

## IDENTIFICATION AND ANALYSIS OF THE BARRIERS HAMPERING WHEAT PRODUCTION IN THE PUNJAB, PAKISTAN: THE CASE STUDY OF VEHARI DISTRICT

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Wheat, being staple food occupies a very conspicuous place for ensuring food security in Pakistan but the real matter of concern is the gap between its potential and actual yield. The present study has attempted to identify the factors that have been hampering its required production. There has certainly been many production hindering factors. The aim of the research was to analyze those obstacles and present useful suggestions so that state of food security in the country can be improved. A cross-sectional survey research was conducted through an interview schedule after selecting the sample of 120 respondents randomly. Both quantitative and qualitative data were collected in this research. The results of the study indicate that high prices of fertilizers and pesticides coupled with their adulteration are the most prominent barriers of wheat production. Likewise, unavailability of irrigation water and good quality low priced seed are also exacerbating the problem. Farmers are also being exploited by marketer in terms of inappropriate payments and dealings in the presence of price fluctuations and non-availability of credits to them. Last but not the least there remains a big gap between latest information regarding wheat and its growers due to which the former was not easily accessible and relied upon. The arguments in this paper could act as a food for thought for all the concerned stakeholders for an in-depth understanding of the issue. In this way they may be able to control to the barriers before it is too late by giving due attention to the factors identified in this paper. Otherwise the state of food insecurity may worsen in the years to come. Government level check and balance and mass media campaigns can play a potential role for reducing the problems of production.

**Keywords:** Barriers, wheat production, farmers' perception, district Vehari

### INTRODUCTION

Wheat (*Triticum aestivum* L.) is the main staple food of Pakistan's population and major grain crop of the country. Its value added contribution to agriculture and GDP (Gross Domestic Product) is 12.5% and 2.6%, respectively (Govt. of Pak., 2012). However, this value addition to agriculture and GDP has declined within the last four to five years, as it was, according to governmental statistics, 14.4% and 3.0% in 2007. In spite of its importance wheat yield has generally been lower in Pakistan than that in most of the countries in the world (Abbas *et al.*, 2008). It is around two and half times lower than that of other wheat producing countries, furthermore, it is also lying stagnant over the years whereas the demand is on the rise due to increasing population, this is creating a big gap that is difficult to fill by researchers and farmers (Nadim *et al.*, 2011). It is beyond doubt that by increasing its production, availability and accessibility of food can be enhanced as well as national income can be boosted so by increasing production rising issues of food insecurity and poverty can be reduced (Farkhanda *et al.*, 2009). There exists a gap between the potential and actual

yield (Khan *et al.*, 2003) and fluctuations in wheat crop production every year due to which the growers are deprived of getting benefit from a large chunk of their wheat crop. The yield gap and fluctuations in the annual output are due to many factors that are called as 'barriers'. As agriculture is one of the main sources of livelihood, especially in the rural areas (Khan *et al.*, 2007), the obstacles can have significant impacts on rural sociology directly or indirectly. If these barriers are removed, or at least reduced, the production can be enhanced on a sustainable basis.

It is due to various production related hindering factors that showed grim picture as the production of wheat in especially five years back was dropped down to 21.8 million tons from 23.5 million tons (Malik, 2008). The more bitter fact is that the average yield/ acre at farm level are quite below than that of country's existing wheat varieties. The production can be increased; (a) by bringing more area under cultivation and (b) by increasing its per hectare yield especially by reduction of the barriers that are hampering its production. The effort is important because it can meet the pace of increasing demands of food for population. Between the possible solutions, (a) area under cultivation can't be increased up to

a large extent because of emerging requirements of more land for shelter of growing population and urbanization. Moreover, it is not feasible in face of the depletion of scarce natural resources especially water as indicated by ICIMOD (2009). The latter (b) possibility is more feasible than the former because it is more pleasant to increase per hectare yield by overcoming various hurdles, which deem practicable solution in hand.

Previous researchers such as Easterling and Apps (2005) considered nutrients, temperature, precipitation, and others as important limiting parameters for wheat yield. On the other hand availability and prices of the inputs were also found to be obstacles in getting desired objectives out of wheat cultivation. As Hammed *et al.* (2003) ascribed non-availability of improved seed for farming community responsible for low output. Moreover the prices of fertilizers increased considerably that could also be the cause of low production of wheat. The high prices of fertilizers have also panicked in other developing countries as neighboring country India (Choudhary and Choudhary, 2013). This increase in prices of inputs has been pre-dominant problem in Pakistan along with the fact that it has given a setback to agriculture worldwide. The previous mentioned reason clarified that why USAID (2005) reported the expensive fertilizer as one of the contributors to high levels of food insufficiency and insecurity. At the same time the percentage increase in cost of fertilizer was 73% worldwide in this way it remained even more than the percentage increase in fuel prices during 2008 (Cornbelt, 2009). The required/recommended doses of fertilizers are not provided to the cereal crops due to high prices (Govt. of Pak. 2008) where according to an estimate one (1) kg of nutrient fertilizer can produce 8 kg of cereals. If the fertilizers would have been available in the purchasing power (pecuniary ranges) of farmers they would start using the recommended doses. The crop always responds actively to the balanced application of fertilizer/ nutrients (Reddy, 2004) and produces more grain yield in all cereal crops including wheat (Fois *et al.*, 2008; Khalil and Jan, 2010). Hammad *et al.* (2011) observed significantly positive relationship with the use of organic manures in wheat and its growth with more economic returns. Lack of funds was found (Bashir *et al.*, 2010) to be the major challenge in purchasing fertilizers, improved seeds, advanced technologies etc. The demand for fertilizer application is continuously rising day by day especially because of introduction of high yielding varieties of wheat, this high demand was not much evident in the history of this country (Reddy, 2004; Ur- Rehman *et al.*, 2007) but supply is not meeting that demand. The perennial deficit in demand and supply of fertilizers may be referred to lack of funds for the manufacturing of these fertilizers (Khan, 2009). Whatever may be the reason one thing is for sure that without green manuring and chemical fertilizer input practice in wheat-rice cropping system sustainability would

clearly be under threat (Yadav *et al.*, 2000). Some authors alluded lack of economic access to weedicides as most important factor for decline in wheat yield because weed is an undesirable plant that competes for moisture, light nutrient etc. of crops thus had tendency to reduce or affect grain yield in wheat (Tabassum *et al.*, 2007; Abbas, 2006). Unavailability of irrigation water had also found to be a hurdle in getting potential wheat yield, according to an estimate Rabi crops (including wheat) were especially suffering with this problem and these got 31.6% less availability of water than normal in Pakistan (Khalil and Jan, 2010). Likewise, there was also a perception that different market issues could limit the size of farmers' adoption of improved cultivation practices for their crops (Wheeler, 2008).

Different factors put pressure on the annual output of wheat, but the most important factors that had done real damage in Pakistan were directly or indirectly related to inputs, market, awareness and information. This paper identified the core issues related with the inputs, market and information availability (type and source) which hindered wheat production in the Punjab (province). There was dire need to investigate these core issues in order to improve the production of wheat and cope with the rising apprehensions regarding food security. Therefore, the main objective of this paper was set to explore and analyze the barriers that had their bit in keeping the wheat production at low level.

## MATERIAL AND METHODS

The study was conducted in Burewala Tehsil of Vehari District in the Punjab. A cross-sectional survey research design was applied. There were total 32 union councils (UCs) in Tehsil Burewala. Among these, six Union Councils fell in the urban area. The remaining 26 UCs comprised rural area. Out of these 26 Rural Union Councils, four were selected randomly. From each of the selected union council three villages were selected at random. Out of the each selected village, 10 respondents were selected by using simple random sampling technique, thereby, making a total sample of 120 respondents.

A well-structured interview schedule, for the collection of quantitative data from the respondents, was developed that contained both open-ended and close-ended questions. In addition to the factual and bipolar questions, rating scales were especially added in the questions where the researcher sought the extent of agreement and disagreement of the interviewees. It was, later on, tested for reliability and validity. The interview schedule was developed in English but the personal interviews were conducted in the local language (Punjabi). By doing so, accurate information regarding the problem was obtained that otherwise was a difficult task.

The quantitative data were supplemented and supported with the qualitative data. The latter were collected through the purposively selected sample after the completion of quantitative data to explore the underlying realities of the issue and validate the quantitative results. Information rich cases were preferred for that purpose. The farmers, who had faced the lowest and highly fluctuated production of wheat from their fields due to any reason, were interviewed by considering them as key informants. The interviews were conducted through an interview guide. The quantitative data collected were analyzed by using Statistical Package for Social Sciences (SPSS). The qualitative data were analyzed by using 'Content Analysis Technique' (as used by Shahbaz, 2007).

**RESULTS AND DISCUSSION**

**Inputs related barriers:** Respondents clearly indicated the inputs related barriers as the most serious for the production of wheat. The data regarding inputs related responses are summarized in Table 1.

**Table 1. Distribution of the respondents as their perception regarding inputs barriers for wheat crop production:**

Barriers (Inputs related)	Yes		No	
	f	%	f	%
Adulteration (fertilizers)	119	99.2	1	0.8
Adulteration (pesticides)	118	98.3	2	1.7
High prices of pesticides	117	97.5	3	2.5
Low quality costly seed	103	85.8	17	14.2
Lack of irrigation water	96	80.0	24	20.0

The most prominent input barriers in the study area were high cost of fertilizers and it was an alarming finding to note that all (100%) of the respondents agreed with this as rising prices had reduced the recommended doses of fertilizers which by no means was good for wheat production (Choudhary and Choudhary, 2013). The prices were going out of interviewees' financial ranges and they were reducing the application of fertilizer than the recommended doses due to the same reason. The high fertilizer prices' apprehensions were not the only point of input related worries but at the same time farmers were concerned with overall input prices although with little bit less severity. As according to collected data again an over whelming majority (97.5%) of the respondents were of the view that the prices of pesticides were also out of the range of their purchasing power. Even high price factor also affected on availability and access of quality seed and this high quality seed with the low affordable prices had become dream of the local residents. Again a large majority (85.5%) agreed with the statement that the quality seeds were not available in the cheap prices and showed their helplessness against the problem. A sample

of an owner cultivator's (age=42, landholding=7acres) comments about high prices of inputs is presented below; *"High prices of fertilizers are a major issue of the farmers. The prices of DAP and Urea (types of fertilizers) are now going out of the monetary ranges of farmers which is directly cutting the required doses of these fertilizers. Even if sometimes government provides subsidy on the prices, it remains beyond the capacity of affordable limits. I could apply only half (1/2) bag/acre of DAP and one (1) bag/acre of Urea. I was not satisfied with this as these quantities were below than the recommended doses. Almost half of the doses were applied because of high prices that were why the overall production for my wheat crop remained low. Likewise, cost that I bear over the application of weedicides is too much high which adds to my expenditures and reduces the profit margin"* (Hammed et al., 2003).

The respondent in the above given comments discredited the subsidies provided by government on prices of fertilizers. He was not satisfied with the ratios of fertilizer at all that he applied for his wheat crop just because the cost was very high and he found difficulties in application of the recommended doses.. Same was the case with the prices of weedicides that the grower could not afford. The quantitative and qualitative results clearly depict that high cost of fertilizers and weedicides were unaffordable to the respondents and it was resisting them to use required doses. The overall situation was not encouraging as fertilizers has been part and parcel for providing supplements to crop plants in the nutrient deficit soil of Pakistan.

**Adulteration concerns:** The second most affecting wheat production problem was adulteration in the available fertilizers. The fertilizer in the market was not having the same content what it was claimed to be, again almost all (99.16%) respondents pointed towards this problem. Likewise, the farmers in the area were having largely the problems of adulteration in pesticides as they had no access to pure weedicide as and when required by them. They informed that formation which was written on packing of weedicides was not found inside at all. An overwhelming majority of the respondents also considered it a hindrance to the wheat production. One of the respondents' comments are presented below;

*"...white stones are often crushed and mixed with granular fertilizers; it is a very common practice in our city. It is done because tiny pieces of stones are very difficult to be identified separately from the fertilizer which is in granular form. Illegal mixing is even done besides the Katchehri (premises of court, besides lawyers' chamber). Their (adulterators') brazen perpetration of the crime has crossed all limits. They are earning their profit margin without any threat and police has also kept its eyes closed. I have myself seen the crushing and re-packing units there" "....all chemicals at the time of import are found in large drums and in pure form. On reaching here even the recognized*

companies (dealing in chemicals) adjust their concentration, intentionally make them less concentrated and mostly less expensive chemicals are added into these for more earnings. After that salesmen also get extra benefits by mixing low quality chemicals with it which harms crops drastically because once mild dose is exposed to crops the pests becomes more strong which needs more chemical usage to be controlled upon”.

The farmer's responses indicate that the malicious activity of brazenly mixing different foreign elements into fertilizers and chemicals was in common practices of the dealers. In the respondent's comments given just above it was clearly shown that how the adulteration was done by mixing small crushed stones in fertilizers and less expensive low quality chemicals into costly chemicals for increasing the latter's quantity. The respondent even indicated the exact location of the point where this illegal act was carried out and demanded some immediate solution for that. Growers were very much concerned also with mixing in chemicals and they denoted it with their economic losses by saying that in the case of adulteration more heavy use of pesticides would be the outcome as one had to apply more quantity of adulterated chemicals for getting the required results. This heavy use of chemical was considered to be more burden to the farmers' pockets and less sustainable to environment. This finding was quite in line with the Nafees *et al.* (2008) who considered that heavy use of chemicals on crops another problem originating from the recent trends of farming. Due to the greedy endeavors of the salesmen and other stakeholders low quality of inputs was frequently coming in front as a significant problem to wheat growing and food production, the findings matched with that of Azmat and Coghill (2005).

**Lack of irrigation water:** Farmers got their irrigation water from canals through a well defined turn system called as “*Warabandi*”. Lack of availability of required irrigation water was also responsible for the loss of crop in the study area. As water for irrigation was not available to a vast majority of the farmers (also in accordance with the findings of Khalil and Jan, 2010). They pointed out that low water availability especially at the critical timings of the crop (crown root initiation, flowering and grain formation) had been resisting them to take the crop according to the available potential. So the overall scarcity was reported both with respect to proper amount and optimum time of irrigation. The under given sample of respondents' comments clearly tell the story;

“...at the time of critical stages of wheat crop the lack of irrigation water causes damage. Due to the shortage, farmers are forced to apply the required water to the crop by tube wells to overcome the shortage that compensate the scarcity to some extent but it is again not difficulty free. It is also becoming impractical solution due to rising cost of such

water as the tube wells are run with electricity or oil and both are very expensive and mostly unavailable”.

As indicated by the data in Table 1 that a large majority (80%) of the respondents were worried about the water availability especially at the critical stages of the crop. Even when the wheat growers had started to adopt an alternative source of water i.e. tube wells the sustainable supply of water remained under threat because the high installation cost and fuel needed to run tube wells were not easily available to them. These constraints on irrigation also proved to be a blockage in getting desired output from wheat crop. The respondents clearly indicated that unavailability of water in critical timings of the crop was the actual bone of contention as far as irrigational problems were concerned and showed their dissatisfaction in this regard. The findings were quite in line with the Khan *et al.* (2003) who argued that scarcity of water is a ‘bottleneck’ for high yield gap. All input related wheat barriers as mentioned above are clearly visible with their frequencies and percentages under ‘yes’ and ‘no’ categories in Table 1.

**Market related problems:** Market related responses were also taken by the respondents as the major hindering factors. The data regarding responses in context of market related barriers are summarized in the Table 2 given below;

**Table 2. Distribution of the respondents as their perception regarding market barriers for wheat crop production:**

Market related Barriers	Yes		No	
	f	%	f	%
Improper payments	117	97.5	3	2.5
Improper dealing of marketer	112	93.3	8	6.7
More distant farm	110	91.7	10	8.3
Market uncertainty	109	90.8	11	9.2
Non-availability of credit	102	85.0	18	15.0

The most important market related problem in wheat crop as indicated by the farmers was ‘*improper payment*’ that was being made to them by the marketers. Payments were delayed and were not given at the spot that discouraged the farmers to think of growing it on an extended area available to them. At the same time the lower prices were given to the producers than the prices fixed by the government. An overwhelming majority (97.5%) again graded it into the great marketing hindrance. The results were contrary to the findings of Sheikh and Abbas (2007) who found that only about one third (35%) respondent gave nodding expression about the problem faced by farmers in markets of Punjab for rice-wheat cropping system. Timely payments with the fulfillment of other essential needs of the farmers could also make them enabled to get rid of debts that they took during investing on the crop. In addition, in market the attitude of the *Arhatis* (Middlemen) towards farmers was found to be

humiliating and full of concealing intentions of fraudulent, a large majority of the farmers voted for that. Furthermore, the prices of commodity in the market were not stable at all. An overwhelming majority of the respondents (over ninety percent) showed their lack of interest towards the increase of production because the market in which they sold their yield was at a reasonable distance and it was not easily approachable whether due to the lack of infrastructure. An over whelming majority (90.8%) of the respondents showed their concerns regarding fluctuated market prices for their produce and were worried about the constant ups and down. Not a great number of marketers were interested in providing credits to the growers as stated by the respondents. The data regarding market related barriers are given in the Table 2. The severity percentage, weighted score and ranking order about the mentioned factors are given in Table 3. Some of the respondents' comments were as under;

*"...it's true that the farmers are always exploited in the market, sometimes on the payment issues and sometimes due to the market rise and fall tendency. More than that the behavior of marketers before getting the crop remains cool but after that it takes vertical turn and becomes totally indifferent. I myself have been making many visits for recovery of my blocked money with also somewhat humiliating tone. The market person (to whom I sold my produce) said, "Go home; your produce is not very good so less would be its price than he decided earlier".*

The data regarding market factors given in Table 2 clearly show that the mentioned factors had their major role in escalating problems of wheat as it was perceived by the wheat growers. The comments of the respondents complemented the findings and helped for in-depth analysis as in the above given paragraph one of the respondents clearly described his situation that how he got loss from the marketers and the market system. The most important finding was that the middlemen went out their words while giving final payments because it was clearly indicated that once they took their command over the produce they totally became indifferent to the growers' payments and bargained further. They started to put options in front of the growers and thus used payment delaying tactics.

Data given in Table 3 indicated all factors mentioned in context with the market problem that hampered wheat production according to the farmers' view point. Among the various factors "Improper payments" was ranked the highest (1<sup>st</sup>) in rank order with securing the highest weighted scores. On the other hand, "non-availability of credits" was ranked lowest (5<sup>th</sup>) with lowest weighted scores. In order to calculate the weighted score for each factor the percentage count of each factor was multiplied with the score value (1, 2, 3, 4, 5) allotted to each category of the scale. The factor that got highest weighted score was ranked as highest or most effecting factor. Response rating percentage (%), mean values and standard deviations are also visible in Table 3.

**Lack of specific information regarding production:** The crucial information regarding production of wheat was not sufficiently available. It was derived by asking the respondents the specific type of information regarding awareness of different good quality seed varieties, latest sowing methods, advanced cultural practices and post-harvest technologies. An overwhelming majority (80%) of the interviewees did not know that how they should prevent post-harvest losses to keep their produce for long for selling on their own preferences. Very few people were aware of the 'advanced cultural practices and 'latest/ beneficial seed sowing methods' with the total percentages of 35% and 37.5%, respectively. A large majority of the respondents (66%) did not know regarding newly emerging potential 'seed varieties'. Unfortunately, while alluding to the availability of the mentioned specific type of information a common but a very low response trend came in front as among options no information was available to the majority of the respondents. The relevant data in this regard are given in Table 4.

**Sources of information:** The research explored a stark reality that few people were relying upon popular sources of information for getting updates regarding wheat crop and its production. Although television had took credit in catching the attraction of people for getting agricultural information but still majority of people (59.2%) stated that they had not ever used television for obtaining mentioned information. Fellow farmers and extension field staff acknowledged to

**Table 3. Percentage (%), weighted score and rank order of the response regarding the perceived extent of the severity of market related barriers of respondents that hampered production of wheat**

	Response Rating %					WS	Mean	SD	RO
	1	2	3	4	5				
Improper payments	5.0	13.3	37.5	25.8	15.8	326.3	3.27	1.18	1
Improper dealing of Marketer	7.5	15.8	34.2	23.3	12.5	297.4	2.98	1.34	2
Market uncertainty	8.3	20.8	31.7	22.5	7.5	272.5	2.73	1.35	3
More distant farm	15.8	19.2	34.2	19.2	3.3	250.1	2.50	1.29	4
Non-availability of credit	35.8	27.5	17.5	10.0	4.2	204.3	2.04	1.23	5

Scale: 1=Very low, 2= Low, 3= Medium, 4= High, 5= Very High; WS = Weighted scores; RO=Ranking order, SD=Standard Deviation

serve for dissemination of agricultural information among only around one third (34.1%) of farmers. Print media had been the third source of information with the small percentage (15.8%) of the respondents. The data are presented in Table 4.

**Table 4. Distribution of the respondents according to their perception regarding barriers in wheat crop production**

(Information Related Barriers) Type of information (Available)	Yes		No	
	f	%	f	%
Seed varieties	40	33.3	80	66.6
Sowing methods	45	37.5	75	62.5
Advance cultivation practices	42	35.0	78	65.0
Post-harvest technology	24	20.0	96	80.0
<i>Source of information</i>				
Television	49	40.8	71	59.2
Others (Farmers/EFS)	41	34.1	79	65.8
Print Media	19	15.8	101	84.2
Radio	10	8.3	110	91.7
Internet	1	0.8	119	99.2

**Distance from the office of Agriculture Officer (AO):** One of very authentic information sources for farmers was Agriculture Officer (extension worker) but it was indicated by a simple majority (54.2%) of the respondents that the distance of their farms from the office of Agriculture Officer was very far. This fact disabled their ability to take benefit from this source. About one third (35.8%) of the respondents considered the distance of their homes from Agriculture Office to be normal. The data in this regard can be viewed in Table 5.

**Table 5. Distribution of the respondents as their perception regarding barriers in wheat crop production:**

Barriers (Physical distance from Agri. services)	Yes		No	
	F	%	f	%
<i>Distance from the office of AO</i>				
Near	12	10.0	108	90.0
Normal	43	35.8	77	64.2
Far	65	54.2	55	45.8

**Conclusion:** High costs of fertilizers and pesticides as well as adulteration in these were reported as the serious challenges faced by the wheat growers in study area. In addition low quality high priced seeds and lack of irrigation water were also found to be major input related problems. In

market, delayed and low payments, lack of ethics in the dealers conduct, physical distances from the point of sale, market uncertainties and lack of credit supply were the hindrances that were agreed upon largely by the local residents. Majority of farmers were also not using any mass communication or social source for obtaining latest wheat related information when the agricultural officer was also not easily approachable. So it was largely accepted that no information regarding seed varieties, sowing methods, advanced cultivation measures and post-harvest preservation and handling was available or accessible there. The recommendations regarding all discussed barriers are as under:

- A close check should be maintained on the price regulations for fertilizers and inputs. Adulteration should be eliminated with effective administrative structure. Irrigation requirement need to be solved through adoption of the latest irrigation techniques. Efficient organic manures should also be applied.
- Farmers committees need to be activated and empowered for devising the strict rules for the recovery of the delayed and blocked payments. Government should intervene to develop infrastructure to improve access of people to the distant markets and reducing marketing uncertainties, especially artificial, with strict monitoring and research based policies.
- A mass campaign through electronic and print media is required that can be carried out with more interesting programs on wheat production technologies and related information. Extension Field Staff should develop their credibility to convince social farmers who would reduce the burden of dissemination of information and training other farmers from them.

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