wheat is a staple food crop of Pakistan. Enhancing wheat yield by encouraging farmers, predominantly small farmers, to adopt agricultural innovations including efficient and judicious use of land and water resources for coping with the needs and demands of ever increasing population of Pakistan is a serious challenge. This challenge provided impetus to plan and conduct the present study. In order to evaluate the adoption of the latest technologies at small farms, district Faisalabad was selected as the study area. Area under study comprised five tehsils: Faisalabad, Jaranwala, Sammandri, Chak Jhumra and Tandlianwala. The cross sectional survey research design was applied. Field interviews were conducted with the help of a validated and reliable research instrument. Most of the respondents (58%) under observation were of middle age category. Majority of the respondents (~100%) adopted wheat sowing recommendations such as well preparation of soil, use of recommended dose of seed, application of fertilizer, best way of harvesting and better method of storage whereas, manual weed removing, and fumigation of seed were adopted 33.0% and 37.8 % respectively. Further more regarding extent of adoption of wheat sowing recommendations, the well preparation of soil and best method of storage were adopted by 84.4 %, and 63.7% respondent respectively where as the respondent adopted the wheat sowing recommendations such as use of recommended seed (56.3%) and use of weedicide (55.6%) to an average extent. Compatibility of farmers' preferences with the recommendations and actual practices provide useful adoption indicators.

Key words: Adoption, Wheat, Recommendations, Small farmers, Faisalabad.

INTRODUCTION

Wheat is the second most produced crop in the world (approximately 680 million metric tonnes produced annually), following only world maize production. Wheat is the main staple food and prime source of income for farmers in Pakistan. It is also an inexpensive source of feedstuff for poultry and livestock in Pakistan. Wheat grain contains 68, 15.4, 12.2% and carbohydrates, protein contents and fiber, respectively (Anjum *et al.,* 2005). Therefore, it is necessary to enhance crop productivity to attain self-sufficiency food and surplus for earning foreign exchange. Wheat crop is extensively distributed and has importance for human food (Tsenov *et al*., 2009). Wheat production has increased from 23,311 thousand tons in 2009-10 to 24,214 thousand tons in 2010-11, showing an increase of 3.9% (GOP, 2011). Most of the research and extension work is carried out in the country to boost up wheat production as it contributes to the political slogan of food, fibre, and shelter for the poor.

Wheat is a major crop within the Rabi season crops covering an area of about 60-70% of the total cropped area and thus uses major portion of water allocated in Rabi season. It is general observation that in this modern age of agriculture, farmers grow wheat under broadcasting and flood irrigation. To save water and improve water productivity of wheat, Water Management Research Centre, University of Agriculture, Faisalabad developed a "Four Row Wheat Bed Planter" to grow wheat on Furrow Irrigated Raised Beds (Mahmood and Ahmad, 2005).

There is about 60% yield gap in wheat, which need to be narrowed. The major reasons for low productivity and instability include: delayed harvesting of Kharif crops like cotton, sugarcane and rice, and consequent late planting of wheat; non availability of improved inputs like seed, inefficient fertilizer use; weed infestation; shortage of irrigation water; drought in rain fed areas; terminal heat stress; soil degradation; and inefficient extension services. Farmers are not aware of modern technologies because of weak extension services system (PARC, 2012).

In a study conducted three years back it was found that the levels of adoption of the improved technologies differed among technology types and adoption areas. Wheat sown in rows by drill had better plant height, more number of spikelets per spike and the yield (Abbas *et al* 2009). Sowing time, rotavator use, seed rate, weedicide cost and use of nitrogenous fertilizer were found as contributing factors towards higher wheat yield (Hassan *et al* 2010).

Extension is a vital element in transferring agricultural technology and fostering the adoption of new

wheat sowing methodology. Extension services include extension-agents' visits to farmers, radio/television programs, and field days. The facilities available to extension agents are extremely low. Farmers generally get information from their fellow farmers. Their adoption level concerning wheat sowing recommendations need to be appraised. In this piece of research an attempt has been made to discuss, analyze and interpret relevant data concerning adoption of wheat sowing recommendations in order to draw pertinent conclusions and formulate appropriate suggestions in the light of the study results.

MATERIALS AND METHODS

Agricultural research work and field activities especially introduction of wheat sowing recommendations; like well preparation of soil, analysis of soil, use of recommended quantity of seed, sowing of new seed variety, fumigation of seed, timely sowing of wheat, application of fertiliser on given dose, application of water with reasonable intervals, manual weed removing, use of weedicide, best way of harvesting, better method of storage by the Agriculture department for wheat enhancing are in progress. To evaluate the adoption of wheat sowing recommendations at small farms, district Faisalabad was selected as study area, which consists of five Tehsils; Faisalabad, Jaranwala, Sammandri, Chak Jhumra and Tandlianwala. Three Tehsils i.e. Chak Jhumra, Jaranwala and Sammandri out of five Tehsils were selected randomly using simple random sampling technique. A Tehsil wise list of watercourse was collected from the office of the District Officer water Management Faisalabad. The study was conducted in the year 2010. A list of 25 watercourses was separately prepared duly authenticated by water management officer, where maximum water saving interventions, and wheat sowing recommendations were adopted. From 75 watercourses, 30 watercourses were selected randomly. From these 30 watercourses, 270 respondents were selected randomly and uniformly 3 from head, middle and tail respectively. Thus 270 small farmers (having landholding <12.5 acres) were selected as sources of data. . The data were collected with the help of validated interview schedule. Data were analysed with the help of Statistical Package for Social Sciences (SPSS).

RESULTS AND DISCUSSION

Human adoption behaviour could be influenced by age factor. In order to see the influence of age on the adoption behaviour, information along with the other information was collected. From the random collected data, most of the respondents (58.1 %) were of middle age category with a mean age of 45.54 while 18.5 % and

23.3 % of the respondents belonged to young and old age categories respectively (Table 1). This trend of involvement of middle aged and younger farmers in agriculture shows their interest in farming. Age has been found to have either positive or negative affect on adoption behaviour of the individual (Hossain, 1972). Contradictory views about the affect of age and behaviour of individuals have also, however, been found in available literature (Kotile and Martins, 2000).

The data also show the uniform involvement of respondents of all ages. The data show a normal distribution of respondents based on age variable. The results are also similar with the findings of Sharif, (1990) and Randavy and Vaughn, (1991) who have concluded the similar distribution of respondents.

Table 2 shows the distribution of the respondents according to the adoption of wheat sowing recommendations. Wheat sowing recommendations such as well preparation of soil, use of recommended dose of seed, application of fertilizer best way of harvesting and better method of storage were adopted by about 100% respondents, whereas manual weed removing, and fumigation of seed were adopted by 33.0% and 37.8 % of the respondents respectively (Table 2). Further more regarding extent of adoption of wheat sowing recommendations 84.4 %, and 63.7% respondent adopted the well preparation of soil, best method of storage, respectively where as 56.3% and 55.6% respondents adopted the wheat sowing recommendations like use of recommended seed, use of weedicide to an average extent (Table 2).

The data presented in Table 1 and 2 indicated that the least adopted recommendation of wheat crop were: manual weed removing; fumigation of seed; analysis of soil and timely sowing of wheat. The highly adopted recommendations were: well preparation of soil; better method of storage; application of water with reasonable intervals; and application of fertilizer. The levels of adoption of the improved technologies differed among technology types and adoption areas.

Table 3 shows that wheat sowing recommendations such as well preparation of soil, better method of storage and application of water with reasonable intervals were ranked 1st, 2nd, 3rd respectively with weighted score 1037,988 and 956 and mean 3.84, 3.66 and 3.55 with standard deviation 0.38, 0.58 and 0.61 respectively. Data also show that wheat sowing recommendations such as manual weed removing, fumigation of seed were ranked at 12th and 11th weighted score value 298 and 316 with mean, 3.35, 3.10, and standard deviation values 0.52, 0.85, respectively. Manual work in agriculture is very difficult and expensive and some time not possible due to non-availability of labour (Jamshid, 1998).

About 84.4% respondents were sowing wheat on 4-6 acres after water course improvement and 46.3%

were getting yield 36-40 Munds (1440-1600 kg) of wheat (Table 4). Similar results were also observed earlier (Khan, 1997). Comparison studies showed that there is increase in wheat sowing area and wheat yield after watercourse improvement. There were 20% increase in cropping intensity and 15 % increase in wheat yield.

Compatibility of farmers' with the recommendations and actual practices provide useful adoption indicators. A high percentage of the farmers' were related to well preparation of soil, application of fertilizer, application of water with reasonable intervals and better method of storage. Farmers' awareness of recommendations, however, varied for different technology components and areas.

Table 1: Distribution of respondents according to age

Age of the respondents (in years)	No.	Percentage
Up to 35	50	18.5
36-50	157	58.1
Above 50	63	23.3
Total	270	100.0

Table 2. Distribution of the respondents according to extent of their adoption of wheat sowing recommendations.

Wheat sowing recommendations	Adoption				Extent of adoption level									
	Yes		No		1		2		3		4		5	
	No.	%	No.	%	N.	%	N.	%	N.	%	N.	%	N.	%
Well preparation of soil	270	100.0	-	-	-	-	1	0.4	41	15.2	228	84.4	-	-
Analysis of soil	124	45.9	146	54.1	-	-	6	2.2	20	7.4	98	36.3	-	-
Use of recommended dose of seed	270	100.0	-	-	-	-	6	2.2	152	56.3	104	38.5	8	3.0
Sowing of new seed variety	262	97.0	8	3.0	1	0.4	2	0.7	146	54.1	111	41.1	2	0.7
Fumigation of seed	102	37.8	168	62.2	-	-	32	11.9	38	10.4	42	15.6	-	-
Timely sowing of wheat	265	98.1	5	1.9	-	-	62	23.0	98	36.3	103	38.1	2	0.7
Application of fertilizer on given dose	270	100.0	-	-	1	0.4	6	2.2	126	46.7	126	46.7	11	4.1
Application of water with reasonable intervals	269	99.6	1	0.4	-	-	2	0.7	131	48.5	121	44.8	15	5.6
Manual weed removing	89	33.0	181	67.0	-	-	2	0.7	57	21.1	30	11.1	1	0.4
Use of weedicide	267	98.9	3	1.1	1	0.4	8	3.0	150	55.6	103	38.1	5	1.9
Best way of harvesting	270	100.0	-	-	-	-	6	2.2	136	50.4	110	40.7	18	6.7
Better method of storage	270	100.0	-	-	1	0.4	5	1.9	85	31.5	172	63.7	7	2.6

1= To some extent, 2= To below an average extent, 3=To an average extent, 4= To above average extent, and 5= To high extent

Table 3. Mean, standard deviation, weighted Score and rank order of their adoption about the wheat sowing recommendations.

Wheat sowing recommendations	Weighted score	Mean	Std. Deviation	Rank Order
Well preparation of soil	1037	3.84	0.38	1
Better method of storage	989	3.66	0.58	2
Application of water with reasonable intervals	956	3.55	0.61	3
Application of fertilizer on given dose	950	3.52	0.63	4
Best way of harvesting	950	3.52	0.65	5
Use of recommended dose of seed	924	3.42	0.59	6
Use of weedicide	904	3.39	0.60	7
Sowing of new seed variety	897	3.42	0.55	8
Timely sowing of wheat	840	3.17	0.79	9
Analysis of soil	464	3.74	0.54	10
Fumigation of seed	316	3.10	0.85	11
Manual weed removing	298	3.35	0.52	12

1= To some extent, 2= To below an average extent, 3=To an average extent, 4= To above average extent, and 5= To high extent

Table 4. Distribution of the respondents according their perceptions concerning wheat sowing in this area after water course improvement

Wheat sowing in this area after water course improvement	No.	Percentage
Yes	270	100.0
No	-	-
Total	270	100.0
Area of sown wheat (acres)		
Upto 3	24	8.9
4-6	228	84.4
7 and above	18	6.7
Total	270	100.0
Production of wheat		
Upto 35(1400) kg	18	6.7
36-40(1440-1600) kg	125	46.3
Above 40(1600)kg	127	47.0
Total	270	100.0

Table 5. Comparison between wheat productions (in munds)

	Mini.	Maxi.	Mean	Std. Deviation
Production of wheat before watercourse improvement	25	46	39.86	3.95
Production of wheat after watercourse improvement	26	46	40.60	3.50

Conclusion: All of the respondents adopted wheat sowing recommendations such as well preparation of soil, use of recommended dose of seed, application of fertilizer, best way of harvesting and better method of storage whereas, manual weed removing, and fumigation of seed were adopted 33.0% and 37.8 % respectively. Further more regarding extent of adoption of wheat sowing recommendations, the well preparation of soil and best method of storage were adopted by 84.4 %, and 63.7% respondent respectively where as the respondent adopted the wheat sowing recommendations such as use of recommended seed (56.3%) and use of weedicide (55.6%) to an average extent. Overall adoption level of wheat sowing recommendations among farmers is encouraging and yield enhancing.

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