



# ***FOOD SECURITY IN THE PUNJAB PROVINCE***

***A study by the Auditor  
General of Pakistan with  
respect to wheat***

2021-2022



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## ABBREVIATIONS & ACRONYMS

API	Agriculture Policy Institute
ECC	Economic Coordination Committee
CPEC	China Pakistan Economic Corridor
CY	Calendar Year
FAO	Food and Agriculture Organization
FCA	Federal Committee on Agriculture
FD	Finance Department
FLMIS	Flour Ledger Management Information System
FSC&RD	Federal Seed Certification & Registration Department
FY	Financial Year
FYM	Farmyard Manure
HIES	Household Integrated Economic Survey
HR	Human Resources
ICT	Information and Communication Technology
ICESCR	International Covenant on Economic, Social and Cultural Rights
IRSA	Indus River System Authority
IT	Information Technology
MNFS&R	Ministry of National Food Security & Research
MoU	Memorandum of Understanding
MT	Metric Ton
MMT	Million Metric Ton

MOC	Ministry of Commerce
MOF	Ministry of Finance
NFDC	National Fertilizer Development Centre
PACRA	Pakistan Credit Rating Agency
PASSCO	Pakistan Agricultural Storage & Services Corporation Ltd
PFD	Punjab Food Department
P&D	Planning & Development
PITB	Punjab Information Technology Board
PPP	Public-Private Partnership
ROI	Return on Investment
SAARC	South Asian Association for Regional Cooperation
SBP	State Bank of Pakistan
SDLC	Software Development Life Cycle
SOP	Standard Operating Procedure
UDHR	Universal Declaration of Human Rights

## PREFACE

Pakistan being blessed with favorable weather, diversified flora and fauna and multiple rivers and glaciers has traditionally been stable with regard to agricultural roots. However, climate change, population pressure and geo-political environment is steadily creating significant challenges to this erstwhile stability paradigm. Food security today more than ever has taken center stage with regard to issues of national significance.

In the context of food security, wheat and its products constitute the staple food of the country. The province of Punjab represents the breadbasket of the country cultivating the majority of the country's wheat. Hence, food security in Punjab with respect to wheat is of key importance not just for the province but for the country. The issue is also of paramount significance because self-sufficient wheat reserve stocks with exportable surplus deplete so rapidly and so seamlessly, that wheat exporting status of the country has reversed with the status that of wheat importing nation, that too within the time span of a growing season.

The Auditor General of Pakistan has undertaken a detailed study report titled as "Food Security in the Punjab Province". The report serves the purpose in terms of a dispassionate appraisal dwelling upon dynamics of wheat cultivation, procurement, storage, grinding, transportation and consumption in the demand-driven market as well as mobilization of reserves, through registered flour mills and enlisted social safety nets such as Sasta bazaars and Utility stores.

The study encompasses the mismatch between the size and depth of government interventions and the magnitude of the wheat crises, unfolding gradually with a view to evaluate as to whether the government entities have been able to add value to the prevailing policy regime also ensuring rectification and remediation of the administrative drawbacks and

governance gaps. The findings of this study report provide a way forward for optimum use of available means and resources for adoption of a fool proof operational methodology. This is likely to help in firming up of a range of recommendations to synergize an integrated inter and intra-agency response mechanism, characteristic of a pro bono publico dispensation, beneficial to those who are likely to suffer the most in the event of reduced productivity, accentuated price destabilization or panic-driven crowding out of reserve stocks.

The report hones in a broad-based literature review of major publications and international journals of repute, also skimming primary and secondary sources of data, besides co-opting the relevant stakeholders for their feedback.

The study indicates specific actions that, if taken, will help the management realize the desired objectives of fending for food security against the onset of wheat crises and the inhospitality of inclement weather patterns.

**Dated:**  
**Islamabad**

**(Muhammad Ajmal Gondal)**  
**Auditor General of Pakistan**



## EXECUTIVE SUMMARY

The lynchpin of national food security in Pakistan has been a pursuit of self-sufficiency in cultivation, productivity enhancement, storage and consumption of wheat. Even sporadic food shortages in the remotest part of the country do imperil masses in multitude with ominous foreboding of famine, riots and scenes of utter misery and pestilence, attracting adverse media attention. For Pakistan's agrarian economy as a home to 63 % of the rural population dependent for their subsistence, living and livelihoods on growing of wheat, it undoubtedly emerges as a major cash crop for the entire Rabi season across the alluvial plains of Punjab. Even the trivial slippage of determining announcement time for support price can have serious implications for procuring wheat. Marginal delay in announcing the minimum support price of wheat can mercurially influence the market mechanism of the entire commodity market spiraling food inflation beyond manageable proportions and eroding the purchasing power parity of millions of people.

Moreover, within the ambit of the overall food commodity supply and demand pendulum swinging, wheat carries central significance. It is the major staple food of the country with ubiquitous dominance, deeply rooted amongst the agriculture practices across the country. As per a report titled as "Review of the wheat sector and grain storage issues" by FAO/World Bank Cooperative Program, one-third of all wheat produced by the farmers is locally utilized by them for in-house consumption, thus highlighting the importance, it carries with respect to its supply chain sustainability in the country. Further, for Pakistan, the province of Punjab acts as the breadbasket of the entire country, contributing to 76% of all wheat cultivated across the provinces.

The purpose to be served by the study is to encompass various perspectives and facets of food security impacted by diverse shades and

nuances of the wheat crop cycle so as to highlight underlying key issues and bottlenecks for proposing a plausible action plan to put in place remedial measures doing away with drawbacks occasioned by misdirected policy parameters, administrative inefficiencies and instances of systemic failures. Moreover, the study report has been firmed up taking into account the view point of major stake holders, stance of key informants, focal persons, area experts and respondents to a questionnaire filled by farmers of nine districts of Punjab.

***Major highlights of the study:***

Some key areas of analysis and issues with regard to food security peculiar to the context of wheat crop cycle are enumerated as follows:

***i) The facts and context overshadowing Wheat crop cycle:***

In the Punjab Province, the wheat crop cycle begins with start of the wheat sowing season in October/November each year. On average 16.29 million acres<sup>1</sup> of wheat crop is cultivated each year. At the sowing stage, major inputs include, seed, fertilizer and urea along with water spells. Local seeds are widely used for cultivation and use of tube-well is steadily increasing. The source of irrigation for 75% of the total irrigated area is tube-wells at some stage<sup>2</sup>.

At the harvest stage, local farmers keep a significant portion of the crop produced whereas the Punjab Food Department and PASSCO procure wheat at notified rates, termed as “support prices”. The support price is meant to help stabilize the price of wheat in the open market by acting as a baseline figure. On average, the annual procurement of wheat by the Punjab Government is 3.6 million tons.

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1 “Crop Reporting Services Punjab.pdf,” Google Drive (Google), [https://drive.google.com/file/d/1D\\_a5tHjW8-1Cwa0GN-HE11ecLt6mAq28/view?usp=sharing](https://drive.google.com/file/d/1D_a5tHjW8-1Cwa0GN-HE11ecLt6mAq28/view?usp=sharing).  
2 “Overview,” Agriculture Department | Government of the Punjab, <http://www.agripunjab.gov.pk/overview%20new>.

Intermediaries in the shape of Arthis and random business persons get engaged with farmers at both the growing and harvest stages. They provide credit lines, wheat inputs to the farmers and in lieu thereof, enable themselves to off-take their crop yields, exploiting the vulnerabilities of the growers, pocketing with them their unduly excessive profit margins.

The wheat procured by the government is sold off to the floor mills (approx. 929 functional flour mills) across Punjab at a subsidized “release price”. This intervention of release price based sales is to fulfill the objective to keep the atta so produced at an affordable cost. Multiple by-products are made from wheat, including fine atta, maida and barn at the extraction ratio, prescribed by the government. Chakkis also grind wheat and produce whole grain atta at a price higher than the floor mill atta.

The availability of atta at retail stores further involves factors such as local market availability, rate monitoring by District Administration and transportation charges. Larger urban centers are more vulnerable to escalation-prone pricing of atta than the areas home to rural population.

*ii) Analysis of Wheat cycle & issues identified*

*a) Inadequate supply of quality seed<sup>3</sup>:*

The use of quality certified seed for wheat sowings is the single most important attribute which can independently have a substantial impact on the overall wheat production and crop profitability, other factors remaining constant. Different certified seed varieties stood tried and tested. However, their supply was very limited and the common farmers heavily rely on their local seeds for wheat sowing. The average yield of the certified seed varieties range between 6500 to 7500 kg per hectare

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3 Issue 2.4.1, 2.5.1

whereas the average wheat yield per hectare, during the last year 2020-21 for irrigated fields remained 3282 kg per hectare, primarily on account of limited usage of seed varieties. Similarly, the total certified seed requirement for Rabi 2020-21 was 802,256 MT, whereas the availability of certified seed was only 452,608 MT (41.99%). Furthermore, as per data retained by Provincial Directorate of Crop Reporting Services, certified/quality seeds were used in only 22% of wheat sown areas.

***b) Increasing cost of wheat production<sup>4</sup>:***

Over the years wheat crop has turned more and more expensive to cultivate. The cost of production per acre of wheat has increased from Rs. 10,225 per acre in the FY 2006/07 to Rs. 43,743 per acre in the FY 2020-21, registering an increase of 328% over the period, whereas the average yield per acre has increased from 28.08 (40 kg per acre) in the FY 2006-07 to 31.34 in the FY 2020-21 registering an increase of 12 % of produce (between the maximum and minimum of yield outputs). The increasing cost of wheat production has meant that the farmers have found it increasingly difficult both to cultivate the wheat across large areas and to use quality inputs during the production process.

The increase in the cost of production was due to market inflationary trends and a steady increase in wheat input costs during the last 10 to 15 years. These cost components include essentially required inputs such as fertilizer and pesticides. etc. For example, the cost of 50kg DAP increased from Rs. 3,200 in April 2018 to Rs. 10,000 in January 2022. Similarly, the urea fertilizer pack price increased from Rs.1,410 in April 2018 to Rs.1,788 in January 2022.

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4 Issue 2.5.5, 2.7.1

***c) Wheat Support Price–challenges & impact:***

Wheat crop Support Price determination is evidently a key activity that effects the wheat cycle significantly in both the short and long term. Some of the issues analyzed in this regard are as follows:

***(c)(i) Comparative analysis of support price<sup>5</sup>:***

Being the breadbasket of the country, the support price announced by the Government in Punjab and Sidh Provinces has had a major impact on the overall wheat production of the country. During the last three financial years (2018-19 to 2020-21), the support price notified by Pakistan has been on the lower side when compared with neighboring countries India & China. For example, in FY 2020-2021 support price prevailing in China was Rs. 2260 per 40/g (after Pak Rupee conversion) and in India was Rs. 1975 per 40 Kg (after Pak Rupee conversion), whereas in Pakistan, it was Rs. 1800 per 40kg.

***(c)(ii) Delay in announcement of support price<sup>6</sup>:***

One objective of notifying wheat support price is to encourage the farmers to cultivate wheat on a larger scale. If the support price is announced after the sowing season is over, it has no practical impact on crop cultivation rather it can be a stimulus to intermediaries to plan their unrecorded potential profits. In this context, the support price announced by the government of Punjab during the FYs 2019-20 to 2021-2022 was after the 15<sup>th</sup> of March in the respective years.

***(c)(iii) Diminishing value of nominal support price<sup>7</sup>:***

The nominal price is the notified wheat support price by the government and the “real price” is the actual price in terms of value for money that the farmer is getting after making adjustments for inflationary

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5 Issue 2.2  
6 Issue 2.3.1  
7 Issue 2.3.3

trends. Taking CPI as a barometer and calculating the real price reveals the following trend:

Year	Consumer Price Index (CPI)	Support Prices	
		Nominal	Real
	2015-16=100	Rs 40/Kg	
1	2	3	4= (3/2) x100
2015-16	100.00	1300	1300.0
2016-17	104.81	1300	1240.3
2017-18	109.72	1300	1185.3
2018-19	117.18	1300	1109.4
2019-20	129.76	1400	1079.8
2020-21	140.96	1800	1277.8

Source: Wheat Policy Analysis For 2021-22 Crop by API

The above tabulated statistics is making it evident that the value for money for support price the farmer was getting in 2015-2016 is not covered with the nominal prices even six years later.

**d) Inadequate input subsidy coverage<sup>8</sup>:**

The Government of Punjab announces subsidy incentives on various wheat inputs to support the farmers in the wheat cultivation process. This includes subsidy on seed, fertilizers, weedicides and implements.

For instance, the subsidy coverage with respect to fertilizer was:

Year	Subsidy amount required for expected Fertilizer Utilization,	Budget Released	Shortfall/ Surplus	% of Subsidy coverage
2017-18	13,080.006	969.400	(12,110.61)	7.41%
2018-19	18,175.560	1,000.000	(17,175.56)	5.50%
2019-20	16,551.056	2,394.725	(14,156.33)	14.47%
2020-21	35,889.640	9,148.050	(26,741.59)	25.49%

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8 Issue 2.5.6, 3.1

Secondly, the subsidy measures were “reimbursement based”. This was a discouraging element for small farmers who retained low cash capital to initially invest in the wheat crop.

A survey conducted during the subject study revealed that 76% of farmers did not get their reimbursements due to various technical problems. This further reduced the impact of the subsidies.

***e) Emergence of wheat circular debt<sup>9</sup>:***

The Punjab Food Department procures wheat from the framers through credit from a consortium of banks, which may vary from time to time. From the sale proceeds of wheat, the loans so obtained are re-paid. The Government of Punjab maintains a separate Account II (Food) with the SBP, for managing state’s trading in food grains.

From the FY 2013-14 onwards, the re-payments to the banks have been consistently lesser than the new borrowings resulting in an overall increase in the outstanding wheat procurement debt at the end of procurement season. As of 30<sup>th</sup> June 2021, this circular debt has increased up to Rs. 548 billion.

***f) Increase in price of flour due to servicing of wheat circular debt<sup>10</sup>:***

When wheat is sold off to the flour mills, it is done so at notified “release price” but also involves subsequent addition of subsidy translated into incidental charges incurred by the government after wheat procurement.

However, the wheat circular debt has changed the dynamics of the incidental expenses. At present, incidental charges are eclipsed by the compelling interest payments on outstanding wheat procurement loans. In FY 2020-21, these interest charges amounted to 76% of the total incidental charges, calculated for the year.

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9 Issue 2.13.4

10 Issue 2.13.5

Current (FY 2020-21) borrowing (Rs. 218 billion) accounted for only 40% of the total PFD debt of Rs.548 billion. The incidental charges per 40Kg of wheat based on accumulated interest charges came to Rs. 627.75 whereas current borrowing interest charges (FY 2020-21) came to Rs. 342.53.

***g) Inadequate agriculture advisory services<sup>11</sup>:***

Agriculture advisory services were an important functional arm of the provincial government tasked with a successful implementation of any initiative such as a subsidy scheme and awareness campaign against new threats to crops all depended upon the working of the advisory services personnel. The output of these services was sub-optimal as was also ascertained from feedback questionnaire responded by a broad-based sample of farmers.

***h) Inaccuracies in agriculture data<sup>12</sup>:***

Reliable and accurate data was a prerequisite for well-informed and sound decision-making. If data was unreliable then there was a high risk that appropriate decisions would not be made. In this context various inconsistencies are present in the agriculture data being populated by the government. Different government agencies were compiling different figures for the same set of data.

***i) Procurement of wheat on historical rather than scientific/analysis basis<sup>13</sup>:***

It was imperative that every year the demand for new procurement was calculated based on scientific data. However, from the FY 2012-13 till the FY 2020-21, the target remained at 04 MMT based on a purely historic basis. This practice was not efficient.

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11 Issue 2.7.5

12 Issue 2.7.2, 2.7.7

13 Issue 2.10.1



***j) Non-increase in the wheat storage capacity<sup>14</sup>:***

Wheat storage capacity of the provincial government has remained stagnant at 2.22 MMT with different storage development projects remaining incomplete in Bahawalpur and DG Khan.

Non-increase in wheat storage capacity has created storage capacity challenges for the province.

***k) Effect of climate change on wheat crop<sup>15</sup>:***

Food and Agriculture Organization (FAO) of the United Nations in its report titled “Climate-Smart Agriculture for Punjab Pakistan (2018), has stated that “Punjab has experienced severe droughts, followed by devastating floods in 2010, 2011, and 2014. Further, the report highlights that “each degree-Celsius increase in global mean temperature would, on average, reduce global yields of wheat by 6.0%.

In the above context, analysis of temperature during the Rabi season from the FY 2011-12 to the FY 2021-22 reveals that from January to April, there has been a steady increase in temperature as compared with the previous year. This has exposed the wheat crop to heat stress during the grain formation stage, leading to shriveled grains.

Similarly, during the same period, the rainfall has remained un-predictable with sharp high and low spells across different areas of the province for a cycle of 02 to three years.

Hence, climate change is adversely affecting the wheat harvest, requiring long-term strategies to secure adequate wheat crop production in the future.

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14 Issue 2.10.3

15 Issue 2.7.3

### *Conclusive Recommendations*

Existing short-term reactive approaches to problem-solving turn out to be inchoate and inadequate. Instead of “throwing money” at untargeted relief afforded to consumers in the wake of milling, grinding and marketing of wheat through enlisted flour mills and sasta bazars, which would only increase demand, driving the price up further, warranting efforts to be streamlined to help build resilience in the medium term.

Given the context that people tend to spend a larger share of their income on food due to reduced incomes, subversion of purchase power parity and rising food prices. The governments, Federal as well as Provincial are obligated to prioritize support for the most vulnerable households. Transformed food systems can become a cornerstone of green, resilient, and inclusive development.

Food security policies ought to aim at implementation of measures arriving at points of convergence that help preserve sustainable reserve stocks of wheat and surplus wheat productivity for the growers ensuring the economic welfare of the farmers community by adapting to the challenges posed by climate change risks, price escalation for inputs including fertilizer, fuel, pesticides and implements besides administrative drawbacks, governance gaps, and slippery price destabilization. The strategic institutional response is called for to devise guidelines and measures to cope with the challenges, sequel to an evaluation of institutional weaknesses. This will pave the way of attaining viability of wheat cultivation with the encouragement to all major stakeholders to accept ownership of these guidelines.

## INTRODUCTION

Although food comprises multiple consumables and nutrients around the world, wheat has remained the main symbolism of food itself and the basic staple food for the population. Food shortages specifically those revolving around wheat products can have profound and unpredictable socio-political results, hence with regards to food security, wheat and its products take center stage.

According to Article 38 (d) of the Constitution of the Islamic Republic of Pakistan:

*“The State shall provide basic necessities of life, such as food, clothing, housing, education and medical relief, for all citizens, irrespective of sex, caste, creed or race, as are permanently or temporarily unable to earn their livelihood on account of infirmity, sickness or unemployment”.*

The above constitutional provision lays the foundation of ensuring food security across the country. Further, the Food and Agriculture Organization of the United Nations (FAO), highlight that food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. There are four major pillars that relate to food security: availability, access, utilization and stability<sup>16</sup>.

### **Current Scenario**

#### ***Current Food Security Scenario***

At present on account of global warming and other regional conflicts food security has become a global challenge requiring strong short-term and long-term initiatives. As per “Global Humanitarian

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16 <https://www.fao.org/3/al936e/al936e.pdf>

Overview 2022” by United Nations, “last year’s warnings of unprecedented levels of global food insecurity have been confirmed. Up to 811 million people worldwide were undernourished in 2020, which implied an approximate rise of 161 million from the previous year. In Pakistan, increasing inflation rates compounded by recent flooding, droughts, locust outbreaks and loss of livelihoods due to COVID-19, have caused food insecurity for 3.8 million people. Afghanistan’s neighboring countries, particularly the Islamic Republic of Iran and the Islamic Republic of Pakistan, host more than 2.2 million registered refugees from previous waves of forced displacement and also are compelled to arrange provisioning of subsistence for a further 4 million Afghans of varying statuses<sup>17</sup>”.

As per the national nutrition survey 2018, 36.9 percent of Pakistan’s population faces food insecurity<sup>18</sup>. The survey highlighted that on an average Pakistani household spent 50.8 percent of their monthly income on food, due to which the population was vulnerable to food-related price inflation<sup>19</sup>.

Further, as per International Financial statistics available with the World Bank, consumer prices have seen steady inflation during the last five years with inflation coming at 9.5 % during the year 2021<sup>20</sup>.

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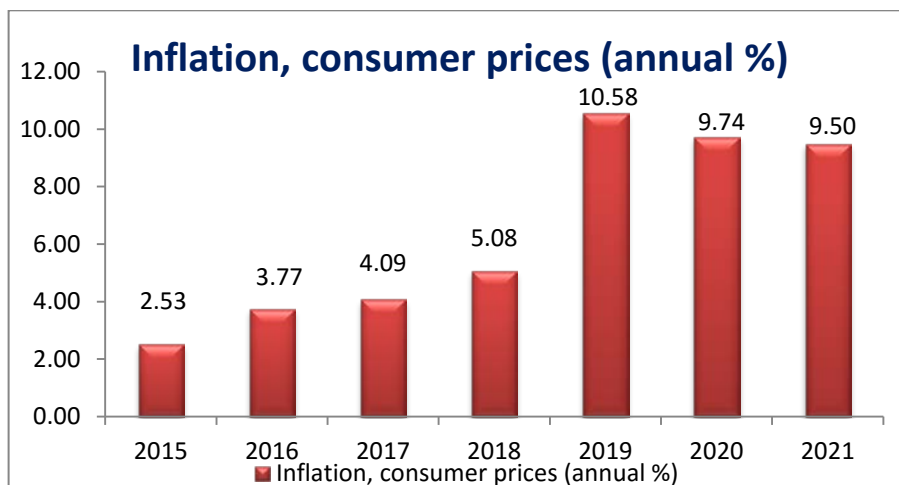
17 OCHA, UN. *Global Humanitarian Overview 2022 (2021)*, <https://www.un-ilibrary.org/content/books/9789210012423>

18 “Pakistan: World Food Programme,” UN World Food Programme, <https://www.wfp.org/countries/Pakistan>

19 “Pakistan: World Food Programme,” UN World Food Programme, <https://www.wfp.org/countries/Pakistan>

20 “Inflation, Consumer Prices (Annual %) - Pakistan,” <https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=PK>,

Illustratively:



The above steady increase in consumer prices has a direct impact on food security.

Similarly, the Pakistan Economic Survey 2021-2022 highlights that, “The pace of food inflation surged 15.6 percent in Urban and 17.7 percent in Rural areas during the month of April 2022”<sup>21</sup>.

Furthermore, in the context of food security, the Ukraine-Russia conflict can have serious negative repercussions for Pakistan. Kiev supplied 39% of Pakistan’s wheat imports last year. Pakistan also imports corn, barley, grain, seeds among other items from Ukraine. The conflict will disrupt these supplies<sup>22</sup>.

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21 “[ Ministry of Finance: Government of Pakistan ],” | Ministry of Finance | Government of Pakistan |, [http://www.finance.gov.pk/survey\\_2021.html](http://www.finance.gov.pk/survey_2021.html).

22 “Ukraine-Russia War and Pakistan,” Daily Times, February 26, 2022, <https://dailytimes.com.pk/891918/>.

The target vs actual production with respect to wheat crop across Punjab remained as under:

Year	Production Target* (MMT)	Production Achieved** (MMT)
2016-17	19.500	20.466
2017-18	19.607	19.178
2018-19	19.607	18.377
2019-20	19.660	19.402
2020-21	20.000	20.900
2021-22	21.945	20.032
*Source: Working papers & minutes of meetings of Federal Committee on Agriculture		
**Source: Crop reporting services		

Wheat production and food security represents forging of multiple intricate and mutually interdependent agricultural, administrative, socio-economic and environmental issues.

Efficient methods of managing reserve stocks of wheat harvest in purpose built silos for long term storage, emanating from economic strategizing and forecasting to brace calamities of the magnitude of long drawn drought and rise in precipitations owes its origins to the days of Prophet Joseph (May God Be pleased with him) as far as known human history of the antiquity for more than 3600 years ago is concerned. All these improvisations are undoubtedly characteristic of sterling statesmanship, admirable fortitude and administrative acumen by virtue of which he enabled citizens of Egypt and neighboring territories to be saved from the wrath of famine, spanning over seven years. His success lay in the effective integration of his gifted discernment and foresight as well as acquired competencies.

The case study mentioned above needs recapitulation as follows;

As his first act, the Prophet Joseph (May God Be Pleased with him) went through all the land of Egypt on an inspection tour to become familiar with the people who managed agriculture as well as the locations and conditions of the fields, the crops, the roads, and means of transportation.

He was called upon to establish and oversee the training of what amounted to a Department of Agriculture and Revenue. During the seven years of abundant harvest, he had the grain stored in cities.

During the seven lean years that followed, he dispensed grain to the Egyptians and other people who were affected by the widespread famine. To create and administer all this, while surviving the political intrigue of an absolute monarchy, required exceptional talent.

After the people ran out of money, he allowed them to barter their livestock for food. This plan lasted for one year during which he collected horses, sheep, goats, cattle, and donkeys.

Determining the value of these animals and establishing an equitable system for exchange. He provided access to points of food distribution and treated people even-handedly.

When all of the livestock had been traded, people willingly sold the ownership of their lands as well in exchange for seed for planting. He enacted an enduring law that people return 20 percent of the harvest to state.

Happily, by applying his God-given skill and wisdom, he successfully brought Egypt through the agricultural catastrophe. When the seven years of good harvests came, Prophet Joseph (May God Be pleased with him) developed a stockpiling system to store the grain for use during the coming drought. When the seven years of drought arrived, he provided enough food to bring the nation through the famine. His wise strategy and effective implementation of the plan even allowed Egypt to supply grain to the rest of the world during the famine.

The above successful climate risk mitigation parable inspires emulation to be followed by strategic managers even today particularly in the back drop of the fact that inhospitable climate crisis of apocalyptic nature is looming large to blow the semblance of food security to smithereens which is so precariously poised that at this point in time,

predictions of severe heat waves or flash floods due to heavier moonsoon, or speedier glacier melts causing flashfloods can hardly be brushed aside.

### *Literature review*

Food security denominates the situation in which there is secure and sustainable access to ample food for an active and salubrious life<sup>23</sup>. FAO has defined Food Security as “access by all people at all times to the food needed for an active and healthy life”<sup>24</sup>. It reflects the desire to eliminate hunger and malnutrition (WFP, 2003).<sup>25</sup>

A change in the land use system may arise from competing land resources which are not only used to produce food but also to provide materials and feedstock for the bio-based economy, for conservation of nature, urban development and recreational facilities<sup>26</sup>. According to Food and Agriculture Organization, Food security has four main components i.e. availability, accessibility, nutrition and stability<sup>27</sup> of which unfortunately, Pakistan or as the case may be the Punjab Province is not fulfilling any single aspect as yet<sup>28</sup>.

Furthermore, safeguarding the right to food for all is the sole responsibility of state which is set out in Universal Declaration of Human Rights (UDHR) and International Covenant on Economic, Social and Cultural Rights (ICESCR)<sup>29</sup>.

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23 Schramski, Sam, and Ana Carolina Barbosa de Lima. "Fruitful exchanges: social networks and food resources amidst change." *Agriculture & food security* 11, no. 1 (2022): 1-16.

24 World Food Programme Pakistan. 2003. Food insecurity in rural Pakistan. Published by: Vulnerability Analysis and Mapping (VAM) Unit, World Food Programme (WFP) Pakistan.

25 Ibid.

26 Zahid Mahmood, Sana Iftikhar, Abdul Saboor, Atta Ullah Khan & Muhammad Khan (2015): Agriculture land resources and food security nexus in Punjab, Pakistan: an empirical ascertainment, Food and Agricultural Immunology, DOI: 10.1080/09540105.2015.1079593

27 Food and Agriculture Organization (FAO). “Crop Prospects and Food Situation,” February 2010, No. 1, <http://www.fao.org/docrep/012/ak343e/ak343e00.pdf>.

28 Abbasi, SAQIB SHAKEEL, NISAR KHAN Marwat, S. O. B. I. A. Naheed, and S. A. Q. I. B. Siddiqui. "Food security issues and challenges: a case study of potohar." *Eur. Acad. Res* 2, no. 3 (2014): 3090-3113.

29 Mechlem, Kerstin. "Food Security and the Right to Food in the Discourse of the United Nations." *European Law Journal* 10, no. 5 (2004): 631-648. Gerber, Paula. "Education about human



As early as 1998, it stood postulated by Maxwell et al (1998), that food insecurity denoted more than just a scarcity of food in the market with clear indication that it was to be reckoned equivalent to a lack of sufficient funds to acquire food, let alone nutritious and wholesome food.<sup>30</sup>

GHI( Global Hunger Index ) is aimed at galvanizing global action to combat hunger<sup>31</sup>. The index comprises four indicators<sup>32</sup> including undernourishment, child wasting, child stunting and under-five mortality rate<sup>33</sup>. The rankings for Pakistan in GHI, HDI, and Under 5-year mortality are not encouraging.

Several countries have constitutional provision on the rights of citizens to adequate food and Pakistan is also one of them. Article 38 of the Constitution of Pakistan enunciates that, “the State shall provide basic necessities of life such as food, clothing, housing, education and medical relief”.<sup>34</sup>

Average wheat yield per hectare in Pakistan is well below the potential yield by about 60 percent<sup>35</sup>. Hussain et al. (2012) reported that

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- rights: Strengths and weaknesses of the UN Declaration on Human Rights Education and Training." *Alternative Law Journal* 36, no. 4 (2011): 245-249.
- 30 Maxwell, Simon, and Marisol Smith. "Household food security: a conceptual review." *Household food security: Concepts, indicators, measurements 1* (1992): 1-72.
- 31 Von Grebmer, Klaus, Jill Bernstein, Naomi Hossain, Tracy Brown, Nilam Prasai, Yisehac Yohannes, Fraser Patterson et al. 2017 *Global Hunger Index: the inequalities of hunger*. Intl Food Policy Res Inst, 2017. von Grebmer, Klaus, Jill Bernstein, R. Mukerji, F. Patterson, M. Wiemers, R. Ní Chéilleachair, C. Foley, S. Gitter, K. Ekstrom, and H. Fritschel. "Global Hunger Index by Severity, Map in 2019 Global Hunger Index: The Challenge of Hunger and Climate Change." (2019).
- 32 Roser, Max, and Hannah Ritchie. "Hunger and undernourishment." *Our World in Data* (2019).
- 33 Khan, Gul Nawaz, Ali Turab, Mohammad Imran Khan, Arjumand Rizvi, Fariha Shaheen, Asmat Ullah, Amjad Hussain et al. "Prevalence and associated factors of malnutrition among children under-five years in Sindh, Pakistan: a cross-sectional study." *BMC nutrition* 2, no. 1 (2016): 1-7.
- 34 Sayeed, Asad. "Social protection in Pakistan: Concept, situation analysis and the way forward." In *Proceedings of a Joint Seminar Organized by the Planning Commission, ILO and UNDP on Employment-based Poverty Reduction Strategy for Decent Work in Pakistan*. Pakistan Institute of Development Economics. Islamabad. 2004. Arif, Mazhar, and Nida Khalid. *Agriculture and food security in Pakistan*. South Asia Partnership-Pakistan, 2007.
- 35 Aslam, Muhammad. "Agricultural productivity current scenario, constraints and future prospects in Pakistan." *Sarhad Journal of Agriculture* 32, no. 4 (2016): 289-303.

yield gap for wheat crop was 40 percent in the irrigated areas of Punjab<sup>36</sup>. Non-adoption of recommended technologies and production practices by the farmers is declared one of the main reasons of low wheat yield<sup>37</sup>. About 20% reduction in crop productivity occurs due to adverse climatic situations in Pakistan<sup>38</sup>. Unreliable and inadequate canal water supplies along with inequitable water distribution cause low crop yields<sup>39</sup>. In Pakistan, currently seed production meets only 40% of yearly seed requirement<sup>40</sup>. In Pakistan, crop productivity can be enhanced significantly by improving availability of good quality agriculture inputs like seed, fertilizers, pesticides, herbicides, water and their efficient, judicious and balanced use. Improvement in farmers' access (timely & doorstep availability at reasonable price & subsidy) to these inputs and services through improved agriculture credit would enhance land productivity tremendously<sup>41</sup>.

For enhanced agricultural productivity, a proper price policy of government is vital. Thus, keeping the prices aligned with international prices provides the right incentives to the farmers to increase their land

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- 36 Hussain, Abid, Abdul Saboor, Muhammad Azeem Khan, Abdul Qayyum Mohsin, and F. Hassan. "Technical efficiency of wheat production in rain-fed areas: a case study of Punjab, Pakistan." *Pakistan Journal of Agricultural Sciences* 49, no. 3 (2012): 411-417.
- 37 Ullah, Ayat, Muhammad Arshad, Harald Kächele, Ayesha Khan, Nasir Mahmood, and Klaus Müller. "Information asymmetry, input markets, adoption of innovations and agricultural land use in Khyber Pakhtunkhwa, Pakistan." *Land use policy* 90 (2020): 104261.
- 38 Sattar, T. 2012. A sociological analysis of constraining factors of development in agriculture sector of Pakistan. *J. Econ. Sustain. Dev.* 3(8): 8-24.
- 39 Hussain, I., R. Sakthivadivel, U. Amarasinghe, M. Mudasser and D. Molden. 2003. Land and water productivity of wheat in the western Indo-Gangetic plains of India and Pakistan: A comparative analysis. International Water Management Institute Research Report 65. Colombo, Sri Lanka: International Water Management Institute
- 40 Iqbal, M., and M. Ahmad. 2005. Science & technology based agriculture vision of Pakistan and prospects of growth. In: Pakistan Society of Development Economists (PSDE) 20th Annual General Meeting (AGM) on Regional Co-operation and Economic Growth 2005, Marriott Hotel Islamabad, Pakistan, 10th - 12th January, 2005
- 41 Das, A.B., and D. Sahoo. 2012. Farmers' educational level and agriculture productivity: a study of tribals of KBK districts of Odisha. *Int. J. Edu. Econom. Dev.* 3(40): 363-374. <http://dx.doi.org/10.1504/IJEED.2012.052312>

productivity<sup>42</sup>. According to estimates, water shortage would increase from 28 MAF in 2015 to 41 MAF in 2025<sup>43</sup>. In Pakistan water use efficiency (WUE) is not realized<sup>44</sup>. Low WUE is mainly due to poor irrigation management (lack of adequate and timely availability of irrigation water, inefficient irrigation practices and technologies, lack of adoption of irrigation scheduling, improper conjunctive use of surface and groundwater for irrigation) and low irrigation water quality<sup>45</sup>. WUE could be increased through innovative improvements in agronomic and water management practices which would require shifts in agricultural practices, policies and effective institutions.<sup>46</sup>

Agriculture productivity can be increased by the use of modern technology and improvement in the existing technology<sup>47</sup>. The evaluation of laser land technology revealed 20% increase in crop yield<sup>48</sup>. The zero tillage technology results in 12-15% increase in crop yield<sup>49</sup>. The impact

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- 42 Hussain, I., R. Sakthivadivel, U. Amarasinghe, M. Mudasser and D. Molden. 2003. Land and water productivity of wheat in the western Indo-Gangetic plains of India and Pakistan: A comparative analysis. International Water Management Institute Research Report 65. Colombo, Sri Lanka: International Water Management Institute
  - 43 GoP (Government of Pakistan). 2010. Discussion paper for people's five year development plan 2010-1015. Planning Commission, Islamabad, Pakistan.
  - 44 Watto, M.A., and A.W. Mugeru. 2016. Groundwater depletion in the Indus Plains of Pakistan: Imperatives, repercussions and management issues. *Int. J. River Basin Manage.* 2016: 2.<http://dx.doi.org/10.1080/15715124.2016.1204154>
  - 45 Hussain, I., R. Sakthivadivel, U. Amarasinghe, M. Mudasser and D. Molden. 2003. Land and water productivity of wheat in the western Indo-Gangetic plains of India and Pakistan: A comparative analysis. International Water Management Institute Research Report 65. Colombo, Sri Lanka: International Water Management Institute
  - 46 Zahoor, Syed Ahsan, Shakeel Ahmad, Ashfaq Ahmad, Aftab Wajid, Tasneem Khaliq, Muhammad Mubeen, Sajjad Hussain et al. "Improving water use efficiency in agronomic crop production." *Agronomic crops* (2019): 13-29.
  - 47 Rehman, S.U., A. Hussain and M. Taqi. 2014. Impact of agricultural credit on agricultural productivity in Pakistan: An empirical analysis. *Int. J. Adv. Res. Manage. Social Sci.* 3(4): 125-139.
  - 48 Gill, M.A., and N.A. Awan. 2009. Water conservation through resource conservation technologies. p. 76-88. In: Project Management and Policy Implementation Unit (PMPIU) of the Ministry of Water and Power Water conservation, present situation and future strategies. Proc. Ministry of Water and Power, Planning Commission and Asian Development Bank National Seminar. 21 May 2009. Project Management and Policy Implementation Unit (PMPIU), Ministry of Water and Power, Islamabad, Pakistan
  - 49 Ahmad, S. 2009. Water availability and future water requirements. In: Project Management and Policy Implementation Unit of the Ministry of Water and Power (MOWP) Water conservation, present situation

evaluation of bed and furrow irrigation technology also revealed better crop yield and water use efficiency compared to traditional method. In Pakistan, pace of adoption of these technologies by farmers is very slow<sup>50</sup>. In order to enhance land productivity these technologies need to be up-scaled<sup>51</sup>. Revolving credits which make disbursement and repayment convenient for farmers should be promoted by the banks of Pakistan.<sup>52</sup>

The information and communication technologies like internet, mobile phones, radio and television are the most important and effective communication tools to provide agriculture information and knowledge to farmers<sup>53</sup>.

Expert system based on meteorological, agronomic and economic and pest management data of stored grain ecosystem should be developed for use by grain storage managers<sup>54</sup>. Grain Storage Management needs to be recognized as a profession requiring constant input of knowledge and training and support from many academic disciplines.<sup>55</sup> Sound grain storage management on small farms need to be promoted, making farm granaries and containers water proof, rodent proof and weather proof, storing clean grains only, strictly observing storage hygiene, reducing initial moisture content of grain to the level of 10-12% and during

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- and future strategies. Proc. MOWP, Planning Commission and Asian Development Bank National Seminar. 21 May 2009. Project Management and Policy Implementation Unit MOWP, Islamabad, Pakistan. pp. 43-62.
- 50 Abbas, Mazher, A. D. Sheikh, Maqbool Shahbaz, and Amna Afzaal. "Food security through wheat productivity in Pakistan." *Sarhad Journal of Agriculture* 23, no. 4 (2007): 1239.
- 51 Aslam, Muhammad. "Agricultural productivity current scenario, constraints and future prospects in Pakistan." *Sarhad Journal of Agriculture* 32, no. 4 (2016): 289-303.
- 52 Husain, I. 2012. Agriculture sector: Issues and prospects. Appeared in DAWN, Feb 16, 2012.
- 53 Chhachhar, Addul Razaque, Barkatullah Qureshi, Ghulam Mujtaba Khushk, and Shakil Ahmed. "Impact of information and communication technologies in agriculture development." *Journal of Basic and Applied scientific research* 4, no. 1 (2014): 281-288.
- 54 White, N. D. G. "A multidisciplinary approach to stored-grain research." *Journal of Stored Products Research* 28, no. 2 (1992): 127-137.
- 55 Ahmad, Farooq. "Food security in Pakistan." *Pak. J. Agri. Sci* 46, no. 2 (2009): 83-89.

storage<sup>56</sup>, keeping the grain cool and protecting from large scale changes of out-door temperature, avoiding direct sun light effects on grains, controlling insect infestation and fungal infection and regularly inspecting grain for unsafe storage conditions and pest infestation<sup>57</sup>.

***Statement of the problem:***

Wheat is a staple food of 109.99 million people of Punjab with a growing rate equal to 2.13%, the wheat requirements of the province are steadily increasing. On top of this, Punjab acts as the breadbasket of the country accounting for 76% of total wheat cultivated across the country and has an annual production of 19.665 MMT during the last five years. Over the years, Pakistan has faced a dearth in wheat reserves owing to various factors like low yield, increase in input prices, shortage of inputs, climate change, and suboptimal research incapable of introducing climate-resilient varieties compatible with heat waves, pest infestation and water vaporization.

Unlike major wheat producing countries in the world, in Pakistan, public sector funded cash flows involve devolving of an inalienable role for the Federal and the Provincial Governments to steer as a monopoly, the entire cycle of wheat. In this connection, both the Governments assign to themselves fulfillment of onus to meddle with various critical stages of wheat procurement, storage, grinding and stocking of atta for stabilizing affordability thereof at controlled prices. This onerous task is made even more challenging because of unforeseen hassles caused by hoarding, smuggling, panic buying and profiteering by cartels and vested interests. The minimum support price mechanism also involves grave risks of

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56 Bakhtavar, Muhammad A., Irfan Afzal, Shahzad Basra, and Abdul Wahid. "Implementing the 'dry chain' during storage reduces losses and maintains quality of maize grain." *Food Security* 11, no. 2 (2019): 345-357.

57 Kaushik, Rekha, and Jyoti Singhai. "An approach for the development of a sensing system to monitor contamination in stored grain." In 2019 6th International Conference on Signal Processing and Integrated Networks (SPIN), pp. 880-884. IEEE, 2019.

failing to stabilize prices due to escalation of input costs for fertilizers, fuel, pesticides etc. So much so, a small reduction in wheat crop productivity does have a direct bearing on food security, with a built-in risk of unfolding of unmanageable shortage of atta in the market, spurring yet another demand driven spell of price hike. In addition to the challenge of dreadful atta shortages, the price stabilization has a huge cost not transferable to consumers conceding incidental charges and ballooning circular debt as well as drastic accumulation of accounts receivable in government Food Account-II.

The key research question, the study group has taken up for resolving whether the current state of affairs would perpetuate unabated or a holistic remediation with a multipronged remedial action plan needed a road map based implementation.

### ***Significance of the study***

The study aims at exploring an action plan with revision in policy paradigm to serve as an adequate safeguard against wheat cultivation from being rendered a less feasible crop for the farmers envisaging a shift of emphasis for promoting targeted social protection to farmers with small holdings instead of untargeted subsidies amenable to distortions. The study will be instrumental in proposing price stabilizing for agri inputs, agri-credits, MSP for wheat, Ex-mill price for atta and by-products of wheat in the wake of milling and grinding, forestalling hoarding, smuggling, irrational releases of stocks to flour mills, not without ensuring that our country remains food secure in future.

### ***Objectives/TORs of the Study***

In order to build a broad analysis canvas to orchestrate a holistic appraisal of issues of potential significance impinging upon the scenario implying perpetuation of the status quo, this study maps out the whole wheat crop cycle starting from sowing seeds in the fields to harvesting the

wheat yield produced in farms, till the wheat products reach the consumers sequel to Support Price based procurements or offtakes from fields or farm yard granaries or market prompted sell offs at wholesale or retail outlets. This study and analysis also factors in distortions in transportation and tractability of stocks channelized through Government enlisted flour mills producing atta and by products of wheat. This process flow review is also meant to point out financial and administrative efficiencies /inefficiencies if any found in the process. The following aspects have been looked into:

- 1 Efficacy or otherwise of subsidies and inputs received by farmers to produce crops and increase yield thereof and stabilize cost of products.
2. Value additions warranted in existing protocols and procedures governing sale of produce by farmers to DFCs and benefit / profit accruing to farmers.
3. A drill down of drawbacks accentuated by all intermediary steps till the produce reaches the consumers culminating into purchase by District Food Controllers, sale to merchants, shops, and further processing of produce for its conversion into flour and by products etc.
4. A precise critical evaluation of efficiencies and inefficiencies of the whole system with special reference to the costs incurred in all intermediary steps will also ensue.

The compass of this Study would extend to differentiation between cost/price paid to farmer and cost of commodity received when it reached to consumers.

The Government Departments and entities whose functions and roles were deliberated upon for dealing with chronic systemic problems in need of being addressed have been summarized at Annexure–A for dwelling upon intricacies and complexities, these Departments and entities are required to cope with.

### ***Scope Limitation***

Food security includes various commodities of food items such as livestock, miscellaneous crop like rice, potato, vegetable etc. However, for the purpose of this study wheat crop has been taken for analysis and review, keeping in view the parameters defined in the TORs.

Review of data and record relatable to sub-topics being analyzed confines to the time ranging from previous 05 to 10 years, up to the FY 2020-21 and sowing season 2022 only.

Furthermore, although initially sugarcane crop was also to be reviewed from food security perspective, the matter of including sugar under the food security study in the instant case was discussed with a number of area experts including Director Food Punjab, Vice Chancellor Agriculture University Multan and experts at Ministry of Food Islamabad. All came up with the considered expert opinion that it would be expedient not to construe Sugar as part of the food security paradigm. Accordingly, report finalized focuses on wheat only.

### ***Methodology***

During this study, two techniques were used for data and information gathering. These are segregated and explained as follows:

The first technique used for data and information gathering included review of soft-data, publication and information from sources which can be broadly categorized as:

- Ministry of National Food Security & Research, Agriculture Department, Food Department, Food Security Policy and initiatives being undertaken by federal and provincial governments to ensure food security were reviewed and analyzed.



- Support Institution: Publications of national and international institutions, think-tanks, and academia were reviewed and analyzed.
- Government Sources: Officially published data from Federal and Provincial Bureau of Statistics, and other government organizations were reviewed and analyzed.

Secondly, key field experts/stakeholder/informants from the agriculture/Food sector, including MNFS&R, Punjab Agriculture department, food department, various Associations and farmers were included. The information was gathered by applying the following two techniques:

- Survey via a questionnaire: A feedback survey was completed between April 26 to May, 5 2022. The purpose for survey was to complement the findings and to translate responses into quantified and measurable data.
- Interviews/meetings with key informants: meetings with Pakistan Kisan Ittehad, Pakistan Flour Mills Associations and interviews with senior officers of MNF&R, Punjab Agriculture and Food Departments were held. Purpose for the in-person, one-on-one interactions with the key Resource Persons was to ascertain the issues pertaining to food security from these stakeholders.



## SECTION-1

The analysis and appraisal delineated in this part of the study report adverts to multiple and multifarious shades and nuances of the wheat crop cycle's dynamics, bringing within its loop several stages from sowing of wheat seeds in the fields to marketing of wheat products for the consumption of consumers' dietary intakes.

### **1.1 Wheat Crop Cycle in Punjab: An overview**

The brief process of wheat cycle from sowing till consumption is articulated as under: -

#### ***1.1.1 Sowing and harvesting times of wheat***

In Punjab, wheat sowing in the irrigated areas generally starts from 1st November and extends up to end of December while in barani areas, it begins from 20th October and continues up to 15th November.

Wheat harvesting in the south of the province starts from end of March and continues till June in northern parts. Harvesting of wheat depends on the climatic conditions and maturing times of varieties sown. Excessive heat waves can cause the harvest to mature early. Similarly, late rains during rabi season can lead to late sowing of the crop.

#### ***1.1.2 Irrigation***

The irrigation system of the provinces comprises three main rivers namely Indus, Jhelum and Chenab. These rivers form the life-line for irrigation across most parts of the country including Punjab, Sindh and Baluchistan as well as KP (in case of up-stream).

The irrigation sources in the province bank heavily upon water intensive "flood irrigation system" that is no longer ideal, considering that more efficient and less water intensive irrigation systems are readily being

adopted around the globe. This includes practices such as drip irrigation, sprinkle farming, green house solutions/tunnel farming etc.

The irrigation system of the province denominates a network of major and minor canals which segregate into outlets (moghaz) and farmers' water courses.

Details regarding usage of canals, tube wells, wells and other sources for irrigation are:

<i>Sources</i>	<i>Pakistan (Area in million hectares)</i>	<i>Punjab (Area in million hectares)</i>	<i>% age usage area in Punjab</i>
Canals	6.36	3.35	23
Tube wells	3.79	2.94	20
Wells	0.31	0.20	1
Canal Tube wells	7.60	7.60	53
Canal wells	0.25	0.25	2
Other sources	0.31	0.09	1
Total Irrigated Area	18.63	14.41	

Source: <http://www.agripunjab.gov.pk/overview%20new>

### ***1.1.3 Agriculture Inputs***

The development and progress of a sustainable agriculture sector greatly depends on supply of timely and quality key farm inputs like seed, fertilizers, credit, pesticides, weedicides, and herbicides on affordable prices. These inputs play a vital role in ensuring enhanced farm productivity and profitability.

#### ***1.1.3.1 Seed***

In the Wheat cycle the most critical element is seed. Its potency and resilience impact the overall wheat crop and the agro-wheat economy. High quality seeds alone can increase overall wheat production more than any other agriculture input.

In turn new seed varieties are required to ensure high productivity levels of wheat crop.

### **1.1.3.2 Fertilizers**

As per National Food Security Policy 2018 “Soils of Pakistan are low in organic matter and extremely deficient in macro and micro soil nutrients. The pH level of our soils is also very high. Hence the reliance on the use of synthetic fertilizers has tremendously increased.”<sup>58</sup>

Ali and Iqbal (1984) found that fertilizer use was one of the main factors affecting the wheat yield in the Punjab province. They estimated that about 52-72 percent of the change in yield could be attributed to use of fertilizers.<sup>59</sup>

Nitrogen, Phosphorus, and Potash are the main ingredients needed to uplift the soil fertility. Different types of fertilizer are available in the market to fulfill the needs for these ingredients i.e., Urea, Single super phosphate, Di ammonium Phosphate, etc.<sup>60</sup>

### **1.1.3.3 Pesticide, weedicides, and herbicides**

Different pesticides, weedicides and herbicides are available for controlling the un-wanted plants growing in the wheat fields. To control the crop pests effecting the crops, spray of pesticides is common. To control wild shrub and other unwanted plant growth in the field, farmers normally use practices of crop rotation, land preparation, intensive ploughing etc. However, the weedicides and herbicides are used if these methods cannot control the un-wanted growth. The use of chemicals is

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58 “National Food Security Policy,” [http://www.mnfsr.gov.pk/userfiles1/file/National%20Food%20Security%20Policy%20%202018%20\(1\).pdf](http://www.mnfsr.gov.pk/userfiles1/file/National%20Food%20Security%20Policy%20%202018%20(1).pdf)

59 Mudasser, Muhammad, Intizar Hussain, and Muhammad Aslam. "Constraints to land-and water productivity of wheat in india and pakistan: A comparative analysis." *International Water Management, Colombo, Sri Lanka* (2001). [www.researchgate.net/profile/Muhammad-Mudasser-2/publication/265234537\\_CONSTRAINTS\\_TO\\_LAND-AND\\_WATER\\_PRODUCTIVITY\\_OF\\_WHEAT\\_IN\\_INDIA\\_AND\\_PAKISTAN\\_A\\_COMPARATIVE\\_ANALYSIS/links/54e6276f0cf2bff5a4f3b674/CONSTRAINTS-TO-LAND-AND-WATER-PRODUCTIVITY-OF-WHEAT-IN-INDIA-AND-PAKISTAN-A-COMPARATIVE-ANALYSIS.pdf](http://www.researchgate.net/profile/Muhammad-Mudasser-2/publication/265234537_CONSTRAINTS_TO_LAND-AND_WATER_PRODUCTIVITY_OF_WHEAT_IN_INDIA_AND_PAKISTAN_A_COMPARATIVE_ANALYSIS/links/54e6276f0cf2bff5a4f3b674/CONSTRAINTS-TO-LAND-AND-WATER-PRODUCTIVITY-OF-WHEAT-IN-INDIA-AND-PAKISTAN-A-COMPARATIVE-ANALYSIS.pdf)

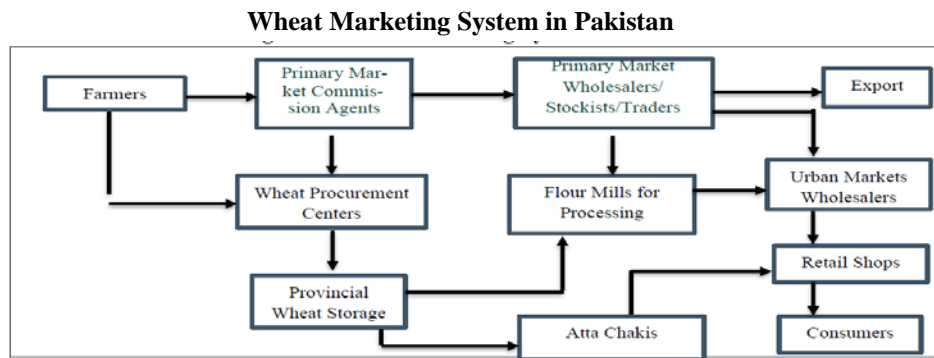
60 Ibid

mainly advised soon after sowing or after first irrigation. The type of chemicals and quantities differed on the basis of weeds that are needed to be controlled<sup>61</sup>.

## 1.2 Wheat Procurement Process

Food Department being the main agency of the Government of the Punjab for implementation of Food Management Policies undertakes procurement of wheat with the broad objectives of ensuring Minimum Support Price (MSP) to the farmers and availability of food grains to the weaker sections at affordable prices.

Key players of the existing wheat procurement system are indicated below:



## 1.3 Sale of wheat by Farmers and procurement by PFD

Annually the Punjab government through the PFD procures wheat from the farmers as per an annual procurement target. For last wheat season this target was 3.5 MMT. Furthermore, the federal government also procures wheat from Punjab for its own requirements. Pakistan Agricultural Storage and Supplies Corporation (PASSCO) is the procurement arm of the Federal government. PFD and PASSCO have

61 Ibid

earmarked specific areas for their procurement and keep their activity limited to these areas. There is no overlap.

With regards to the wheat cycle the farmer supplies wheat to the Punjab Food Department (PFD) in a four-step process:

1. Step1: The farmers get themselves registered for sales of wheat.
2. Step2. The farmers receive bardana (gunny bags) after payment of security deposit. The farmers are liable to pay a security deposit of Rs 288 per jute bag, or Rs 64 per PP bag.<sup>62</sup>
3. Step 3: The farmers are responsible for delivery and off-loading of filled gunny bags at designated procurement centers on scheduled dates already communicated to them. This process is labor intensive. The food department gives a certain sum (Rs. 09 per 100 kg) to the farmers for this exercise.
4. Step 4: The fourth step is payment. The farmer's payment is calculated and entered into Wheat Centre's record. A payment slip is prepared using Form 2. Two copies of Form 2 are retained at the Centre and two copies are given to the farmer to present at the bank. At day's end, the Centre prepares a consolidated statement using Form 3 and delivers this to the designated bank. The bank will pay the farmer only upon receipt of the consolidated payment advice in Form 3. Thus, the farmer must return to the bank the next day or later to receive the payment. Payment for less than 50 bags is made in cash. Otherwise, the farmer needs a bank account to which payment can be credited.

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62 Wheat procurement policy 2021-22

The whole process, which starts and ends at the bank, usually completes within 7-10 days.

#### **1.4 Intermediaries**

In Punjab's agricultural practices and its overall agro-economy, intermediaries have a key role to play. These people normally called as Arthis cash-in on all business opportunities arising from shortcomings and bottlenecks faced by the farmers in the agriculture sector on the whole and the same is the case with wheat.

The common Lower to Middle class farmers do not have the resources to manage sowing of wheat using high quality seeds, fertilizers and pesticides. Secondly due to cash and time constraints, they cannot wait for long days with regard to sale of their wheat crop. As the government official procedures involve multiple steps and are time intensive, the farmers sell off their crop to the Arthis on cash basis. The Arthis buy the crop from the farmers at their door step or fields and keep a certain margin for themselves. He can extend credit facility on sowing of wheat, exploiting the farmers as a money lender in the name of proverbial return on investment.

Arthis make the most of compulsion of farmers. The exchange of documents involved informally materializes, enabling the arthi to circumvent checks and balances while easily receiving controlled rate compensation for wheat sold at the government procurement centers. Decision to sell the wheat at the center or to hold it for a period are taken by Arthi based on market trend and overall output of annual regional harvest. Hence arthi not only represent a vast underground economy but also act as a key player in managing the local food market of an area.



## **1.5 Storage of wheat**

The Punjab Food Department (PFD) maintains different types of storage facilities including: covered godowns; concrete silos; and bins etc. Total storage capacity of PFD is 2.2 MMT<sup>63</sup>. The rest is stored in the open fields under plastic sheets. These are called Gunjis.

## **1.6 Flour Mills**

There are presently a total of 929 functioning mills in Punjab as of 28.02.2022<sup>64</sup>. These are dispersed throughout the province, but a large number are located in Rawalpindi and Bahawalpur divisions. The mills' capacity is calculated on the basis of their roller bodies: daily grinding capacity of a roller body is 20 metric tons<sup>65</sup>. Each year, PFD prepares a wheat issuance policy and allocates quota as per mills' capacity.

Mills collect their stock from the Wheat Centre at their own cost. PFD releases wheat upon specific demand from a mill within its allocated quota. The mill must deposit the full cost in the PFD account before it can collect its stock from a nearby Centre. It is PFD's responsibility to make sufficient stock available within the district to meet allocated quota of each mill.

## **1.7 Chakkis**

Chakkis represent small grinding units for production of atta across cities as well as at villages. Presently there are an estimated 5766 number of chakkis spread across the province. Consumers generally prefer chakki atta over flour mill atta due to better taste and high nutrition value. The types of chakkis vary from old manual chakkis to more modern chakkis powered by electricity or diesel engines.

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63 As per report District wise storage accommodation of PFD

64 As per daily report of PFD dated 28.02.2022

65 As per Punjab Food Department

## 1.8 Consumers

Consumer represent the common man and the end-user of wheat products. The consumers get atta and its by-products such as maida, choker etc. from local markets at the market prices. These prices are invariably on a higher side as compared with the entire wheat cycle discussed earlier. Any increase in the sale of atta in the market directly affects the food security position as it constrains the consumers towards the use of this staple food item.

According to Household Integrated Economic Survey (HIES) 2018-19, carried out by Pakistan Bureau of Statistics, food accounted for about 36.05 % of total household expenditure, of which wheat and wheat flour accounted for 11.20% (8.98% in urban areas and 12.84 % in rural areas). Quintile-wise share of wheat and wheat flour as proportion of total household expenditure is given in Table below:

**Table- Average monthly household income (Rs.) by Quintiles and Areas 2018-19**

		<i>Rural</i>	<i>Urban</i>	<i>Total</i>
5 <sup>th</sup>	Quintile	75,194	56,244	63,544
4 <sup>th</sup>	Quintile	41,084	38,094	37,643
3 <sup>rd</sup>	Quintile	34,789	31,705	31,373
2 <sup>nd</sup>	Quintile	30,210	29,743	29,049
1 <sup>st</sup>	Quintile	24,365	22,819	23,192
	Total	53,010	34,520	41,545
Source: Household Integrated Economic Survey 2018-19				

*Table- Quintile-wise share of household expenditure (%) 2018-19*

		<i>Expenditure on Food</i>	<i>Expenditure on wheat and wheat flour as proportion of total expense on food</i>
<b>5<sup>th</sup></b>	<b>Quintile</b>	36.05 %	6.77
<b>4<sup>th</sup></b>	<b>Quintile</b>		10.28
<b>3<sup>rd</sup></b>	<b>Quintile</b>		12.72
<b>2<sup>nd</sup></b>	<b>Quintile</b>		14.98
<b>1<sup>st</sup></b>	<b>Quintile</b>		18.28

Source: Household integrated Economic Survey 2018-19

The above scenario illustrates that a major portion of food expense is related to wheat. Hence increase in wheat prices can have major impact on the food security implications for the province.

## SECTION-2

The study delves deep into the potential challenges to food security deliberating upon impediments in bringing to fruition the benefits intended to travel to farmers but to no avail, putting in jeopardy the intended purpose of subsidies, price stabilization also casting serious aspersions on affordability and availability of wheat flour to consumers with serious repercussions on fragile food security.

### *Analysis of Wheat Cycle's dynamics and underlying issues*

Having outlined the wheat cycle in the previous section, this section now takes the discussion a little further and potential issues in the area are identified. The data used in this analysis were collected from the Punjab Food Department (PFD), the Pakistan Bureau of Statistics, Agriculture Policy Institute, MNFS&R and published academic papers etc. Semi structured interviews were also conducted with several stakeholders like, Pakistan Kisan Ittehad, Pakistan Flour Mills Association and with experts of various institutions such as Pakistan Agriculture Research Council, Agriculture Policy Institute, Punjab Agriculture and food departments.

### **2.1 Support Price determination and criticality of timely decision**

The wheat procurement price is set by the Federal government in October- November each year after holding consultation with the provincial governments. For this purpose, the MNFS&R utilizes the services of Agriculture Policy Institute (API). The support price is recommended by the API. Following major factors are considered for analysis of the price estimations.<sup>66</sup>

- i) Domestic Demand, Supply, Stocks and Price Situation

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66 Wheat Policy Analysis for 2019-2020 by Agriculture Policy Institute Ministry of National Food Security and Research

- ii) World Production, Consumption, Stocks and Trade Situation
- iii) International Price
- iv) Export or Import Parity Prices
- v) Cost of Production
- vi) Comparative Economics of Competing Crops
- vii) Nominal and Real Support and Market Prices
- viii) Economic Efficiency of Wheat Production in Pakistan
- ix) Producer Prices of Wheat in Selected Countries
- x) Impact of Increase in Support Price of Wheat on Common Price Index (CPI) and Average Household Expenditure
- xi) Provincial Government's proposals

Federal Agriculture Committee then reviews the support price prepared by the Ministry. Changes if any are made and recommendations are sent to the ECC of the Federal Cabinet for approval. Subsequently the Punjab Provincial Cabinet formally ratifies the support price coupled with procurement targets and approves release policies within the framework set forth by the Federal Government.

## 2.2 Support Prices of Wheat in Selected Countries

The practice of announcing support price for wheat is prevalent across different countries. As per the Wheat Policy report 2021-2022 prepared by API, the support prices given by different countries as compared with that of the one in vogue in Pakistan were as follows:

(Rs. Per 40 Kg)

Country	2018-19	2019-20	Increase/ decrease	%age increase /decrease	2020-21	Increase/ Decrease	%age Increase/ decrease
Australia	1,358	1417	59	4.34	1751	334	23.57
China	2,014	2001	(13)	-0.65	2260	259	12.94
India	1,615	1725	110	6.81	1975	250	14.49
USA	1,156	1020	(136)	-11.76	1571	551	54.02
Brazil	1,040	1379	339	32.60	1154	-225	-16.32
Pakistan	1,300	1400	100	7.69	1800	400	28.57
Source: (1) <a href="https://www.awb.com.au/daily-grain-prices">https://www.awb.com.au/daily-grain-prices</a> (2,3,5) <a href="https://apps.fas.usda.gov/newgainapi/">https://apps.fas.usda.gov/newgainapi/</a> (4) <a href="https://www.ag360insurance.com/crop-insurance-pricing/">https://www.ag360insurance.com/crop-insurance-pricing/</a> Exchange Rate: \$ 1 = PKR 161.9699, Pakistan Economic Survey-2020-21							

The above table indicated that support prices announced by different countries specifically those by our neighboring countries, India and China remained higher than that provided by Pakistan.

## **2.3 Issues in setting support price:**

### ***2.3.1 Delayed announcement of Minimum Support Price***

Minimum support price has been used as tool/measure to achieve two broad objectives:

- To induce an element of stability and to inculcate assurance and confidence in the area of wheat production and its pricing with a view to ensure that the staple food remains sufficiently available to the public.
- To ensure that small and medium farmers get due return from cultivation of wheat crop thereby shielding themselves from negative market dynamics.

By way of recourse to the announcement of Minimum Support Price (MSP), the farmers are encouraged to sow wheat crops on the one hand and on the other hand, they are given a protective financial umbrella whereby they expect themselves to be able to sell their crops to government/third party using the support price as a base-line. However, in order to be effective, the MSP has to be announced by the Government before the very start of the sowing season (November each year). If the MSP is announced at a later date, this significantly nullifies its impact on wheat production incentives emanating from the said interventions as by this time, farmers invariably would have already sown their crop. Whatever positive impact lies in store for prospective growers of wheat, the same is easily lost in case of delays conceded in the MSP announcement.

During the last 03/04 years, the government announced its support price as per detail below:

<b>Year</b>	<b>Date of announcement</b>	<b>Amount of Support Price per 40kg</b>
<b>2019-20</b>	19 <sup>th</sup> March 2020	Rs.1,400
<b>2020-21</b>	31 <sup>st</sup> March 2021	Rs.1,800
<b>2021-22</b>	31 <sup>st</sup> March 2022	Rs.2,200

The above table illustrated that the government announced the MSP at a considerably belated stage, after the end of wheat sowing season. Hence, the farmers had to cultivate the crop, placing reliance on historic trends only, and the area of wheat crop could not be significantly increased.

### ***2.3.2 Anomalies due to non-uniform minimum support prices across the provinces***

In order to ensure adequate wheat supplies across all provinces and prevent hoarding and illegal marketing, it was necessary to have uniform minimum support price mechanism all over the country. Although after introduction of 18th Amendment to the Constitution of Islamic Republic of Pakistan 1973, Agriculture has become a provincial subject and provinces can decide policies on this subject at their own. To avoid negative market practices and hardship to the citizens, the minimum support price continues to be decided at the Federal level after holding consultation with all provincial representatives and thereafter, the same is accordingly adopted by the respective provinces on the basis of conventional arrangements.

There has been an exception to this general practice. No province has ever set a lower price for its procurement, but there is an example of a higher price. For example, in 2020-21, Sindh announced MSP at Rs 1950

per 40 kg against federal and Punjab's Rs 1800 per 40 kg<sup>67</sup>. This imbalance created a major challenge of availability of wheat in the market as wheat smuggling at inter provincial borders had a boost prompted by this price variation and as a consequence thereof, it unleashed multiple bouts of abnormal wheat price hike, hoarding of stocks and shortages in market.

### ***2.3.3 Diminishing value of nominal wheat support price is a major point of concern for future food security***

The Wheat Policy Analysis Report (2021-2022) prepared by API has given a pertinent analysis on the significant difference between nominal and real (support) prices during the last six years.

Nominal price is the notified wheat support price that is being given to the farmers through annual wheat procurement. Real price is the actual price in terms of value for money that the farmers are getting after making adjustments for inflationary trends. The Consumer Price Index (CPI) is an indicator of inflation in the economy and a barometer used for calculating the real price of services/goods.

Considering the CPI, the nominal and real support price of wheat during last six years are detailed below:

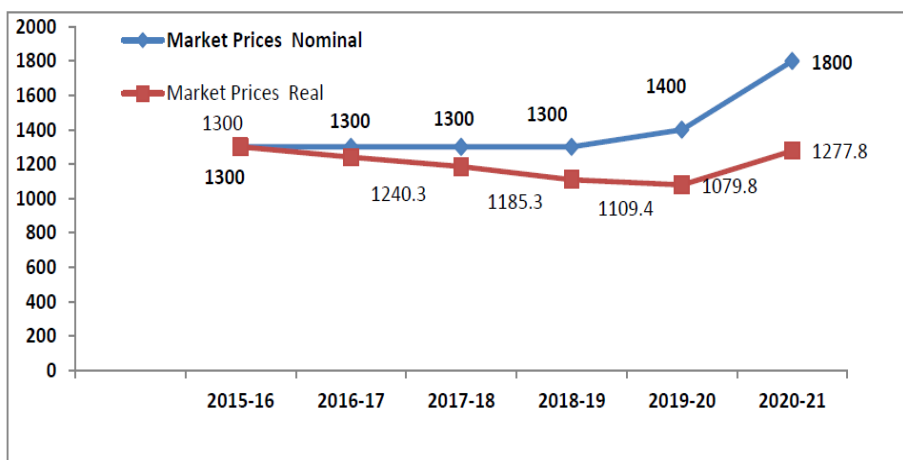
<i>Year</i>	<i>Consumer Price Index (CPI)</i> <i>2015-16=100</i>	<i>Support Prices</i>	
		<i>Nominal</i>	<i>Real</i>
		<i>Rs 40/Kg</i>	
<i>1</i>	<i>2</i>	<i>3</i>	<i>4= (3/2) x100</i>
<b>2015-16</b>	100.00	1300	1300.0
<b>2016-17</b>	104.81	1300	1240.3
<b>2017-18</b>	109.72	1300	1185.3
<b>2018-19</b>	117.18	1300	1109.4
<b>2019-20</b>	129.76	1400	1079.8
<b>2020-21</b>	140.96	1800	1277.8

Source: Wheat Policy Analysis For 2021-22 by API

67 Wheat Policy Analysis for 2020-21 Crop by Agriculture Policy Institute



*Nominal and Real Market Prices of Wheat*



The above table and graphs illustrate that the CPI increased from Rs.100 (2015-2016, the base year) to Rs.140.96, registering an increase of 40.96 %, during the period. The impact of this inflation was that in real terms, the value of support price as in financial year 2015-2016 fixed for Rs. 1300 (per 40kg) could not be provided to the farmers in the financial year 2020-2021 even though for this period the farmers were given support price of Rs.1800 (per 40kg). In real terms, the farmers were getting a support price of Rs.1277.8 (per 40kg) against the notified or nominal price of Rs.1800 (per 40kg). This was a clear indicator that giving an adequate support price to the farmers was increasingly becoming a significant challenge for the provincial government due to uncontrolled high inflationary trends.

## **2.4 Unchecked price escalation of agricultural inputs**

In order to cultivate wheat like any other agriculture crop, a base-line set of activities and material requirements are needed. These requirements or “wheat inputs” are quite critical to the final outcome of the wheat crop. If the wheat inputs are strong and timely implemented, the chances of getting a high yield for the crop also increase significantly.

Hence with regard to food security, the affordability and adequacy of wheat inputs carry critical significance.

Furthermore, wheat inputs constitute major costs elements that are involved in the sowing of the wheat crop. They have a significant bearing on the wheat cultivation process. On the one hand, they are necessary to be incurred. On the other hand, they carry the risk of minimizing the farmer's income from the wheat crop.

Wheat inputs greatly depend on the resources available with farmers. In Punjab subsistence agriculture is being practiced. As per Agricultural Census 2010, Pakistan report, the total number of farms in Punjab is 5,249,804 out of which 3,347,488 farms size is less than 5 acre. This implies that most farmers in the province are reliant on traditional farming techniques and cannot afford modern and more intensive types of cultivation. Wheat being a staple food is readily cultivated by the farmers with an initial objective of providing food security to their family. As per report "Review of the wheat sector and grain storage issues" one third of wheat produced is consumed locally by the farmers<sup>68</sup>.

Due to constraints affecting financial standing of small and middle-class farmers, best available wheat inputs are not at the disposal of growers during the wheat cultivation process. Instead, due to persistent inflationary trends in the market, black marketing of certified seeds, fertilizers, pesticides, agricultural implements, farmers gradually are getting more constrained to even incur bare minimum expenses on the wheat crop.

#### ***2.4.1 Analysis of input costs***

As per the API following are the major wheat input elements:

- Seed and sowing operations

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68 Prikhodko, Dmitry, and Oleksandr Zrilyi. "Pakistan: Review of the wheat sector and grain storage issues country highlights." *Rome: Food and Agriculture Organisation* (2013). <https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/853827/>

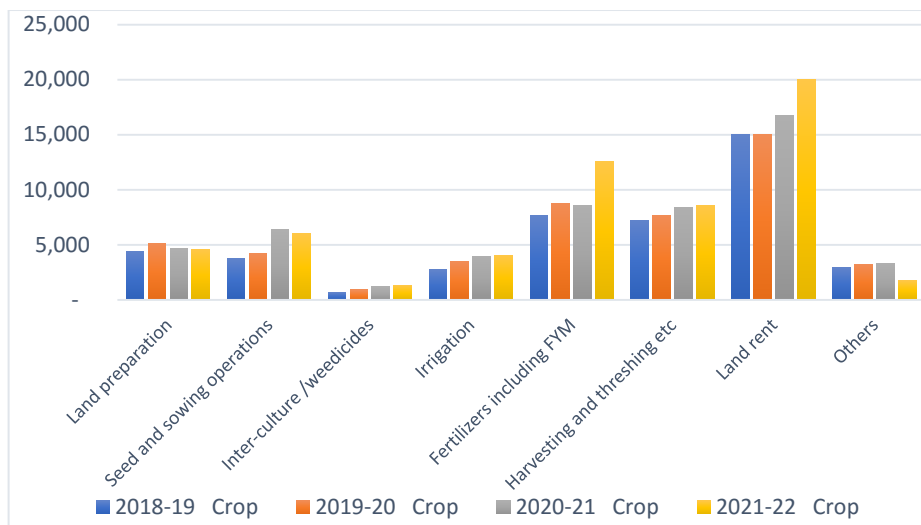
- Fertilizers
- Inter-culture /weedicides
- Irrigation
- Harvesting and threshing etc.

During the last four years the Cost of major farm operations/Inputs of wheat Crops were:

(Rupees)

Sr. No.	Operation	2018-19 Crop	%age share	2019-20 Crop	%age share	2020-21 Crop	%age share	2021-22 Crop	%age share
1	Land preparation	4,418	10	5,137	11	4,638	9	4,600	8
2	Seed and sowing operations	3,773	8	4,178	9	6,409	12	6,050	10
3	Inter-culture /weedicides	700	2	900	2	1,200	2	1,350	2
4	Irrigation	2,729	6	3,452	7	3,974	7	4,063	7
5	Fertilizers including FYM	7,622	17	8,732	18	8,583	16	12,593	21
6	Harvesting and threshing etc.	7,256	16	7,649	16	8,434	16	8,550	14
7	Land rent	15,000	34	15,000	31	16,750	31	20,000	34
8	Others	2,935	7	3,255	7	3,325	6	1,785	3
	<b>Total cost</b>	<b>44,433</b>		<b>48,303</b>		<b>53,313</b>		<b>58,991</b>	
	Per acre increase base year 2018-19			<b>3,870</b>		<b>8,880</b>		<b>14,558</b>	
	%age increase base year 2018-19			<b>9%</b>		<b>20%</b>		<b>33%</b>	

Source: Wheat Policy Analysis for 2021-22 crop by API



As illustrated above, land rent, fertilizers including farm yard manure (FYM), harvesting and threshing are the major components in gross cost of cultivation of wheat in Punjab accounting for 34, 21 and 14 percent of the costs incurred.

Analysis of these cost items and their impact on food security is elaborated in the sub-topics stated below.

### ***Land preparation***

Land preparation is first and quite important step in the wheat cultivation process. Timely cultivation of land is essential to ensure that best climatic conditions are made available for the crops. If the crops are not timely cultivated, all other measures taken subsequently have little effect on the crop outcome. Similarly, proper ploughing of the fields after initial irrigation and extraction of weeds are key steps in the cultivation process.

Although farmers try to observe the annual wheat harvesting time lines, they are faced with various challenges such as climatic changes and non-availability of agricultural implements etc.

As per “Constraints to Land-And Water Productivity of Wheat in India and Pakistan” report, less than 50 percent of the farmers sow wheat by the recommended date mostly because of delayed harvesting of the kharif crops, and lack of equipment and machinery available for land preparation.<sup>69</sup>

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69 Mudasser, Muhammad, Intizar Hussain, and Muhammad Aslam. "Constraints to land-and water productivity of wheat in india and pakistan: A comparative analysis." *International Water Management, Colombo, Sri Lanka* (2001). [www.researchgate.net/profile/Muhammad-Mudasser-2/publication/265234537\\_CONSTRAINTS\\_TO\\_LAND-AND\\_WATER\\_PRODUCTIVITY\\_OF\\_WHEAT\\_IN\\_INDIA\\_AND\\_PAKISTAN\\_A\\_COMPARATIVE\\_ANALYSIS/links/54e6276f0cf2bf5a4f3b674/CONSTRAINTS-TO-LAND-AND-WATER-PRODUCTIVITY-OF-WHEAT-IN-INDIA-AND-PAKISTAN-A-COMPARATIVE-ANALYSIS.pdf](http://www.researchgate.net/profile/Muhammad-Mudasser-2/publication/265234537_CONSTRAINTS_TO_LAND-AND_WATER_PRODUCTIVITY_OF_WHEAT_IN_INDIA_AND_PAKISTAN_A_COMPARATIVE_ANALYSIS/links/54e6276f0cf2bf5a4f3b674/CONSTRAINTS-TO-LAND-AND-WATER-PRODUCTIVITY-OF-WHEAT-IN-INDIA-AND-PAKISTAN-A-COMPARATIVE-ANALYSIS.pdf)

## *Seed*

Seed constitutes the single most important attribute in the wheat input matrix. If all other attributes remain constant, i.e., same quantity and type of fertilizers are given to a piece of land, same frequency of irrigation made, same type of pesticides administered, still the type of seed alone can substantively change the yield of the crop. Hence high-quality seeds can singularly improve the overall profitability of the wheat crop thereby positively impacting food security more than any other measure.

As per Agriculture Policy Institute Report, the following types of seeds have been introduced in the agriculture sector during the last 05 years.

<i>Sr. No.</i>	<i>Variety</i>	<i>Year of Release</i>	<i>Yield Potential (Kg/ha)</i>
<b>Wheat Varieties Developed by Wheat Program- NARC</b>			
1	Markaz - 2019	2019	6800
2	Borlaug - 2016	2016	7000
3	Zincol - 2016	2016	6500
<b>Wheat Research Institute, Faisalabad</b>			
1	Akbar 2019	2019	7500
2	Anaj 2017	2017	7500
3	Ujala 2016	2016	6700
<b>Barani Agricultural Research Institute, Chakwal</b>			
1	Ehsan 16	2016	7400
2	Fateh Jang 16	2016	7400
3	Barani-17	2017	7400

The above table illustrates that the seed varieties present in the country have an average yield of 6500 to 7500kg/hectare. This implied that if the farmers had access to the top seed varieties, then the average crop yield of wheat would be increased substantially.

However, the annual yield of wheat in the Punjab province remained consistently on the lower side as compared with the seed potential.

Details were:

<i>Yield In Kgs/Hectare in Punjab</i>				
Years	Irrigated	Un-irrigated	Avg. Yield per Hectar	Avg. Yield of Quality Seed per hectare
<b>2016-17</b>	3,254	1,209	3,073	6000-7000
<b>2017-18</b>	3,080	1,228	2,924	6000-7000
<b>2018-19</b>	2,952	1,485	2,829	6000-7000
<b>2019-20</b>	3,157	1,558	2,978	6500-7500
<b>2020-21</b>	3,282	1,616	3,098	6500-7500

The above table clearly illustrated that good quality seed varieties were not being utilized by the farmers in crop cultivation. If these varieties were utilized to their maximum benefit, the overall per hectare yield production of the province would significantly increase. In turn this would make the wheat crop more feasible for cultivation by the common low-income farmer.

However, in order to ensure that good quality seeds were utilized by the farmers, it was important that the new seed varieties that were introduced from time to time by relevant institutions were readily available in sufficient quantities to the farmers. Only then benefit of high yield seeds could be attained.

### ***Fertilizers***

Fertilizers are nutrients essential for the growth of plants and crops. There are three main types of fertilizer used by the agricultural sector. These include Nitrogenous fertilizers such as Urea and CAN, Phosphorous fertilizers such as DAP and Potassium fertilizers including NPK and NP. The most common type of fertilizers are nitrogenous fertilizers (mainly Urea) due to their vital properties and lower prices as compared to other types of fertilizer.

Farmers apply fertilizers according to their financial resources, the availability of water, the types of fertilizers available and the expected financial returns. The recommended quantities of fertilizers for wheat production in Punjab are as under:

<i>Average Fertilizer Bags (50Kg) Used Per Hectare</i>			
<i>Crops</i>	<i>Nitrogen (Urea and CAN)</i>	<i>Phosphate (DAP)</i>	<i>Potash (NPK and NP)</i>
Wheat Irrigated	2	2	1
Wheat Rainfed	2	2	1

Source: FAO Food and Agriculture Organization

As per “Fertilizers Sector Study report January 2022” by PACRA “The sector is dominated by six players which occupy almost ~95% of the market share. This makes the sector oligopolistic in nature. Out of these 6, 4 players are listed on the Pakistan Stock Exchange (PSX). These companies belong to the three Big Names of the Corporate Sector, Fauji, Engro and Fatima Group. Crop outputs, credit disbursement of agricultural sector, government policies, weather conditions and soil health are a few of the main drivers of demand for the fertilizers sector.

## **2.5 Issues and impediments in wheat inputs:**

Following issues / inefficiencies exists in wheat input system:

### **2.5.1 Huge gap between requirement, availability and utilization of certified seed**

The annual data of certified seeds maintained by MNFS&R illustrates that the certified seed varieties were not adequately available to the farmers for sowing season Rabi 2018-19, 2019-20 and 2020-21.

Total seed availability was as under:

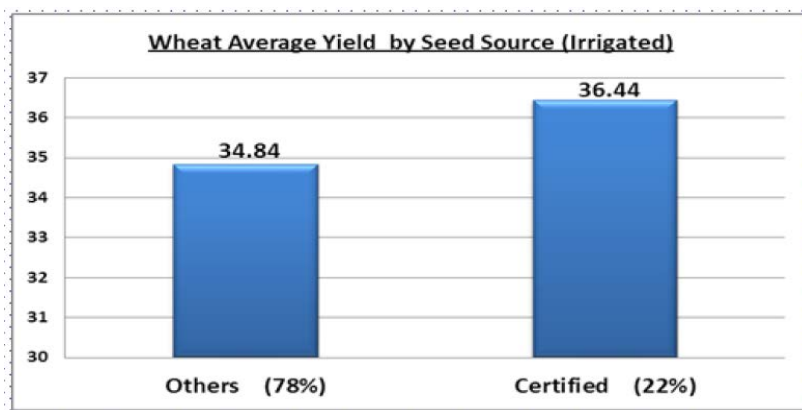
(Fig in MT)

Sector	2018-19 (Rabi)		2019-20 (Rabi)		2020-21 (Rabi)	
	Total Seed Requirement	Procurement/ Availability	Total Seed Requirement	Procurement/ Availability	Total Seed Requirement	Procurement/ Availability
Public	804,603	42,520.42	804,603	55,224.47	802,256	64,344.35
Private		348,764.90		362,539.70		387,264.45
<b>Total (%age of TSR)</b>		391,285.32 (48.63%)		417,764.17 (38.29%)		451,608.8 (41.99%)

Sources: i) FSC &RD

ii) Working Paper (13<sup>th</sup> & 15<sup>th</sup> Meeting of the Federal Committee on Agriculture (FCA) <sup>70</sup>

The provincial directorate of crop reporting services stated that certified seed was used in only 22 percent of wheat sown area and rest of the area (78 percent) was sown through farmers' own seed or seed from local merchants as depicted below;



Source: Crop Reporting Service Punjab.

70 FCA working paper for 13<sup>th</sup> and 15<sup>th</sup>



### ***2.5.2 Inadequate wheat seed tracking system***

FSC & RD reported that about 103,200.35 MT (2,060,000 seed bags) were provided by the seed companies to different dealers in Punjab during CY 21. However, the Director General Agriculture Extension confirmed receipt of 1,863,306 bags. The whereabouts of remaining 196,694 seed bags in Punjab were not traceable due to poor wheat tracking system.<sup>71</sup> This showed that the data being maintained with regards to certified seed utilization was not accurate and contained anomalies. Accurate and reliable data was important for well-informed decision making and future policy initiatives.

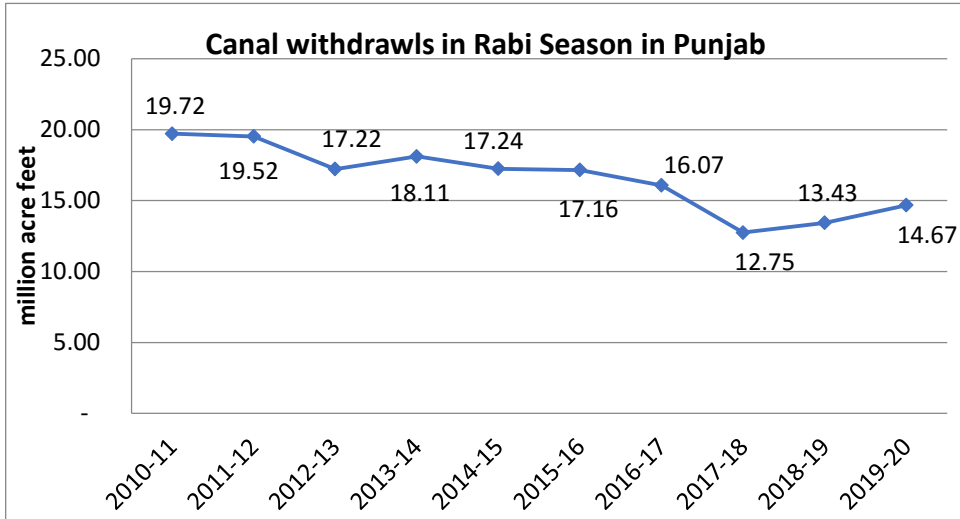
### ***2.5.3 Excessive use of tube-well for cultivation leading to increased production cost and environmental hazards***

Historically, the natural irrigation system of the Punjab fed by glacial melt, and monsoons run off, flowing into five rivers i.e., Ravi, Beas, Sutlej, Chenab, Jhelum and Indus provided an exceptional source of surface water for the cultivation requirements of the farmers of Punjab. Flood irrigation emerged as the traditionally adopted crop cultivation technique in the province also contributing to the growing of the wheat crop.

In the wake of the Indus Water treaty of 1960 and more recently advent of climatic change, a stress and scarcity has cast aspersions on adequacy of this cultivation technique. To the farmers across the province water is not readily available for the flood-based irrigation. This can be gauged from the fact that during the last ten years, canal water withdrawals in Punjab during Rabi seasons were substantially reduced:

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71 Director General Agriculture (Extension & AR) Punjab Lahore Letter No. 37859 dated 20.12.2021 addressed to Director General Federal Seed certification & Registration Department Islamabad.



(Source: Pakistan Bureau of Statistics)

The impact of shortage in irrigated water supply has resulted in the farmers relying more and more on ground water extraction by installing tube wells to meet their irrigation needs over the years. As per article on Water Published: 27th October 2020 “Groundwater Governance in Pakistan” “Pakistan is the third-largest user of groundwater for irrigation in the world. The surface water supplies are sufficient to irrigate 27% of the area, whereas the remaining 73% is directly or indirectly irrigated using groundwater. The Punjab province uses more than 90% of the total groundwater abstraction. Currently, 1.2 million private tube wells are working in the country, out of which 85% are in Punjab, 6.4% are in Sindh, 3.8% are in Khyber-Pakhtunkhwa, and 4.8% are in Baluchistan<sup>72</sup>.”

Further the report highlights that, “rapidly falling groundwater levels in the irrigated areas has increased soil salinization problems. The groundwater levels in more than 50% of the irrigated areas of Punjab have

72 Qureshi, Asad Sarwar. "Groundwater governance in Pakistan: From colossal development to neglected management." *Water* 12, no. 11 (2020): 3017. <https://www.mdpi.com/2073-4441/12/11/3017>

dropped below 6 m, resulting in increased pumping cost and degraded groundwater quality. Despite hectic efforts, about 21% of the irrigated area is affected by different levels of salinity<sup>73</sup>.”

Reliance on tube-well has had adverse effect on the crop cultivation in the province with wheat being no exception. Ground water is not an un-limited source of irrigation hence its regular and excessive use has led to environmental hazards such as salinity in the relevant crop fields. Once the ground-water turns saline that land becomes un-usable for further cultivation. As per Punjab Agriculture Department, out of 14.41 million hectares area in Punjab, 10.54 million hectares area (75%) is irrigated through tube wells and canal tube wells<sup>74</sup>. Twenty one % of the irrigated area of the province has been affected by different levels of salinity<sup>75</sup>.”



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73 Qureshi, Asad Sarwar. "Groundwater governance in Pakistan: From colossal development to neglected management." *Water* 12, no. 11 (2020): 3017. <https://www.mdpi.com/2073-4441/12/11/3017>

74 "Overview," Agriculture Department | Government of the Punjab, <http://www.agripunjab.gov.pk/overview%20new>.

75 Qureshi, Asad Sarwar. "Groundwater governance in Pakistan: From colossal development to neglected management." *Water* 12, no. 11 (2020): 3017. <https://www.mdpi.com/2073-4441/12/11/3017>

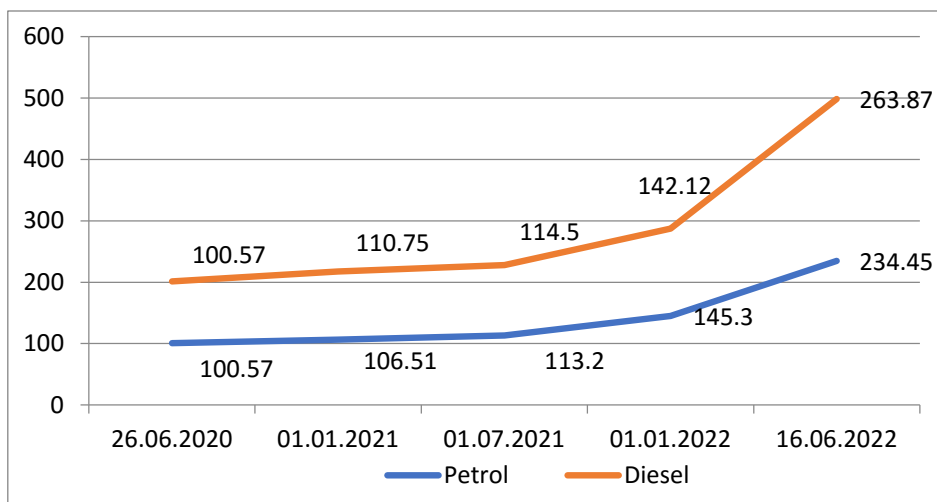
Secondly excess use of tube-well has meant that the cost of production of wheat has now become linked with fuel prices. Majority of tube-well run-on HSD fuel hence as the fuel price increases the cost of production of wheat increases significantly. This renders all efforts futile to curb escalation in input cost for producing wheat as per any formula for cost price estimation, given the fact that about 85% of the tube wells in the Punjab province are diesel operated, and the remaining 15% are powered by electric supplies<sup>76</sup>.”

For example, in the wheat sowing season–November 2020, the price of fuel was Rs.101.43 per liter, whereas in current sowing season November- 2021, it increased to Rs.142.62 per liter by registering an increase of 40.61% per liter. Now, this situation has worsened further. The trend of oil prices over last two years was as under:

<b><i>Trend of Oil Prices over two years</i></b>		
<b><i>Price Effective Date</i></b>	<b><i>Petrol price per liter (Rs.)</i></b>	<b><i>Diesel price per liter (Rs.)</i></b>
26.06.2020	100.57	100.57
01.01.2021	106.51	110.75
01.07.2021	113.20	114.50
01.01.2022	145.30	142.12
16.06.2022	234.45	263.87
Source: <a href="https://ogra.org.pk/pakistan-state-oil-co-ltd">https://ogra.org.pk/pakistan-state-oil-co-ltd</a>		

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76 Qureshi, Asad Sarwar. "Groundwater governance in Pakistan: From colossal development to neglected management." *Water* 12, no. 11 (2020): 3017. <https://www.mdpi.com/2073-4441/12/11/3017>



Hence un-checked ground-water extraction coupled with increasing reliance on fuel for cultivation has become a major challenge for food security in the province.

#### ***2.5.4 Unavailability/shortage of fertilizers at crucial times***

At least one bag per acre of DAP is applied in preparing the land for sowing wheat and three bags of urea are applied during the growth period of the crop.

Less supply of Urea and DAP to the farmers can adversely impact the wheat crop yield and can also lead to higher production cost due to supply of these wheat inputs at exponentially higher prices in the black market.

During the out-going wheat harvest season i.e., Oct/Nov-2021 the province of Punjab witnessed such supply shortages and this resulted into higher prices at the vendor outlets. As per “Fertilizers Sector Study report January 2022” by PACRA during Rabi-2021-22 (Oct-Mar), the off take/demand for Urea in the country was 3,742 thousand MT where-as supply was 3,698 thousand MT, resulting in a shortfall of (44) thousand

MT. Urea is manufactured locally by different companies in the country such as Fatima-DH and Agritech's plants. These plants due to non-availability of gas remained idle during July to September 2021 and were unable to produce urea in sufficient amounts for the Rabi crops. Resultantly the ECC also approved import of 50,000 MT tons of Urea from China in Jan' 22 but because of delay conceded, it was too late for the wheat farmers to consume imported consignment of the fertilizers for the wheat growing season<sup>77</sup>.

### **Farmers suffer as Urea fertilizer crisis intensifies in Southern Punjab**



December 29, 2021

LAHORE (92 News) - Farmers are facing numerous problems due to severe shortage of Urea in Southern Punjab.

DAP is primarily imported except for a partial turnover by Fauji Fertilizer Bin Qasim Limited (FFBL) which is the only local producer of DAP. DAP is one of the most widely used fertilizers during wheat

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77 "Sector Study - PACRA," [https://pacra.com/sector\\_research/Fertilizers%20-%20PACRA%20Research%20-%20Jan'22\\_1643378925.pdf](https://pacra.com/sector_research/Fertilizers%20-%20PACRA%20Research%20-%20Jan'22_1643378925.pdf).

cultivation. The average demand during CY 21 was 2,184.25 thousand MT against the availability of 2,301 thousand MT.<sup>78</sup>

Impact of short/non availability of Urea and DAP meant that high crop yield prospects in the Punjab province were adversely affected.

### ***2.5.5 Increase in production cost due to sky rocketing prices of fertilizers***

In order to keep price at an affordable level for the general public, the key is to maintain a balance between the profit on this crop towards the grower and the price of atta to be made available to the common man. On the one hand, if the grower or farmer faces hardships and cannot get due return from his wheat harvest, he would invariably shift to other crops leading to food security challenges for the country. On the other hand, if price of atta is increased significantly, food inflation would result leading to social unrest.

In this context, it is imperative to keep the input costs of wheat at a lower and manageable level so that the end product i.e., atta remains at a low price for the general public.

However, as illustrated above, it is observed that the input cost of wheat crop is constantly on the increase, creating food security challenges. During the last five years, the increase in price of Urea and DAP was as follows:

<b><i>Fertilizers Price Trend</i></b>		
		<b>(Rs./50 Kg Bag)</b>
<b>YEAR</b>	<b>UREA</b>	<b>DAP</b>
10th April, 2018	1410-1420	3150-3200
5th, October, 2018	1740-1760	3300-3500
1st March, 2019	1830-1850	3600-3650

78 "Sector Study - PACRA," [https://pacra.com/sector\\_research/Fertilizers%20-%20PACRA%20Research%20-%20Jan'22\\_1643378925.pdf](https://pacra.com/sector_research/Fertilizers%20-%20PACRA%20Research%20-%20Jan'22_1643378925.pdf).

8th Sept, 2019	2040-2060	3725-3770
4th Feb, 2020	FFC & others 1740-1760	3484-3534
	Engro 1880	3484-3534
2nd March, 2020	FFC 1665-1685	3484-3534
	Engro 1880	3484-3534
12th August, 2020	1667-1687	3580-3634
20th October, 2020	1667-1687	4010-4040
20th Jan, 2021	1697-1717	4504-4554
16th Feb, 2021	1717-1737	4914-5019
5th March, 2021	1720	5500-5600
July, 20th, 2021	1720	5750-5839
27-Aug-21	1768-1788	6389-6439
Sept, 2021	1768-1788	6529-6579
28th Oct, 21	1768-1788	7475-7525
06.11.2021	1768-1788	7835-7885
16.11.2021	1768-1788	8650
20.12.2021	1768-1788	9000
20.01.2022	1768-1788	9900-10000

Source: Directorate of Agriculture Extension Punjab

As can be seen from the above table, in April 2018, Urea fertilizer was available at Rs 1,420 per bag, which crossed the threshold of Rs 1,788 and became a rare commodity for the farmers in January/February 2022. Similarly, the DAP fertilizer was available at Rs 3,150 per bag, which in many parts of the province crossed the limit of Rs 10,000 per bag, registering an increase of 217.46%.

The above table showed that the input cost of fertilizers was steadily increasing for wheat crop. This meant that more working capital was needed to have a good quality harvest. The average to middle income farmers were being forced to either obtain the fertilizers on credit from middle men entailing cuts in the farmers' wheat income or on account of non-application of these fertilizers, they were forced to remain content with getting lower yields.



### 2.5.6 *Untargeted subsidy on agriculture inputs*

The government grants subsidies on various agriculture inputs i.e., wheat seed, fertilizers, weedicides and implements to reduce the cost of production of agriculture and to make particular inputs, available to farmers at below market costs as a way of incentivizing increased agricultural productivity and profitability and ultimately reducing poverty and stimulating economic growth among the farm households.

The government of the Punjab had granted subsidy to various sectors to facilitate the potential users. The last five-year expenditure on account of subsidy of Food, Transport and Agriculture were:

*(Rs. in billion)*

<i>Subsidy disbursed to different sectors</i>			
<i>Year</i>	<i>Food</i>	<i>Transport</i>	<i>Agriculture</i>
2016-17	37.251	13.18	10.21
2017-18	49.21	6.77	-
2018-19	65.94	8.40	2.14
2019-20	82.378	3.75	3.79
2020-21	72.851	0.51	10.87
<b>Total</b>	<b>307.63</b>	<b>32.62</b>	<b>27.01</b>

(Source: PFD & Appropriation Accounts of Govt. of the Punjab)

The priority sectors of subsidy can be gauged from the disbursement/expenditure patterns in the different sectors/departments. The pattern of expenditure shows that subsidy is skewed towards Food Department and a meager amount was allocated to agriculture for subsidy on agri inputs like seed, fertilizers, weedicides, interest free loans, agri equipment/implements, insurance of crops to reduce the cost of production and increase the productivity of wheat crop.

It is important to highlight that Food Subsidy was being provided at substantial amounts at the stage of sale of Wheat to flour mills, whereas far lesser amounts were being disbursed on wheat inputs. Result was that rather than striving for a cheaper item of produce, the umbrella of applying cost cuts is being activated at a later stage when various high-value expenses in wheat production stood already incurred.

Detail of subsidies on agriculture input were as follows:

(i) **Subsidy on Fertilizers:** Following are the different types of subsidies provided by the government during FY2021.

- Provision of subsidized natural gas for fertilizer production (Rs 865 per bag of urea as per fuel and feed price difference)<sup>79</sup>
- Provision of subsidized LNG for production of urea by Fatima fertilizers and Agritech companies (Rs 479 per bag)<sup>80</sup>
- Cash subsidy (reimbursement based) by Government of Punjab for phosphate and potash fertilizer (DAP and SOP and equivalent for other phosphate and potash fertilizers based on percent nutrient content through E-voucher). A voucher has been provided in each fertilizer bag, the registered farmers of Punjab can get subsidy by sending hidden voucher number along with CNIC to the short code 8070 and can collect subsidy from the designated Branchless Banking Operator Franchise at following rates.

(Rupees)

<i>Name of fertilizer</i>	<i>2016-17</i>	<i>2017-18</i>	<i>2018-19</i>	<i>2019-20</i>	<i>2020-21</i>
DAP	-	300	500	500	1000
NP	-	150	200	200	200
SSP	-	150	200	200	200
NPKs	-	300	300	300	300
SOP	800	800	800	800	800
MOP	500	500	500	500	500

(Source: Directorate of General Agriculture Extension, Govt. of the Punjab)

79 “[Ministry of Finance: Government of Pakistan],” | Ministry of Finance | Government of Pakistan |, [http://www.finance.gov.pk/survey\\_2021.html](http://www.finance.gov.pk/survey_2021.html).

80 “[Ministry of Finance: Government of Pakistan],” | Ministry of Finance | Government of Pakistan |, [http://www.finance.gov.pk/survey\\_2021.html](http://www.finance.gov.pk/survey_2021.html).

### Overall Coverage of subsidy on fertilizer for last five years

(Rs. in million)

Year	Subsidy amount required for expected Fertilizer Utilization,	Budget Released	Shortfall/ Surplus	% of Subsidy coverage
2016-17	884.360	500.000	(384.36)	*56.54%
2017-18	13,080.006	969.400	(12,110.61)	7.41%
2018-19	18,175.560	1,000.000	(17,175.56)	5.50%
2019-20	16,551.056	2,394.725	(14,156.33)	14.47%
2020-21	35,889.640	9,148.050	(26,741.59)	25.49%
*In the year 2016-17 subsidy was granted for only SOP & MOP. Since 2017-18 subsidy was granted on DAP, NP, SSP, NPKs, SOP & MOP.				

(Source: Directorate of General Agriculture Extension, Govt. of the Punjab)

The above table illustrated that fertilizer subsidy coverage was not adequate and a significant percentage of farmers couldn't avail themselves of this benefit. Moreover, in-efficiencies were present in the supply chain as the same was un-documented. This further introduced malpractices such as hoarding, black marketing and smuggling of the fertilizers. This greatly reduced the desired benefits of extending input subsidies.

#### (ii) Inflation and its impact on subsidy:

As illustrated above the budgeted amount of input subsidy was not sufficient to cover the estimated demand of fertilizers. This scenario was further adversely impacted by sharp inflationary trends in the fertilizer market prices during the last four years. Details were:

FERTILIZERS PRICE TREND	
YEAR	(Rs. /50 Kg Bag)
	<b>DAP</b>
10th April, 2018	Rs 3150-Rs3200
20th October, 2020	Rs 4010-4040
27-Aug-21	Rs 6389-Rs 6439
11.11.2021	Rs 8200-8300
20.01.2022	Rs 9900-10000

(Source: Directorate of General Agriculture Extension, Govt. of the Punjab)

The above table illustrated that due to high-inflation the impact of subsidy amount was getting reduced. For example, in the FY 2018-19 Rs. 500 was being provided as subsidy against 50kg of DAP, whereas in the FY 2021 Rs 1000 was being provided against 50kg of DAP, even though the price of DAP had increased manifold during the same period.

In the year 2019-20, the government had launched “National Programme for enhancing profitability through increasing productivity of wheat under National Agriculture Emergency.

Major interventions were to:

- Promote Mechanization by provision of agriculture machinery / implements on 50% cost sharing basis.
- Develop climate smart high yielding varieties and improve provision of certified seed.
- Create awareness among farmers about use of certified seed, weedicides, balanced use of fertilizer, timely sowing by conducting farmer days and seminars on D-plots.
- Enhance continuous development and productivity of wheat crop to ensure its supply around the year at affordable prices.
- Promote of wheat cultivation with certified seed, balance use of fertilizer, timely sowing, weed management, application of irrigation only at critical stages.
- Revamp and disseminate latest production technologies on wheat to the farmers through agriculture extension staff, agriculture input dealers and service providers and publicity through print & electronic media.
- Showcase agricultural technologies
- Hold yield competition among best growers at provincial and district level.

Under this Programme subsidy was granted on following wheat inputs:

- Subsidy on wheat seed @ Rs. 1,200 on 50kg,
- Weedicides @ Rs250/acre pack and
- Agriculture machinery / implements on 50% cost sharing basis

**(iii) Subsidy on wheat seed:**

Government has also introduced subsidized certified wheat seed of 15 rust tolerant varieties as well through E-voucher scheme. The detail of wheat seed subsidy was as under:

<i>Year</i>	<i>Total seed requirement for the province (in bags)</i>	<i>Target for grant of subsidy (In bags)</i>	<i>Achievement (No of bags on subsidy granted)</i>	<i>Actual disbursement of subsidy (Rs.) Million</i>	<i>Coverage of subsidy w.r. to seed requirement</i>	<i>Coverage of subsidy w.r. to target</i>
2019-20	16,210,000	432,500	184,842	164,792,400	1.14%	43%
2020-21	16,210,000	300,000	139,982	165,966,000	0.86%	47%
2021-22	16,210,000	833,333	386,933	452,566,800	2.39%	46%

(Source: Directorate of General Agriculture Extension, Govt. of the Punjab)

The above table illustrated that during the years 2020, 2021 and 2022 the subsidy was granted @ Rs.1,200 per (seed) bag of 50kg. However, the coverage was far below as compared to total requirement of the seed for sowing season. The subsidy coverage for last three years only catered to 1.14%, 0.86% and 2.38% respectively of the total seed requirement.

**(iv) Subsidy on weedicides:**

Subsidy on weedicides had also been introduced through E-voucher @ Rs.250/acre pack.

The details were:

(Rupees)

<b>Year</b>	<b>Target for grant of subsidy (Packs)</b>	<b>(Achievement) Total number of packs on which subsidy was granted</b>	<b>Rate of Subsidy per Pack</b>	<b>Total amount of Subsidy</b>	<b>% Achievement against target</b>
<b>2019-20</b>	2,368,994	46470	250	11,133,000	2%
<b>2020-21</b>	3,036,000	291,210	250	71,171,250	10%
<b>2021-22</b>	2,940,340	1,156,695	250	285,689,750	39%

(Source: Directorate of General Agriculture Extension, Govt. of the Punjab)

The above table illustrated that as in case of seed, the coverage of subsidy with respect to weedicides was substantially lesser than the requirement, ranging between 02 to 39% during last three years.

**(v) Subsidy on implements:**

Other than working capital, Government also provides subsidy to farmers @50% on Agri equipment/implements like Zero Tillage Drill/happy Seeder, Dry Sowing Drill /Shallow Drill, Water Drill /Rabi Drill, Wheat bed planter, Rotary Slasher, laser levelers and drip irrigation system etc. The details are shown below:

<b>Year</b>	<b>Budget Allocation (Rs. in million)</b>	<b>Budget Release (Rs. in million)</b>	<b>Target for the province (No. of implements)</b>	<b>No. of implements on subsidy granted</b>	<b>Actual amount disbursed as subsidy (Rs.)</b>	<b>% Achievement</b>
2019-20	20.982	Expenditure is made out of total release of Rs. 348.171 million	1545	333	43,150,000	22%
2020-21	53.522	Expenditure is made out of total release of Rs.515.270 million	2161	813	164,792,000	38%
2021-22	17.000	Continued	200	Continued	Continued	

(Source: Directorate of General Agriculture Extension, Govt. of the Punjab)

Subsidy on implements was not directly transferred to farmers in the form of cash and farmers. They had to buy equipment from government approved contractors. So, generally higher costs of buying equipment from government approved vendors due to peculiar specifications substantially reduced the intended relief of subsidies. This

was evident from the above table as in 2019-20 and 2020-21, against the target of 1545 and 2161 only 333 and 813 implements were distributed among the farmers that constitute only 22% and 38% respectively of the deliverables. The target had been reduced to 200, indicative of lack of success of subject initiative in the next Financial Year.

The implementation of the above three initiatives were indicative of the fact that their intended benefits were not being achieved as the coverage was minimal and farmers had not been able to avail themselves of the benefits of these schemes. Farmer’s awareness, media campaigns, ease of business were key aspects that were needed to be planned, for achieving success of subsidy initiative.

**(vi) Subsidy on Crop Insurance:**

Government of Punjab has introduced crop insurance Program to mitigate the risk of losses of farmer in case of calamities and provide support to small scale farmers particularly by free crop insurance program up to 5 acre and 50% subsidy on above 5 acres. Since Kharif crop 2018 to Rabi crop 2021-22, crop insurance of 1,257,972 farmers were got covered for Rs. 66,943 million and government paid premium of Rs. 1,929 million. The claims received by 57,294 farmers were Rs. 644.4 million that constitute 33.4% of premium paid by the government and 0.96% on sum insured. The details were:

*(Rs. in million)*

Area Yield Index Insurance (AYII) in Punjab by CRS - Crop Reporting Services, Agriculture Department, Government of Punjab								
Crop Season	No. of Distt.	Premium Details			Refund of Premium Under No Claim Regime (Rs.)	Claims Detail		
		No. of Farmers Insured	Sum Insured (Rs.)	Amount (Rs.)		No. of Farmers	Amount (Rs.)	Claim to Premium Ratio
Kharif 2018	4	16,750	2,100	41.6	-	1,986.0	32.0	76.9%
Rabi 2018-19	9	41,375	2,900	54.5	-	No claim triggered		
Kharif 2019	18	226,832	20,000	400.5	-	4,958.0	98.2	24.5%
Rabi 2019-20	The Tender Was Not Floated Due to Working on No-Claim Bonus Formula & Saved 260 million							
Kharif 2020	18	254,482	20,000	482.9	6.9	42,937	502.2	104.0%
Rabi 2020-21	27	166,570	750	150.0	114.7	No claim triggered		
Kharif 2021	27	176,843	7,670	349.0	254.1	7,413	12.0	3.4%
Rabi 2021-22	27	375,120	13,523	450.2	-	Yet to be announced		
<b>Punjab</b>		<b>1,257,972</b>	<b>66,943</b>	<b>1,929</b>	<b>375.7</b>	<b>57,294</b>	<b>644.4</b>	<b>33.4%</b>
<b>South Punjab</b>		<b>455,641</b>	<b>27,570</b>	<b>855</b>		<b>48,213</b>	<b>552.0</b>	<b>64.6%</b>

Source (Crop reporting Services, Punjab)

It was apparent that although Government had allocated substantial amount of subsidies but their effective disbursal to deserving farmers was lacking. For example, the above highlighted subsidies were available only to the registered farmers. As per the office of DG Agriculture Extension, the province of Punjab had 5,249,900 number of farmers out of which the number of registered farmers were 3,934,088 as of 28-04-2022. This showed that a substantial number of farmers i.e., 25% were still outside the ambit of subject subsidies owing to their non-registration.

On the other hand, in case of Wheat seed, fertilizers and weedicides etc. cash subsidy was being disbursed through E-voucher through a laborious disbursal mechanism. First of all, these subsidies were reimbursement based. The farmer had to purchase the wheat input items at full price. This was an inhibiting factor for low-income and poor farmers as they were unable to procure the inputs at high prices. Subsequently the reimbursement mechanism was cumbersome. For example, in case of weedicide, to receive a subsidy of only Rs. 250, the farmer was to send hidden voucher number along with CNIC to the short code 8070 through mobile phone, waiting for the reply and then visited designated Branchless Banking Operator /Franchise outlets.

## **2.6 Challenges to wheat productivity**

Wheat is Pakistan's one of the largest crops and the main staple diet. Wheat contributes about 9.2 per cent to the value added in agriculture and 1.8 per cent to the GDP<sup>81</sup>. The crop occupies around 39.2 per cent of total cropped area. It is cultivated on 8.8 million hectares with an annual

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81 “[Ministry of Finance: Government of Pakistan,]” | Ministry of Finance | Government of Pakistan |, [http://www.finance.gov.pk/survey\\_2021.html](http://www.finance.gov.pk/survey_2021.html).



average production of 25.63 million tons (2018-21) wheat production<sup>82</sup>. About 87.4 per cent of wheat area is irrigated which accounts for 93.5 per cent of the annual production.

During 2020-21, wheat production target was 27.00 million tons fixed by the Federal Committee on Agriculture (FCA). However, the production yielded 27.46 million tons of wheat which exceeded the target by 0.46 million.<sup>83</sup>

Amongst the world wheat producing countries, Pakistan ranks 8th and 7th in terms of area and production respectively<sup>84</sup>. However, in terms of productivity i.e., yield per hectare, Pakistan ranks 63rd in the world.<sup>85</sup> This shows that agriculture practices w.r.t to wheat production are not satisfactory.

Punjab contributes about 76 percent in total wheat production of the country. The provincial shares of area and production are presented in table below:

<i>Percentage Share of Punjab in area, yield and production of wheat crop for 2020-21</i>									
Element	Pakistan	Punjab	%age Share	Sindh	%age Share	KPK	%age Share	Baluchistan	%age Share
Area (000 acre)	22655.8	16670	73.5	2971.5	13.1	1882.5	8.3	1131.8	5
Yield (Kgs per Acre)	1212	1254	-	1361	-	723	-	1024	-
Production (000 ton)	27464.1	20900	76	4043.2	14.7	1361.6	4.9	1159.3	4.2

Source: Wheat Policy Analysis for 2021-22 Crop by Agriculture Policy Institute.

82 Wheat Policy Analysis for 2021-22 Crop by Agriculture Policy Institute.

83 Wheat Policy Analysis for 2021-22 Crop by Agriculture Policy Institute.

84 Food and Agriculture Organization of the United Nations Statistical Year Book 2021, <https://www.fao.org/statistics/en/>

85 Food and Agriculture Organization of the United Nations Statistical Year Book 2021, <https://www.fao.org/statistics/en/>

## 2.7 Issues in wheat production:

In this context some of the key issues being faced in wheat production are as follows:

### 2.7.1 *Low crops-productivity jeopardizing food security*

As compared to Pakistan's ranking placed at 8<sup>th</sup> position comparatively in terms of cultivation area with wheat grown in the world, in terms of productivity i.e. yield per hectare, it ranks 62<sup>nd</sup>, in terms of Cropland area per capita which also decreased between year 2000 and 2019 as population increased faster than cropland<sup>86</sup>.

**Cropland Area Per Capita (HA Per Capita)**

Year	2000	2005	2010	2014	2015	2016	2017	2018	2019
Pakistan	0.22	0.19	0.17	0.16	0.16	0.16	0.16	0.16	0.14

Source: (Food and Agriculture Organization Statistical year book 2021)

This required a corresponding increase in agricultural yield with higher efficiency to feed the population with limited land resources. However, over the last fifteen years, the growth of average yield improved by only 0.8 per cent as detailed below:

### **Wheat Area, production, Average yield and growth in yield over the year**

Year	Wheat Area (Area '000' Acres)	Wheat Production '000' Tons)	Average yield 40 Kg. Per Acre)	Growth in average Yield over the year
2006-07	15896.09	17853	28.08	0%
2007-08	15819.98	15607	24.66	-12%
2008-09	16892.93	18420	27.26	-3%
2009-10	17083.95	17919	26.22	-7%
2010-11	16534.13	19041	28.79	3%
2011-12	16019.89	17738.9	27.68	-1%
2012-13	16090.07	18587	28.88	3%
2013-14	17054.05	19738.9	28.94	3%

86 Food and Agriculture Organization Statistical year book 2021, <https://www.fao.org/statistics/en/>

Year	Wheat Area (Area '000' Acres)	Wheat Production '000' Tons)	Average yield 40 Kg. Per Acre)	Growth in average Yield over the year
2014-15	17250.75	19281.9	27.94	0%
2015-16	17084.94	19526.7	28.57	2%
2016-17	16458.02	20466.3	31.09	11%
2017-18	16209.92	19178.5	29.58	5%
2018-19	16052.02	18377.2	28.62	2%
2019-20	16099.96	19401.9	30.13	7%
2020-21	16670.00	20900.0	31.34	12%
Growth of Yield in fifteen years=(growth12%/15year)				0.8%

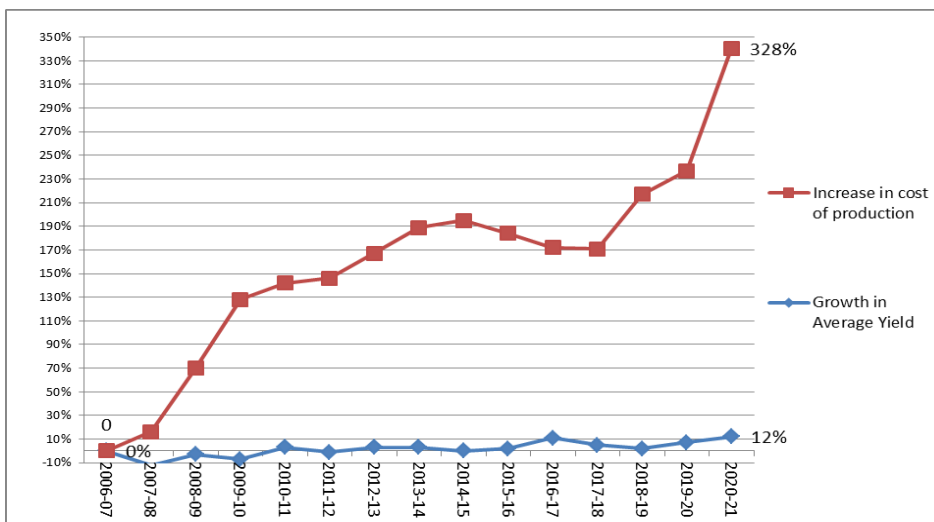
Source (Crop reporting Services, Punjab)

On the other hand, the cost of wheat production during the same period increased from Rs.10,225 in 2006 to Rs.43,743 in 2020, registering an increase of 328% with annual average increase of 22%. The details are illustrated as under:

#### Cost of Production (Wheat) per acre and percentage increase over the year

Year	Cost Of Production (Rs. /Acre)	Increase in cost of production over the year (base year 2006-07)
2006-07	10,225	0
2007-08	13,051	28%
2008-09	17,702	73%
2009-10	24,041	135%
2010-11	24,428	139%
2011-12	25,277	147%
2012-13	26,963	164%
2013-14	29,290	186%
2014-15	30,115	195%
2015-16	28,816	182%
2016-17	26,723	161%
2017-18	27,239	166%
2018-19	32,250	215%
2019-20	33,724	230%
2020-21	43,743	328%
Average increase in cost of production over last fifteen years (328%/15)		22%

Source (Crop reporting Services, Punjab)



**(i) Yield in neighboring countries**

Pakistan’s average yield of wheat is very low as compared with number of neighboring countries. This comparison for the year 2020 is as follows:

Sr. No	Area	Yield/hectare in kgs
1	China, mainland	5742.10
2	Uzbekistan	4555.60
3	India	3431.10
4	Tajikistan	3152.00
5	Bangladesh	3097.00
6	Nepal	3088.70
7	<b>Pakistan</b>	<b>2867.50</b>

Source: Food and Agriculture organization- Statistical data 2021

This is mainly because of poor agronomic practices, low technology adoption and lack of innovation in the sector. As a result, growth of average yield of wheat per acre in Punjab has been on a downward trend for many years.

**(ii) Impact of low productivity:**

The above graphs illustrate that over the last fifteen years it has significantly turned more expensive to cultivate wheat crops and these expenses have not been off-set with an increase in the crop yield, leading to the crop becoming economically unfeasible for large scale cultivation.

Farmers in recent years have been moving towards other crops like oilseed, maize and potatoes, this is evident from the current year crop estimates as the area of wheat was decreased by 2.8% as compared to previous year that directly decreases the wheat production by 570,400 ton (31yield per acre\*460,000 area/25 mound=570,400 ton) whereas the sown area of maize, potato and oilseed increased. Details were:

<b>Rabi Crops Area in acres</b>					
<b>Sr. No.</b>	<b>Crop Name</b>	<b>2020-21</b>	<b>2021-22</b>	<b>Increase/ decrease in area</b>	
1	Wheat	16,670,000	16,210,000	-460,000	(2.76%)
2	Oil seed	413,500	585,500	172,000	41.60%
3	Maize	1,146,000	1,384,000	238,000	20.8%
4	Potato	545,000	740,400	195,400	35.85%

Source: Crop Reporting Services, Punjab

Hence low average yield of wheat was a significant threat to food security for the province and for the country as well.

**2.7.2 Support price & farmer's profitability**

As discussed in the above sub-sections support price was a mechanism through which government ensured a certain profit margin to the farmers with regard to wheat. The objective was to encourage the farmers towards more wheat cultivation, thereby stabilizing the supply of wheat and making the population secure with regard to Food Security.

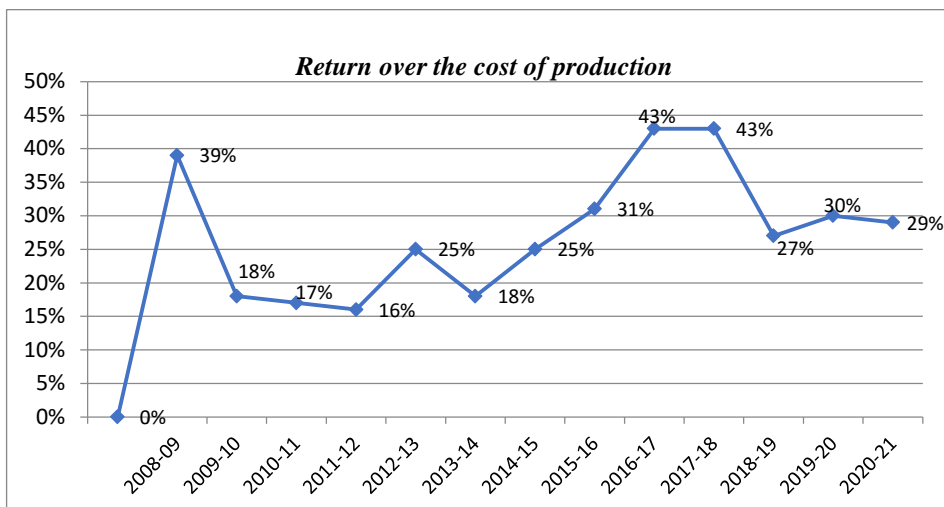
Data from the Agriculture department revealed the following provision of profit margin passed on to the farmers during the last thirteen years.

Details were:

(Rupees)

Year	Cost per 40 Kg *	Support Price of 40 Kg*	Profit per 40 Kg	%Profit per 40 Kg
2008-09	685	950	265	39%
2009-10	803	950	147	18%
2010-11	814	950	136	17%
2011-12	906	1050	145	16%
2012-13	960	1200	240	25%
2013-14	1015	1200	185	18%
2014-15	1043	1300	257	25%
2015-16	994	1300	306	31%
2016-17	912	1300	388	43%
2017-18	908	1300	392	43%
2018-19	1020	1300	280	27%
2019-20	1081	1400	319	30%
2020-21	1400	1800	400	29%

Source: \* Crop reporting Service



The above chart and graph indicated that a varied amount of profit margin was allocated to the farmers via support price over the years. From a minimum of 16% to a maximum of 43%, the profit margin did not offer a clear trajectory. This meant that farmers were not assured of their profits on consistent basis from the wheat harvest. If the factor of late

announcement of support price (discussed at sub-sections 2.1, 2.2 & 2.3) is added to this, the farmers are not encouraged to cultivate wheat as a high profit crop. Rather subsistence agriculture was broadly being practiced with a few exceptional years where high incentives were provided to the farmers.

Comparisons of profit margin allocated in a year to the production of that year and the production results of following year are detailed below:

*(Rupees)*

<i>Year</i>	<i>Cost per 40 Kg*</i>	<i>Support Price of 40 Kg*</i>	<i>Profit per 40 Kg</i>	<i>% Profit per 40 Kg</i>	<i>Production of wheat (MMT)</i>
2008-09	685	950	265	39%	18.420
2009-10	803	950	147	18%	17.919
2010-11	814	950	136	17%	19.041
2011-12	906	1050	145	16%	17.738
2012-13	960	1200	240	25%	18.587
2013-14	1015	1200	185	18%	19.739
2014-15	1043	1300	257	25%	19.282
2015-16	994	1300	306	31%	19.527
2016-17	912	1300	388	43%	20.466
2017-18	908	1300	392	43%	19.178
2018-19	1020	1300	280	27%	18.377
2019-20	1081	1400	319	30%	19.402
2020-21	1400	1800	400	29%	20.900

Source: \* Crop reporting Service, Punjab

The above analysis indicated that profit margin fluctuations had a bearing on the production of wheat, most specifically in the next sowing season. For example, support price remained constant @ Rs. 950 per 40 kg for three years (2008-09 to 2010-11). However, the input cost burden shot up drastically escalating year on year basis with baseline amount from Rs. 685 to Rs.814 per 40 kg for the same period. This meant that profit margin during the period remained stagnant and on the lower side. This resulted into reduction of overall wheat crop production from 19.041 million ton (2010-11) to 17.738 million tons in 2011-12.

Similarly, from the FY 2015-2016 to the FY 2018-2019, the support price remained constant at Rs 1400 per 40Kg whereas the growing input cost per 40kg increased from Rs 994 to Rs 1024 per 40Kg. Therefore, the profit margin remained volatile during the same period. The result was that production dipped to below 19 million MT.

However, the cost estimates linked with profitability could only be partially relied upon. This was so because as per record made available during study, no scientific/empirical working has been found to be involved in the cost price calculation. A significant reliance on “estimate” and general knowledge were apparently being used. This is apparent if the cost estimates compiled by Agriculture Department are to be compared with those compiled by MNFSR (API). Details are given below:

*(Rupees)*

<i>Comparison of Cost of production per acre estimated by Agriculture Policy Institute and Crop Reporting Services for the crop 2020-21</i>			
<i>Sr. No.</i>	<i>Operations/ Inputs</i>	<i>As per API</i>	<i>As per Crop Reporting Services</i>
1	Cost of Land preparation	4,638	3,883
2	Seed and Sowing operation	6,409	2,699
3	Cost of Water	3,974	2,540
4	Cost of Fertilizer	7,933	7,307
5	Cost of Dung/Manure	650	305
6	cost of Weedicides	1,200	910
7	Cost of harvesting /threshing	8,435	5,286
8	Cost of land rent (half yearly)	16,750	20,000
9	Other expense/charges	1,715	96
10	Cost of Transport	-	717
11	Mark up on investment	1,609	43,743
<b>Cost of Production</b>		<b>53,313</b>	<b>43,743</b>

The above table showed that the cost estimates prepared by agriculture department were apparently not based on relevant international standard or scientific analysis. List of cost estimates prepared by the Agriculture department for the FY 2020-21 & 2021-22 were attached at annexure-B.

Rabi season in Pakistan has a variety of crops which implies that Wheat has a lot of alternative crops. So, it makes wheat cultivation highly



elastic with respect to returns or revenue and farmers generally can get inclined to a lot of other crops.

Normally these prices should be either linked with international commodity prices or inflation rates or input cost. But it has been observed that none of these criteria is applied while determining support price and most of the times, it is a gut feel figure that is applied.

### ***2.7.3 Effect of climate change on wheat crop***

Pakistan has been experiencing adverse effects of climate change and global warming over the years. The frequency of abnormal weather patterns and heat waves has increased, more so over the last ten years. These changes include period of abnormally low rainfall, followed by heavy rains along abnormal cycles and intense heat waves causing glacier melting.

As per the Global Climate Risk Index-2021, Pakistan has been ranked the 08th most climate vulnerable country in the world both in the long-term index and in the index for each respective year from 2000 to 2019<sup>87</sup>. As per UN Global Land Outlook report Pakistan has been ranked among those countries which are facing drought emergencies.<sup>88</sup>



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87 David Eckstein, Vera Künzel, and Laura Schäfer, "Global Climate Risk Index 2021," German watch e.V., accessed July 1, 2022, <https://www.germanwatch.org/en/19777>.

88 Amin Ahmed, "Un Lists Pakistan among 'Drought-Hit' Countries," DAWN.COM, May 15, 2022, <https://www.dawn.com/news/1689752>.

Food and Agriculture Organization (FAO) of the United Nations in its report titled “Climate-Smart Agriculture for Punjab Pakistan (2018), has stated that “Punjab has experienced severe droughts, followed by devastating floods in 2010, 2011, and 2014. This vicious and unpredictable cycle of climatic extremes has severely impacted agricultural production and the supporting irrigation systems. The average temperatures in Punjab have risen by 0.5°C in the past century from 1901 to 2000 and expected to rise by a further 1°C–3°C by 2060<sup>89</sup>.”

The subject reports link the changing climatic conditions with agriculture production by highlighting that, “each degree-Celsius increase in global mean temperature would, on average, reduce global yields of wheat by 6.0%, rice by 3.2%, maize by 7.4%. The impact on yields may vary across the Agro-Ecological Zones (AEZ’s) in Pakistan and Punjab, but are likely to be significant without adequate adaptation strategies. A rise in the temperature will increase the glacial melt in the Himalayas, that feed the river system, followed by unpredictable monsoons patterns. Results will be severe cycles of too much or too little water. As a result, the surface water availability in the province through the Indus basin will likely become unpredictable, severely constraining the ability of farmers and policy makers to plan and produce effectively<sup>90</sup>.”

Such climatic conditions have had adverse and unforeseen impacts on the agriculture production in general and wheat crop in specific. Wheat crop cycle in Punjab begins in October/ November each year and ends in April/May. (Two months have been shown at start and end as the sowing and harvesting period varying across the north and south of the province). Late sowing of crops or their early maturity, leading to a truncated crop

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89 CIAT; Climate-Smart Agriculture in Punjab, Pakistan. CSA Country Profiles for Asia Series. International Center for Tropical Agriculture (CIAT), FAO, Rome, (2018)  
36p.<https://cgspace.cgiar.org/handle/10568/99181>

90 CIAT; Climate-Smart Agriculture in Punjab, Pakistan. CSA Country Profiles for Asia Series. International Center for Tropical Agriculture (CIAT), FAO, Rome, (2018)  
36p.<https://cgspace.cgiar.org/handle/10568/99181>

cycle can adversely impact the output of wheat crop being against its natural growth cycle. This fact has been highlighted in a research study titled, “Weather & Crop development in Central Punjab (Faisalabad 2014-2015)” carried out by Pakistan Metrological Department by elaborating that if wheat crop is sowed late by the farmers, the crop is exposed to heat stress during grain formation stages (milk and wax maturity stages) leading to formation of shriveled grain<sup>91</sup>. This implies that wheat crop requires that grain formation occurs in a moderate climate. If harsh climates are experienced during this period of the wheat cycle, it can damage the grain quality and thereby the output and productivity thereof.

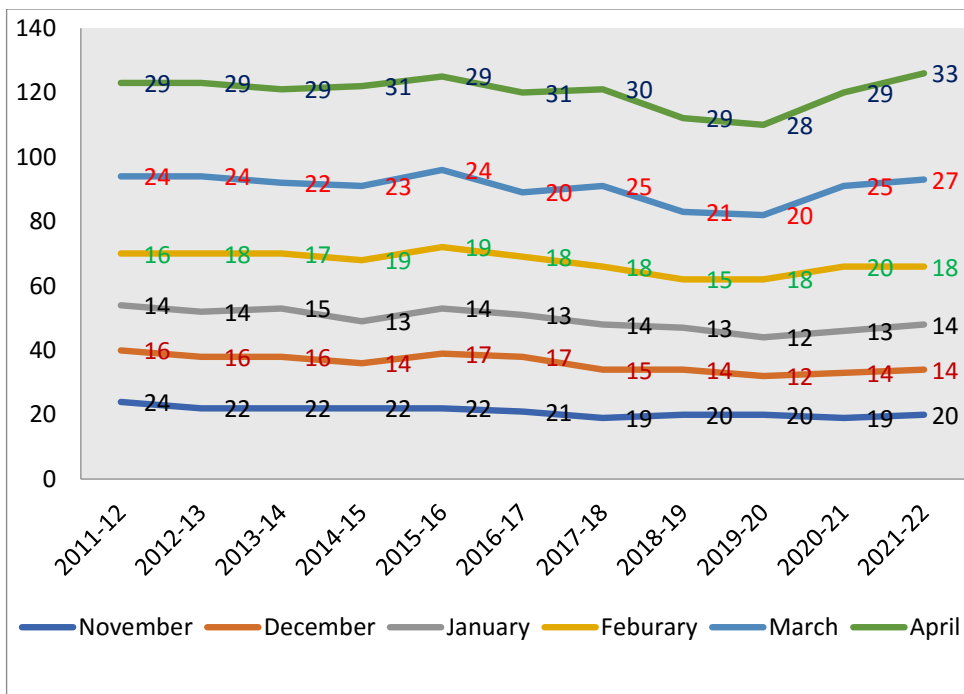
In the above context, it is pertinent to view the temperature pattern across Punjab during the last 11 years to look for negative temperature changes with regard to the wheat season. Details are:

**Average Temperature °C of Punjab during wheat seasons 2011-12 to 2021-22**

Year	November	December	January	February	March	April
	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.
2011-12	24	16	14	16	24	29
2012-13	22	16	14	18	24	29
2013-14	22	16	15	17	22	29
2014-15	22	14	13	19	23	31
2015-16	22	17	14	19	24	29
2016-17	21	17	13	18	20	31
2017-18	19	15	14	18	25	30
2018-19	20	14	13	15	21	29
2019-20	20	12	12	18	20	28
2020-21	19	14	13	20	25	29
2021-22	20	14	14	18	27	33

**Source:** <https://www.timeanddate.com/weather/@1167710/historic?month=4&year=2022>

91 “Weather & Wheat Crop Development in Central Punjab (Faisalabad) (2014 2015);” <https://tripleis.org/wp-content/uploads/2019/12/Weather-and-Wheat-crop-development-in-central-punjab.pdf>.



The above data reveals that from January onwards there has been a gradual but steady increase in the average temperature of the Punjab more specifically during last three years. This implies that during the mid-growth of the wheat crop when grains are to grow and mature, the weather is becoming hotter, putting stress on the grain growth process. It is an indicator that the moderate climatic conditions of “spring season” which were significant to grain quality and productivity are getting reduced/altered with the passage of time. Such climatic changes are likely to create significant impact of wheat cultivation posing serious challenges to the farmers and the government alike.

The Food and Agriculture Organization (FAO) of the United Nations have also highlighted this issue by stating that “Intermittent periods of very high temperature (>35°C), common in many of the world’s

wheat growing areas, can significantly reduce yield and quality. High temperatures cause an array of physiological and biochemical changes in plants, which affect growth and development and may lead to a significant reduction in yield<sup>92</sup>.”

A second important climatic factor towards the wheat crop is rainfall/precipitation. The average rainfall during the wheat sowing and harvesting months in 2020/2021 and 2022 were as follows:

<i>Month</i>	<i>Weighted Rainfall</i>		
	<i>Normal (mm)</i>	<i>Average (mm)</i>	<i>Departure (percent)</i>
December-20	10.2	8.9	-12.6
January-21	15.6	14.8	-5.6
March-21	28.0	31.3	11.7
April-21	20.6	13.4	-34.8
December-21	10.2	1.4	-86.4
January-22	15.6	55.7	258
February-22	23.2	8.9	-61.7
March-22	28.0	9.8	-65.0
April-22	20.6	2.3	-88.7

Source: Climate Data Processing Centre, Pakistan Meteorological Department

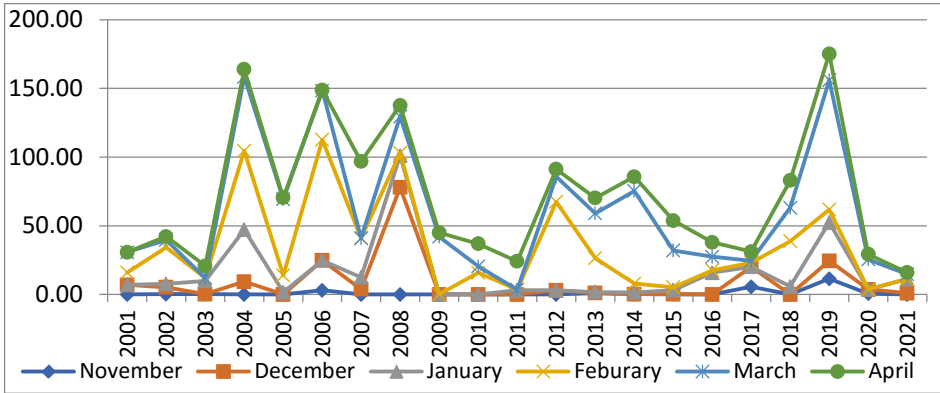
The above table indicates that during last two wheat cycles rainfall in Punjab remained on the lower side than the normal levels, indicating dry weather conditions.

A further detailed overview of rainfall across 03 districts of the Punjab, (Sargodha, Multan and Bahawalnagar) during last 21 years yields the following pattern:

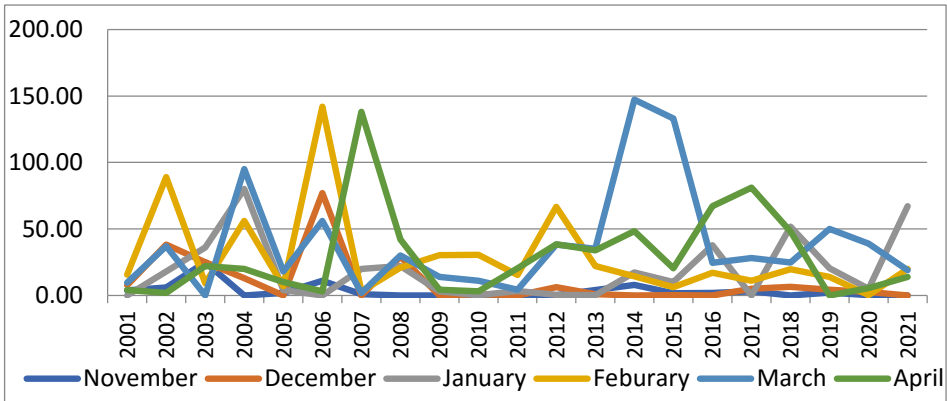
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92 CIAT; Climate-Smart Agriculture in Punjab, Pakistan. CSA Country Profiles for Asia Series. International Center for Tropical Agriculture (CIAT), FAO, Rome, (2018) 36p.<https://cgspace.cgiar.org/handle/10568/99181>

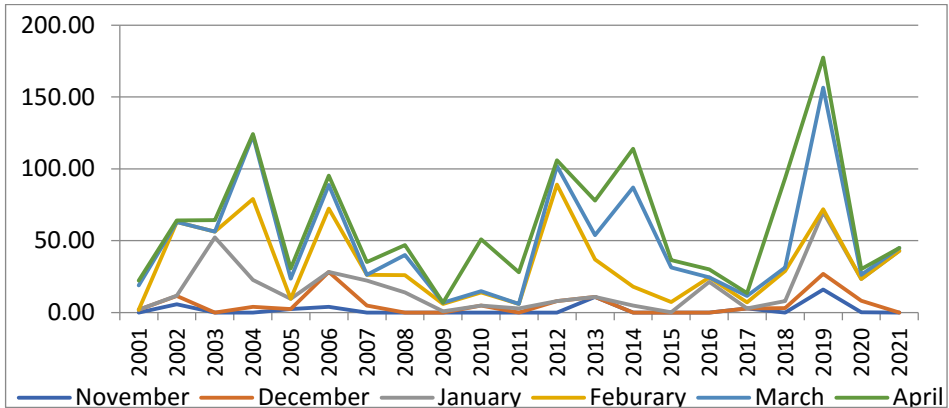
Wheat season (2001-02 to 2021-22) Rainfall (mm) at District Multan over the year



Wheat season (2001-02 to 2021-22) Rainfall (mm) at District Sargodha over the year



Wheat season (2001-02 to 2021-22) Rainfall (mm) at District Bahawalnagar over the year



The above illustrated trend analysis shows that abnormal rainfall pattern has existed across Punjab during last 21 years. There have been abrupt high and low rain spell across the districts with low rainfall spells lasting 02 to 03 years.

If this abnormal rainfall pattern is clubbed with canal water availability, then a clear picture on the water availability for the wheat crop can be assessed. In this context canal water withdrawals for rabi season across Punjab from FY 2010-2011 to 2019-2020 were as follows:

<i>Canal withdrawals during Rabi Season in Punjab</i>	
<i>Year</i>	<i>(Million-acre feet)</i>
2010-11	19.72
2011-12	19.52
2012-13	17.22
2013-14	18.11
2014-15	17.24
2015-16	17.16
2016-17	16.07
2017-18	12.75
2018-19	13.43
2019-20	14.67
(Source: Pakistan Bureau of Statistics)	

Low canal water availability coupled with hot-weather and unpredictable rainfall patterns have the combined impact of drought like conditions, low yields and high risk to food security in the Punjab in the coming years.

#### ***2.7.4 Increasing trend in urbanization is a growing risk to food security***

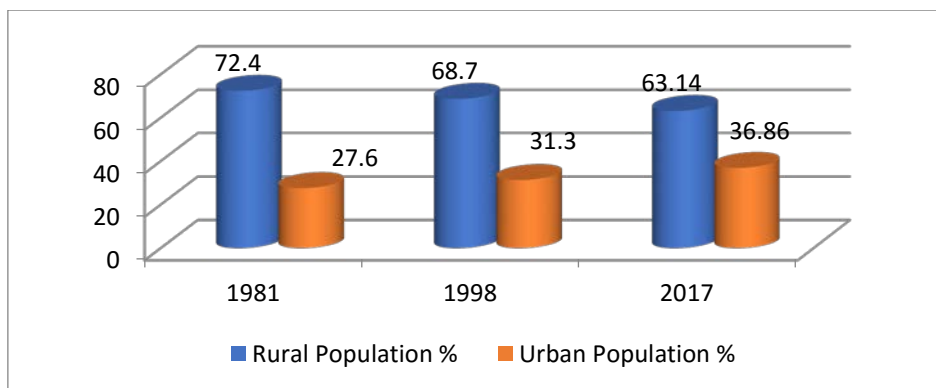
Urbanization is not an entirely new phenomenon. The scholars have referred to urbanization as the “real population bomb” and it is no longer possible to neglect the impact of urban dimensions of development.

Urbanization constitutes the challenges inclusive of constrained Agricultural growth rate by shrinking arable land, owing to large-scale population and labor shift from rural to urban areas. Rapid urban growth

and an increasing number of major cities imply that more food will have to be made available to people who live in an environment that has traditionally been perceived as inappropriate for agriculture. Almost all urban residents are net buyers of food. On the other hand, the farmers in Pakistan retain about one-third of their wheat production for seed and household food consumption<sup>93</sup>. This implies that rural population had maintained self-sufficiency in wheat for the whole year.

One the other hand, government procures wheat to provide quality flour at affordable prices to urban consumers as well as maintaining food security in the province. The increasing trend of urbanization is shrinking the agricultural land as well as enhancing the wheat demand supply in the urban areas. This compels the government to enhance the procurements that have a significant cost.

The state of food security in Pakistan and in the Punjab province may deteriorate further over the next couple of decades. The main reasons are the swift population growth and rapid urbanization which works as an important factor in limiting the odds of land extension for agriculture purposes as depicted below:



(Source: Pakistan Bureau of Statistics)

93 Prikhodko, Dmitry, and Oleksandr Zrilyi. "Pakistan: Review of the wheat sector and grain storage issues country highlights." *Rome: Food and Agriculture Organisation* (2013). <https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/853827/>



The government of the Punjab over the last fifteen years has kept its annual procurement around 3.5MMT. This implies that due to factors such as infrastructure and financial constraints, the procurement targets have not been enhanced to cater for the steady increase in the urban population. This issue therefore constitutes an important food security challenge for the province as well as for the country.

### ***2.7.5 Inadequate Agriculture Advisory Services***

Agriculture advisory services play a crucial role in promoting efficient and effective agricultural practices in the country leading to a strong agricultural economy. These services include educating the farmers on the best agricultural techniques, protecting crops from different hazards, awareness on different incentives, optimum utilization of Agri-Resources and quality inputs etc. In order to achieve the desired results, the services require strong communication and contact with the farmers.

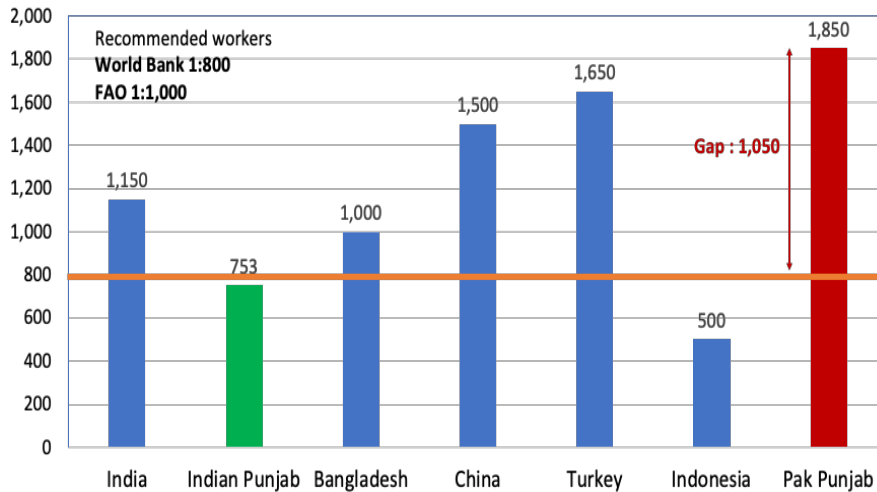
As per assessment done by World Bank one extension worker is needed to cover 800 farmers and as per Food and Agriculture Organization (FAO) of the UN states 01 extension worker should cover 1000 farmers or less in order to effectively deliver requisite services.

The Agriculture Extension services for the government of Punjab comprises 2,816 of extension workers for the whole province. As per Directorate of Agriculture Extension Punjab, the total numbers of farmers in the Punjab were 5,249,900. This showed that in the province one extension worker covered 1,864 numbers of farmers.

Similarly, the provincial agriculture department in its report titled “Prudence Analysis Report” on the project “Private Provider, Publicly Financed and ICT enabled Extension Services in the Punjab” has highlighted the extent of shortage of agriculture extension worker in the department. In the report, the department has referred to FAO data to

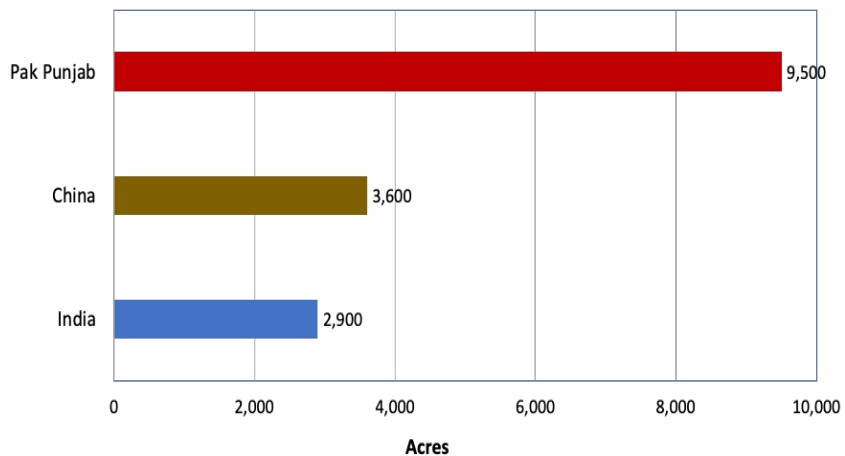
comparatively illustrate extension services workers being deployed around various neighboring countries of the Pakistan. Details were:

### Extension Workers – Global Picture



Source: Food and Agriculture Organization (FAO)

### AREA COVERAGE PER EXTENSION WORKER



Source: Food and Agriculture Organization (FAO)

The above graphs were an indicator of the fact that sufficient number of extension workers were not available to provide services to all farmers across the provinces.

Impact of this gap can be assessed from the fact that small and medium land-holding farmers have very little knowledge of current agriculture practices/news etc. They continue with their years old traditional practices and are vulnerable to emerging threats facing wheat production such as low-yielding seeds, in-efficient fertilizer products, climatic hazards and pest hazards etc. The net effect is low crop productivity as discussed earlier in the section.

### 2.7.6 *Inadequate agriculture credit measures*

Financial requirements of the agriculture sector had increased over the years as the cost of production increased due to sky rocketing increase in prices of agri-inputs and their extended use i.e., fertilizers, improved seeds & diesel prices etc. Agricultural credit plays an important role in facilitating the transformation of agriculture as well as raising the productivity of crops. There are mainly two sources of credits which are available to the farmers;

- Formal and
- Informal

Formal sources are the financial institution like commercial and microfinance banks. These institutions provide credit facility to farmers for Agri-Inputs, Crop production. The interest rate & other modus-operandi of Agri-credits are summarized below:

*(Rupees)*

Sr. No.	Name of Bank	Agri Loan %	Processing Fee for 1000000	Collateral	Duration (month)	Loan Limit for 09 Kanal	Remarks
<b>Microfinance Bank</b>							
1	Khushhali Microfinance bank	26%	3000	Agri Passbook	12	50000 to 60000	Stop New Agri Loan
2	U Microfinance bank	36%	5000		12		
3	Mobilink Microfinance bank	26%	4200		12		
4	Apna Microfinance bank	26%	3000		12		

Sr. No.	Name of Bank	Agri Loan %	Processing Fee for 1000000	Collateral	Duration (month)	Loan Limit for 09 Kanal	Remarks
5	HBL Microfinance bank	26%	5000		12	200000 to 500000	
6	Finca Bank	37%	4000		12		
7	Punjab Provincial Cooperative Bank Limited	14%	5000		09		
<b>Commercial Bank</b>							
8	ZTBL	23 %		Agri Passbook		50000 to 60000	Stop New Agri Loan
9	Habib Bank	20%	2320		12		
10	Al- Habib bank	21%	2500		Limit loan		
11	United bank	20%	2300		Tenure 3 Years	200000 - 500000	
12	MCB Bank	21%			12		

Source: Own source data collection from bank branches

The above table illustrated that interest rate charged on agri-loans were ranging from 21 to 37% except in the case of Punjab provincial cooperative bank i.e., 14%. On the other hand, Agriculture loan limit for 09 kanal for twelve months was Rs.50,000 to Rs.60,000 against the security of land. Giving land as security was a major hindrance for farmers as it discouraged them for taking such credits.

Difficulties faced in receiving loans from the financial institution compels farmers especially those having lower land holdings to be glued to the informal /undocumented agriculture economy. These “Informal sources” normally consist of commission agents, input providers, middlemen and village shop keepers etc. The small growers obtain loan in the form of cash or inputs like seed, fertilizers and pesticides from commission agents, shopkeepers and input suppliers. Either high rates are charged to the growers or the credits are given with the pre-condition that the farmers have to deliver their produce to these commission agents who offer the price of their produce much lower than the market price.

For overall agriculture sector, this issue is an impediment towards agriculture growth, limiting the efforts to enhance food security position across the province.

### ***2.7.7 Inaccuracies in crop reporting data leading to lack of well-informed decision making***

One important parameter for assessment of production of any crop was the area of cultivation of that particular crop. That is, if a crop was cultivated across large areas, it would invariably result in better harvest of that crop excluding allied factors such as climate change etc. In Punjab, two departments i.e., Agriculture Department (Crop Reporting Services) and Board of Revenue (BOR) were assigned the responsibility to measure the area sown for all major crops.

The Directorate of “Crop Reporting Services”, Agriculture Department estimates the area sown under crops through sample surveys. [5500 (village segments) which were 23% of total villages in Punjab and land area is about 5% of total area]<sup>94</sup>.

The Board of Revenue also estimates the Rabi and Kharif crop areas sown under all crops based on complete enumeration (Girdawari) of all Mouzas carried out by Patwaris of Revenue Department twice a year. The information gathered by Patwaris is passed on by the Revenue Department to the Punjab Bureau of Statistics for preparation of computerized Jinswar statements.

Well informed decision making by the provincial and federal governments required that accurate crop data was timely made available at the relevant forum. In this context, the sown area of crops was an important information for the government.

There were substantial differences in the wheat crop area reported by Crop Reporting Services and BOR during the last four years. The

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94 “Frequently Asked Questions,” Frequently Asked Questions | Crop Reporting Service, <http://www.crs.agripunjab.gov.pk/faqs>.

figures reported by BOR for areas sown for wheat were on higher side as detailed below. The inaccuracies in crop reporting data directly impact and lead to lack of well-informed decision making at Government level.

<b>Wheat Crop Area in Acres</b>			
<b>Year</b>	<b>Crop Reporting Services</b>	<b>Board Of Revenue</b>	<b>Difference</b>
<b>2017-18</b>	16,210,000	18,646,000	2,436,000
<b>2018-19</b>	16,052,000	18,756,000	2,704,000
<b>2019-20</b>	16,099,960	17,685,000	1,585,040
<b>2020-21</b>	16,670,000	17,962,000	1,292,000

Source: Crop reporting Services & Mechanical Tabulation Reports of Punjab Bureau of Statistics)

The above table illustrated that there was lack of transparency and accuracy in the crop area reporting by different government department. All future analysis based on the cultivation on crops and their production needed reliable data of area cultivation in order to execute necessary policy initiatives. For example, if government planned to give subsidy in form of agriculture inputs, the area under cultivation was the barometer of the scope of such a subsidy to be given.

Many of these policy initiatives and schemes were aimed at improving the food security of the province and involved high budgetary expenses as highlighted at sub-section 3.5.6 of the report. Similarly, decisions regarding import of wheat were based on the wheat crop cultivation statistics under which “area cultivated” were the key attribute.

Secondly the statistics prepared by Crop reporting services were sample based where as those by BOR were based on actual field activity done by BOR staff across the Punjab up to the village level. Hence the BOR data by design was supposed to be more accurate whereas in reality it appeared to carry more error.

This indicated that complete reliance on agriculture statistics being populated by the provincial departments could not be made.

## **2.8 Risk of production shortfalls and its implications**

As already discussed in the above discourse, wheat being the major staple food for the population of the province has a significant bearing on the food security. All strata of population i.e., low class, middle class and upper class were dependent on this food item. 63.14 % of population of Punjab<sup>95</sup> was residing in rural areas where wheat cultivation was being exercised for subsistence purposes. This meant, if adequate wheat harvest was achieved in the province, then the rural population was relatively secure, fending for food shortages.

However, shortage in wheat harvest crop had multifarious negative impacts for the government as well as for the population of the province. Some implications in this context were:

### ***i) Wide spread food insecurity***

Shortcomings in the annual wheat harvest can create food insecurity immediately at the tehsil and village level as productivity inadequacy can impact adversely the lower class, lower middle class and small farmers residing in the districts and relying heavily on the annual wheat crop for their food sustenance. Hence apart from having impact at national and provincial level, wheat harvest had the unique aspects of effecting the living of the common village house hold almost instantaneously across the province.

### ***ii) Food Inflation***

Another negative fallout of short wheat harvest was food inflation. Wheat was a major expenditure item when it came to expenditure pertaining to food. As stated earlier in the report wheat contributed towards 11.20% (8.98% in urban areas and 12.84 % in rural areas) of the

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95 Source: Pakistan Bureau of Statistics

overall food related expenditure. Shortage of wheat leads to its increased price in the market. An analytical study done by Paul Dorosh and Abdul Salam suggests that even a small reduction in wheat crop caused an increase in the wheat market price by 05-14%<sup>96</sup>. Ultimately the effect of high price would cause food inflation in the area

*iii) Extra Burden on foreign reserves*

Another impact of wheat shortfall was extra burden on foreign reserves that had to be borne by the government on account of import of wheat to bridge the shortfall to ensure food security. For example, in the FY 2020-2021, the government had to spend US\$983.3 million on account of import of 3.6 million ton wheat<sup>97</sup>. Adequate foreign reserves were needed for economic stability of the country, hence, procurement of wheat which was the primary national crop of the country was an unsustainable model not fit for the country's economic growth. Additional expenses such as transportation costs were also involved in the wheat import process which had the potential of increasing the price of wheat.

The second aspect of this transaction was its long-term impact. On the one hand Pakistan was an agrarian economy with 63.14 % of its population living in rural based environment. Import of basic food item such as wheat for an agrarian country was an alarming sign as it meant that food security challenges were being introduced by relying on import for basic food needs despite having local resources to meet the same needs in an adequate manner. On the other hand, import also meant that more foreign exchange was needed for the subject procurement putting further pressure on the forex reserves of the country.

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96 Paul Dorosh and Abdul Salam, "Wheat Markets and Price Stabilisation in Pakistan: An Analysis of Policy Options," *The Pakistan Development Review* 47, no. 1 (January 2008): pp. 71-87, <https://doi.org/10.30541/v47i1pp.71-87>.

97 "[Ministry of Finance: Government of Pakistan]," | Ministry of Finance | Government of Pakistan|, [http://www.finance.gov.pk/survey\\_2021.html](http://www.finance.gov.pk/survey_2021.html) .



*(iv) Current scenario of wheat production in the province*

For the crop year 2021-2022, the government of Punjab had set wheat production target of 21.945 million M tons (with average yield 33.84 mound per acre)<sup>98</sup>. However multiple allied indicators showed that harvest was unlikely to meet the estimated demand, causing the government to again look for other means of wheat procurement including import from abroad.

As per the data provided by the Metrological Department to the MNFS&R in the FCA meeting, the country was facing hot and dry weather conditions during the current out-going wheat season. Rainfalls (Oct to Dec 2021) were estimated below normal in agricultural plains of all provinces. IRSA anticipated that a shortfall of 28% in water availability which was far higher than previous year (10%)<sup>99</sup>.

Secondly the prices of fertilizers increased sharply during previous rabi season. These key inputs become inaccessible to farmers during their wheat cultivation process<sup>100</sup>. (Details at farmer feedback survey at section-4 may also be seen).

Last year when conditions were relatively favorable, such as reasonable availability of fertilizers on stable prices and normal weather conditions, the achieved average yield was 31.3 mound per acre. The farmers have been facing tougher conditions during the out-going Rabi season.

This scenario reduced the cultivated area of wheat by 460,000 acres as compared to previous year and indicated that the wheat harvest of the province would fall short of the estimated target yield, causing potential food insecurity risks.

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98 FCA Meeting Rabi season 2021-22 dated 7th October, 2021

99 FCA Meeting Rabi seasons 2020-21 & 2021-22

100 Dawn Report, "Fertiliser Shortage, Price Hike Leave Farmers Crying," DAWN.COM, <https://www.dawn.com/news/1663436/fertiliser-shortage-price-hike-leave-farmers-crying>.

## 2.9 Wheat Procurement and Storage

### (i) Procurement

Under the existing procurement policy of the government, wheat for the strategic and operational reserves are procured by various agencies such as Food Department, Pakistan Agriculture Storage & Services Corporation (PASSCO) and private flour millers. In determining the procurement target among other factors, important variables include, the wheat stocks available with different governments and agencies as well the harvesting trend of the wheat crop. The final decision for the procurement is given by the provincial cabinet.

### 2.10 Procurement redundancies with historical estimation and storage capacity shortfall

#### 2.10.1 Procurement of wheat on historical rather than scientific/analytical basis

The wheat procurement targets set the government of the Punjab and resultantly wheat procured during the last ten years is illustrated below:

*Year	Carried forward Stock (MMT) (Prov. Govt)	Procurement targets (MMT)	Wheat proc. (MMT)	Percentage of Achievement
2012-13	1.743	4	2.784	70%
2013-14	0.48	4	3.677	92%
2014-15	0.134	4	3.743	94%
2015-16	1.958	4	3.234	81%
2016-17	2.256	4	3.929	98%
2017-18	2.579	4	3.949	99%
2018-19	3.597	4	3.623	91%
2019-20	1.57	4	3.32	83%
2020-21	0.25	4	4.1	103%
2021-22	0.4	3.5	3.69	105%

\* The Punjab Food Department takes FY as one year advance. That is, the FY donates the coming year for which the procurement was done in the prior year. For example. For release/utilization during the FY 2012-2013, 2.784 MMT of wheat was procured during the FY 2011-2012.

The above table illustrates that the province having faced demographic and climatic changes, the procurement targets it fixed had remained largely static at 4 million tons per year. Even though the carried forward stocks available with the government had greatly varied from 0.25 MMT to 3.597 MMT, no corresponding adjustments were noticed in the procurement targets.

Moreover, the government was largely unable to achieve its procurement targets during the last ten years. Considering that the government was only procuring a portion of the overall wheat produced, the shortfall in procurement indicated that Food Department and the District Administration did not have effective liaison with the farmers. (This issue is explored further while discussing support prices/bardana management)

### ***2.10.2 Unsatisfactory distribution of bardana leading to hoarding and growth of underground economy***

The procurement target of the government is implemented through accumulation of wheat through distribution of Bardana (Gunny bags). Effective gunny bag distribution and collection is the “critical business process” around which the whole wheat procurement process of the government is based upon. The Food Department along with the district administration gets engaged in this activity annually, calling upon the individual farmer to register himself/herself with the food department. He/she gets a certain number of gunny bags. The farmer then fills them up returns them to the food centers and subsequently based on the deposits slips so received, gets payments from respective banks. The envisaged advantage of this system is reducing the role of middle man, adding transparency in financial transactions and providing direct cash flow to the actual grower.

However, over the years this model has faced many implementation challenges. The farmers have been facing hardships in getting the bardana from the government centers. There were steady periods for example during the FY 2016-17 and FY 2017-18 where farmers were only allowed a limited number of gunny bags (200 per person). Then were administrative hassles involved in the exercise, making the farmers, visit multiple offices, wait in lengthy queues besides facing other bureaucratic hurdles. This meant that the farmer had to rely more on local food merchants/Arthees for sale of their crop.

The Arthee/procurement middle man is a clear manifestation of un-documented economy existing in the agriculture market. This middleman procures wheat from the farmer in arbitrary un-documented fashion. The farmer is blackmailed into selling his/her crops as he/she cannot store the same and the government interface is providing not only a partial relief but a lot of hassle for the grower. They are also a source of wheat hoarding.

The end result has been that farmers are increasingly dissuaded from the government initiatives and want intermediaries to handle their crop produce. This is evident from the fact that even though the government relaxed the quality limits for release of bardana during last two years, the roles of intermediaries has not diminished and the government reverted to issuing anti-hoarding notices in respective districts and village.

The current scenario negates one of the main objectives of reaching out to the actual grower through the procurement regime.

***(ii) Storage of Wheat***

An important and critical part of the procurement process is the storage of wheat. Wheat is procured in huge quantities from the farmers every year. It is stored in different types of depots before onwards sales.

The different types of storage depots used by the Food department include:

- Silos
- State owned Godowns
- Private owned Godowns
- Bulk Head
- Binni shell

### 2.10.3 *Inadequate wheat storage facilities, affecting the quality of wheat and negatively impacting food security*

At present the Food Department has a network of 195 storage depots with a total storage standard capacity of 2.33MT with operation capacity of 2.22MT. The detail of storage capacity is shown below:

Storage Type	Functional		Non-Functional		Total Capacity (Million ton)
	Number	Capacity (MT)	Number	Capacity (MT)	
H.T.GODOWNS	1,768	1.59	1.6	0.01	1.6
SILOS	31	0.12	0.12	-	0.12
BINS	4,269	0.15	0.19	0.04	0.19
BULK HEAD	1	0.01	0.07	0.06	0.07
BINI SHELL	216	0.35	0.35	-	0.35
<b>Total Standard Capacity</b>		<b>2.22</b>		<b>0.11</b>	<b>2.33</b>

Source: Punjab Food Department

Not all wheat stock is sold-off as sufficient quantity is kept for food security stock purposes. Illustratively:

*(Million ton)*

Year	Carried forward	Procurement targets	Wheat proc.	Stock available	Release
2012-13	1.743	4	2.784	4.527	4.047
2013-14	0.48	4	3.677	4.157	4.023
2014-15	0.134	4	3.743	3.877	1.919
2015-16	1.958	4	3.234	5.192	2.936
2016-17	2.256	4	3.929	6.185	3.606
2017-18	2.579	4	3.949	6.528	2.931
2018-19	3.597	4	3.623	7.22	5.65
2019-20	1.57	4	3.32	4.89	4.64
2020-21	0.25	4	4.1	4.35	3.95
2021-22	0.4	3.5	3.69	4.09	

Source: Punjab Food Department

The wheat stocks during last ten years ranged between 04 to 07 MMT. Even if the release of wheat stock is taken into account, a minimum storage capacity of 05MMT is needed by the government around the year to adequately store the procured wheat. Whereas the existing storage capacity is only 2.22MMT indicating a storage capacity shortfall of 2.78MMT. As per practice any excess stocks are stored in open plinths which are susceptible to wastage, climatic hazards leading to deterioration of the wheat stocks.

To enhance the storage capacity the PFD had taken the following measures:

- 1) Construction of 200 Steel Silos of 10,000 ton each in Public Private Partnership (PPP) mode. In first phase 40 sites were offered, out of which only in District Bhakkar and Layyah Steel Silos, 02 bins with 5000 ton each capacity construction was completed by March, 2020 and implementation is still pending.
- 2) Construction of Silos with 30,000 tons capacity at DG khan with the cost of Rs. 345 million in 2016 through ADP however, the silos were still not handed over to PFD and remained un-operational.
- 3) Another ADP scheme was approved for Construction of Silos with 30,000 tons capacity at Bahawalpur with the cost of Rs.500.152 million. Since 2015, the work was not completed and the case has been moved for revision of total cost.

### *Silos under construction*



It was noticed that efforts of PFD to enhance its storage capacity in previous 3 decades remained unfruitful and short capacity of storage always remained a challenge to PFD vis-à-vis Food Security. These resulted into higher cost of incidentals as well as damage/ shortfall of stocks. The same is evident from the daily report of PFD that 395 tons wheat valuing Rs 23.947 million got damaged /short from the stores of PFD.

Not been able to store wheat even at historic level was a significant challenge with regard to safeguarding food security for the province. With growing population ideally, this capacity should have been enhanced significantly. Yet the same is not forthcoming. Low storage capacity would inevitably reduce the government capacity to tackle any food crisis related to wheat.

#### **2.11 Procurement based on credit financing with liability of disproportionate incidental charges**

Every year the provincial government enters into credit financing agreements with a consortium of banks to fund the wheat procurement. This is major financial undertaking for the provincial government as it

involves financial impact in excess of Rs. 100 billion. During the last thirteen years the loans taken from banks are having the following breakup:

*(Rs in Billion)*

<i>Year</i>	<i>Borrowing/Loans during the year</i>
<b>2008-09</b>	143.176
<b>2009-10</b>	88.667
<b>2010-11</b>	76.025
<b>2011-12</b>	73.305
<b>2012-13</b>	110.539
<b>2013-14</b>	112.58
<b>2014-15</b>	105.345
<b>2015-16</b>	128.064
<b>2016-17</b>	128.696
<b>2017-18</b>	118.086
<b>2018-19</b>	108.064
<b>2019-20</b>	143.222
<b>2020-21</b>	218.624
<b>Total</b>	<b>1554.393</b>
Source: Punjab Food Department	

*(i) Sale of wheat*

As illustrated in the previous section, the government procures wheat annually on credit basis. As these borrowings are of substantial amounts, handling and sale of wheat then become two key activities for the government for making re-payments of the credits received. The government pay-backs for the loans to commercial banks along-with the interest costs are met from two sources:

- i. Sales proceeds from sale of wheat
- ii. Budgeted subsidy-grants to be paid directly to the banks

The government has maintained an Account-II (Food) with the State Bank of Pakistan for managing the cash flows pertaining to the food departments and specifically pertaining to the state's trading in food grains. The proceeds from sale of wheat are collected in Account II (Food)



and utilized after budgetary allocations. During the last thirteen years the repayments made to the commercial banks were as follows:

*(Rs. in Billion)*

<i>Year</i>	<i>Repayments during the year</i>
<b>2008-09</b>	45.794
<b>2009-10</b>	47.376
<b>2010-11</b>	101.067
<b>2011-12</b>	56.127
<b>2012-13</b>	104.258
<b>2013-14</b>	97.267
<b>2014-15</b>	,39.098
<b>2015-16</b>	75.231
<b>2016-17</b>	100.74
<b>2017-18</b>	22.942
<b>2018-19</b>	127.056
<b>2019-20</b>	108.983
<b>2020-21</b>	132.756
<b>Total</b>	<b>1058.695</b>
Source: Punjab Food Department	

Moreover, the subject financial transaction was cyclic in nature. Every year the government through the Food department would be making new borrowing for the current year harvest where it would also be making payment of prior year loans by selling off its existing wheat stocks at the same time.

This was highly time-sensitive business activity. It was imperative that timely re-payments were made for the sums borrowed from banks in order to avoid payment of higher interest costs as well as creation of circular debt.

***(ii) Wheat Release Price***

After the wheat is procured, it is sold off to the flour mills/other agencies as per the decision of the provincial government. The government takes in to account various factors while determining the release price of wheat. This is a critical activity as the final price of flour

for the general public is directly linked with the release price set forth by the government. The higher the release price, the higher the cost of flour would be and vice versa.

In this context, it was found that partial incidental charges were included in the release price of wheat during last three years. Details are given below:

*(Rupees)*

Year	Support Price (Per 40 Kg)	Incidental Charges (Per 40 Kg)	Cost Price (Per 40 Kg)	Release Price (Per 40 Kg)	Subsidy (Per 40 Kg)	Incidental Charges passed on to the consumer <i>Per 40Kg</i>
	1	2	(1+2=3)	4	5= (3-4)	6= (2-5)
2019	1,300	800	2,100	1375 with bardana	725	75
2020	1,400	534	1,934	1,475	459	75
2021	1,800	628	2,428	1,950	478	150

The above table illustrates that the gradually accumulated subsidy burden had become unsustainable and its financial impact was being transferred towards the consumers/masses.

## 2.12 Subsidy on sale of wheat

Subsidy may be defined as, “a financial aid supplied by a government to an industry, farmer, or consumer, in order to make low-cost food available to poor people”.<sup>101</sup> In simple terms, the difference between the cost price of wheat and its release price is the “food subsidy” being shouldered by the provincial government. Accordingly, every year the food department calculates the amount of subsidy, it requires from the provincial government to adequately pay-off its wheat financing liability.

### *(i) Major Components of the Subsidy:*

Subsidy constituted those cost items which were not passed on to the general public at the time of sale of wheat. These cost items include

101 “Collins English Dictionary,” Definitions, Translations, Example Sentences and Pronunciations, <https://www.collinsdictionary.com/dictionary/english>.

expenses carried out by the government after procuring the wheat, as well as to meet the differential of costs relating to the reduced release price of wheat at minimum level for the wellbeing of the general public. Over the years, some of the major cost components leading towards subsidy formation included:

- Bank Loan Interest
- Transportation Charges
- Godown Expenses
- Cost of Gunny Bags
- Departmental Charges

## **2.13 Collusive handling of subsidy on sale of wheat primarily favoring non-entitled beneficiaries**

### **2.13.1 Less or non-release of funds for subsidy causing payment of subsidy liabilities from commercial borrowings**

Every year the Food Department, submitted subsidy claim based on the above cost item to the provincial Finance Department for release of subject funds. However, during the last thirteen years, the subsidy provided by the provincial government (through Finance Department) was far less than the actual subsidy worked out and claimed by the Food department. Details are given below:

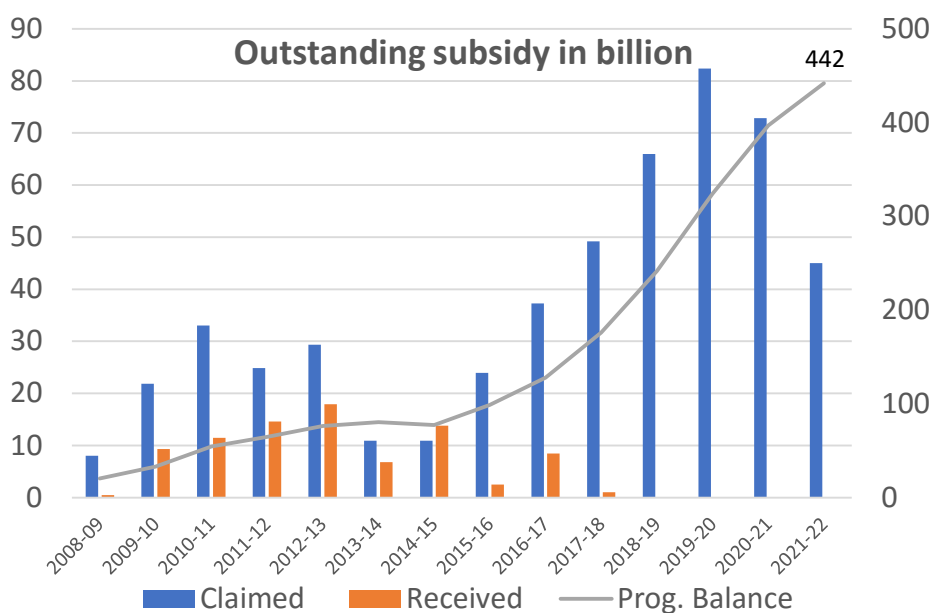
*(Rs. in Billion)*

Year	Opening balance of outstanding subsidy	Subsidy claimed during the Year	Subsidy received	% Of subsidy received	Closing balance for the FY	Progressive balance of outstanding subsidy
1	2	3	4	5= (4/3)*100	6=3-4	7=2+6
2008-09	12.809	8.056	0.47	6%	7.586	20.395
2009-10	20.395	21.859	9.295	43%	12.564	32.959
2010-11	32.959	33.026	11.463	35%	21.563	54.522
2011-12	54.522	24.869	14.578	59%	10.291	64.813
2012-13	64.813	29.342	17.893	61%	11.449	76.262
2013-14	76.262	10.914	6.805	62%	4.109	80.371
2014-15	80.371	10.896	13.806	127%	-2.91	77.461

Year	Opening balance of outstanding subsidy	Subsidy claimed during the Year	Subsidy received	% Of subsidy received	Closing balance for the FY	Progressive balance of outstanding subsidy
2015-16	77.461	23.962	2.5	10%	21.462	98.923
2016-17	98.923	37.251	8.454	23%	28.797	127.72
2017-18	127.72	49.21	1	2%	48.21	175.934
2018-19	175.934	65.94	-	0	65.94	241.706
2019-20	241.706	82.378	-	0	82.378	324.084
2020-21	324.084	72.851	-	0	72.851	396.935
2021-22	396.935	45.00	-	0	45	441.935

Source: Punjab Food Department

Illustratively:



As can be seen from the above table & chart, during the period 2008-09 to 2021-22, there was consistently a substantial gap between the subsidy claimed by Food Department and subsidy received from provincial government. From the financial year 2018-2019 onwards, no funds were released for expense related to financing the subsidies.

Resultantly the outstanding subsidy pertaining to previous years increased from Rs20.395 billion in 2008-09 to Rs 441.935 billion in 2021-22.

Less or non-release of subsidy had multi-pronged impact on the whole wheat procurement and sale processes. Ideally all proceeds from the sale of wheat were supposed to be paid to the banks from whom the monies had been borrowed. However additional expenses were incurred after acquiring the wheat (cost items constituting the subsidy), Food department incurred these expenses from the sale proceeds (Account II Food) and subsequently demanded subsidy from the government to recoup the expense so incurred. This re-imbursement was necessary so that commercial banks could be paid maximum amount of loan re-payments.

As subsidy fund release was less/not being provided to the food department, on the one hand, Food Department had to pay extra interest cost to banks, on the other hand, underlying subsidy expenses had to be borne out of the sale proceeds to wheat, being maintained in Food Account II.

As the out-standing subsidy has rapidly increased during last three years, the capacity of the government to pay-back its wheat financing related payments is steadily decreasing, rendering the overall current wheat procurement model unfeasible.

### ***2.13.2 Circular debt and burgeoning accounts receivables/payables***

The projections for raising new borrowing for procurement operations and repayment of loans, out of sale proceeds of the wheat released to the Flour Mills are made in annual provincial budget. It was noticed that the budget grant of Rs.51.348 billion for the FY 2019-20 for repayment of principal to banks out of sale proceeds was approved. Accordingly, an amount of Rs.46.583 billion was repaid up to 27.11.2019, leaving a budgetary balance of Rs. 4.765 billion.

The government was paying mark-up on daily basis to the banks. However direct payments from daily cash receipts in Account II food could not be made. Based on the working done by Food department the Finance Department released budget for re-payment to subject loans. Any delay in the preparation or release of budget meant extra interest payments to bank.

In this context, it was analyzed that an amount of Rs.60,550 million got accumulated in the Food Account –II from the sale proceeds of wheat from 27.11.2019 to 25th March, 2020. Details were:

*(Rs. in million)*

<i>Date</i>	<i>Account II Food</i>	<i>Rate of interest</i>	<i>Avoidable Interest</i>
Balance as on 02.01.2020	17,056	14.5	216.82
Balance as on 03.02.2020	23,815	14.8	260.73
Balance as on 02.03.2020	43,355	14.8	404.33
Balance as on 25.03.2020	60,550	14.8	49.10
<b>Total avoidable interest</b>			<b>930.98</b>

However, the payments to the banks were delayed for approximately four months due to non-finalization of budgetary release and payments were made on 27th March 2020. Hence delay in release of budget resulted in avoidable interest payments Rs. 930.98 million to the banks. Had timely activities been finalized, the same could have been averted.

### ***2.13.3 Non recovery in respect of food grains supplied to Federal Government***

As per instructions of the provincial government, Food Department issues wheat to other Governments under various schemes. Food Department submits claims to the concerned from time to time. However, it was observed that as on 30 June 2021 Rs. 43.76 billion was outstanding from various governments/Departments which resulted in Food Department seeking external financing and incurring avoidable interest burden.

Details were:

<b>Issues</b>	<b>Department</b>	<b>Amount (Rs.)</b>
Payment of Mark-Up on 2.5 MMT of Federal Strategic Reserves of Wheat Claimed	Food	33.80
Federal Share of Subsidy on Wheat Export	Food	9.96
<b>Total</b>		<b>43.76</b>

*(Source: white paper Govt. of the Punjab 2021-22)*

#### **2.13.4 Wheat sector circular debt posing serious concern to food security**

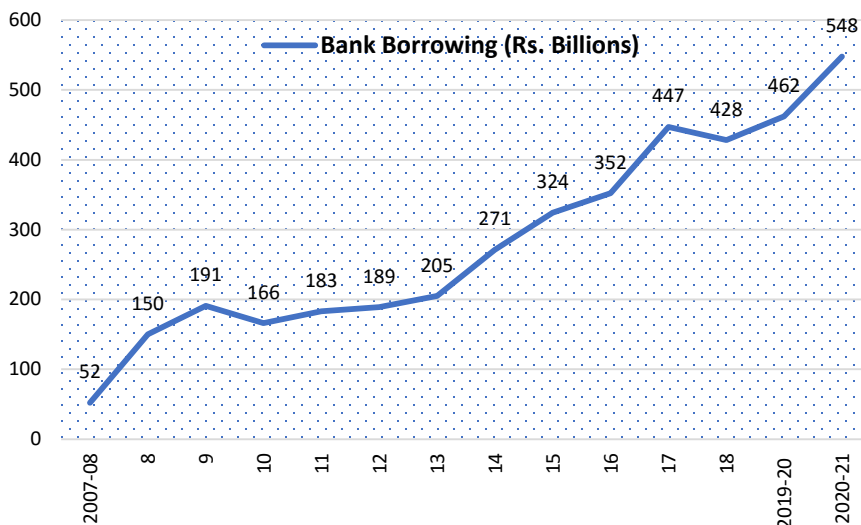
PFD has a credit line with two consortia i.e., NBP & BOP to be utilized during the procurement season and other independent banks also providing loan facility to the department. The receipt realized from sale of wheat to flour mills is repaid to the banks during the year.

Prior to 2008, there was no buildup of stocks or outstanding bank debts. However, since 2008 the government has been clearing only a part of its liabilities due to financial constraints and the rest have remained outstanding each year. Except in 2010-11 and 2012-13, repayments have been less than new borrowing, thereby increasing the outstanding liability. Consequently, PFD has had to pay the mark-up not only on its current borrowing but also on the outstanding debt. On average, during the last four years, PFD has paid Rs.21.5 billion to Rs.55 billion each year as mark-up alone.

Partial payments of debt have led to its significant annual accumulation. As on 30th June 2021 the outstanding wheat financing debt has reached up to Rs. 548 billion. Being ever increasing and cyclic in nature, the same can be termed as “wheat sector circular debt”. After the power sector it is one of the largest circular debts existing in the country.

Illustratively:

### *Wheat Sector Circular Debt*



Wheat circular debt is a significant issue and major threat to the food security of the provinces as it is gradually but steadily decreasing the government's ability to provide benefit of future wheat related subsidies to the masses.

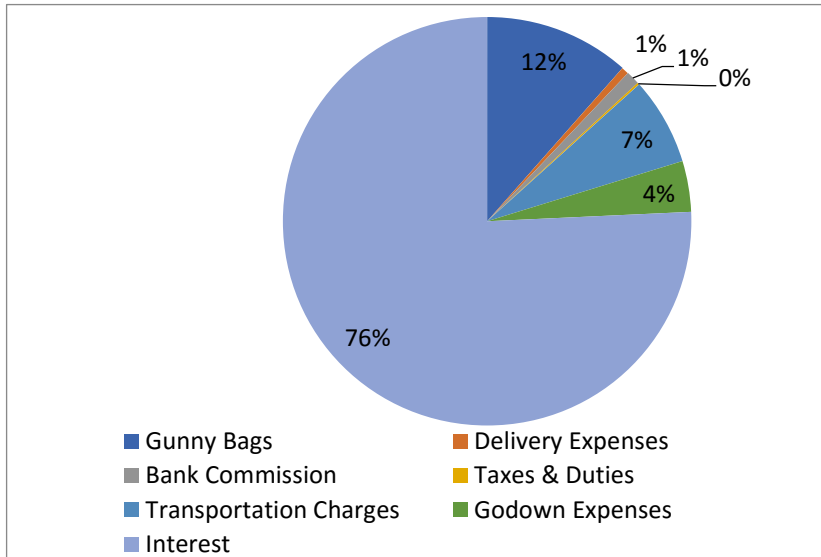
#### **2.13.5 Increase in price of flour due to servicing of wheat circular debt**

As explained earlier, subsidies are basically incidental charges that are incurred by food department on procurement operations. The major portion of incidental charges is interest on borrowings of food department. Owing to heavy interest payments, the subsidies are heavily skewed towards banks. For example, during the financial year 2020-2021, the share of interest calculated by PFD per Metric Ton of wheat was 76 percent of the total incidental charges.



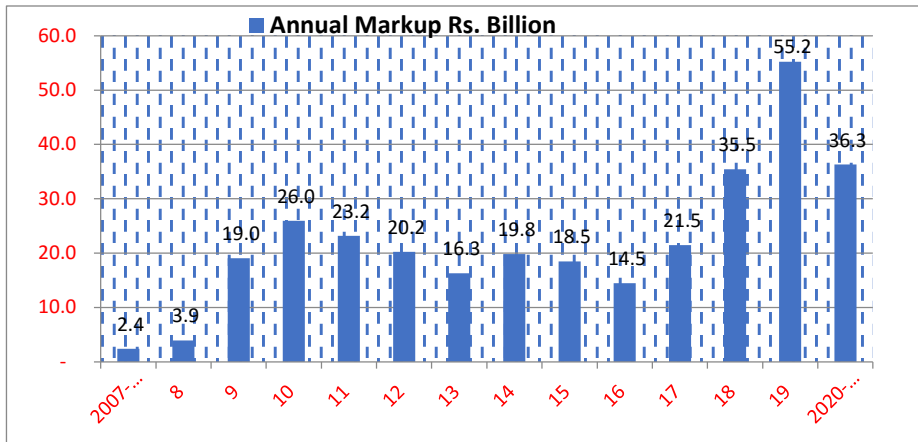
Details were:

**Share of components of incidental charges**



Source: Punjab Food Department

As evident from following graph, the annual mark-up during 2007-08 was only 2.4 billion whereas due to non-payment of timely outstanding debt, it increased to Rs 55.2 billion in the FY 2019-20.



Current borrowing in 2021 accounted for only 40 percent (current borrowing Rs.218 billion/total outstanding Rs.548 billion) of the total PFD debt. If PFD had to pay mark-up only on its borrowing for current operations, its incidentals would be correspondingly less.

Illustratively

Incidental charges items	Incidental charges w.r. to piled up debt	Incidental charges w.r. to current borrowing (i.e., for FY 2020-2021)
Component	Rs.	Rs
Gunny Bags	72.3	72.3
Delivery Expenses	3.6	3.6
Bank Commission	6.76	6.76
Taxes & Duties	1	1
Transportation Charges	43.43	43.43
Godown Expenses	25.28	25.28
Interest	475.37	190.15
<b>Total per 40kg</b>	<b>627.75</b>	<b>342.53</b>

Adjusting the mark-up as shown above gives us a figure of Rs. 342.53 per 40 kg for PFD incidental expenses, provided there is no outstanding debt.

In this context if PFD had procured wheat at the official support price and paid mark-up only on new (i.e., current procurement season) borrowing, its release price of wheat at the time of issuance to flour mills would have been Rs. 2,142.53 per 40 kg (1,800 + 342.53). Then if PFD provided subsidy at the current level (viz. Rs. 477.75 per 40 kg), cost of flour would have been lesser by Rs. 135.22 per 40 kg (342.53–477.75 =135.22), ceteris paribus.

In other words, at present the consumers of wheat were paying Rs.135.22 extra per 40 kg due to long accumulated debt.

### **2.13.6 Food Directorate working without Risk Management Policy**

Working of Food Directorate was of critical significance to the provincial government as it dealt with subject of wheat procurement, storage and release of wheat to flour mills. This had a significant impact

on the masses as it impacted the price of wheat as well as that of flour. Hence for ensuring food security in the province SOPs and allied operations of Food Department were required to be fool proof, robust and resilient.

The department had to work out its key business risk areas, have a risk mitigation policy and ensure implementation of such a policy. Only then could Food Security pitfalls be avoided by the government.

However, no risk management policy is in vogue in the department. As a results chronic issues had accumulated over the years such as, wheat circular debt, inadequate storage facilities etc.

## **2.14 Consumption of government procured wheat for profiteering**

### **2.14.1 *Surplus grinding capacity of flour mills destabilizing the atta supply chain***

As per “Wheat Release Policy 2021-22” clause - wheat shall be released on the basis of targeted population of the district given in the enclosed appendix wherein targeted population-based requirement of wheat was 16,602 MT (per day). The list of respective districts mentioned in the enclosed appendix is placed at annex-C.

As per Punjab Food department’s daily report dated 02.10.2009, total number of functional flour mills in the province were 708, having 5109 working roller bodies with daily grinding capacity of 102,180 tons.

By 2022, the number of mills had increased to 994 flour mills out of which 929 were functional (as on 28.02.2022) with a combined grinding capacity of 184, 360 tons per day (working roller bodies 9218 x per day grinding capacity 20 tons). However, the estimated required grinding capacity was 20,000 ton per day for the urban population of the province.

Details were:

<i>Year</i>	<i>Total Flour Mills</i>	<i>Total Bodies</i>	<i>Functional Flour Mills</i>	<i>Functional Bodies</i>	<i>Grinding capacity per body (per Day in tons)</i>	<i>Total Grinding capacity of flour mills per day</i>	<i>Urban population (million)</i>	<i>Daily Atta requirement of urban population (tons)</i>	<i>Grinding capacity against required</i>
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6*</i>	<i>7</i>	<i>8**</i>	<i>9***</i>	<i>10</i>
<b>2009</b>			708	5109		102180		17788	06 times
<b>2022</b>	994	9868	929	9218	20	184360	59.83	20327	09 times
Source: * As per Punjab Food Department ** Note: (total population of punjab 109.99 million with growth rate equal to 2.13%. Total urban population 36% of Punjab Population besides in migration of labor force reaching out to urban and peri urban dwellings from rural surroundings) = say 50% *** Note: The Daily Atta requirement for the urban population was calculated as: {Total Urban Population X Per capita consumption (124 kg)}/365 = X X/1000 = Y Tons									

The above table illustrated that the grinding capacity of flour mills was approximately 09 times of the daily requirement of the urban population. Urban population represented a major consumption chunk for flour mill atta as in the rural areas, population kept their own food grains and used locally grinded atta. Still even if the overall population of Punjab was considered, the daily average estimated atta requirement came to 20 thousand tons. Hence even with respect to the whole population of the province, the floor mill grinding capacity was far in excess.

It is notable that districts of Punjab bordering KP and Sindh have comparatively more flour mills i.e., Rawalpindi (131), Attock (43) & R. Y. Khan (81) compared to population with wheat requirement of the district. For instance, as per wheat lease policy 2021-22, targeted population based daily requirement of wheat in district Attock & Rahim Yar Khan was 178MT & 375MT per day<sup>102</sup>. However, quota authorized to release the wheat to flour mills on the basis of grinding capacity was 678MT and 1160MT (per day) respectively<sup>103</sup>.

102 Wheat lease policy 2021-22

103 As per daily report of PFD dated 28.02.2022

Having excessive number of flour mills on the borders of the province had changed the very dynamics of supply of atta across the districts of the Punjab. Ideally the wheat was to be released as per the population requirement of a district/city with the objective that the atta so produced by the flour mills could easily become available to the citizens. However, if the flour mills were concentrated in a few areas such as 81 in RY Khan and 43 in Attock, the population-based criteria become irrelevant. In order to remain functional, these flour mills required to grind more atta than the local population demand. The atta so produced was to be transported and re-distributed to other cities and district.

For the flour mills located on the outskirts of the province, it was comparatively less feasible to supply atta across the cities, located deep inside the Punjab than supplying the same to the neighboring provinces at a higher price. Details were:

(Rupees)

City	Price of Atta per Kg						
	May-17	Dec-18	Dec-18	Dec-19	Dec-20	Dec-21	Mar-22
Lahore	36.63	40	39.25	40.5	43	55	55
Karachi	42.24	43.93	44.73	54.42	60.49	66.6	60.51
Peshawar	37.21	38.79	39.5	46.74	51.92	55	55
Quetta	40	40	41	53.12	62.75	70	70.8
Source: a monthly publication of the Vulnerability Analysis and Mapping (VAM) Unit, World Food Programme, Pakistan							

The above illustration was only a sample view. It showed that for the flour mills there was invariably a positive business incentive to sell atta outside of Punjab. Such a practice had two negative impacts. The first impact was that expenses incurred by the provincial government at the time of procurement (support price) and release of wheat (release price) failed to meet the basic objective of providing benefits to the people of the province through ready availability of atta and at affordable rates. The second negative impact was that of recurrence of artificial shortage and

local price hike with regard to supply of atta. As the atta is to be steadily shifted away to other areas, different districts and town centers across Punjab, especially those having lesser number of flour mills, experienced artificial supply shortages.

Other anomalies in the working of flour mills were evident from actions taken by the Punjab Food Department. Details are given as follows:

<b>Sr. No.</b>	<b>Description</b>	<b>No of Flour Mills Proceeded</b>
<b>1</b>	Flour Mills not performing activities on FLMIS after lifting of wheat Quota from PFD.	248
<b>2</b>	Less Grinding	105
<b>3</b>	Supply of atta in Market	230
<b>4</b>	Variation in daily report	118
<b>5</b>	Non maintenance of extraction ratio	32
<b>6</b>	Movement of atta out of province	86
<b>7</b>	Moisture Contents	760
<b>8</b>	Gluten Contents	114
<b>9</b>	Adulteration	2
<b>10</b>	Overcharging	12
<b>11</b>	Any other	729
<b>Total</b>		<b>2436</b>
<b>Source: Report of PFD FLMIS dated 21.02.2022</b>		

Transparent and efficient working of the flour mills in a systematic manner was a crucial element towards ensuring adequately safeguard of food security across the province. Anomalies in the flour mills workings as highlighted in the above discussion meant that the final benefits of multiple government initiatives regarding provision of affordable atta to all segments of population were not being achieved.

### **2.14.2 *Inconsistencies in extraction ratio of atta from subsidized wheat***

As earlier discussed, the main objective of the whole system of wheat procurement by PFD is to provide atta at affordable prices to consumers. For this purpose, Punjab Food Department's releases wheat to flour mills at subsidized price to supply atta in the market at subsidized rate. The flour mills were required to observe prescribed extraction ratio while grinding the subsidize wheat. The extraction ratio was:

<b>Year</b>	<b>Policy issued vide notification No.</b>	<b>Extraction ratio = (flour:fine:bran)</b>
<b>2020</b>	No. SO(F-1)3-46/2020(W.E.) dated July 7, 2020	65:22:13
<b>2021</b>	No. SO(F-1)3-2/2021-22 dated 19 <sup>th</sup> September, 2021	80:10:10
	Substituted with same No. & date	70:18:12

However, the said extraction ratio was fixed by the government of Sindh, for flour mills (80% atta, 10% maida and 10% bran) vide notification No. SO(W)-AttaPrice10(01)201920 dated 23rd October 2020.

The Government is mainly regulating the price of wheat flour only, which is used to make rotis. Maida is used for making bakery items and fine flour for Naans. The bran (choker) is sold on reduced price for animal consumption. The flour mills prefer to focus on producing more maida and fine atta, given its higher market value and usage in more refined products.

As is apparent from the above data, there is no consistency in analytical procedure leading to different turnovers due to variations rampant in extraction ratio over the year. The extraction ratio is a key decision point with significant impact on the wheat / atta supply cycle. If the extraction ratio is on the higher side like in Sindh or Punjab during 2021, this implies that more flour mill atta would be got generated from the wheat released (on subsidized rate) to the flour mills. Whereas if the extraction ratio is on the lower side such as in Punjab during 2020, it would mean that comparatively lesser amount of flour mill atta would be got produced from the wheat released (on subsidized rate) to the flour

mills. In this case additional wheat procurements and wheat imports may become necessary to meet the demand of atta in the market, at the same time reducing the impact of subsidy given against release of wheat to flour mills.

Hence maintaining an extraction ratio in line with international best practices and on rational analysis basis is essential to ensure that due value is derived from the subsidy being provided and that maximum atta supply is facilitated in the market.

## **2.15 Price of wheat paid to farmers and charged to consumers on sale of atta**

### *(i) Preparation & Sale of Atta*

Wheat is grinded for production of atta and other products such as maida etc. It is then sold to the consumers by flour mills and local chakki. This “sale of atta” constitutes the end of the wheat crop cycle with its final step of consumption by the people being met. The manner in which atta is sold to the consumers is a critical business transaction as it constitutes the final impact of all previous activities done in the wheat processing cycle. If care is not taken in the atta sale process then artificial price hikes, shortages, sale of impure products and other hardships are faced by the citizens. The end result in such a scenario is government not being able to achieve the desired target of providing atta/the staple food to the people in an affordable and convenient manner, thereby increasing food security challenges for itself.

The flour mills extract different ingredients from the subsidized wheat as per prescribed extraction ratio:

- i) Flour
- ii) Fine
- iii) Bran



Out of above ingredients, the Punjab Food Department only fixes and monitors the price of atta extracted from the subsidized wheat. The flour mills sell the fine atta, maida and choker at market price. This implies that on average 30 to 35% of wheat received from government is sold at higher market price by the flour mills through its by-products. Further atta and fine atta constitute two main varieties of atta produced by the flour mills. Regular atta or atta is sold at the retail price fixed by government, whereas fine atta is sold at higher prices.

In addition, local chakkis also receive and grind the atta across the province. The variety of chakki atta is pure as no ingredients are being extracted from the wheat. The chakki atta is considered best quality and liked by the consumers. However, the price of chakki atta is higher than the retail price fixed for flour mill atta. A few instances of this are tabulated below:

<b>Price of Atta Available in the Lahore markets as on 08-june-2022</b>		
	Per Bag	Per KG
Maida (white Atta)	-	99.0
Organic shop Whole wheat flour (natural) (5KG)	620.0	124.0
Punjab Atta No. 1 (whole wheat )10KG	809.0	80.9
Sunridge White Chakki Atta (5KG)	525.0	105.0
Sunridge Super fine Atta (5KG)	515.0	103.0
Note: Price of wheat 1 KG	-	55
Source: <a href="https://metro-online.pk/detail/cooking_essentials/commodities/flour/white-flour-and-whole-wheat-flour/punjab-atta-no.-1-whole-wheat-5-kg/12622028">https://metro-online.pk/detail/cooking_essentials/commodities/flour/white-flour-and-whole-wheat-flour/punjab-atta-no.-1-whole-wheat-5-kg/12622028</a> accessed on 08.06.2022		

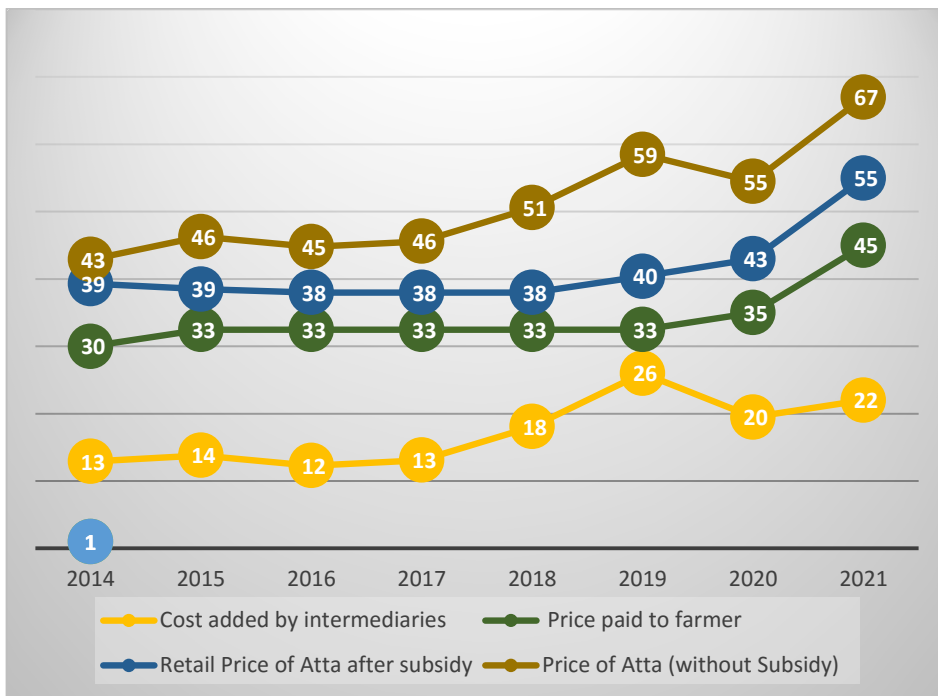
*i) Analysis-price of wheat paid to farmers and charged to consumers on sale of atta*

If price of wheat paid to farmers is compared with the atta sold by flour mills, it can help reveal the minimum amount of cost escalation from the farmer to the atta consumer.

Comparison of wheat purchase cost and atta sold by flour mills for the financial years 2014 to 2021 was as follows:

(Rate per KG in PKR)

Years	Price paid to farmers per KG	Incidental Charges per KG	Cost price (per KG)	Release Price	Subsidy Per KG	Retail Price of Atta (KG_	Increase in price of atta	% age increase.	Rate Atta without Subsidy	Cost added by intermediaries
1	2	3	4 (2+3)	5	6 (4-5)	7	8	9	10 (6+7)	11 (10-2)
2014	30	6.9	36.9	33.3	3.6	39.3	0	0%	42.9	12.9
2015	32.5	7.3	39.8	32.0	7.8	38.5	-0.75	-2%	46.3	13.8
2016	32.5	6.8	39.3	32.5	6.8	38.0	-0.5	-1%	44.8	12.3
2017	32.5	7.6	40.1	32.5	7.6	38.0	0	0%	45.6	13.1
2018	32.5	12.6	45.1	32.5	12.6	38.0	0	0%	50.6	18.1
2019	32.5	20.0	52.5	34.4	18.1	40.4	2.4	6%	58.5	26.0
2020	35	13.4	48.4	36.9	11.5	43.0	2.6	6%	54.5	19.5
2021	45	15.7	60.7	48.8	12.0	55.0	12	28%	67.0	22.0



The above data showed that a considerable amount of cost ranging between Rs.12 to Rs.22 were added on to the cost of atta sold by flour mills (inclusive of subsidy) during the last 08 year. This meant that a significant amount of cost was added on each year as intermediary cost to the actual wheat purchase price from the farmers. This intermediary cost had steadily increased over the years turning out to be one reason for the higher price of atta in the market. Although subsidy was not passed on to the consumer, it had a cost effect, burdened on the government and as illustrated in the subsidy section of this report was a contributing factor to increasing incidental charges over the years.

Moreover, the above tabular analysis is only with respect to flour mill atta that is extracted from the subsidized wheat at the ratio of 70:18:12. This atta is considered to be not as nutritious as chakki atta or whole-grain atta because the mill atta is not whole grain based as different by-products such as fine atta and maida are extracted from the wheat supplied to the flour mills.

Hence the actual price difference between the cost paid to farmers at the time of wheat procurement and the cost at which the consumer buys atta from retail outlets is the price of whole-grain based atta, which is significantly on the higher side. The table listed above highlights this difference. It is apparent that at the end of the consumer for which the whole wheat cycle and all government initiatives are based, the cost of atta supplied is far higher than the cost of wheat crop itself. The cost of wheat products gets appreciably escalated from Rs.55 per kg wheat (Year 2022) at farmer end to Rs. 103 per kg atta (Year 2022) at consumer end for the actual whole-grain product. This shows inherent system in-efficiencies, the ever-growing role of intermediaries and the additional risks posed to food security on account of these system in-efficiencies.

## SECTION 3

This section exhibits the feedback /viewpoints of key informants, focal persons, stakeholders and various bodies voicing concerns on wheat growing, marketing and other allied factors of food security.

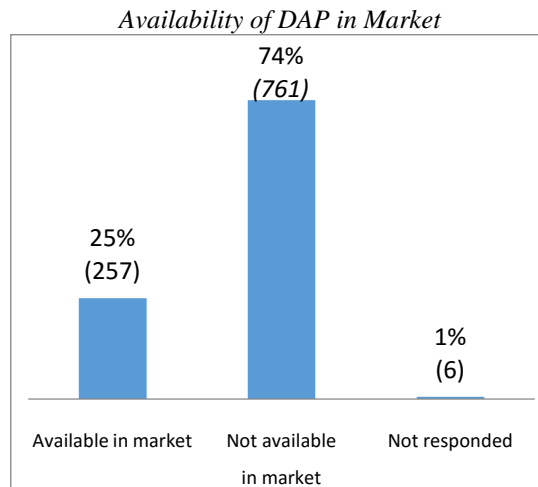
### *Stakeholder's feedback:*

#### *3.1 Structured questionnaire survey*

Field survey was conducted to get the farmer's feedback. Total 1024 number of farmers from nine districts of the Punjab (Sargodha, MB Din, Gujrat, Gujranwala, Sheikhpura, Multan, Muzaffargarh, Bahawalpur and Layyah) were interviewed in the feedback survey. The results of the feedback survey of growers are as under:

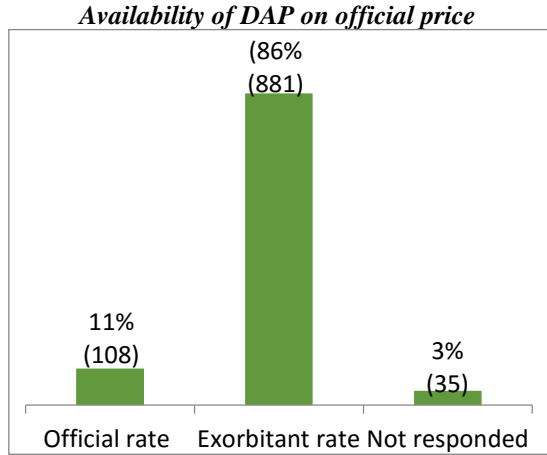
#### *Availability of DAP at the time of wheat sowing (last sowing season)?*

25% of the farmers responded that DAP was available at sowing times of wheat; 74% responded that DAP was not available or available with more difficulties; and 1% did not respond. This showed that the DAP was not equally available to majority of farmers readily.



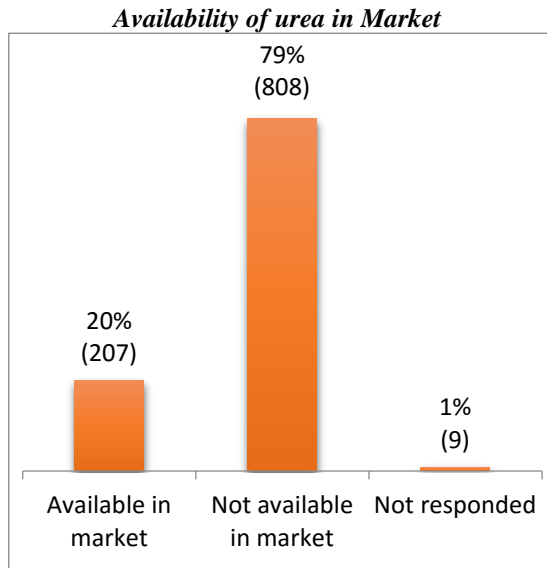
***Availability of DAP on official price (last sowing season)***

11% of the farmers responded that DAP was available in the market on official rate; 86% responded that DAP was not available in the market on official price; and 3% did not respond. It is apparent from the survey that farmers acquired DAP on off-market high rates. This meant that not all farmers got access to DAP causing negative impact on the crop cultivation.



***Availability of urea at crucial times (last sowing season)***

20% of the farmers responded that urea was available at crucial times i.e., 1<sup>st</sup> & 2<sup>nd</sup> irrigations of wheat; 79% responded that either the urea was not available or available with more difficulties; and 1% did not respond to questionnaire. This showed that the urea was not easily available to majority of farmers. This implied that farmers were unable to add adequate quantity urea to their crops, which would ultimately negatively impact crop productivity.

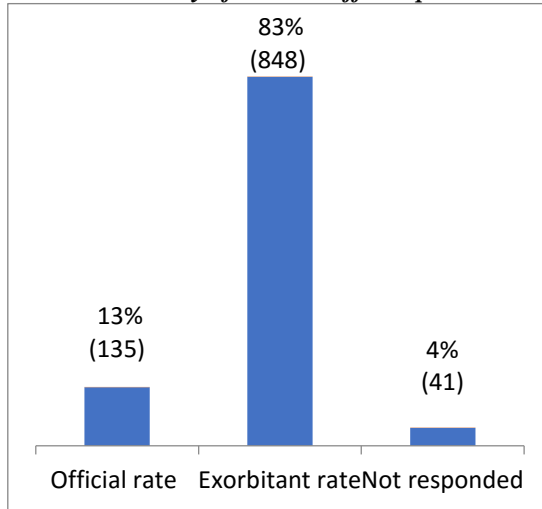


***Availability of urea on official price (last season)***

13% of the farmers responded that urea was available in the market on official rate; 83% responded that urea was not available in the market on official price; and 4% did not respond.

The above stats showed that cost of production of wheat was significantly higher than normal during the subject sowing season making the wheat cultivation process more complex for the farmers.

***Availability of urea on official price***

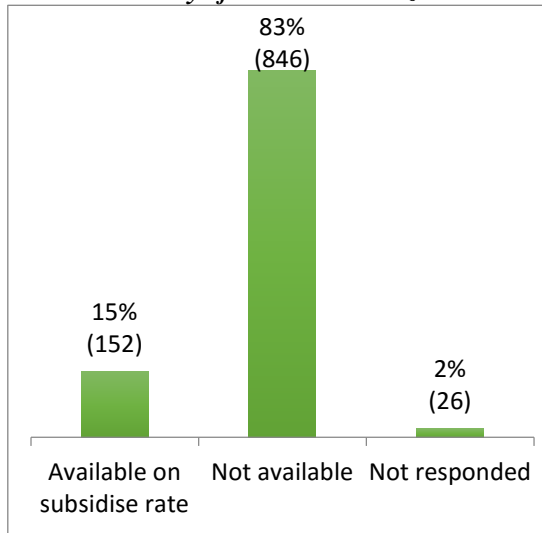


***Availability of urea at subsidized rate (last season)***

Only 15% of the farmers responded that Urea was available at subsidized rate in market; 83% responded that Urea was available in market at higher prices; and 2% did not respond. This showed that the Urea was not available at prescribed price and farmers paid extra price.

The above stats indicated that desired results from subsidy drive were not achieved.

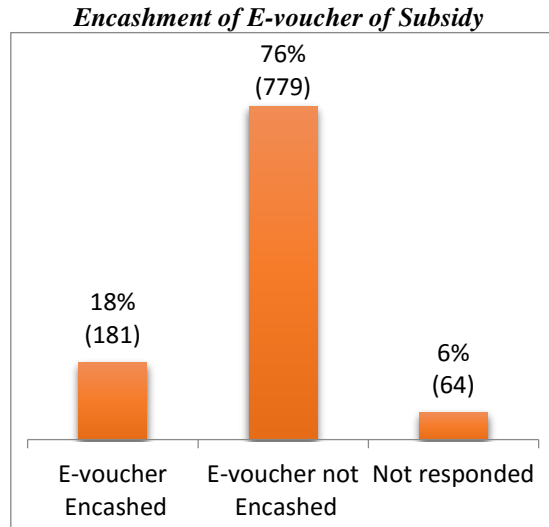
***Availability of Urea at Subsidize rate***



***Encashment of E-Voucher of Subsidy***

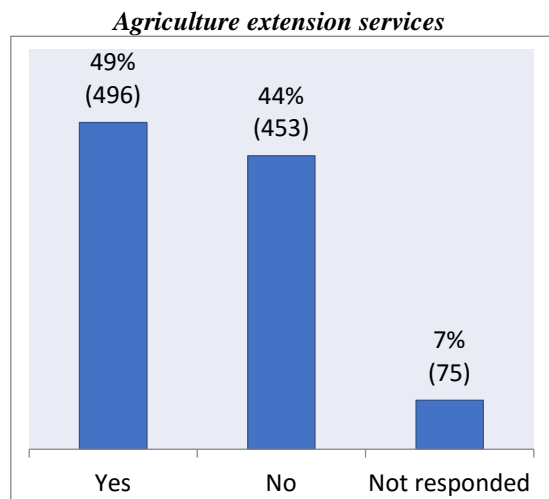
Only 18% of the farmers responded that they got E-voucher of subsidy en-cashed; 76% responded that they had not got the benefit of subsidy owing to non-encashment of E-voucher.; and 6% did not respond. This showed that the benefit of subsidy was not transmitted to farmers.

The above results also implied that internal controls were weak with regard to the subject subsidy initiative.



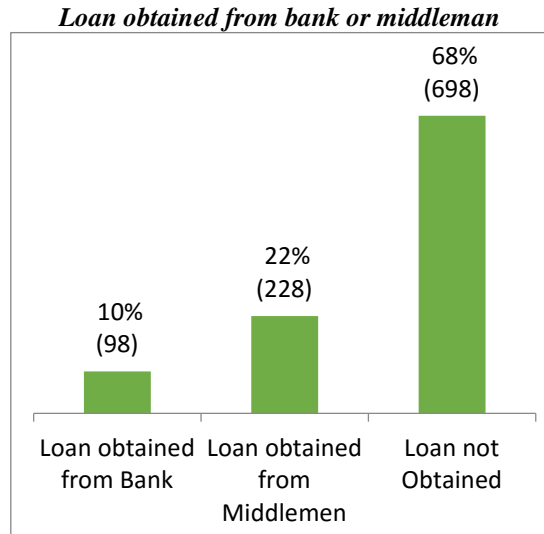
***Adequacy & Coverage of agriculture extension services***

49% of the farmers had an access to agriculture extension services; 44% had no access to these services in the Punjab; and 7% did not respond. This showed the inadequacy & low coverage of Agriculture extension services available to farmers of Punjab.



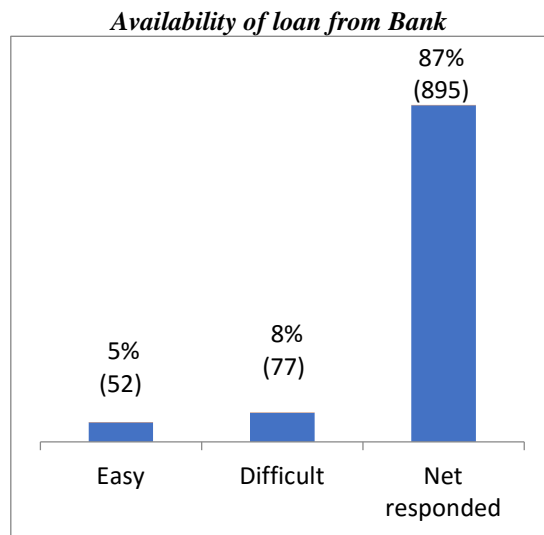
***Loan facility availed by farmers.***

10% of the farmers had availed the facility of loan from financial institutions (banks); 22% had got loan from middlemen, brokers, shopkeepers etc.; and there were 68% that had not got the loan either from bank or middlemen/broker or not responded.



***Availability of Loan from Bank.***

5% of the farmers responded that the process of obtaining loan from bank was easy; 8% was of the view that there was difficult procedure to obtain loan from bank; and 87% did not respond.



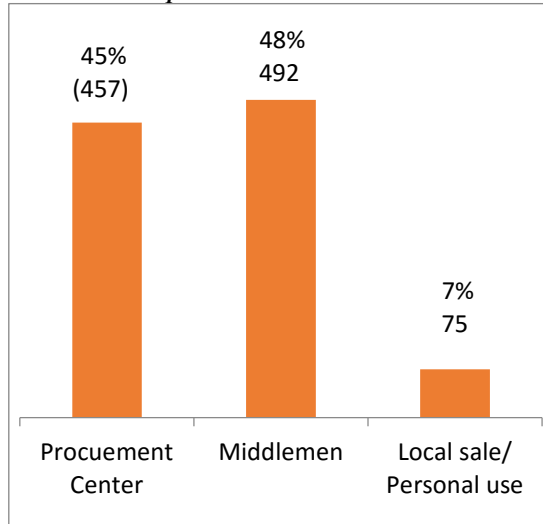


***Wheat sold at government procurement center or middlemen***

45% of the farmers sold their wheat at government procurement centers; 48% had sold their wheat to middle man; and there were 7% those who sold their wheat to local consumers or retained for their personal use.

The above further highlighted the growing role of middle-man in the wheat market.

***Wheat sold at procurement center or middlemen***

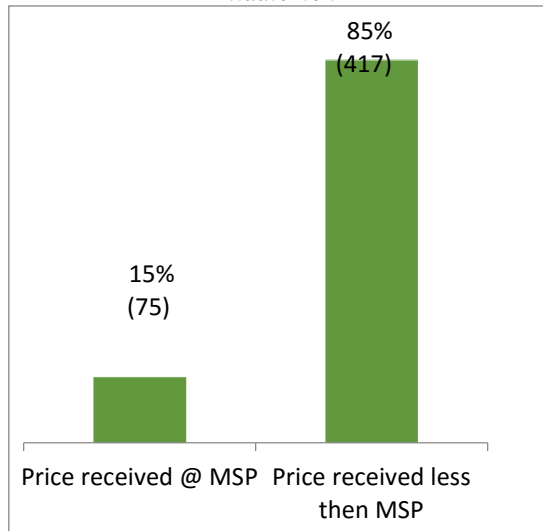


***Price of wheat received by farmers from middlemen***

15% of the farmers received full price i.e., MSP of wheat who sold their wheat to middleman; 85% of the farmers had received less than MSP when they sold their wheat to middle man. This showed that the purpose of MSP to safeguard the farmer's interest was not achieved owing to intervention of middleman.

The above stats also implied that role of middle man was negatively impacting the wheat cultivation by the farmers.

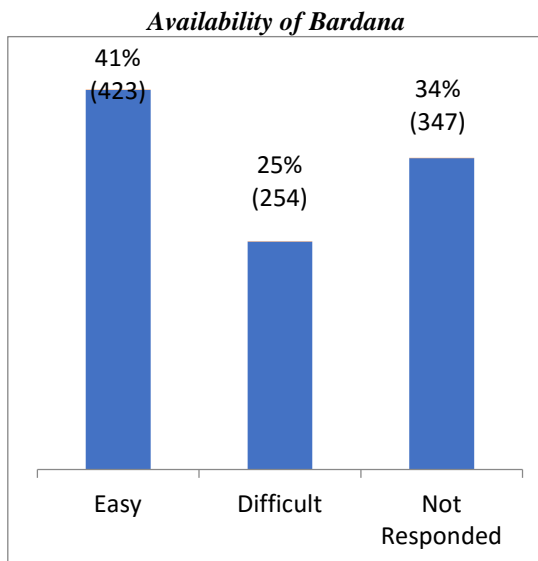
***wheat price received by farmers per 40kg from middlemen***



***Availability of bardana for sale of wheat at government center.***

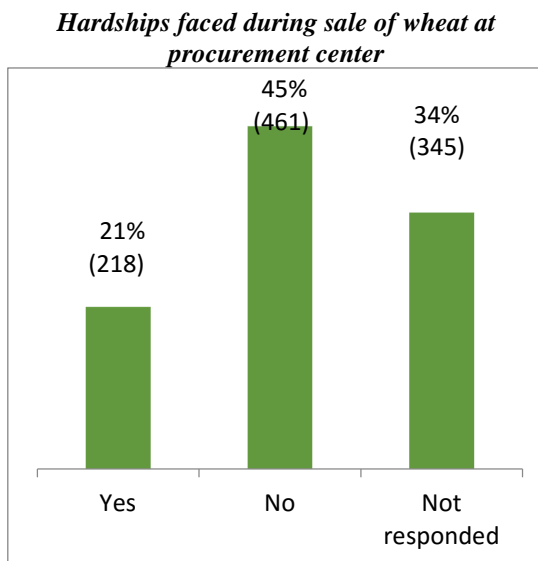
41% of the farmers responded that there was no difficulty in the availability/receipt of bardana to sell the wheat at procurement center; 25% of the farmers had responded that they faced difficulties in receipt of bardana and there were 34% who did not respond.

The above analysis showed that most farmers tried to avoid from the bardana receipt process because of the difficulties in the registration process.



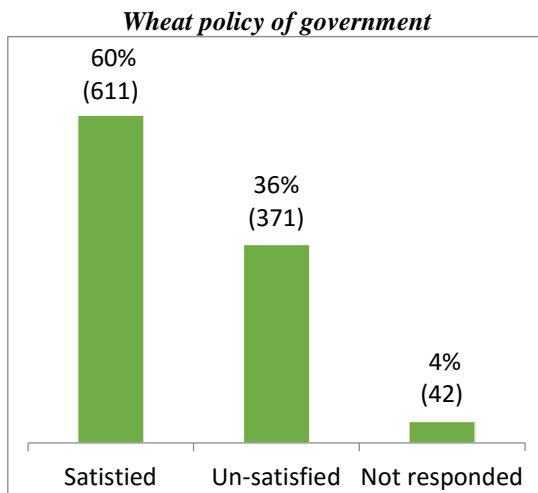
***Hardships faced by farmers at the time of sale of wheat at procurement centre***

21% of the farmers responded that they faced difficulties over sale of wheat at procurement center; whereas 45% of the farmers had responded that they faced no difficulties during sale of wheat at procurement center and there were 34% who did not respond.



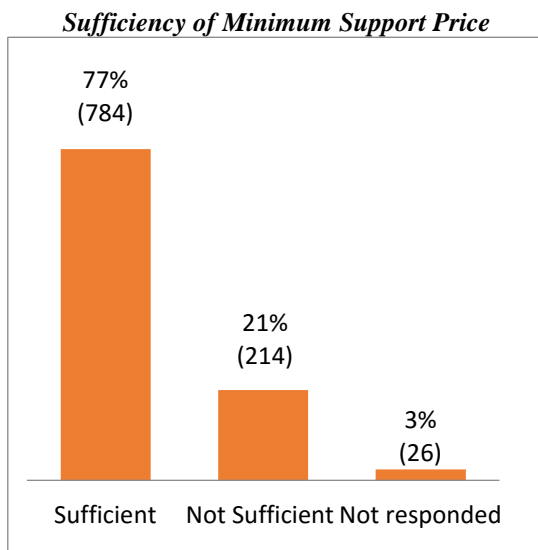
***Wheat policy of government***

60% of the farmers responded that they were satisfied in respect of wheat policy of the government; 36% found un-satisfied; and 4% did not respond.



***Sufficiency of Minimum Support Price of Wheat***

77% farmers responded that the MSP announced by the government for wheat season 2021-22 was sufficient; 21% were not satisfied with the announced price; and 3% did not respond.



### *Viewpoint of key stakeholders*

During the course of study, study team got the view point of Pakistan Kisan Ittehad and Pakistan Flour Mills Association enabling both the entities to be part of this consultative exchange:

#### **3.2 *Viewpoint of Pakistan Kisan Ittehad***

In order to modernize our agriculture and enhance agriculture productivity to a surplus level, Pakistan must take some fundamental and concrete measures such as:

1. Agriculture should immediately be declared an “industry” and provided same incentives so that it can grow accordingly.
2. Any assistance provided to Agriculture is not subsidy but in reality, it is an investment in agriculture, which returns in terms of employment, exports earnings, self-reliance, value addition and women empowerment.
3. Any penny put in agriculture, returns with multiplier effect. Hence, Agriculture sector must be declared an investment-oriented industry, which provide jobs, earns foreign exchange, provide import substitutions and make industry to run.
4. As it qualifies to be declared an “Industry” it will be liable to concessional-interest rate loaning and proportionate loans against equity and subsidized rates of utilities.
5. PIU based agriculture loaning policy be replaced with sanctioning of 50% of value of Govt declared (DC price) of land.
6. Agriculture loaning @ 50% of value of land must be included in State Bank of Pakistan’s policy and economic policies of the Finance Division of the Government. This

- will boost modernization but transform the entire agriculture sector.
7. Aggressive Taxation on agriculture inputs must be avoided and input prices be brought to the level of neighboring countries to provide a level playing field so that the sector continues to provide jobs and cheap raw material to local industry. The prices of fertilizers, pesticides, seeds, diesel, electricity and farm machinery be kept at lower level.
  8. Minimum support price of all major crops will ensure profitability of growers and enhance productivity, which can substitute imports of food commodities.
  9. Research, Extension and academia (agriculture universities) be brought under one umbrella, this will help to best utilize the resources and trained manpower housed in agriculture universities and which will boost our agricultural productivity.
  10. There must be a permanent forum or platform to formulate short-, medium- and long-term policies in consultation with farmers. The forum shall be authorized to take immediate decision on export, subsidies or ban on import of a commodity to protect local production.
  11. Small farmers may be included in government pension and social security schemes and provided free insurance against price instability and natural calamity.
  12. Agricultural research is underfunded in Pakistan in comparison to neighboring countries in the region. The R&D spending must be enhanced from 0.18% of agriculture GDP to 2% in next three years.
  13. New technologies of seed, production and mechanization be acquired to keep the domestic agriculture production aligned with that of international best practices.

14. Free, fair and urgent justice is basic right of farmers as well which should be assured by legal reforms.

### **3.3 *Viewpoint of Pakistan Flour Mills Association***

1. Wheat is raw material of flour milling industry. Flour Mills purchased wheat from open market during harvesting season along with Government agencies. But as experienced in past years, Provincial Food Department imposed certain restriction on purchase of wheat by flour mills during harvesting season and mills were not able to meet their daily grinding requirements. That disturbed the supply chain of wheat products in market. There must be no restriction on purchase of wheat from open market even in harvesting season. There must be free movement of wheat and purchase of wheat by Flour Mills to ensure their uninterrupted supplies of wheat flour at affordable prices.
2. Every year government announced wheat release policy for release of subsidized wheat to flour mills and framed certain SOPs for release of wheat to flour mills which is not satisfactory
3. Government has fixed unrealistic subsidy rate for recovery from flour mills including Bank mark ups of past previous years which is not justified. The recovery rate of subsidy must be rationalized.
4. Punjab Food Department usually closed flour mills or stop wheat supplies even on minor mistakes or imposed recovery or fine on flour mills that is not justified and must be stopped.

5. Provincial food department verified grinding of subsidized wheat and sale of wheat flour through different methods, posting staff at mills premises, verification from market and through consumption of electricity, triple verification is not justified. There must be one method of verification of grinding and supplies of wheat flour to markets.
6. Provincial Agriculture Department marketing division (Market Committee) has unnaturally increased the registration/licensing fee and also 100% increased market committee fee that must be reviewed in case of flour mills and must be minimized up to 50% as is done in the case of cotton ginning industry.
7. State Bank of Pakistan has authorized National Bank of Pakistan for receiving cost of government wheat. This is a great facility for the millers located in the area where State Bank of Pakistan is not available or not in nearby location.
8. In last four days of every month, National Bank of Pakistan refused to receive prices of government wheat and directed millers to deposit wheat prices in State Bank of Pakistan, that creates problems for flour millers. Due to current law and order situation, it is not safe to carry huge cash amount to distant branches of State Bank of Pakistan. That must be rectified and National Bank of Pakistan may allow to receive payment from flour millers.

### **3.4 *Key informants' interviews,***

To gain an understanding of the subject of Food Security, its inter-related aspects and the initiatives currently being implemented by the provincial and federal government, the study group carried out discussions and unstructured interviews with different key focal persons.

Meetings were held with Director Food Punjab and Director General Agriculture Extension Punjab. The officers sensitized the study group on the existing wheat procurement practices and allied wheat support facilities being provided to farmers. Similarly, interface of the Food department with flour mills was also discussed.

Similarly, meeting was held with Mr. Imtiaz Ali Gopal, Food Commissioner at the Ministry of National Food Security & Research. Mr. Gopal highlighted the wheat cycle process and the role of different stakeholders in the process. The proceedings of FCA were also deliberated upon. A meeting was held with Director General API Islamabad Mr. Abdul Karim, on the wheat production and the challenges relating to it.

An Interview was held with Environmental Jurist Mr. Sardar Asif Siyal to discuss the issue of food security and its link with environmental challenges faced by the country. Mr. Siyal explained that environmental changes of which climate was one part was severely impacting the agriculture practices of the country. Although at a global level Pakistan's contribution towards global warming was negligible yet, on the impact side it was one of the countries being most effected by climate changes/spikes. In a cyclic fashion the threat of droughts and desertification was increasing for Pakistan and for the Punjab province. There was a strong need to ensure that internal water accords were adhered to in letter and spirit and efforts made to avoid future negative fallout from Indus Basin Water Treaty.

Apart from this, a string of environmental conservation/restoration measures were needed to ensure future food security of the province. These included initiatives such as building of small dams, afforestation projects in urban areas and rural areas comprising of local indigenous tree with preference to fruit bearing varieties. The highways were also a source



for afforestation and indigenous shady trees instead of current eucalyptus trees could be planted.

Mr. Sardar argued that the issue of food security was central to very stability of any country and in the face of growing environmental challenges, ensuring food security was a major national goal. It was clear that the future global power would be a state that would have self-sufficiency in food.

Agri-Republic Co-Founder, Mr Amir Hayat Bhandara said that the wheat was the most widely grown and used commodity in Pakistan which was needed because it satiated the hunger of every one alike. Pakistan has become the net importer of wheat due to various factors such as lack of research in increasing yield and insufficient support prices. In particular, the total wheat production declined by six to nine percent in Punjab due to many reasons including but not limited to the impact of climate change, shortage of agricultural water, increase in crisis of fertilizers and diesel, higher cost of production and poor management at the market level. In Punjab, the case was not just the decline in productivity but also the decline in crop area, and late MSP announcement also impacted the decisions of the farmers. On the other hand, the government procurement strategy also disheartened the wheat farmers like every year.

### ***Evolving holistic appraisal of contentious issues***

Insofar as responses received to a questionnaire from the Peasant community are concerned, it was apparent that there was a gap between existing government agriculture policies and their intended benefit meant to be extended to the farmers. At the implementation level, farmers were faced with multiple difficulties rendering the initiatives less effective. The role of the middle-man was also very extensive in the current agriculture practices and was a source of hardship and profitability minimization for the farmers. With greater efficiency and transparency, ease of doing business hassle free, this role needed to be reduced.

Insofar as Kissan Ittehad's stance is concerned, Kissan Ittehad representatives gave a variety of proposals for improving agriculture sector performance and thereby food security in the province. Some of these proposals such as avoidance of taxation on agriculture inputs and stabilizing their prices, Agriculture loans at 50% of land value as well as the establishment of a broad forum to frame agriculture-related policies do merit review and consideration.

As far as the representative of the flour mills association are concerned, they highlighted the different issues being faced by the flour mills specifically with reference to their relation with the provincial food department. Through more positive coordination, the same could be addressed. Furthermore, the proposals put forward by the representatives such as opening the market for wheat purchases and allowing the export of wheat products were more relatable to the days when productivity is doubled as per yield potential and surplus stocks are in abundance. However, it transpired that the un-recorded and undocumented turnover of stocks released from PFD storage needed "track and trace" and such initiatives could be effectively launched without having any negative fallbacks.

## SECTION-4

### *Conclusion and way forward*

It is apparent from the above discourse that food security in Punjab with respect to wheat crop is neither stable nor satisfactory. The issue has not emerged overnight; rather it has assumed alarming proportions, slowly and steadily over the years. Both internal and external factors have created challenges to food security with respect to the wheat crop. The wheat production has not increased in a manner consistent with the needs of the growing population of the country. The per acre yield has remained static, whereas the cost of production has increased manifold. This has resulted in wheat gradually becoming a less feasible crop for farmers to cultivate. The impact of this can unfold itself into a gradual shift to alternative crop preference like maize, potatoes triggering crisis worse confounded.

On the consumer end, atta availability is unpredictable through a host of domestic factors including, prices varying across the country, potential smuggling and unplanned mushroom growth of flour mills concentrated on the very outskirts of Punjab rather than densely populated centers. Furthermore, there is limited capacity for storage of wheat leading to exercising the option of import of wheat depleting forex reserves and leading to further escalation of atta prices for the consumers. Adverting to the key research question whether current state of affairs could be allowed to perpetuate, it is imperative to forge concerted efforts revolving around broad based remedial action plan, reinforced by synergy of multi pronged interventions. The core areas which need to be focused upon include revisiting minimum support price estimation, channelizing of targeted subsidies, doing away with governance gaps and improvising reform agenda based on a well conceived action plan.

Wheat crop is the major staple food of the common Pakistani citizen. Its food security through adequate supply, distribution and price

control is quite critical to the economic and political stability of the country. Hence all stakeholders need to work together to ensure that country farsighted policies are made, effectively implemented and thoroughly monitored, to improve food security in respect of wheat crop, ensuring that Pakistan remains a food secure country in the coming future. The course of action also needs reinforcements simultaneously adding to the reform agenda measures enumerated at Annexure-D relating to environmental sustainability.

## SECTION-5

The study group recommends adoption of multipronged measures encompassing key areas involving both in short term as well as long term improvisations.

### **Recommendations and action plan**

#### ➤ *Minimum Support Price*

Minimum support price plays a vital role to make the wheat crop cultivation feasible both in area vis-a-vis enhance productivity. It describes the profitability that leads to sustainability. In this context, in the short term it is recommended:

- Timely announcement of the Minimum Support Price well in advance of sowing will encourage the farmers to cultivate and invest in the crop. The farmer's decision on how much he/ she wants to invest in his crop totally depends on the price which he/she received on the maturity of the crop.
- A uniform minimum support price policy across the provinces may be enforced to maintain flour prices as well as food security across the country. and
- In the long run, to determine the sufficiency of MSP, the government may constitute a Commission on Agricultural Costing (comprising of experts with equal representation from all provinces) which analyzes the support prices prevailing internationally, and in neighboring countries weighing inflationary trends as well as the cost of the produce on rationale basis. To make the commission effective, all out efforts may be made to implement the recommendations of the commission.

➤ *Wheat in-puts*

The quality agricultural inputs like seed, fertilizers, pesticides, weedicides and water etc. are the key elements of crop cultivation. Non-availability of these inputs at crucial times at affordable prices adversely affects the crop yield. To ensure the availability of quality inputs at affordable prices to enhance wheat productivity in the short term, it is recommended that:

- High quality seeds are acquired from countries where the average yield is considerably higher than that in Pakistan. The CPEC initiative may be explored for this purpose.
- To ensure the availability and use of the quality seed, it is suggested that a seed replacement scheme may be launched to replace (a barter system) for exchange of the local seed of farmers (small/low income) with quality seed free of cost before the sowing season. This will enable the farmers in increasing productivity without adding any additional cost.
- To maintain price stability and ensure availability of inputs like seed, fertilizers, etc. the supply chain of inputs may be documented from producer to end-users through the intervention of information technology. This will help the government to check hoarding, black marketing and smuggling of agricultural inputs.

In the long term: -

- Investment may be made in the research and development of heat-tolerant varieties. Simultaneously, IT-enabled effective organizational measures are needed to provide quality seeds to the farmers at their doorstep.

- A modern seed Act may be enacted to deal with fake seed varieties.
- Investments may be made for development and disbursement of cost-effective modern implements for agriculture moving from traditional agriculture to modern techniques for example Flood irrigation to drip irrigation and traditional sowing to drill sowing.
- Pakistan is the third-largest user of groundwater for irrigation in the world with 73% of cultivated land being directly or indirectly irrigated using groundwater. The Punjab province uses more than 90% of the total groundwater abstraction. Owing to this, the groundwater levels of Punjab in more than 50% of the irrigated areas have dropped below 6 m. For effective groundwater management, it is recommended that on the supply-side the construction of water storage dams is the only way that ensures the future food security of the country. On demand side, innovative interventions may be introduced for balancing the use of groundwater for irrigation e.g. drip irrigation instead of flood irrigation etc.

➤ *Subsidy on agriculture inputs*

To minimize the cost of production and to make crop cultivation feasible government grants subsidy on various agricultural inputs. However, due to inflationary trends and low coverage, the objective of subsidy remains unachieved. To make the subsidy scheme more effective the following recommendations are made in the short term:

- For a successful E-voucher subsidy scheme, there is a need to enhance fund allocation as well as the face value of the E-voucher to cope with inflation.

- In the long run, 100% registration of farmers needs to be ensured for enabling them to be eligible for E-voucher subsidies. Moreover, the subsidy amount of the E-voucher may be transferred into the concerned farmers' account only. Furthermore, a mechanism may be devised to move from a re-imbusement model to an advance payment model wherein the farmer is facilitated in a hassle-free way to get subsidized inputs.
- In the case of implements, to provide the benefit of subsidy to small/medium farmers, Community Based Organizations may be formed taking into consideration best practices on the same internationally.

➤ ***Increasing unplanned Urbanization and food security***

The emerging risk of unplanned urbanization is impacting food security in multiple ways; - shrinking of quality agricultural land, labor shift from rural areas and also increasing the demand for wheat-atta among urban consumers. It is recommended that the ongoing challenge of rapid urbanization may be addressed through effective legislation to ensure the future of food security.

➤ ***Agriculture Extension Services***

In the modern era, the agriculture extension services have become an integral part of agriculture sector development. The inadequacy of agriculture extension services proves disadvantageous for the farmers as they are unable to adopt new available cultivation technologies, safeguarding the crop from climate change effects and available quality inputs. Systematic change may be introduced to address the issue. First, a list of key services along with a verifiable quantitative matrix may be defined. Information technology including GIS application could be consulted. Next as a test case, a pilot exercise may be conducted in few



districts to test the provision of new agriculture services model. Results thereon may be replicated.

➤ ***Agriculture Credit***

The financing requirements of the farmers have increased with the increase in cost of various inputs like land rent, fertilizers, fuel prices and harvesting cost. To bridge the gap of required working capital for farmers, in the short-term government may engage the financial institutions to enhance the credit limit by up to 50% of the cost of the land. In the long run, there is a need to devise a mechanism of credit scheme for the provision of agriculture credit to farmers at low markup and waiver of processing fee.

➤ ***Managing Climate Change***

A permanent cell/wing under the agriculture department needs to be established with the singular focus of identifying the impact of climate on each crop harvest at the tehsil and village level. This research exercise should then be used as input for policy decision-making to face the future food security challenges of the province.

➤ ***Wheat Procurement and Storage***

PFD procures and stores wheat for strategic reserves as well as operational use to provide atta at affordable prices to consumers and ensure food security. In this context, it is recommended that:

- The annual procurement requirement of wheat may be based on a scientific base, considering various aspects such as climatic changes, geopolitical scenario etc. instead of a historic basis. Focus should be on ensuring wheat-based food security.
- To meet the storage requirement of PFD, in the short term, it would be helpful to make operational the un-operational

storage facilities through repair and early completion of Silos which were under construction at District DG Khan and Bahawalpur. In the long run, the storage capacity of the province may be enhanced to 05 MMT subject to review after every 05 years.

➤ ***Financing the procurement and subsidy thereof***

PFD finances its wheat procurement activities through commercial borrowing from banks and payback from the receipt realized on account of release of wheat to flour mills and subsidy paid by the provincial government. However, over the years due to various factors (subsidy by FD, idle interest, pending claims etc.), wheat circular debt emerged and the price of atta increased. To streamline the business of PFD, it is recommended:

- The FD may make a timely allocation to the Food department towards the food subsidy component to be given to the Food department and un-budgeted subsidies should be discontinued. Moreover, a strategy may be formulated for the disbursement of targeted subsidy for providing maximum benefits to the needy sector of the population.
- To reduce the cost of atta, historic incidental charges may not be passed on to the consumers. Separate payback modalities for this pending liability may be finalized by the provincial government.
- Efforts for receipt of outstanding claims from various governments/departments on account of the sale of wheat need to be accelerated.
- In the long run, the provincial government may establish a wheat procurement fund for financing the wheat procurement. Initially, the fund may be injected with

capital, to be later enhanced through various planned initiatives. This will eventually reduce the burden of interest as well as maintain the price of atta.

➤ ***Managing the supply and price of atta***

The wheat procured by the government was subsequently released to the flour mills at a subsidized price to supply atta in the market. This made the role of flour mills pivotal in stabilizing the supply and price of atta. For efficient management of this subject area the following recommendations are made:

- The supply chain of subsidized wheat released to flour mills as well as the stocks procured by flour mills may be documented from flour mills to end consumers through IT-based interventions. This will enable the government to check the issue of less grinding, non-maintenance of extraction ratio or movement of atta outside the province etc.
- The release of quota on the basis of the grinding capacity of flour mills destabilizing the atta supply chain in districts having a lower number of flour mills merited that subsidized wheat quota to flour mills may be pegged to the proportion of the targeted population of the district concerned.
- The business of the flour mills in collaboration with all stakeholders needs to be standardized and made transparent at the national level ensuring that local hoarding and smuggling of atta is prevented.

➤ ***Planning through out of the box approach and in conformity with ground realities:***

As has been illustrated in this research study, a number of initiatives to promote wheat crop and maintain stable prices of its products have been made over the years. However, the success of these initiatives can be debated as food security issues in the context of wheat have been attracting complexities and complications. Hence, an out of the box thinking is needed to devise robust and scalable initiatives that can add true value to the agriculture and wheat sector.

It is thus imperative that those who are involved in planning new initiatives and executing them are rendering themselves subservient to a settled action plan and defined KPIs. The success of the initiative is tied to the success of those assigned the task of steering them in terms of performance measurement criteria. This action plan for rolling it out on a short-term basis is placed below in the tabulated form.

**Action Plan:**

Target	Actions	Responsibility	Resources	Timelines	KPIs
Determination of MSP based on realistic input cost and its Timely announcement	Scheduling of meetings of stakeholders through a dedicated liaison office ahead of the sowing season	FCA (Federal Committee on Agriculture), API and provincial government	HR mobilization	Recurrence feature in the calendar of activity	a) Adherence to work schedule b) Process flow modification c) Dashboard for alert generation for lapsing of deadline
Substitution of seeds derived from local varieties with high yield certified seeds also found climate resilient for heat waves and water scarcity	Indigenize building of user requirement based inventory of certified seeds structuring supply chain enabling access to farmers	Federal Seed Certification and Registration Department, Director General Agriculture (Extension & AR) and Punjab Seed Corporation	i)HR mobilization ii)Outsourcing modalities to be evolved with the help of academia and centers of Research iii) diversion of existing fund flows from unutilized allocation for subsidies	Preliminary intervention to be piloted before the next sowing season. Replication of full-scale exercise	a) Gradation and trial to be validated for selection of certified varieties b)Commission on quality control regime c) TPV (third party validation mechanism)
Promulgation of modern seed Act	Formulation of draft legislation and	Agriculture Department and Law &	Within existing resources	6 months	Performance measurement tools applied for

Target	Actions	Responsibility	Resources	Timelines	KPIs
	widespread publication for inviting suggestions of stakeholders and legal experts	Parliamentary Affairs Department			a review of progress achieved within the deadline
The supply chain of inputs subscribing to institutionalized trail	a) Stringent track and trace framework to be embedded at every stage of the supply chain b) Collaborated monitoring based on barcode application with reporting from ICT Gadgets on the bases of MoUs and SOP to be settled between suppliers and government line departments	Agriculture Department	HR mobilization to create a coordination cell	6 months	a) Signing of Agreement b) Exchange of Texts of MoUs c) Meetings to thrash out the agreed document.
Investment promotion in agriculture research and development	Facilitation centers with one window operations	Agriculture department in collaboration with Federal and Provincial Boards of investments and P&D PPP Cell	HR mobilization	6 months	a) Engagement with prospective investors on the basis of projects showing encouraging ROI (Return on Investment) b) Public-private partnership cell in P&D requiring monitoring and evaluation reports against DLIs
Development and disbursement of cost-effective modern implements	Equitable access to modern agriculture implements at the doorstep	Pakistan Agriculture Research Council and Director General, Agriculture (Field), Punjab	Outsourcing and negotiation of standardized hire purchase arrangements with the burden of cost minimize for farmers	1 year	a) Finalizing specifications for cost-effective selection of agri-implements compatible with local conditions to negotiate outsourcing arrangements b) Signing of Agreement

Target	Actions	Responsibility	Resources	Timelines	KPIs
					c)Exchange of Texts of MoUs
Effective groundwater management,	Innovative interventions may be introduced for balancing the use of groundwater for irrigation e.g. drip irrigation instead of flood irrigation etc	Pakistan Agriculture Research Council and Director General, Agriculture (Water Management), Punjab	Outsourcing and negotiation of standardize hire purchase arrangements with burden of cost minimize for farmers	1 year	a) Finalizing specifications for cost effective selection of agri-implements compatible with local conditions to negotiate outsourcing arrangements b)Signing of Agreement c)Exchange of Texts of MoUs
Data validation for foolproof registration of entitled farmers to subsidy	Data cleansing for the removal of inclusion and exclusion errors to weed out undeserving claimants	Director General Agriculture (Extension & AR), Punjab. And Data base Administrator for on line portal already developed by PITB	HR Mobilization	6 months	a) Development of MIS with anomaly report generation for purging of undeserved registered persons b) IS audit of the portal and database by the team of AGP
Efficacious Agriculture advisory services	Coherent work plan scheduling and impact assessment for the services rendered	Director General Agriculture (Extension & AR), Punjab.	HR mobilization	Recurrence feature in the calendar of activity	performance audit by AGP
Digitize reporting of data fields preventing fudging (crop reporting & FLMIS)	Removal of anomalies in legacy data in the two data basis impacting reporting and decision making on real time basis	Directorate of crop reporting services, Directorate of Food and PITB	HR mobilization	Recurrence feature in the calendar of activity	Technical review of SDLC cycle, dump data, software architecture and information security modules
Inordinately prolonged time overrun for already commenced civil works of additional Silos for storage facilities	Ensuring commission of installation for storage facilities to remove capacity deficiencies	Directorate of Food, Punjab.	Already allocated in ongoing development schemes	6 month	Physical and financial progress of projects placed under special report
Affordable agriculture credit with ease of access	Credit access package to be developed for customized value addition targeting	SBP, Finance Department and Agriculture Department	Credit financing source exploration like Akhawat model	1 year	Performance measurement tools applied for a review of progress achieved within

Target	Actions	Responsibility	Resources	Timelines	KPIs
	small & medium farmers				the deadline
Customize debt limitation and fiscal responsibility enactment for reducing circular debt	Formulation of draft legislation and widespread publication for inviting suggestions of stakeholders and legal experts	Finance department, Food Department and Law & parliamentary affairs Department	Within existing resources	6 months	Performance measurement tools applied for a review of progress achieved within the deadline
Bar on unbudgeted subsidy	Check on arbitrary account of expenditure without budgetary cover	Finance Department	Within existing resources	Immediately	Application of in-built bar on such expenditures through a formal notification
Curbing collusive stock handling by flour mills consuming controlled rate wheat without ensuring trail of atta dispatches within price control regime in the precincts of Provincial boundaries	a)Stringent track and trace framework to be embedded at every stage of the supply chain b) Collaborated monitoring based on barcode application with reporting from ICT Gadgets on the bases of MoUs and SOP to be settled between suppliers and government line departments	Food Department	HR mobilization to create a coordination cell	6 months	a)Signing of Agreement b)Exchange of Texts of MoUs c) Meetings to thrash out the agreed document.
Alleviation of leakages, pilferages mal governance and administrative gaps	Cognizance of losses suffered at the hands of public functionaries	CM IT Supervise administrative accountability commission	HR mobilization	immediate	Putting in place dedicated monitoring for implementation on all inquiry cases, audit paras and inspection reports based on detection of administrative lapses





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## ANNEXURES

### *Role of major stake holders–In the Wheat areas*

### *Annexure-A*

<b>Major Players/Stakeholders</b>	<b>Role/ responsibilities</b>
<b>Federal level</b>	
Ministry of National Food Security & Research	The Ministry is responsible for policy formulation, economic coordination and planning in respect of food grain and agriculture. It also includes procurement of food grains, fertilizer, and import price stabilization of agriculture produce, international liaison, and economic studies for framing agricultural policies.
Federal committee on Agriculture	FCA is committee established under – ministry. It meets biannually to evaluate the progress and fix the targets for the new crop season. It comprises of provincial Ministers for Agriculture and Food Department, Secretaries of the Relevant Ministries /Departments and representatives of various stakeholders like PASSCO, Crop Reporting Services, Agri. Policy Institute (API), NFDC and State Bank of Pakistan
Agriculture Policy Institute (API)	The Institute is working under MFS&R and responsible to conduct studies on emerging policy issues, periodically examine, processing, storage, and marketing costs of agricultural commodities and recommend policies and programs to reduce such costs and improve the competitiveness of commodities. Analyze the impact of important agricultural policies on groups such as consumers, processors and exporters and advise on policy adjustments needed for greater efficiency and equity.
Pakistan Agriculture Research Council	The council operates under the MFS&R and responsible for translating Government’s policy in to actions, to undertake, aid, promote and coordinate agricultural research, utilization of research results, to fill in the gaps in existing programs of agricultural research, arrange the trainings and disseminate information relating to agriculture etc.
Department of Plant Protection	Under the administrative control of the Ministry of NFS&R, the department is responsible for Standardization and import of pesticides, Aerial Spray, Plant Quarantine, Locust Control in its international aspect and maintenance of locust warning Organization.

<b>Major Players/Stakeholders</b>	<b><i>Role/ responsibilities</i></b>
Federal Seed Certification and Registration Department	Federal Seed Certification and Registration Department is an attached department of the Ministry of National Food Security and Research and responsible for implementation of the seed regulatory framework throughout Pakistan. It provides seed quality regulatory services to the public and private seed sectors in the country.
Indus River System Authority (IRSA)	The authority is responsible to: <ul style="list-style-type: none"> <li>• lay down the basis for the regulation and distribution of surface waters amongst the province</li> <li>• review and specify river and reservoir operation patterns c) coordinate and regulate the activities of the Water and Power Development Authority in exchange of data between the provinces</li> <li>• determine priorities, compile and review canal withdrawal indents as received from the provinces</li> <li>• settle any question that may arise and consider and make recommendations on the availability of water against the allocated shares of the provinces</li> </ul>
Pakistan Metrological Department	Responsible for providing meteorological service throughout Pakistan to wide variety of interest and for numerous public activities and project which require climatic information
National Fertilizer Development Centre	The responsibilities of NFDC include data base; demand forecasting; international prices; fertilizer situation reviews; special technical notes; fertilizer use surveys; crop responses; fertilizer bibliographic updates; fertilizer research reviews and training etc.
Pakistan Agricultural Storage & Services Corporation Ltd.	The corporation has been assigned following major functions: - <ul style="list-style-type: none"> <li>• Provision of food security at national level, by maintaining strategic reserves of wheat and other specified commodities. It also maintains SAARC Food Bank Reserve Stock.</li> <li>• Extend state welfare to farmers by providing support to farmers; stabilize prices by intervening in domestic market. Release wheat to deficit province as well as Armed Forces and undertake import / export of different food grains when called upon.</li> </ul>
State Bank of Pakistan (SBP)	The Bank to regulate the monetary and credit system of Pakistan. In pursuance of government's agenda for

<b>Major Players/Stakeholders</b>	<b><i>Role/ responsibilities</i></b>
	promotion of agriculture sector, State Bank of Pakistan (SBP) assigned annual indicative agricultural credit disbursement targets.
<b><i>Provincial Level</i></b>	
Agriculture Department	<p>The Department is responsible for Legislation, policy formulation and sectoral planning regarding:</p> <ul style="list-style-type: none"> <li>• Agriculture education, training and research, Improvement of agricultural and water management methods, Soil Fertility and Soil Conservation.</li> <li>• Mechanization, reclamation of land, use of agricultural machinery, tube-wells installation, Agricultural statistics, Monitoring of agriculture inputs like fertilizers, pesticides, Promotion of modern agriculture technologies, subsidies etc. and</li> <li>• Production, multiplication and marketing of certified seed through Punjab Seed Corporation.</li> <li>• The implementing arms include:</li> <li>• Director General Agriculture (Extension &amp; AR), Punjab.</li> <li>• (ii) Director General, Agriculture (Field), Punjab. (iii) Director General, Agriculture (Research), Punjab.</li> <li>• (iv) Director General, Agriculture (Water Management), Punjab.</li> <li>• (v) Director General Pest Warning &amp; Quality Control of Pesticides, Punjab.</li> <li>• (vi) Director of Agricultural Information, Punjab.</li> <li>• (vii) Director of Agriculture Crop Reporting Service, Punjab.</li> <li>• (viii) Chief, Planning &amp; Evaluation Cell</li> <li>• (ix) Chief, WTO Cell</li> <li>• (x) Director of Agriculture (Economic and Marketing), Punjab</li> <li>• (xi) Chief Coordinator, Regional Agriculture Economic Development Centre.</li> <li>• (xii) Director Floriculture (T&amp;R).</li> <li>• (xiii) Director Punjab Institute of Agriculture Marketing.</li> <li>• [(xiv) Director General, Soil Survey of Punjab.]</li> </ul> <p><b>List of Autonomous bodies under the oversight of Agriculture department include the following:</b></p>

<b>Major Players/Stakeholders</b>	<b><i>Role/ responsibilities</i></b>
	i) Punjab Seed Corporation. ii) University of Agriculture, Faisalabad. iii) Punjab Agricultural Research Board. iv) Pir Mehr Ali Shah University of Arid Agriculture, Rawalpindi. Market Committees Provincial Fund Board. <b>Company:</b> Punjab Agriculture Marketing Company (PAMCO).
Irrigation Department	The responsibilities of the Department include: Indus system water shares, Construction, maintenance and operation of irrigation infrastructure, Basic & applied research in hydraulic, ground water and land reclamation, Storage of water and construction of reservoirs, Vertical & surface drainage and Flood planning & management. The implementation arms are: <ul style="list-style-type: none"> <li>• Ten number of Zonal Chief Engineers Irrigation</li> <li>• Punjab Irrigation &amp; Drainage Authority (Pida).</li> <li>• Inland Water Transport Development Company.</li> </ul>
Food Department	The department is responsible for procurement of wheat for issuance to the mills, to act as government agent to provide a wheat purchase window to the farmers at support price, ensure Food Security in wheat and wheat products, targeted Food Support Programmes and Ramzan/Christmas Packages, undertaking activities related to export of wheat, Co-ordination with other stakeholders like MOF, MOC, MNFSR, other provinces and International Agencies for matters relating to wheat. Implementing agencies include: <ul style="list-style-type: none"> <li>• Directorate of Food, Punjab.</li> <li>• Punjab Food Authority</li> </ul>
Finance Department	The major functions of the department are: <ul style="list-style-type: none"> <li>• Management of public funds</li> <li>• Framing of financial rules for guidance of departments</li> <li>• Supervision of accounts of provincial departments</li> <li>• Framing of Civil Service Rules applicable to all government servants and interpretations thereof</li> <li>• Floatation and administration of provincial loans</li> <li>• Examination and advice on matters affecting finances of the province directly or indirectly</li> <li>• Administration of emoluments, pensions and</li> </ul>



<b>Major Players/Stakeholders</b>	<b><i>Role/ responsibilities</i></b>
	allowances <ul style="list-style-type: none"> <li>• Administration of public revenue</li> <li>• Communication of financial sanctions</li> <li>• Examination of all proposals for the increase or reduction of taxation</li> <li>• Audit matters of provincial receipts and expenditure</li> </ul>
Board of Revenue (BOR)	BOR is the controlling authority in all matters connected with the administration of land, land taxation, land revenue, preparation, updating, maintenance of records and crop reports. The implementing agencies includes: <ul style="list-style-type: none"> <li>• Director, Land Records, Punjab</li> <li>• Special Institution Punjab Land Commission</li> <li>• Colonies Department</li> </ul>
Flour Mills	The flour mills play a vital role to ensure food security in the province. The mills are responsible to supply wheat flour and other by-products of wheat like Maida, Suji etc. by procuring wheat from the open market as well as from the Food department.
Deputy Commissioners	The deputy commissioner is mainly responsible to supervise and coordinate with the district line departments in implementation of government policies. He /She also act as controller general of prices in the concerned district.

<b>Weighted Average Cost of Production, Wheat</b>					
<b>Crop Reporting Service, Punjab (Approved) 2020-21</b>					
No.	Operation / Inputs	Avg. No. of Operation Unit (/ Acre)	Percentage of Usage (%)	Avg. Cost per Operation/ Unit (Rs./acre)	Total Weighted Cost (Rs./acre)
1	Deep Ploughing	0.5	48%	1355	325
	Ploughing	3.12	100%	775	2418
	Planking	1.86	100%	438	815
	Leveling	1	20%	1624	325
<b>Cost of Land Prep</b>					<b>3883</b>
2	Seed Quantity (kg)	51.32	100%	49	2515
	Seed Drilling	1	11%	1049	115
	Seed Broadcasting	1	19%	260	49
	Seed Treatment	1	4%	300	12
	Bridging	1	2%	390	8
<b>Cost of Seed &amp; Sowing</b>					<b>2699</b>
3	Water No	2.96	85%	943	2373
	Water Labour	1	55%	200	110
	Canal Labour	1	34%	169	57
<b>Cost of Water</b>					<b>2540</b>
4	Urea	1.73	100%	1670	2889
	DAP	1.08	100%	3750	4050
	Other Fertilizer	1	2%	3200	64
	Fertilizer Labour	1	100%	205	205
	Fertilizer Transport	1	100%	99	99
<b>Cost of Fertilizer</b>					<b>7307</b>
5	Dung trolly	1.75	8%	1351	189
	Dung Transport	1	8%	769	62
	Dung Labour	1	8%	672	54
	<b>Cost of Dung</b>				
6	Spray Pesticides				0
	Spray Pest Labour				0
	<b>Cost of Pesticides</b>				
7	Spray Weedicides	1.05	80%	871	732
	Spray Weeds Labr	1	66%	270	178
	Hoing Labour				0
	<b>Cost of Weedicides</b>				
8	Pick / Dig Cost				0
	Cutting Cost	1	40%	5725	2290
	Threshing Cost	1	40%	3997	1599
	Machine Harvesting	1	60%	2328	1397
<b>Cost of Harvesting</b>					<b>5286</b>
<b>9 Full / Half Yearly Land Rent (Rs./acre)</b>					<b>20000</b>
10	Admin. Cost	1	8%	1200	96
	Tunnel Cost				0
	<b>Cost of Other Exp.</b>				
11	Transport Rent	1	48%	940	451
	Transport Labour	1	31%	412	128
	Bar Dana (Bags)	1	22%	627	138
<b>Cost of Transport</b>					<b>717</b>
<b>Cost of Production</b>		<b>With Land Rent</b>		(/ acre)	43,743
		<b>(at Farm Gate)</b>		(/ 40 Kg)	1,398
		<b>Without Land Rent</b>		(/ acre)	23,743
		<b>(at Farm Gate)</b>		(/ 40 Kg)	759
<b>Avg. Yield</b>				(40kg/acre)	31.3
<b>Gross Revenue</b>		<b>Crop Price (Rs./40 kg)</b>		1400	43,820
		<b>Residual (Rs./acre)</b>			10,698
		<b>Net Revenue (Rs./acre)</b>			54,518
<b>Profit</b>		<b>With Land Rent</b>		(Rs./acre)	10,775
		<b>(at Farm Gate)</b>		(Rs./40kg)	344
		<b>Without Land Rent</b>		(Rs./acre)	30,775
		<b>(at Farm Gate)</b>		(Rs./40kg)	983
<b>Indicative Price (Rs./ 40 Kg) @</b>		<b>18%</b>		<b>1,650</b>	

Weighted Average Cost of Production, Wheat					
Crop Reporting Service, Punjab (Approved) 2021-22					
No.	Operation / Inputs	Avg. No. of Operation Unit (/ Acre)	Percentage of Usage (%)	Avg. Cost per Operation/ Unit (Rs./acre)	Total Weighted Cost (Rs./acre)
	Deep Ploughing	1.16	37%	1540	661
	Ploughing	3.12	100%	825	2574
	Planking	1.88	100%	521	979
	Leveling	1	15%	1831	275
<b>1</b>	<b>Cost of Land Prep</b>				<b>4489</b>
	Seed Quantity (kg)	51.32	100%	64	3284
	Seed Drilling	1	14%	1113	156
	Seed Broadcasting	1	12%	277	33
	Seed Treatment	1	3%	448	13
	Bridging	1	4%	226	9
<b>2</b>	<b>Cost of Seed &amp; Sowing</b>				<b>3495</b>
	Water No	3.25	93%	1004	3035
	Water Labour	1	48%	248	119
	Canal Labour	1	24%	219	53
<b>3</b>	<b>Cost of Water</b>				<b>3207</b>
	Urea	1.76	100%	1800	3168
	DAP	1.06	100%	6500	6890
	Other Fertilizer	1	7%	3550	249
	Fertilizer Labour	1	100%	269	269
	Fertilizer Transport	1	100%	102	102
<b>4</b>	<b>Cost of Fertilizer</b>				<b>10678</b>
	Dung trolley	1.47	5%	1428	105
	Dung Transport	1	5%	903	45
	Dung Labour	1	5%	692	35
<b>5</b>	<b>Cost of Dung</b>				<b>185</b>
	Spray Pesticides				0
	Spray Pest Labour				0
<b>6</b>	<b>Cost of Pesticides</b>				<b>0</b>
	Spray Weedicides	1.06	31%	958	315
	Spray Weeds Labr	1	22%	245	54
	Hoing Labour				0
<b>7</b>	<b>Cost of Weedicides</b>				<b>369</b>
	Pick / Dig Cost				0
	Cutting Cost	1	40%	6725	2690
	Threshing Cost	1	40%	4997	1999
	Machine Harvesting	1	60%	3308	1985
<b>8</b>	<b>Cost of Harvesting</b>				<b>6674</b>
<b>9</b>	<b>Full / Half Yearly Land Rent (Rs./acre)</b>				<b>20000</b>
	Admin. Cost	1	7%	2167	152
	Tunnel Cost				0
<b>10</b>	<b>Cost of Other Exp.</b>				<b>152</b>
	Transport Rent	1	57%	1199	683
	Transport Labour	1	31%	490	152
	Bar Dana (Bags)	1	22%	906	199
<b>11</b>	<b>Cost of Transport</b>				<b>1034</b>
	<b>Cost of Production</b>	<b>With Land Rent</b>		(/ acre)	50,283
		<b>(at Farm Gate)</b>		(/ 40 Kg)	1,668
		<b>Without Land Rent</b>		(/ acre)	30,283
		<b>(at Farm Gate)</b>		(/ 40 Kg)	1,004
	<b>Avg. Yield</b>			(40kg/acre)	30.15
	<b>Gross Revenue</b>	<b>Crop Price (Rs./40 kg)</b>		1800	54,270
		<b>Residual</b>		(Rs./acre)	12,132
		<b>Net Revenue</b>		(Rs./acre)	66,402
	<b>Profit</b>	<b>With Land Rent</b>		(Rs./acre)	16,119
		<b>(at Farm Gate)</b>		(Rs./40kg)	535
		<b>Without Land Rent</b>		(Rs./acre)	36,119
		<b>(at Farm Gate)</b>		(Rs./40kg)	1,198
<b>Indicative Price (Rs./ 40 Kg) @</b>		<b>25%</b>		<b>2,085</b>	

*Annexure-C*

<b>District</b>	<b>Population based requirement (MT)</b>
Rawalpindi	2692
Attock	178
Jhelum	129
Chakwal	103
<b>Total</b>	<b>3102</b>
Gujranwala	1493
Gujrat	301
M.B.Din	119
Sialkot	416
Narowal	93
<b>Total</b>	<b>2422</b>
Lahore	4044
Sheikhupura	437
Nankana	89
Kasur	324
<b>Total</b>	<b>4894</b>
Faisalabad	1367
T.T.Singh	161
Jhang	217
Chiniot	154
<b>Total</b>	<b>1899</b>
Sargodha	397
Khushab	128
Mianwali	119
Bhakkar	95
<b>Total</b>	<b>739</b>
Multan	748
Lodhran	97
Vehari	184
Khanewal	205
<b>Total</b>	<b>1234</b>
Sahiwal	188
Okara	302
Pakpattan	105
<b>Total</b>	<b>595</b>
D.G.Khan	198
Rajanpur	123

<b>District</b>	<b>Population based requirement (MT)</b>
Muzaffargarh	254
Layyah	117
<b>Total</b>	<b>692</b>
Bahawalpur	426
Bahawalnagar	226
R.Y.Khan	375
Total	1027
<b>G.Total</b>	<b>16604</b>

**Path towards environmental sustainability**

- i. There is the need to understand the ecological imbalances resulting from human activity, which are often ignored when postulating the impacts of climate change.
- ii. There are no single silver bullet solutions to the overall problem of climate change. The core problem has to be analyzed piecemeal with most major hotspots and agro-ecological zones modeled and prioritized for close monitoring and adaptation. Worldwide signals reveal that the rate of climate change increase is much higher than earlier anticipated (e.g global warming, rising sea levels, precipitation rate, etc.). This needs to be seriously highlighted in all discussions and documentation.
- iii. Encourage ecologically sound development policies to preserve and develop the country's natural and forest resources to counteract the impact of global warming.
- iv. A major program of aquifer recharge needs to be launched in arid and semi-arid areas.
- v. Provide incentives for farmers to adopt social forestry on a commercial scale
- vi. Seventy-three percent of Pakistan's arable land is irrigated. Water for irrigation is entirely dependent on glacier melting. This source is likely to be disrupted by climate change, and other negative consequences. The glacier retreats issues and identification of institutions that can play a role in monitoring glacier recession can help devise strategies for combating predicted water shortages. Pakistan's agriculture depends on artificial irrigation and

- almost 90% of the agricultural output originates from irrigated areas.
- vii. During the past century the average global temperature has risen by about 1.0C, with much of that increase attributable to the burning of fossil fuels and deforestation. Global temperatures are projected to increase further by between 1.4C and 5.8C and to continue to rise long after that. The predicted consequences include faster glacier melting, a rise in sea levels, a shortage of fresh water, increased droughts and floods, more frequent and intense forest fires, more intense storms, more extreme heat episodes, agricultural disruption, the spread of infectious diseases, and biodiversity losses.
  - viii. During recent months, the government has announced several measures to address the issue of food production. Still, the present wheat crisis has taken a serious turn, with highly inflationary trends seen in wheat flour prices. Mismatches between estimation of the support price and on ground escalation of input prices has often resulted in off the tangent supply responses.
  - ix. As diesel is a key determinant of agricultural productivity (tillage, harvesting and tube well irrigation), its present high cost is placing constraints on agriculture by way of reduced application of tube-well water on most cash crops. Fertilizers' fiasco is partly due to inflation (higher material and gas prices) and partly due to the depreciating value of the Pakistan rupee. Fertilizer, from being a key input in the production of all major cereals including wheat is beginning to lose its parity value and a rapid decline in its usage is predicted, due to lack of availability and high prices. This will impact the target of yield in aggregate for

- the current wheat crop. With the added complication of a tight water situation, it is highly unlikely that even the revised target will be met.
- x. The Apportionment Accord of 1991 setting the stage for sharing the waters of the Indus amongst the four provinces retains significance when flows are above the agreed upon allocation of river supplies of 114.35 MAF. The document is silent on the SOPs if the overall water resources change unexpectedly, under extreme glacier melt, significant changes in timing, intensity and the pattern of precipitation from a worldwide phenomenon like global warming and climate change, and on the terms of the Accord under force majeure conditions. An amendment needs to be made on water allocations under a climate change scenario, after a careful and detailed analysis of water rights protection and the agriculture food security of the country, and a conflict resolution authority needs to be established to address a situation where there is a high level of water variability due to uncertain conditions that may have permanence.
  - xi. It is imperative to develop cooperation with co-riparian national administrations as well as with neighboring countries to better understand the overall river basin potentials and to develop appropriate strategies for their optimal usage and operation at all times, particularly during drought and flood conditions so as to collaborate with neighboring countries through international agencies, such as UNDP/Global Environment Facility (GEF), to prevent chemical and biological pollution by effectively managing industrial, domestic and agricultural effluent disposal. Flooding in rivers located on the upper riparian, can push these pollutants into lower riparian countries.



- xii. It is urgently need to develop the necessary linkages within domestic and international institutions involved in informatics, management and research to initiate much needed action in the form of programs, projects and research agendas that directly reflect the challenges of reduced water supplies and rising temperatures followed by creation of Centers of Excellence in various aspects of climate change within Pakistani academia linking them up with international centers of repute.
- xiii. Climate change, having strained water supplies requires a high quality management response that is based on the best scientific knowhow. Special efforts are needed to train such managers and impart the skills that are needed for better supply and demand management under changing climates.
- xiv. Investment is warranted in commissioning state-of-the-art interpretive equipment linked to international meteorological resources (i.e. satellite and radar coverage, regional meteorological resources.
- xv. Resettlement in hotspots due to climate change need to be monitored carefully to ensure that this does not lead to deterioration in the quality of water.
- xvi. Promotion of afforestation was needed desperately, by taking recourse to minimize downstream as well as upstream environmental impacts and embody appropriate remedial measures in the design of reservoirs and other development works.
- xvii. Wetlands and diverse ecologies providing an opportunity for storage of monsoon water, and efforts must be made to ensure sufficient environmental flows to cater to the needs

- of our rivers, wetlands and fragile ecologies in the Indus Basin, with special attention to the needs of the Delta.
- xviii. Climate change implications for Pakistan need to be shared continuously with the public in a manner that helps preparedness and allows communicating with all stakeholders who can help adapt to such challenges promoting public and private research organizations and universities in the development of appropriate ecologies for:
- Conjunctive use of water
  - Soil conservation, catchment management and watershed protection technologies
  - Disposal of saline effluents
  - Water conservation measures and techniques
  - Land and water resource management
  - Curtailing conveyance losses
  - Improving irrigation efficiencies at distribution and at farm levels
  - Weather forecasting, rainfall prediction, flood forecasting and drought forecasting
- xix. Pakistan's agriculture depends on artificial irrigation and almost 90% of the agricultural output originates from irrigated areas. The study notes that irrigation has to be accorded the highest priority.
- xx. There is a greater need than ever before to develop and forge a national consensus on establishing a cascading system of dams on the river Indus, utilizing all the available sites. This calls for expediting work on the construction of dams and water-harvesting projects. The financing factors impeding the construction of dams should be addressed on

- a war footing, and all available avenues of funding should be explored.
- xxi. Compromised water quality directly impact due to an increase in temperatures and higher precipitation salt imbalance is likely to render water in certain areas no longer fit for human consumption. Climate change adaptation measures must ensure that they do not cause a further deterioration in the quality of water through an improvement in the understanding of water biochemistry under temperature rise.
  - xxii. Tangible efforts are warranted to prevent soil degradation and to restore and improve degraded lands, promote integrated pest management and safe use of insecticide, pesticides, weedicide, fungicide and herbicides for developing strategies and programs to tackle desertification for encouraging ecologically compatible cropping systems relying on scientific methods of farming and improved management interventions.
  - xxiii. Efforts are to be augmented to encourage industries to treat waste water on-site to remove toxic chemicals and other pollutants according to the new improved standards and legislation as well as invocation of the polluter pays principle.
  - xxiv. Urgency could not be ignored to make improvement of the water quality in rivers, reservoirs, and other water bodies, including groundwater, so as to achieve acceptable standards through improved agricultural drainage, municipal, rural and industrial wastewater treatment and effluent disposal.

