Agriculture Webinar Episode 1
Prevailing Wheat Crisis and Future Pathways/Policy Brief

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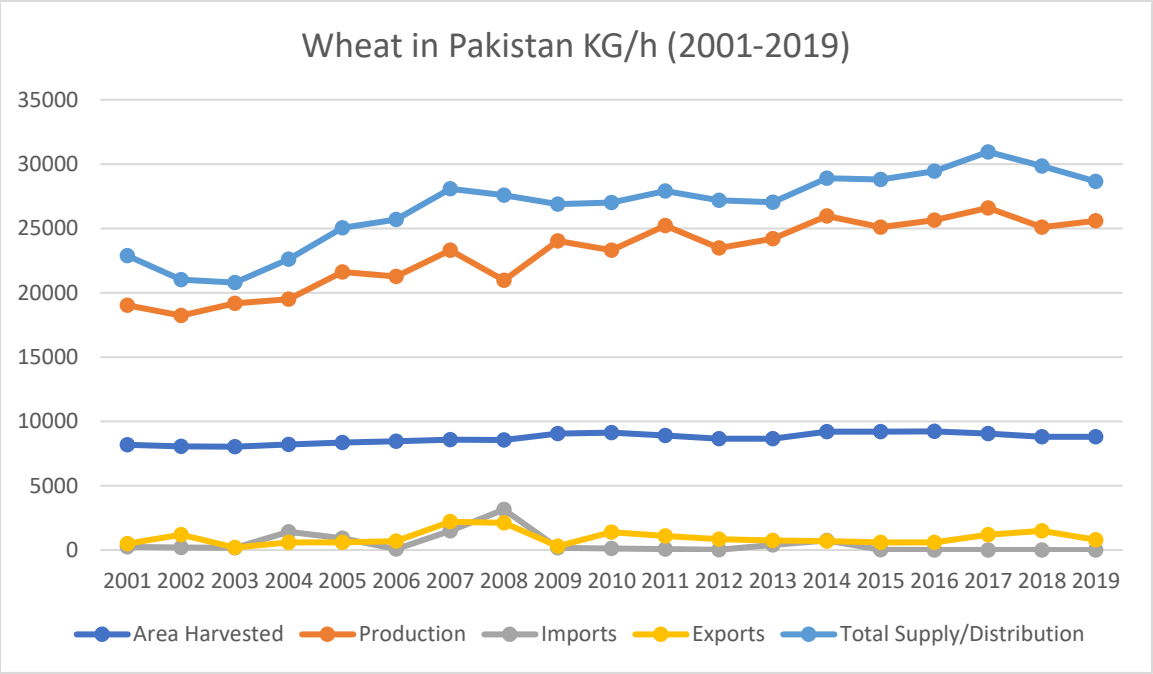
Pakistan grows spring wheat over an area of 21 million acres. Being a staple food for a population of more than 200 million, wheat influences the political economy of the country. Despite incentives such as input subsides and support price, wheat production and productivity has remained nearly stagnant for the last two decades. The country harvested 25 million tons of wheat in May 2020, and the price has jumped more than 40-60% within a span of two months. That has deepened the crisis for the masses to afford wheat as a staple. Leaving aside the market part, we believe that the current crisis would persist in the future if we failed to break the stagnation in wheat yield. Food security for Pakistan demands achieving the goal of producing 30 million tons of wheat within 3 years and doubling its productivity within 10 years. Achieving that target is scientifically possible.



This Webinar Episode was designed to chart the future pathways for critical intervention to break the stagnation. There were 123 participants from 8 countries, logged in for two hours in the session chaired by the Federal Minister for Food Security and Research, Syed Fakhar Imam. The session was opened by Syed Yawar Ali, Chairman Nestle, stressing a need for genetic improvements. Out of three elements (genetics, seed technology and agronomy) two were explored. The Keynote speakers Drs. Kanwarpal Dhugga (CIMMYT) and Kulvinder Gill (WSU) made an elaborate case on the genetic improvement and variety replacements. The two discussants were Drs. Abid Mahmood and Anjam Ali Butter, DG Agriculture Research and Extension, respectively. After a Q/A segment, the session was concluded by the Federal Minister.

The audio/video recording of the event is available at the webpage of PAS www.paspk.org and at the YouTube link: https://youtu.be/Evkudj7UiQYk

Historically, the Green Revolution occurred after the introduction of fertilizer responsive dwarf varieties, i.e., MaxiPak in Pakistan, and Kalyan Sona and Sonalika in India. The varietal replacement has been a continuous process (post Green Revolution) due to the availability of better genetics (disease resistance and environmental adaptations). The wheat variety development process is a product of grand collaboration between the NARS (National Agriculture Research System) and CGIAR/CIMMYT (Consultative Group on International Agriculture Research/International Maize and Wheat Improvement Center). CIMMYT was established in 1968 by the Nobel Laureate Dr. Norman E. Borlaug, the father of Green Revolution.

Breaking the yield barrier and improving rust resistance are continuing struggles. Adaptation to climate change and input response are other critical objectives of wheat genetic improvement. Equally important is the quality of the wheat grain in terms of iron and zinc contents along with the traditional baking quality requirements. The breeders are equipped with fast breeding tools of marker assisted selection, gene editing, phenotyping and transgenic interventions. Hybrid wheat is also a possibility.

There is a consensus that we have varieties capable of producing on average 5-6 MT/h under our growing conditions whereas we are harvesting less than 3 MT/h. That is largely because of a lack of an effective variety replacement program, which can be attributed to an imperfect seed supply chain. The current record of wheat yield is 12 MT/h harvested in the USA as reported by the Wheat Foundation (https://wheatfoundation.org/past-contest-winners/). According to a news story from New Zealand, a new record of 17.4 MT/h has been set. The intensive cultivation practices of growing irrigated wheat in Pakistan demands much higher yields than the current output. The prevalent seed replacement to deliver the latest genetically superior varieties to the farmers must be overhauled. The seed replacement program of the Punjab government is a good pilot but not efficient enough to meet the massive need. A quick succession of newly released varieties is also being cited as a reason for ineffective seed replacement.

As a summary of the event, following pathways were identified as strategic policy outline for breaking the wheat yield stagnation:

1. The stagnation can be effectively overcome with the introduction of genetically improved varieties at the farm level, which is currently a far cry. The national average is less than 2/3rd of the progressive farmers in the country and a quarter of the realizable potential;

2. Prospects of continuous wheat genetic improvement are bright. Breeders are continuously discovering new genes and employing new techniques to introgress genes from within the wheat relatives and across the phylum. However, releases of varieties in quick succession needs to be discouraged;
3. Transgenic wheat offers highly attractive solutions. However, the regulatory environment and public perception are unfavorable. One can predict a possibility of changing demand side and opportunity for the introduction of transgenic wheat. The regulatory framework in the country is still ineffective and unprepared for such an eventuality. Yet, there is an opportunity in the crisis;
4. The NARS breeding programs need to be made more cohesive, allowing for a better collaboration with the international partners. A better coordination between the country office of CIMMYT and national breeding programs is desired;
5. The Gene Shifters (a company associated with WSU-Washington State University, Pullman) is willing to share the newly discovered genes and breeding materials;
6. The breeders need to emphasize breeding for low input responsive varieties. Nitrogen Use Efficiency (NUE) has been an important breeding objective to minimize ground water pollution, while cutting the cost of production;
7. An effective seed supply chain has to be created which is convenient and affordable for the ordinary farmer. The piloted programs of the government must translate into SMEs to create a wheat seed business and not as a continuous subsidy. The farmer must be educated and facilitated to reach out for new seeds;
8. The WSU example of collaboration between the breeders and seed business needs to be studied for incentivizing the private sector to play a role in the wheat seed supply chain;
9. Developing wheat hybrids is a potential course of action to create a seed industry where profitability becomes a key performance indicator for the seed producer and the buyer. However, there is a reservation that hybrid seed could be unaffordable by the small farmers; and
10. The agronomic practices must be optimized for a better harvest of wheat from the currently available varieties.

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