

FOOD SECURITY THROUGH WHEAT PRODUCTIVITY IN PAKISTAN

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ABSTRACT

The food security is the prime goal of any nation. The food security indicates access to food for all and its timely availability. Wheat is the major staple food in Pakistan. Domestic production had been fluctuating and generally it is lower than the consumption and the rest was imported. Therefore, a sound wheat policy seems imperative for food security. In order to meet country's wheat requirements, there is a dire need to adopt innovative technologies, stimulate management and policy front to enhance the productivity. The present study is based on secondary data coupled with primary data gathered from government agencies and farm level survey in Punjab. The study was carried out to explore the factors affecting wheat productivity in the country. The data revealed that majority of the farmers grow wheat late, which pushes the yield down. It was also found that average wheat yield reduction was 1.5 tonnes/hectare during the year 2002-03 over the year 2000 and further declined 0.6 tonne/hectare in the year 2004 in the study area. However the yield increased to 0.7 tonne/hectare in the year 2005 as compared to the year 2004, but below the 2000's year's level. Most of the small farmers reported no use of weedicides, lodging, hailstorm in area, attack of aphids/rust, heavy rain in March 2005 and poor management, respectively were the main factors, causing low wheat productivity during the year 2002-03 through 2004-2005 in the study area. The wheat self-sufficiency is the pre-requisite for the sustainable food security. The food security can be secured through increasing, especially targeting small farmers' productivity and putting emphasis on major wheat-growing districts.

Keywords: Food Security, Productivity, Small Farmers, Wheat, Yield

INTRODUCTION

Pakistan has made a lot of progress since independence in the field of agriculture in terms of production, yields, and growth in area under cultivation. Indus Basin agriculture has experienced a Green Revolution (GR) but the fruits of this revolution were not trickled down to small farmers. The productivity of wheat went down because the GR technologies lost their momentum.

In Pakistan as many as 152.5 million people are engaged in agriculture operations and produce 30 million tonnes of food grains (Govt. of Pak., 2005). As against this in India, 546 million people are engaged in agricultural operations and produce 176 million tonnes of food grains, in USA only 6 million people engaged in agriculture, produce 347 million tonnes of food grains. However, the wheat yield per hectare in Pakistan is 2.38 tonnes, which was far below than that of many other wheat-producing countries of the world (FAO, 2003). The wheat yield per hectare in the Indian's Punjab was 4 tonnes and in Pakistani's Punjab it was 2.5 tonnes per hectare (Ahmad and Chaudhry, 1997).

The productivity of wheat on small farms is low (FAO, 2003). The farmers are facing cost price squeeze (input prices are increasing and output prices do not even cover the variable cost). Thus, wheat crop is losing comparative advantage in the international market. Therefore, emphasis on wheat productivity is imperative to secure the food security of small and marginal farmers.

FOOD SECURITY

The food security of a country indicates access to food for all and its timely availability. The food security of Pakistan is fragile. The staple food of the country is wheat but it had catered until recently 80 percent of the consumption requirements and the rest was imported at the huge foreign exchange cost. The aggregate cereals and pulses production has increased from 20 million tonnes in 1989-90 to 30 million tonnes in 2004-05 (Govt. of Pak., 2005). The total availability of the cereals and pulses after addition/subtraction of import/export is 32 million tonnes. Nearly 25.74 million tonnes (estimates) is available for consumption at the rate of 168 kg per annum per capita. The per capita availability of food index has been quite erratic depending upon the fluctuations in aggregate production of cereals and pulses.

The Government of Pakistan engages in a complex wheat procurement, acquisition, transport, storage and distribution operation. The principal feature of this system is that the government only covers half of the cost of procurement and handling of wheat from the flourmills. As a result, the registered flourmills, which purchase wheat from both the local market and the government, receive subsidy on their quota by the provincial food departments. What is worrisome about Pakistan wheat policy is that, until very recently, its cost was clearly increasing, while the positive effects became harder to identify and the negative effects continued to grow? The nominal cost of wheat subsidy grew from

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Rs. 3.2 billion at end of the rationing period (1984-85 to 1986-87) to Rs. 5.8 billion in the post-rationing period (1987-88 to 1990-91) and to Rs. 17.6 billion onwards till 1996-97. The current level of subsidy is nearly Rs 10 billion mostly borne by the provinces (Govt.of Pak., 2005).

The wheat production could not be sustained at 2000-year level. The production declined to 18-19 million tons in the succeeding years and the country soon became net importer instead of exporter. The current year production estimates provisionally are 21 million tonnes but agriculture experts believe that production is around 19 million tonnes. In both production scenarios country has to import 1 to 3 million tonnes (Table I). Side by side, malnutrition is still common among the vulnerable groups. Solutions for these problems exist in new mixes of public and private sector partnership. Therefore, a sound wheat policy seems imperative for the food security and perhaps the national security of the country.

Self-sufficiency in wheat has long been an objective of the government; however, the net effect of wheat price policies before the present government took over has been to depress the producer price of wheat substantially below the import parity price. Such policies have neither promoted production nor self-sufficiency.

On the technological frontier, the substitution of high yielding varieties (HYVs) for traditional varieties has more or less been halted, and the yields of HYVs have been flat for sometime.

The area under wheat reached to a maximum limit showing a growth rate of slightly over one- percent for the past two decades and in the last five years, the increase has been nominal. Therefore, the key institution that the government can mobilize in support of agriculture production is the research system. However, unfortunately, the often short-lived agricultural production administrations since 1988 failed to give research, which offers a long term pay off the priority it deserved. Pakistan has generally under-invested in research. In particular, Pakistani wheat farmers need to have varieties that can be planted late after taking several picks of cotton as about 40 percent wheat area comes after cotton crop (Byerlee, 1993).

Wheat Crop

Wheat is the staple food of our teeming millions. This crop occupies a major area in Rabi season and grown on more than 20 million acres of land (Govt.of Pak., 2005). The average production increased by 2.5 percent in the decade of 1961-70 and showed a quantum jump of 68.5 percent in the next decade due to introduction of high yielding

varieties and other Green Revolution technologies. In the decade of eighties, the average production increased by 50 percent. The increase was both in area and yield. In the decade of 1991-99, the average productivity increase was 32 percent mainly due to vertical increase in the production. The average increase in production in the last five years (2000-05) was 15.4 percent. The annual compound growth rate of production in the last two decades (1980-99) was 3.32 percent (Table II). Despite major increases in average productivity, the existing potential of wheat varieties is 60 to 70 percent (Govt.of Pak., 2005), which remains to be exploited. The yield per hectare is around two tonnes.

The main causes of low productivity in wheat are, non availability of certified seed, irrational use of fertilizer, weed infestation, untimely sowing, scarcity and un-timely application of irrigation water, drought prone varieties and genetic instability of new cultivars, lack of proper price incentive, inadequate adoption of technology to achieve genetic potential and continuous use of wheat cotton rotation.

The goal of the government for wheat self-sufficiency is self-reliance, enhance productivity and food security. Self-reliance is important in the changing global scenarios. The major thrust is to increase wheat production to reduce imports and ensure food security in order to cater the needs of increasing population.

It is imperative to set the wheat production growth rate more than the population growth rate and the major emphasis among other things should be on the balance use of fertilizer. The existing ratio of nitrogen, phosphorous and potassium is 4:1:1 against the recommended ratio of 2:1:1. Only 40 percent of the wheat growers use phosphatic fertilizer. The enhanced use of phosphatic fertilizer in optimal dose is necessary in order to increase productivity of wheat (Govt.of Pak., 2005).

Another constraining input is certified seed. At present, 19 percent of the certified seed is available which is far below the recommended FAO standards of 40 percent (Govt.of Pak., 2005). Irrigation water is the critical input. About 90 percent of the wheat is grown in irrigated areas. The inequity and scarcity of irrigation water is one of the limiting factors in exploiting the yield potential of this important food crop. The inequity and scarcity is much more pronounced at the tail-end of distributaries and watercourses. The efficacy and equity of irrigation water at the farm level is imperative to ensure wheat self-sufficiency in the country. The consumptive use of water for wheat is

4372 M³ per hectare and 4639 M³ per hectare in the Punjab and Pakistan, respectively (PARC, 1982) but availability at the farm level is only 50 percent of the agronomic requirements (Govt. of Pak., 2005).

The wheat crop is infested with a lot of weeds, which compete for essential nutrients and thus reduce the yield. Farmers use traditional methods of weeding. It is a common saying that one-year seeding takes seven years weeding. The traditional methods of inter-culture are not enough to control the incidence of weeds. Until recently farmers have started using weedicides both for broad and narrow leaf weeds but the use of weedicides is very low because of higher prices. The optimal doses of weedicides could increase yield by 15 to 20 percent (Personal communication by wheat scientists).

In order to increase wheat productivity, government should target small and medium farms whose productivity is less than the national average and major emphasis should be given on the wheat growing districts in order to improve yield. The rain-fed wheat contributes about 10 percent in total production but water is limiting factor to achieve its potential. Therefore, moisture conservation in rain fed areas through mulch and water harvesting is essential. Furthermore, small dam schemes need to be rejuvenated to store run off water during monsoons.

MATERIALS AND METHODS

The study is based on secondary data coupled with primary data gathered from government agencies and farm level survey in the Punjab. A farm level survey was conducted during June 2003 and subsequently snap shot information was sought in 2005 from the same respondents in Faisalabad division, which comprised of Faisalabad, 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 III.

RESULTS AND DISCUSSIONS

General information about wheat production practices in study area

The Table IV reveals that the average area of wheat crop was 5.56 hectares during 2004-05. The average operational land holding of the respondents was 13.67 hectares in the study area.

The large farmers (16 %) and (22 %) sowed their wheat crop in October and December 2004 respectively. A majority of the farmers (72.00 %) sowed their wheat crop in November 2004 and the seed rate was used 124.66 kgs/ hectare by the farmers of the study area. The farmers of the study area applied weedicides to wheat crop only once and the average numbers of irrigation (4.16) applied to wheat crop by respondents of study area.

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 Inqab-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. 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 new varieties' 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 plays a pivotal role in productivity of the crops. The Table V depicts that only 23.33% and 94% respondents of the study area applied 26 tonnes/hectare Farm Yard Manure (FYM) and 154.33 kg/hectare Phosphorous to wheat crop respectively. All the respondents of the study area applied 135.66 kg/hectare of Nitrogen to wheat crop. The Table also shows that the quantity of Potash (51.47 kg/hectare) was applied by 3.33% respondents of the study area to wheat crop.

Impact of sowing months on wheat's yield during 2004-05

The Table VI depicts that 7 %, 73% and 20 % farmers sowed their wheat crop in October, November and December 2004 respectively and correspondingly obtained yield 4.0 tonnes/hectare, 3.5 tonnes/hectare and 3.0 tonnes/hectare respectively. The results show that the farmers who sowed their wheat crop in October 2004 obtained higher yield than other farmers sowing wheat in November and December 2004.

Wheat yields obtained during 1999-00 through 2004-2005 in the study area

The Table VII depicts that large farmers of the study area obtained 5.20, 4.01, 4.15, 3.69, 3.27, and 3.97 tonnes/hectare wheat yields during the years 2000, 2001, 2002, 2003, 2004, and 2005 respectively, which was higher as compared to other farm size groups. The small farmers obtained 5.10, 3.92, 3.71, 3.57, 2.71, and 3.49-tonnes/hectare wheat yields in corresponding years.

Yield decrement during 2004-2005

The over all wheat crop situations was apparently better at tillering stage during the year 2005. The farmers were expecting more wheat yield than that of obtained during the last year 2004. It was also found that average wheat yield reduction was 1.5 tonnes/hectare during the year 2002-03 over the year 2000 and further declined 0.6 tonne/hectare in the year 2004 in the study area. However the yield increased to 0.7 tonne/hectare in the year 2005 as compared to the year 2004, but below the level of 2000. Most of the small farmers reported no use of weedicides, lodging, hailstorm in area, attack of aphids/rust, heavy rain in March 2005 and poor management respectively were the main factors, causing low wheat productivity during the year 2002-03 through 2004-2005 and wheat' yield decreased 1.43 tonnes/hectare during 2005 over 2000 in the study area. On over all basis for the five years period starting from 2000-05, 28.00 percent of the yield loss was noted in the study area.

Farmers' constraints in obtaining maximum wheat's yield during 2004-05

The most of the farmers obtaining low yields are small farmers as compared to other farm size groups. The Table VIII depicts that the factors constraining in obtaining high wheat yields in small farms category are no use of weedicides (40.00 %), lodging (35.00 %), hailstorm (55.00 %), shortage of water (26.00%), late sowing (15.00%), attack of aphids/rust (14.00%) and poor management (15.00%). These results are similar with Sadiq (1977) who found that weeds in wheat crop

decreased the yield 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 (70.00 %) also reported that shortage of water was the main factor responsible towards low wheat productivity, whereas, only large farmers (20.00 %) reported that late sowing was also the factor towards low wheat productivity.

Future Outlook of Wheat Production

The area under wheat has risen to 8.3 million hectares and based on past 18 years wheat data, the area growth rate was 0.04 percent it will be 8.4, 8.1 and 8.35 million hectares in the year 2004, 2005 and 2006 respectively. The horizontal expansion of the area could only be brought under cultivation provided new water resources are exploited and conceivable dams are planned to check the outflow of surface water to the sea. Since new water development initiatives will take some time due to resource constraints and divergent political views, horizontal expansion of agricultural land is perhaps not a distinct possibility in the short -run. Therefore, the only recourse is to tap the intensive margin of land and improve the vertical productivity of existing wheat varieties and increase crop per drop of water. The yawning gap between the actual yield and the potential yield is around 82 percent for cereal crops of which wheat is the most pre-dominant crop (Govt.of Pak., 2005). This gap can be narrowed down through better agronomic practices, weed control, timely sowing and balance use of fertilizer. Next year, i-e 2006-2007, yield gap can be narrowed by increasing yields between 2 to 12 percent as is envisaged in the wheat productivity enhancement thrust of the government. The yield gap can further be bridged in the year 2007 by increasing yields by 8 to 27 percent and increase by 20 to 42 percent by the year 2010. Based on these future trends of growth in area and yields following production scenarios are possible (Table IX).

Future Outlook of Wheat Consumption

Wheat is the staple food of Pakistan and will continue to be so in future. It contributes about 46 percent of the main cereals and total dietary energy of the population. Federal Bureau of Statistics conducts survey of Household Income-Expenditure Survey (HIES), which becomes the only scientific basis to ascertain the per capita consumption of wheat in Pakistan. Based on the available HIES data, the average per capita consumption of wheat is about 124 kg per capita per year. This estimate is perhaps reliable in the absence of any other estimates. The estimated future consumption needs of wheat and wheat flour are based on three different scenarios of population growth rate (being 2.3 and 2.6 percent per

year lowest and highest till year 2001 and 1.7 and 2.5 percent per year lowest and highest till year 2005), is presented in Table X below:

Based on Table IX and Table X, the overall position regarding production - consumption requirements of wheat is shown in Table XI.

The Table XI reveals that in the year 1998-99, the wheat deficit varied from 0.81 million to 1.5 million tonnes. But with the new wheat price initiative and favourable weather conditions, the country was in a position to balance the wheat supply and demand, and generated surplus of 3-4 million tonnes. However, the pace of research efforts on variety improvement, better agronomic and management techniques was not kept up on a sustainable wheat production. Therefore, the wheat production could be sustained at 2000 level and country has to import nearly two million tonnes in the year 2005-06

Short-Term Discussion For Wheat Security Import Requirements to Export Stage

The import requirements for 1999-2000 were worked out at 2.3 million tonnes, of which only 1.6 million tonnes was imported (Govt. of Pak., 2005). But record production of wheat in the year 2000 graduated the country to net exporter. The wheat year 2001 experienced a severe drought, but last year carry over stocks (about 4 million tonnes) kept the country status as net exporter. The momentum of wheat production could not be sustained. The production declined to 19 million tonnes in the year 2003-04 and government imported 1-2 million tonnes in the year 2004 and 2005 to meet wheat requirements (Govt. of Pak., 2005).

Long-Term Discussion For Wheat Security

Wheat production in Pakistan has consistently fallen short of production. A large chunk of the cultivated area i.e. 8.38 million hectares (about 37 percent) of the cropped area has been brought under wheat crop. The yield of wheat per unit area is low i.e. 2.4 tonnes per hectare in irrigated areas and 1.3 tonnes per hectare in barani areas. The yield obtained in the progressive farms was as high as 5.0 tonnes per hectare in Pakistan. This indicates that the country has certainly scope for further improvement in wheat yield. The environments in 'barani' area are very fragile (soil erosion), dependent on rains and beyond human control. However, in irrigated areas, farmers can easily increase wheat yields. It is often argued if wheat yield can be increased to 2.96 or 3 tonnes per hectare in irrigated areas, country can produce about 24 million tons of wheat.

One of the major problems in wheat production has

been that the economic environment which was not conducive and friendly for the growers for making capital investment in improved technologies due to low and marginal returns. Government has realized this problem and increased the wheat support price to Rs. 400 per 40 Kg in the year 2004-05 (Govt. of Pak., 2005). This created an enabling environment for capital formation at the farm level and farmers were able to use improved seed, fertilizers weed management and other improved technologies in the year 1999-2000 that led to bumper wheat harvest. To avoid the occurrence of the inertia of low wheat prices in future, it seems imperative to introduce cascading and market friendly wheat policy, which should reflect economic prices. This will ensure a long-term attractive price of wheat and productivity is expected to substitute imports on sustainable basis.

In the short run, wheat productivity can be increased by timely availability of farm inputs such as seed, fertilizer, and irrigation water. The certified seed must be increased to 25 percent and balance use of fertilizer be propagated through outreach efforts. There is a need to narrow down extension gap. Furthermore, fair, equitable and timely irrigation water must be ensured for its efficient use. The emphasis should also be given on diffusion of technology through crop maximization program campaign on electronic media, traveling wheat seminars, and stepping up outreach efforts. Weed management both through manual and weedicides use must be advocated. In the rain-fed area, conservation technique for water and harvesting programs for run off needs to be introduced. In addition, introduction of zero tillage for paddy area and relay cropping in cotton-wheat area should be encouraged.

In the long run, evolving high yielding varieties in a chain that are drought and salt tolerant should strengthen breeding program. Efforts should also be made to acquire new genetic material from CYMMIT on a priority basis. For horizontal expansion of area, additional water reservoir capacity be created and canal and watercourse lining and precision land leveling must minimize water losses. Furthermore, water logging and salinity must be controlled and soil amendments may be introduced for soil borne disease and improve the organic matter through green manuring and microbial treatments.

CONCLUSIONS

The food security entails access to food for all and its timely availability. Wheat is the main staple food of Pakistan, but its domestic production had been varying and mostly lowers than the

consumption needs imported. Thus, sustainable wheat production seems imperative for food security. In order to meet country's wheat requirements, there is a dire need to exploit the frontier of knowledge and technologies, and improve farm management practices to increase productivity. The present study is based on secondary data coupled with primary data gathered from government agencies and farm level survey in Punjab. The study was carried out to explore the factors affecting wheat productivity in the country.

The data revealed that majority of the farmers grow wheat late, which pushes the yield down. It was also found that average wheat yield reduction was 1.5 tonnes/hectare during the year 2002-03 over the year 2000 and further declined 0.6 tonne/hectare in the year 2004 in the study area. However the yield increase was 0.7 tonne/hectare in the year 2005 as compared to the year 2004, but remained below the year 2000. Lack of weedicides use due to lack of resources, lodging, hailstorm in area, attack of aphids/rust, heavy rain in March 2005 and poor management respectively were the main the constraints in obtaining maximum wheat's yield during year 2002-03 through 2004-2005 in the study area. The food security hinges upon wheat self sufficiency and pre-requisite for the sustainable food production. The country must target the small and medium farmers to increase wheat productivity.

RECOMMENDATIONS

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

Future Strategies

- i. Wheat productivity must be increased to obtain the comparative advantage.
- ii. Increase certified seed from existing 16 percent to 30 percent.
- iii. Efficient use of Fertilizer (NPK ratio 2:1; 1) instead of existing 4:
- iv. Increased use of weedicide. (Range of loss 17- 50%)
- v. Evolve drought and salt tolerant wheat varieties...
- vi. Expand wheat area in Riverine and rain fed areas
- vii. Reduce cost of cultivation through better management practices
- viii. Increase wheat output per unit of irrigation

Table I: Elements of Food Security

Elements	2004-05 ¹	2004-05 ²
Production (crop year 2004-05)	21 million tonnes	19 million tonnes
Seed, feed and waste (@ 10 % of prod.	2.1million tonnes	1.9 million tonnes
Net available	18.99 million tonnes	17.1 million tonnes
Opening stock	0.33 million tonnes	0.33million tonnes
Total	19.32million tonnes	17.34million tonnes
Per Capita consumption	120 kg/year	120 kg/year
Population	153 million	153 million
Consumption requirements	18.36 million tonnes	18.36 milliontonnes
Wheat for Afghanistan	0.6 million tonnes	0.6 million tonnes
Strategic Reserve	1.0 million tonnes	1.0 million tonnes
Deficit	0.7 million t tonnes	2.6 million tonnes
Import	1 million tonnes	3 million tonnes

Source: Economic Survey of Pakistan 2004-2005.

Table II: Wheat Production (1951-99 and2000-05)

Years	Average Production (Million Tonnes)	Percent Increase
1951-60	3.46	---
1961-70	4.93	2.50
1971-80	8.31	68.45
1981-90	12.51	50.54
1991-99	16.53	32.07
2000-05	19.50	15.4

Annual compound growth rate (1980-99) 3.32 percent (Government of Pakistan, 2005)

Table III: Distribution of the sample farmers by farm size

Districts	Farm size groups			All
	Small	Medium	Large	
T. T. Singh	10 (17.9%)	13 (56.5%)	7 (63.6%)	30 (33.3%)
Jhang	22 (39.9%)	4 (17.4%)	4 (36.4%)	30 (33.3%)
Faisalabad	24 (42.9%)	6 (26.1%)	0.00	30 (33.3%)
Total	56 (100%)	23 (100%)	11 (100%)	90 (100%)

Table IV: General information about wheat production practices

Wheat production practices	Farm Size Groups			
	Small	Medium	Large	All
Wheat (Hectares)	1.58	4.3	10.81	5.56
Operational land holding (Hectares)	3.00	8.07	29.96	13.67
Sowing time				
October, 2004 (Percent Farmers)	7	10	16	11.00
November, 2004 (Percent Farmers)	76	78	62	72.00
December, 2004 (Percent Farmers)	17	12	22	17.00
Other wheat production practices				
Seed Rate (Kgs/hectare)	124	120	130	124.66
Weedicides (Nos./ hectare)	1.35	1.17	1.18	1.23
Irrigation (Nos.)	4	4.5	4	4.16

TableV: Fertilizer application to wheat crop in the study area

Name of fertilizers	Farm Size Groups			
	Small	Medium	Large	All
FYM (tonnes/hectare)	19.00	29.00	30.00	26.00
N (kg/ hectare)	115.00	165.00	127.00	135.66
P (kg/ hectare)	140.00	163.00	160.00	154.33
K (kg/ hectare)	00.00	92.66	51.75	51.47

¹ The elements of food security were estimated on the basis of government wheat estimates of 21 million tonnes in the year 2004-05 and ² perceptions of farmers and the industry. So far the country has imported one million tonne but the cumulative wheat stock is 3.5 million tonnes against the carry over stock of 0.33 million tonne.

Table VI: Sowing months and wheat yield obtained during 2004-05

Sowing months	Farmers (Percent)	Yield (Tonnes/hectare)
October, 2004	7	4.0
November, 2004	73	3.5
December, 2004	20	3.0
Total	100	Average 3.56

Table VII: Wheat yields obtained during 2000- 2005 in the study area

Yield (Tonnes/hectare)	Farm Size Groups			
	Small	Medium	Large	All
2000	5.10	5.00	5.20	5.10
2001	3.92	3.81	4.01	3.91
2002	3.71	3.61	4.15	3.82
2003	3.57	3.49	3.69	3.58
2004	2.71	2.96	3.27	2.95
2005	3.49	3.56	3.97	3.67
Yield decrease during 2005 over 2000 (Tonnes/hectare)	1.61	1.44	1.23	1.43
Yield decrease during 2005 over 2000 (%)	31.56	28.8	23.65	28.00

Table VIII: Farmers' constraints in obtaining maximum wheat's yield (Percent Farmers)

Factors	Farm Size Groups			
	Small	Medium	Large	All
No use of weedicides due to lack of resources	40.00	18.00	10.00	22.66
Lodging	35.00	25.00	19.00	26.33
Hailstorm in area	55.00	50.00	18.00	41.00
Shortage of water	26.00	70.00	35.00	43.66
Late sowing	15.00	18.00	20.00	17.66
Attack of aphids/rust	14.00	5.00	00.00	6.33
Poor management	15.00	00.00	5.00	6.66

Table IX: Projections for wheat production

Projections/Year	Low*	Medium*	High*
	(Million Tonnes)		
1998-99	17.1	17.9	18.8
1999-2000	18.7	20.2	21.9
2006	19	20.00	21.48
2010	20	21.00	23.74

* Low: 2.0 tonnes per hectare; Medium: 2.7 tonnes per hectare and High 3.0 tonnes per hectare.

Table X: Consumption requirements (Million Tonnes)

Years	Low	Medium	High
1998-99	17.70	17.70	17.70
1999-2000	18.87	19.02	19.10
2005-2006	19.41	20.81	21.52

Note: For year 2006, per capita consumption of wheat is taken as 120, 122 and 124 Kg. /year for low, medium and high consumption scenarios

Table XI: Overall supply and demand position of wheat till year 2006 (Million Tonnes)

Supply & Demand	Year 1998-99			Year 1999- 2000			Year 2006		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Production	17.10	17.93	18.77	18.67	20.18	21.90	19	20.00	21.48
Less seed/ feed/ waste (10%)	1.71	1.79	1.88	1.87	2.02	2.19	1.9	2.00	2.15
Net Production	15.39	16.14	16.89	16.80	18.16	19.71	17.1	18	19.33
Consumption	17.70	17.70	17.70	18.88	19.03	19.10	19.41	20.81	21.53
Gap/Import Needs	-1.31	-1.56	-0.81	-2.07	-0.87	0.61	-2.4	2.81	2.20

Table XII: Year wise production and value of wheat

Years	Production (Million Tonnes)	Value (Rs. Millions)
1989-90	14.31	36326
1990-91	14.56	42237
1991-92	15.68	52287
1992-93	16.15	56706
1993-94	15.21	59251
1994-95	17.00	76802
1995-96	16.91	77316
1996-97	16.60	97868
1997-98	18.70	126990
1998-99	17.85	118816
1999-00	21.08	157500
2000-01	19.02	142650
2002-02	18.23	136725
2002-03	19.18	143850
2003-04	19.49	170537
2004-05	21.61	216100

Table XIII: Province-wise production of wheat (Million Tonnes)

Year	Punjab	Sindh	NWFP	Balochistan	Pakistan
1989-90	10.5	2.1	1.1	0.6	14.3
1990-91	10.5	2.3	1.1	0.6	14.5
1991-92	11.5	2.4	1.1	0.7	15.7
1992-93	11.7	2.4	1.2	0.8	16.1
1993-94	11.2	2.1	1.1	0.7	15.1
1994-95	12.7	2.3	1.2	0.8	17.0
1995-96	12.4	2.3	1.2	0.9	16.9
1996-97	12.4	2.4	1.1	0.8	16.7
1997-98	13.8	2.7	1.4	0.9	18.7
1998-99	13.2	2.7	1.2	0.7	17.9
1999-00	16.5	3.0	1.0	0.5	21.1
2000-01	15.4	2.2	0.8	0.6	19.0
2001-02	14.5	2.1	0.9	0.6	18.2
2002-03	15.3	2.1	1.1	0.65	19.1
2003-04	15.6	2.2	1.0	0.66	19.4
2004-05	17.3	2.5	1.1	0.64	21.6

Source: The Year Book of Agricultural Statistics, Ministry of Food, Agriculture & Livestock, 2004-05

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