CONFERENCE REPORT

FOOD SECURITY VIS-À-VIS SUSTAINABLE AGRICULTURE IN PAKISTAN: POLICY OUTCOMES & PROSPECTS

6th October 2021

JOINTLY ORGANIZED BY
CENTER FOR GLOBAL & STRATEGIC STUDIES (CGSS), ISLAMABAD,
HANNS SEIDEL FOUNDATION (HSF) PAKISTAN &
MNS UNIVERSITY OF AGRICULTURE, MULTAN

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Table of Contents

Brief of the Conference 1

Concept 2

Introduction: 4

Major Findings of the Conference 4

Executive Summary/Key Takeaways 7

1. Understanding Pakistan's Food Security Situation 7
2. Analyzing Link between Agriculture Production and Population Dynamics in Pakistan 8
3. Gender-Responsive Approach to Pakistan's Agriculture 9
4. Reforming Government's Role in Agriculture 10
5. Adolescent Food Insecurity in Pakistan 11
6. Food Security Challenges in Pakistan 12
7. Promoting Technological Transformation in Pakistan's Agriculture Sector 13
8. Food Supply Chain System 14

Annexure: Speakers/Panelists 16

Picture Gallery 20

Roundtable Discussion Report 21

BRIEF OF THE CONFERENCE

On 6th October 2021, a Conference on "Food Security vis-à-vis Sustainable Agriculture in Pakistan: Policy Outcomes and Prospects" was jointly organized by Center for Global & Strategic Studies (CGSS), Islamabad, Hanns Seidel Foundation Pakistan, and MNS University of Agriculture, Multan at Margala Hotel, Islamabad.

The discussion was attended by 75 participants including experts from relevant fields, deans, faculty members from renowned educational institutions of the country, and students. The details of the panelists is in Annexure A.

CONCEPT

The significance of the agriculture sector of Pakistan has two major directions. First, it accounts for 19% of the GDP. [1]Second is its importance of the agro-based products that comprise of the 80% of country's exports. Furthermore, this sector engages almost 48% of the population in Pakistan via employment provision. [2]The province of Punjab, housing about fifty percent of Pakistan's total population, has its own importance as a contributor to the agricultural sector. From the three fourth share of the agriculture in exports, Punjab has 60% share. Therefore, the second largest province in the country by area, makes 25.9% land with an area of 20.63 million hectares. With a fast-increasing population, 216.6 million according to 2019 census, and resource scarcity, especially water, as well as climatic changes, including uncertain rainfall etc. has affected the cultivable land's capacity overall. From the available land resources 86% are accessible of the aggregate territory whereas 14% remains unreported. Furthermore, out of the total land, 72% is available for cropping. This leaves almost 55% land available for cultivation as 9% of land is categorized as the current fallow, whereas, remaining 8% is a cultivable waste. The government of Pakistan have devised policies to better provide resources to curtail the gap, enhance prioritizing agriculture productivity, and the food supply chain.

Agriculture plays an integral part in the growth and development of a country, as it has a connection with food security. Therefore, articulation of rural and agricultural developments is made a major focus. The Federal and inter-provincial issues relating to agriculture are set to resolve. It includes setting food security standards, seed certification, pest and animal health services and revisiting as well as re-devising the agricultural policies.

In the last organized Roundtable on the same topic, experts identified a wide range of core areas, i.e., agriculture and economic cooperation, climate change and water scarcity issues, imposing dreadful impacts on food security, technological advancement to enhance agriculture productivity and farming techniques and proposed future policy options. The scholars also explored possible ways to combat emerging Non-traditional

[1]http://www.agripunjab.gov.pk/overview#:~:text=Agriculture%20is%20the%20mainstay%20of,is%20engaged%20in%20this%20sector.
[2] Ibid

security challenges, understand food security in Pakistan, how to incorporate new techniques, and provided valuable policy recommendations.

Therefore, an effort has been made to stimulate cooperation by arranging this conference, inviting scholars and experts from all over Pakistan and add constructively into the national policy discourse. An in-depth analysis will allow to create awareness and formulate substantial policy options to enhance the efficacy of the agriculture sector and curtail the risks.

The discussion revolves around the key-areas mentioned below:

- Enhance agriculture production as the foundation of the sustainable food security situation in country through incorporation of agricultural technology, Artificial Intelligence, use of data science support, etc.
- Review existing governmental agricultural policies which are focused on ensuring self-reliance of the farmers.
- How government can facilitate the special measures such as providing quality seed, advanced machinery, balanced fertilizer, and raising awareness regarding the modern farming techniques, etc for small-scale farmers to support their productivity.
- Measures to provide support to the government in order to devise new policies based on input from multiple (relevant) sectors. In this regard, academia can play a fundamental role by doing intensive research to identify gaps that are to be filled to improve overall food security situation of the country.

Introduction:

The Conference brought together a panel of experts, leading academicians from renowned institutions, secretary members of the agriculture sector, scholars, and parliament members to discuss the food insecurity situation of Pakistan due to the agricultural vulnerabilities and how to improve the agriculture production in the country to ensure sustainable food security. The Conference integrated Policymakers to analyze existing agricultural challenges and policies to promote self-reliance of the farmers. The Conference included panelists from wide range of backgrounds to have maximum input on the existing issues. Hence, facilitating the government in devising new policies to counter the existing challenges. This report presents a detailed analysis of the collective views and speeches of the panelists presented during the Conference. The Conference focused on multiple dimensions. The speakers highlighted the role of academia in Pakistan to create awareness of these emerging non-traditional security challenges. The discussion has built a comprehensive analysis and cohesive measures to counter these menaces. The experts identified a wide range of core areas, i.e., agriculture and economic cooperation, climate change and water scarcity issues, imposing dreadful impacts on food security, technological advancement to enhance agriculture productivity and farming techniques and proposed future policy options.

Major Findings of the Conference

Following recommendations/findings are emanated out of expert deliberations during the conference:

a. A holistic approach is required towards food security situation in the country. The approach should take into consideration factors such as demography, consumer choices, production system, and available resources. Additionally, there is a need to maintain a connection between specialized scientists and social scientists in order to address the challenge effectively.
b. Efforts to improve agriculture can be made but desired results cannot be achieved if the rising population challenge is not addressed. Robust actions are needed to tackle the population timebomb.

c. The agricultural policies of Pakistan do not identify climate change as a challenge. Agricultural policies need revision so that existing climate challenges are addressed in such policies.
d. Pakistan's youth bulge needs to be educated and familiarized with the food security situation of the country. Additionally, they need to be engaged in a pro-active manner to ensure their efficient role. Creating awareness through campaigns would play a crucial role in this regard.
e. There is a need to improve and utilize natural resources of the country such as water and soil. No major reservoir has been built in Pakistan in the last fifty years. Furthermore, flood irrigation method is still being used in farms which results in great wastage of water. To achieve sustainable growth in the agriculture system, a high-efficiency irrigation system needs to be developed.
f. The organic matter is soil and it is depleting due to the high temperature in Pakistan. To sustain the productivity of the soil and maintain the percentage of organic matter in the soil, immediate actions need to be taken by the relevant institutions and involved stakeholders.
g. Research and development needs to be incorporated into the agriculture sector. There is a need to develop various agriculture courses at the farmer level to educate them about modern technologies and strategies of the agriculture sector. Such course and subjects have proved to facilitate the farmers in improving their yield potential.
h. Agricultural extensions are known to enable farmers to access skills, tools, and knowledge they require.
i. To promote sustainable development, agro-based industries must be set up in rural areas. This will not only facilitate in generating employment (leading to economic growth) but also minimize migration from rural to urban areas.
j. In Pakistan, there is a need to promote Ecosystem Management, i.e., improving the efficiency of the farmland, enabling it to meet the consumption demand while minimizing the loss of natural habitats and forests for additional cultivation.
k. Agriculture is the only sector that contributes to 17 Sustainable Development Goals (SDGs). Investing in the agriculture sector can address not only hunger and malnutrition but also address challenges such as poverty, water and energy crisis, climate change, unsustainable production and consumption.

l. There has been a drastic increase in the production of food in the past years but simultaneously there has been an increase in poverty and a decrease in the socio-economic conditions of the people. Hence, further reducing the purchasing power of the already affected families. These issues need proper consideration.

m. Anemia is extremely common in girls in Pakistan. At present, there is no data available regarding anemia in boys. Iron deficiency is one of the leading cause of mortality among adolescents all over the world. Keeping this in view, there is a need to develop and maintain data regarding anemia in boys, and nutrient deficiencies among adolescent boys and girls.

n. Fiscal intervention such as taxation of carbonated drinks and other food items to decrease the prevalence of unhealthy food items is necessary and important to be imposed by the government. Furthermore, food safety legislation and labeling regulations also need to be revised.

o. New diseases and pests challenges, which are rising due to climatic changes, resulting in yield decline in food and cash crops. Advanced technologies and research need to be incorporated to deal with modern challenges.

p. Another challenge being faced by the agriculture sector is Parthenium (weed). To deal with this challenge, the Punjab Agriculture Department and other relevant institutions of the country need to take serious actions including research.

q. Educational institutes and Pakistan's academia have a significant role to play in raising awareness about the food insecurity situation in Pakistan and the challenges faced by the agriculture sector. Hence, the curriculum of the agricultural universities needs to be updated. Pakistan submitted its first nationally determined planned contributions to United Nations Framework Convention on Climate Change (UNFCCC) which focused on aligning universities' curriculum with the working of agricultural institutions.

r. The agriculture extension system of Pakistan is not adequate for the farmers. To facilitate and empower women farmers who constitute a major chunk of work force, gender-sensitive policies are to be devised and implemented in the agriculture sector.

s. Role of the private sector in agriculture is limited in Pakistan. Private sector must be encouraged to contribute towards food security and climate change-related problems.

t. Pakistan's agriculture sector is making an 18.9 percent contribution to the GDP. [3]On the other hand, 42.3 percent of the total labor force is engaged in agriculture. [4]With time, the contribution of agriculture to the GDP is decreasing. The issue needs to be addressed by the government.

u. In Pakistan, sustainable development is needed. Sustainable growth will help in improving food production in the form of resource-conserving technologies. In this case, food system approach needs to be adopted which includes food production, processing, distribution retail, market consumption and waste recovery.

Executive Summary/Key Takeaways

1. Understanding Pakistan's Food Security Situation

a. The crops growing in Pakistan face serious threats which need to be critically analyzed in terms of Non-Traditional Security Threats. Since Traditional and Non-Traditional Security threats are interlinked, so if there is pressure on food supply chain due to non-traditional security threats then it is likely to disturb the whole system.

b. In Pakistan, crop diversity also needs to be focused. Even though wheat and rice are the major and most consumed crops of Pakistan. However, to diversify the diets and food supply chain, capacity of other nutrition crops must be enhanced.

c. Major areas of food security include principle availability, physical availability of food, economic and physical access to food, and utilization of food. Equity and Equality in terms of the distribution of food is important. People should have equal access to food.

d. Almost 80 % of the world's extreme poor live in rural areas where most are dependent on agriculture. To reduce poverty, the agriculture sector needs to be prioritized in Pakistan.

[3] http://www.finance.gov.pk/survey/chapters_18/02-Agriculture.pdf
[4] Ibid

e. Agriculture sector is the single largest employer in the world as well as in Pakistan which caters to a substantial number of labour force. Agriculture growth in low-income and agrarian economies is at least twice as effective as growth in other sectors in reducing hunger and poverty.
f. According to Pakistan Dietary Guidance for better nutrition, food safety is not given importance in Pakistan not only in commercial settings but also at homes. Therefore, it is essential to adopt food safety measures and strategies which currently lack in Pakistan.
g. The three main costs defined in sustainable agriculture are economic profitability, social activity, and environmental health. This means that the required resources can be utilized in a sustainable manner to ensure sustainable production.
h. At present, Pakistan needs a sustainable agriculture system which should be resilient, adaptable and open to diversity.

2. Analyzing the Link between Agriculture Production and Population Dynamics in Pakistan

a. The production of wheat and other crops has increased over the years but the food deficit remains due to the increasing population of the country. In this regard, regulatory measures and policies are required.
b. Additionally, cross-border as well as inner displacement of people impacts food distribution and leads to food insecurity. Due to Pakistan's strategic location and cross-border situation, it has a huge number of migrants to feed.
c. The food security also includes the eating habit of our youth in terms of achieving nutritional and traditional food security threats. Pakistan needs to educate and raise awareness amongst its youth in order to improve their eating habits.
d. Today, Pakistan is the tenth largest producer of agricultural commodities in the world and at the same time, it is sixth largest population in the world. In this aspect, there exists a gap which requires to be filled. Unfortunately, the gap is worsening as the population is growing at the rate of 2.2 per annum whereas when we study the world food growth, it is not more than 1.5 percent. In Pakistan, it is even less than 1.5 percent.
e. Pakistan has not been able to control its growing population which is currently growing at 2.2 percent annum. Hence, causing a serious challenge for Pakistan.

Under these circumstances, one third of population in Pakistan does not get the safe and healthy food.

3. Gender-Responsive Approach to Pakistan's Agriculture

a. Despite low development in rural areas, women in villages are the main workforce. Due to differences in access and use of resources, women farmers produce 20-30 percent less than their male counterparts. On the other hand, 90 percent of the livestock is managed by women farmers.
b. It should be noted that women contribute 60- 80 percent not only in producing food but also in curing and preparing food. Furthermore, 90 percent of the livestock is handled by women farmers. Due to various challenges such as cultural norms, traditional beliefs, and lack of economic resources, women's contribution to the agricultural labor force is limited.
c. Women in Pakistan perform many tasks including agricultural workforce role, reproductive tasks (Includes household chores, preparing food, etc.), and non-productive tasks (relaxation tasks, self-care tasks). If women's role in agriculture is to be enhanced, then their tradeoff time for reproductive and non-productive tasks will suffer which will lead to affecting not only her health but that of her children and will lead to food insecurity challenges.
d. A survey in Punjab[5], Sindh, and KP shows that women are spending three hours per day in agricultural activities, five hours in reproductive tasks, and eight hours in non-productive tasks. The survey further highlights that the average calorie consumption is 1765 kilocalories per adult in a household. The normative threshold for food security is 2300. Hence, proving that most Pakistani households are food insecure.
e. Additionally, the survey shows that if a woman allocates one extra hour to a productive task, then household food security is increasing by 62 kilocalories per adult. This proves that woman's participation in agricultural activities the food security of a household.
f. Women also are more prone to growing pulses by using marginalized land which is often not used by men farmers. It is observed that women are interested in

[5] 2012-14 Pakistan Rural Household Panel Survey (PRHPS)

growing pulses more as compared to wheat as it ensures food diversity in household. Thus, women have a significant impact on pulse chain value.

g. If Pakistan wants to meet the SDG 2, it has to plan a comprehensive program for the woman like in Bangladesh where they participate in any agriculture activities and government makes sure that they are getting enough salaries for their labor activities especially intensive labor activities and secondly, they provide food packages to the woman.

4. Reforming Government's Role in Agriculture

a. The present government has realized the food insecurity issue in the country and have supported the agriculture sector in a better way. The government has provided subsidies in the inputs and compatible price texture to the agriculture products so the farmers can get good return for their produced products. With these policies, an increase in the yields of major crops is likely to be achieved. It is important to mention that due to the government's facilitation to the agriculture sector, major improvement in the yield of six crops was observed.

b. The incumbent government supports saving and maintaining forests which result in positive impacts on the ecosystem. Additionally, achieving SDGs is not possible without a strong and sustainable agriculture sector.

c. There is a need to explore what influences the diet of adolescence to market service. Although market surveys do not provide as authentic information findings as compared to systematic, scientific research, but they can give an insight regarding what motivates the adolescent to consume the food. Therefore, this is a call for enforcement and regulatory actors to actually fill the data and policy gaps and to improve nutrition among adolescents.

d. It is also necessary to assess what determines and motivates adolescents to consume what they consume. It is also significant to track this progress in national, provincial surveys such as Pakistan Demographic and Health Surveys, National Nutrition Surveys, as well as multiple indicator cluster surveys. It is also very essential to strengthen multi-sectoral coordination, particularly of education sector as well as the health sector.

5. Adolescent Food Insecurity in Pakistan

a. Adolescence, from 10 to 19 years, is a phase for significant biological, cognitive physiological and psychological as well as emotional development. It is also a phase of gaining independence and acquiring behaviors, knowledge, skills and habits that are most likely to persist into adulthood. As it is a phase of transition into adulthood, adverse adolescence provides a second window of opportunity to improve nutrition among the set population. One quarter of the population of the country, i.e., 40 million comprises of adolescents who are currently facing double burden of malnutrition that is being underweight and obesity that is being overweight.
b. Adolescents who face malnutrition acquire lesser resources including educational attainment. Their well-being is also compromised which results in reduced economic productivity. It is important to make effort to improve the situation since, in the long term, it means improving human capital.
c. There is a need to compile the data regarding the nutritional state and consumption of adolescents since they are under-represented in Pakistan.
d. One in eight adolescent girls and one in five adolescent boys suffer from undernutrition. As such, approximately 56.5% of adolescent girls in the country suffer from anemia.
e. Pakistan gained some momentum in the arena of Adolescent Nutrition since it became the official member of the scaling up nutrition movement, whereas in 2016 Pakistan endorsed the Sustainable Development Goals, which prioritized the nutrition at national level.
f. 2018 was probably the most significant year for adolescent nutrition as an international level advisory and advocacy platform was developed in the country.
g. Currently, the National Nutrition survey of 2018 is the only data set available at national level, which contains information regarding adolescent nutrition in the country.
h. Multiple factors influence the diet of adolescence (solely for South Asia and specifically Pakistan). The first one focuses on socio-economic characteristics.

Adequate nutrition is a form of economic and social privilege. So adolescents who belong to upper socio-economic classes do have less structural barriers, they have better access, availability and affordability of food as compared to adolescents who belong to lower socioeconomic classes. Adolescents from upper socio-economic class also have better access to health and nutrition experts.

i. Second is Personal Food Drivers which are the personal preferences of adolescents in terms of food they wish to consume.
j. Adolescents in Pakistan are dependent upon their caregivers. The last and probably the most important one is External Influence. External influence includes multiple settings which includes peer pressure, societal pressure, social media, etc.

6. Food Security Challenges in Pakistan

a. By 2030, global water demand will increase more than 50%. By 2030, energy demand is expected to increase as much as 50%, driven mostly by developing world demand.
b. A major challenge being faced by world and Pakistan right now is of environmental degradation due to unnecessary consumption and production.
c. By 2030, agriculture's carbon mitigation potential could reach as much as 7.5% of total global emissions, depending on the price of carbon and the adoption of agricultural productivity measures. If these challenges are not rightly tackled, then we are likely to face severe environmental effects due to climate change.
d. The COVID-19 pandemic has also impacted the food environments and food systems, mainly because of a disruption in routine. A study by Global Alliance reveals an increase in the consumption of junk food during lockdown. An increase of 2.2 percent in the prices of 13 food items was also identified which included pulses and vegetables.

7. Promoting Technological Transformation in Pakistan's Agriculture Sector

a. In Pakistan, digital illiteracy among farmers in the agriculture sector prevails. The farmers are not illiterate as they are aware of the farming techniques and the kind of inputs required for farming. Farmers in Pakistan lack basic technical knowledge to use modern scientific methods of agriculture.
b. There are also financial constraints that are linked to poverty and also the small landholding sides, making farmers unable to access modern technologies. The economies of scale-like fragmentation of land may limit the adoption of modern technologies for example the government of Pakistan in various provinces is enabling farmers to have modern technologies but most of the times, small farmers are neglected due to the size of the land.
c. Misuse of agricultural credit, the outreach and scope of extension services also exist in Pakistan's agriculture sector.
d. There is a need of technological transformation to manage the existing challenges. The transformation is required not only to meet growing food demands but also to manage challenges of climate change, urbanization, deteriorating natural resources and loss of biodiversity.
e. In the past, efforts centered on boosting agriculture to produce more food have been made but there is need to divert focus in tackling the root causes of hunger and malnutrition through transformative changes to our food system.
f. Four important action areas which are necessary to transform the agriculture sector. First, to reroute farming and rural livelihoods to new trajectories that reduce emissions and are climate-resilient. Second, there is a need to De-Risk livelihoods, farms and value chains to deal with the increasing vagaries of weather and extreme events. Third, to reduce emissions from diets and value chains, targeting health and climate outcomes. Lastly, there is a need to realign policies, finance, support to and innovation to facilitate action in the above action areas.
g. Efforts are required to ensure zero agricultural land expansion on high-carbon landscapes like avoiding expansion of agriculture on forest plants
h. Markets and public sector actions should be enabled to incentivize climate-resilient and low emission practices. In this case, the role of the market is very

important. There should be a whole value chain connecting the farmers directly to the market.

i. To reduce emissions from diets and value chains, a shift to healthy and sustainable climate-friendly diets is needed.
j. To better align policies, finance, support to social movements, and innovation, we need institutional and policy changes that enable transformation like realigning agricultural subsidies to a climate change agenda.
k. Improving ease of doing business and unlock sustainable finance is one of the key area which needs working.
l. A social change is needed for more sustainable decisions by engaging youth through science-based social movements to transform agricultural systems.
m. The current status of innovation and technological transformation in the agriculture sector in Pakistan is rapidly evolving with the introduction of modern tools, ICT based solutions and artificial intelligence that promotes the resilience of food systems against various shocks.
n. Updated policies and actions plans at the federal and provincial level that acknowledges the need for technological transformation in agriculture sector have been introduced by the present government. An example includes Prime Minister's Agriculture Emergency Program- to uplift agriculture through number of initiatives and also youth engagement is one of major components in this program.

8. Food Supply Chain System

a. A value chain or a supply chain is a strategy, through which one can solve its theoretical problems, as well as practical problems. In Pakistan, there are certain post-harvest handlings that create issues in the value chain system. Additionally, there is no grading system. Everyone is packing their food according to their own grades, including wooden packaging which, in the long-term, leads to deforestation.
b. Poor logistics is another issue faced right now. There is no understanding of how to carry the product into the system and how to sell that product further.

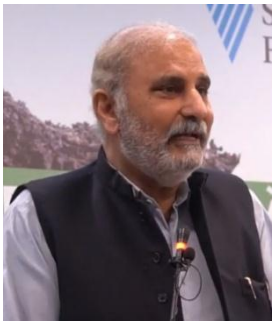
c. There is a need for research and development from the government sector. Certain supportive services in terms of logistics are required. Additionally, financial institutions must be encouraged to finance relevant commodity chains.
d. Supply Chain Management can be mapped, which can help in solving issues mapping requires structure, architecture, channels, nodes, etc..

ANNEXURE: SPEAKERS/PANELISTS

The Panelists of the session included the following individuals:

- His Excellency Syed Fakhar Imam, Federal Minister for National Food Security and Research, Government of Pakistan (Chief Guest)

- His Excellency Syed Hussain Jahania Gardezi, Provincial Minister of Punjab for Agriculture, Government of Pakistan (Guest of Honour)

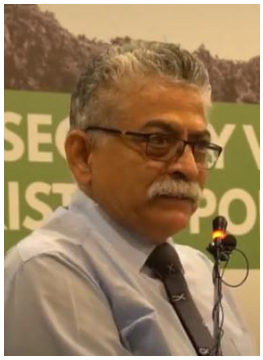


- Mr. Ashfaq Ahmed Gondal, Former Federal Secretary of Information and Broadcasting and Vice President (Federal Region), Center for Global & Strategic Studies (CGSS), Islamabad

- Dr. Steffen Kudella, Resident Representative, Hanns Seidel Foundation Pakistan

- Prof. Dr. Asif Ali (TI), Vice Chancellor, MNS University of Agriculture, Multan

- Prof. Dr. Usman Mustafa, Team Leader, Barani Water Conservation Project, ME&I Consultants MFS&R, Government of Pakistan



- Dr. Shehzad Kousar, Assistant Professor, COMSATS University, Islamabad

- Ms. Manahal Fatima, AWF Foundation, Islamabad

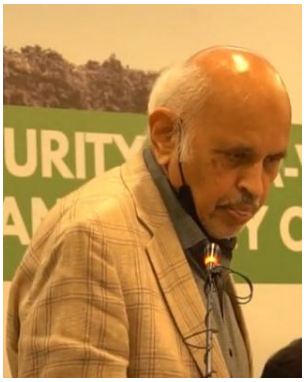
- Dr. Aftab Alam, International Development Consultant

- Prof. Dr. Waqar Akram, Professor of Economics, Institute of Business Administration (IBA), Sukkur

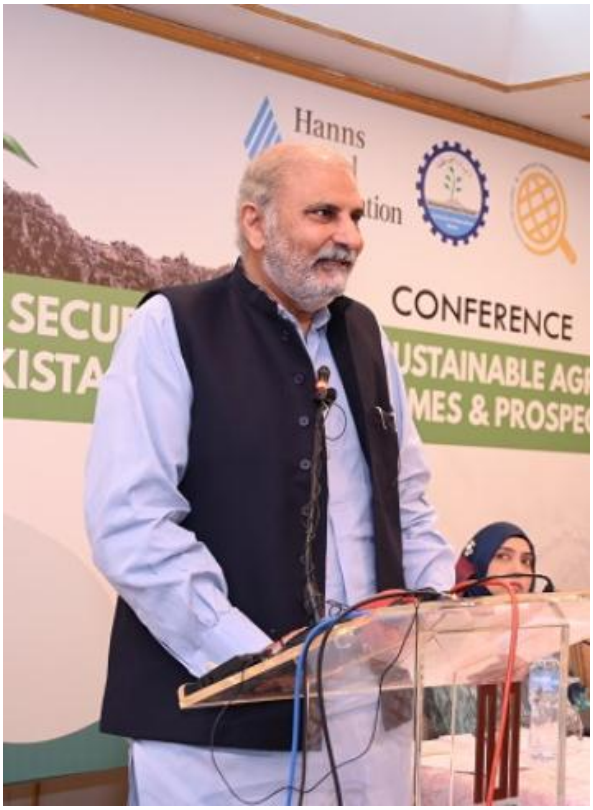
- Dr Muhammad Abid, Senior Advisor Adaptation to Climate Change and Climate Services, GIZ Pakistan

- Dr. Mubashir Mehdi, Associate Professor and Director Business Incubation Center, MNS University of Agriculture, Multan

- Dr. Mehmood Ahmad, Professor of Practices at Water Informatic Centre, Lahore University of Management Science and Former Advisor, Food and Agriculture Organization



Picture Gallery



Roundtable Discussion Report

"Food Security vis-à-vis Sustainable Agriculture in Pakistan: Policy Outcomes and Prospects"

Jointly Organized by
Center for Global and Strategic Studies (CGSS), Islamabad &
Hanns Seidel Foundation (HSF) Pakistan &
MNS University of Agriculture, Multan
at Multan on 7th July, 2021

BRIEF OF THE EVENT

On 7th July 2021, a Roundtable Discussion on "Food Security vis-à-vis Sustainable Agriculture in Pakistan: Policy Outcomes and Prospects" was jointly organized by Center for Global & Strategic Studies (CGSS), Islamabad, Hanns Seidel Foundation Pakistan and MNS University of Agriculture, Multan at Multan. The discussion was attended by approximately 70 participants including experts of the relevant fields, deans, faculty members and students. The details of the panelists is attached at Annexure A.

1. Introduction:

The roundtable discussion brought together a distinguished panel of veteran subject experts, leading academicians, secretary members of the agriculture sector, and scholars to discuss the food insecurity situation in Pakistan due to agriculture vulnerabilities and propose policy options for sustainable agriculture production. Therefore, this roundtable integrated national experts to analyze the agriculture productivity issues and suggest policy recommendations in order to sustain the food supply chain in Pakistan. The report represents a detailed analysis of the collective views and speeches of the panelists presented during the roundtable discussion. The roundtable focused on multiple dimensions. The valuable speakers highlighted the role of academia in Pakistan to create awareness of these emerging non-traditional security challenges. The discussion has built a comprehensive analysis and cohesive measures to counter these menaces.

2. Major Findings of the Roundtable Discussion

The experts identified a wide range of core areas, i.e., agriculture and economic cooperation, climate change and water scarcity issues, imposing dreadful impacts on food security, technological advancement to enhance agriculture productivity and farming techniques and proposed future policy options. The scholars explored the possible ways to combat emerging Non-traditional security threats, understand food security in Pakistan, incorporate new techniques, and provided valuable policy recommendations. Following are the recommendations/suggestions mentioned below:

- Nutritious and sufficient food is a dire requirement of today. Therefore, the government should enhance its efforts towards achieving Sustainable Development Goal (SDG2) to promote sustainable agriculture and support small-scale farmers in Pakistan.
- Technology, AI and data science support sustainable agriculture. In this regard, international cooperation and investment would help stimulate new farming techniques.
- It is crucial to develop relevant knowledge related to dietary guidelines and resources for sustainable development.
- There is a need to introduce advanced machines, either sowing or harvesting, to save resources and improving soil health.

- Sustainable development implies the incorporation of recent innovations that may originate from within scientists or farmers' communities. Therefore, it is important to increase the capacity of rural people to be self-reliant, resilient and build strong rural organizations and economies.
- There should be efforts to enhance market support through risk mitigation through collective action and involve academia, farmers and industry in the process.
- It is significant to curtail small farmers productivity challenges by ensuring quality seed, machinery, a balanced fertilizer and weed management.
- Moreover, medium to long-term plans should be devised for land and water resource management. The long-term correction through breed improvement programs must be launched.
- Livestock productivity must be enhanced from the present stock with better feed, fodder and health coverage. In this aspect, investments in Research & Development (R & D) should be linked with institutional reforms.
- Academia has a significant role in creating awareness on food and nutrition in Pakistan. In this aspect, intensive research is required to identify gaps for improving the food security situation.
- To prepare human resources and a skillful labor force for mitigating the impact of food insecurity.
- To help government agencies, policymakers and program managers to devise plans for improving food security through a multisectoral approach in Pakistan.
- To suggest better and viable dietary plans for the population.
- Phosphate minerals for fertilizers are currently mined, but global reserves are predicted to sustain food production for only another 50 to 100 years. In this aspect, improving efficiencies for fertilizer applications and relying on organic nutrient sources, which are vital for sustainable agriculture.
- Data science can give access to farmers for improved planning, better monitoring and provides insight into yield outcomes. It informs the farmer about weather information, fields characteristic, climatology insights and agronomy insights. Data insights help farmers grow more with existing resources.

- By educating farmers, creating awareness and providing them with advanced tools, food insecurity can be resolved.
- Sustainable food security can only be achieved by studying dimensions at all levels. The reliability of food security evidence can be increased by using more robust methods to measure how food security changes over time.

3. Understanding Food Security: Pakistan's Commitment to Sustainable Development Goals -Agenda 2030

- Food security, as defined by the United Nations' Committee on World Food Security, means that all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life. [6]
- The four major indicators of food security include availability, accessibility, utilization, and sustainability.
- Availability means to produce or have the resources to purchase food at household level. Access means physical, social and economic acquiring of sufficient food. For utilization, actual consumption patterns must meet nutritional needs, including processing & storage, preparation & allocation, and consumption within households. Sustainably means that access and utilization must be stable and reliable.
- Only the availability of food is not sufficing. People should have economic and physical resources to access food.
- If population access to nutritious food is disrupted, it leads to food insecurity which has major implications for the society, such as poverty malnutrition and social unrest.
- The United Nations Sustainable Development Goal 2 (SDG2), Zero Hunger, also highlights the significance of food security. Pakistan as a signatory is committed to fulfilling its agenda to eradicate hunger and malnutrition by 2030.

[6] https://www.ifpri.org/topic/food-security#:~:text=Food%20security%2C%20as%20defined%20by,an%20active%20and%20healthy%20life.

- In this aspect, Pakistan has to encounter several challenges to achieve these objectives. According to the Global Food Security Index (GFSI 2020) Pakistan ranks 80th out of 113 countries.[7]
- The country is facing different non-security threats such as climate change, pest attacks, droughts etc. In order to deal with these challenges, Green Climate Fund (GCF) has been launched, which is working in five districts of Punjab, Multan, DG Khan, Muzaffargarh and Lodhran.
- The project focuses on generating agricultural information and promotes resilient climate agriculture. The Federal Agriculture Organization (FAO) has been working with the government to address this.
- The FAO has been following four betters; better production, better nutrition, a better environment and a better life..
- The establishment of a farmer Field School (FFS) has been a great approach. It is a farmer-led initiative, where farmers sit together, discuss and decide their issues.
- Farmer Extension Organization (FEO) facilitates this process for utilizing this farmer field approach.

4. Gender Responsive Food Security Plan: Requirements and Actions

- In any grave situation or disaster, ensuring food security is the foremost thing. In this aspect, affected communities will need help to restart agricultural activities in order to meet household food security needs adequately and restore resilience.
- Since emergencies tend to exacerbate existing vulnerabilities, the respective roles and responsibilities of women and men and their constraints, needs and capacities need to be analyzed and understood to ensure that effective assistance is provided.
- Pakistan's agriculture sector needs to be revamped with the assistance of men and women.

[7] "Food-Insecure Nation," DAWN, July 5, 2021, https://www.dawn.com/news/1633265/food-insecure-nation#:~:text=Pakistan%20was%20ranked%2080th%20on,Bangladesh%2C%20and%20several%20African%20countries.

- Food insecurity has major impacts on people personally and on the ability of a country to lift itself out of poverty.
- Some of the impacts of food security include famine, undernutrition, soil erosion, rising process, and social unrest.
- A gender-responsive food security program should include five pillars, i.e., demography, economy, political, social institutional & security factors.
- All these factors can be facilitated by certain actions to ensure gender equality programing in food security. In this regard, certain characteristics are as follows:

a. Household food supply and food security
b. Gender-sensitive needs assessment
c. vulnerability maps
d. Gender-sensitive targeting
e. Gender-disaggregated data and gender-sensitive indicators (stakeholders' analysis)

5. Balanced Nutritious Diet: Significance of the Sustainable Agriculture

- A balanced diet is necessary to lead a healthy life. In developed countries, meat, milk, cereal and fruits together are recognized as major sources of proteins.
- In developing countries, the situation is entirely different. Cereals (including rice) contribute 55-70 percent of the total calories in the diet.[8]
- In order to ensure food availability, there are many challenges from an agricultural research point of view which include climate change, water, soil health, pests and unavailability of gene technology.
- Therefore, the government focuses on improving per capita cereal availability, and national programs are set up to improve agricultural production.
- BLA technology has been set up to develop hybrid wheat. Pakistan has developed more than 1000 hybrid wheat.
- The overarching goal for sustainable development is to ensure food security, nutrition for all populations. To achieve this aim, it is crucial to develop relevant

[8] (FAO), accessed July 31, 2021, http://www.fao.org/3/Y4343E/y4343e02.htm.

knowledge related to dietary guidelines and resources for sustainable development. Sustainable agriculture is a growing movement and dire need of the time.

- It is gaining tremendous support and acceptance globally. It focuses on environmental health and economic profitability.
- Sustainable development implies the incorporation of recent innovations that may originate from within scientists or farmers' communities. It is not just about food production but increasing the capacity of rural people to be self-reliant and resilient and about building strong rural organizations and economies.

6. Agriculture System in Pakistan: Productivity and Policy Ramifications

- Pakistan's population is more than 200 million. It is the 5th largest population in the world[9].
- Pakistan is an agriculture country, generating more of its export from agriculture commodities.
- Agriculture provides maximum employment to our labor force. Pakistan has the world's largest irrigation network, but many issues are associated with this network.
- The agriculture sector is indispensable to Pakistan's economic growth, food security, employment generation, and poverty reduction. The agrarian base is extensive and strong. Punjab, well endowed with irrigation and fertile soils, accounts for 55% of the total cultivated area of Pakistan, i.e., 12 million hectares.
- There are about 3.86 million farming families, out of which 94% have less than 5 hectares of land. Moreover, five crops, including wheat, cotton, rice, sugarcane and maize, take up three-quarters of the total Punjab's cropped area.
- According to an estimation, livestock is the fastest-growing sub-sector of Pakistan's agriculture. It has share of 60% in agriculture, and 11.53% in Gross Domestic Product (GDP) achieved a growth of 3.06%.[10]

[9] https://www.nationsonline.org/oneworld/population-by-country.htm#:~:text=Bureau%20of%20Statistics-,Note%3A,groups%20live%20in%20the%20country.

[10] http://www.finance.gov.pk/survey/chapters_21/02-Agriculture.pdf

- However, it has also been observed that due to climate change and water scarcity, crop productivity has been reduced.
- The agriculture efficiency was also compromised due to economic constraints such as energy crisis, water crisis, rapidly growing population, and climate change's unpredicted events. Therefore, food security must include nutritional security.
- The political economy of food security must not be compromising the profitability of the farmer. It is significant to curtail small farmers' productivity challenges by ensuring quality seed, machinery, a balanced fertilizer and weed management.
- Moreover, medium to long-term plans should be devised for land and water resource management.
- Long-term correction through breed improvement programs must be launched.
- Livestock productivity must be enhanced from the present stock with better feed, fodder and health coverage. In this aspect, Research & Development (R & D) investments should be linked with institutional reforms.

7. Sustainable Agriculture and Ensuring Food Security: Role of Data Science and Information Technology (IT) Sector

- Climate change, water scarcity, global warming, these non-traditional security challenges, have massively impacted food security of Pakistan. creating multiple challenges.
- According to an analysis, 71% of food requirements will be increased by 2050. In this aspect, there is a need to take support from advanced technology and enhance farming efficacy.
- There are five major factors affecting farming decisions, i.e., weather challenges, soil health, weed, insect and disease management.
- Data science can help balance farming techniques and utilize upgraded technology to enhance agriculture productivity with the help of machine learning and Artificial Intelligence (AI).
- Data science can give access to farmers for improved planning, better monitoring and provides insight into yield outcomes.

- It informs the farmer about weather information, fields characteristic, climatology insights and agronomy insights.
- Data insights help farmers grow more with existing resources. It ensures that all have access to an affordable, healthy and plentiful food supply.
- By educating farmers, creating awareness and providing them with advanced tools, food insecurity can be resolved.

ANNEXURE A

The Panelists of the session included the following individuals:

- Mr. Khalid Taimur Akram, Executive Director, Centre for Global & Strategic Studies, Islamabad.
- Dr. Steffen Kudella, Resident Representative, Hanns Seidel Foundation Pakistan
- Prof. Dr. Asif Ali (TI), Vice Chancellor, MNS University of Agriculture, Multan
- Ms. Palwasha Nawaz, Project Executive, CGSS
- Dr. Umar Saeed, Food and Agriculture Organization (FAO), Pakistan
- Dr. Zulfiqar Ali, Director ORIC, MNS University of Agriculture, Multan
- Dr. Saeed Akhtar, Department of Food Science and Technology, Bahauddin Zakariya University Multan
- Ms. Rabia Sultan, Progressive Grower / Director Gurmani Foundation
- Dr. Khalid Bashir, Assistant Professor, Institute of Agricultural and Resource Economics, University of Agriculture Faisalabad
- Dr. Muhammad Ashfaq, Project Coordinator, MNS University of Agriculture Multan
- Dr. Sofia Anwar, Dean, Faculty of Management Sciences, Govt. College University, Faisalabad
- Dr. Ayesha Hakim, Assistant Professor, MNS University of Agriculture, Multan
- Dr. Asif Kamran, Economists, Nuclear Institute of Agriculture and Biology (NIAB), Faisalabad
- Prof. Dr. Irfan Ahmad Baig, Dean Faculty of Social Sciences, MNS University of Agriculture Multan

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