



POLICY DIALOGUE ON CLIMATE SMART AGRICULTURE

REPORT OF PROCEEDINGS MARCH 07, 2023





POLICY DIALOGUE ON CLIMATE SMART AGRICULTURE

Report of Proceedings March 07, 2023

DISCLAIMER

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QUOTE BY QUAID-E-AZAM MUHAMMAD ALI JINNAH



"There is no doubt that the future of our State will and must greatly depend upon the type of education we give to our children, and the way which we bring them up as future citizens of Pakistan. Education does not merely mean academic education. There is immediate and urgent need for giving scientific and technical education to our people in order to build up our future economic life and to see that our people take to science, commerce, trade and particularly well planned industries. We should not forget that we have to compete with the world which is moving very fat in this direction. We have to build up the character of our future generations. We should try, by sound education, to instill into them the highest sense of honor, integrity, responsibility and selfless service to the nation. We have to see that they are fully qualified or equipped to play their part in the various branches of national life in a manner which will do honor to Pakistan".

Pakistan Educational Conference, Karachi, 27th November 1947.

PREFACE

Climate change and food security are the two most important concerns that Pakistan is experiencing. Pakistan's dependence on agriculture accounts for around 24% of its GDP. More than 65% of people in our country directly rely on agriculture for their living. The agriculture sector is dealing with a number of issues right now, some of which include crop diseases, water scarcity, land shrinkage, and climate change. Pakistan is not an exception when it comes to the urgency of the global issue of climate change. The country is particularly vulnerable to climate change's effects, including as rising sea levels, floods, droughts, and extreme weather events. The situation is grim in Pakistan, a country that directly hit by global climate change in the shape of higher temperatures, melting of glaciers and catastrophic floods. We witnessed the severest effects of climate change, with unprecedented floods in 2022.

Increasing agricultural productivity necessitates the adoption of sustainable agriculture, which refers to the efficient production of safe, high-quality agricultural products while protecting and improving the natural environment, the social and economic conditions of farmers, agricultural workforce, and local communities, and safeguarding the health and welfare of all species.

The Pakistan Institute for Parliamentary Services is a premier Institute and exclusive learning seat for Members of Parliament from across the country. As the policy makers are confronted with the nexus of challenges of declining productivity, increasing food insecurity and climate change, the Parliamentary Committees are eager to take well-researched and data-driven deliberations into policy discussions and expedite their translation in policy measures. This policy dialogue on Climate Smart Agriculture has been organized to bring policy makers, academia, multilateral partners and private sector at one forum, discuss the challenges being confronted by the stakeholders and deliberate potential solutions to overcome these challenges. The recommendations of the session will be presented in relevant Parliamentary Committees to bring the issue in the consideration of policy makers and provide them assistance in highlighting the matter of public concern on the floor of the Parliament.

We are pleased to present proceedings of the policy dialogue for a happy reading. The Institute recognizes the support of its partner Syngenta Pakistan for holding this roundtable discussion on March 07, 2023.

Muhammad Anwar

Executive Director, Pakistan Institute for Parliamentary Services

LIST OF ACRONYMS

CBD : Cannabidiol

GHGs : Greenhouse gases

IHA : Institute of Hydroponic Agriculture

PARC : Pakistan Agriculture Research Council

PIDC : Pakistan Industrial Development Corporation

PMAS AAUR : Pir Mehr Ali Shah Arid Agriculture University Rawalpindi

UAV : Unmanned Aerial Vehicle

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EXECUTIVE SUMMARY

The Pakistan Institute of Parliamentary Services (PIPS) and Syngenta Pakistan organized a high-level policy discussion on "Climate-Smart Agriculture and Food Security: Challenges & Way Forward for Pakistan" on Tuesday, March 7, 2023, in Islamabad. The event was attended by more than 45 participants, including important stakeholders such as Members of standing committees of food security and climate change in the National Parliament, experts from the public, development, media, and academic sectors, and representatives from the UN FAO, ADB, PMAS Arid Agriculture University Rawalpindi, and QAU, Islamabad.

The objectives of the session hosted by PIPS Research Wing were to highlight the key concerns facing the nation's food security and to propose potential ways to mitigate these challenges in the context of climate change. They highlighted the key challenges facing the food security and agriculture sector in the country amidst climate change.

The Honorable Raja Pervaiz Ashraf, Speaker of the National Assembly of Pakistan/President of the PIPS BoG, graced the occasion as the Chief Guest. He pointed out how Pakistan is facing challenges in the agricultural field due to climate change, and hence recommended to work on those challenges.

The Director General (Research), PIPS Mr. Muhammad Rashid Mafzool Zaka in his welcome remarks highlighted the importance of understanding the very challenge and working on it. He informed the participants that the recommendations from the policy dialogue will be shared with the Honorable Members of the relevant Standing Committees. Hon. MNA Mr Asharaf Chaudhry emphasized the need to increase the capacity of small farmers to embrace climate resilient practices. Dr. Faiz ul Bari, NRM Adviser from Food and Agriculture Organization of the United Nations (FAO) focused his dialogue on importance of food security. Dr Naveed Tahir, PMAS University of Arid Agriculture, Rawalpindi informed the participants that PMAS has established the first-ever Centre for Precision Agriculture to develop indigenous technology for precision agriculture and lessen the impact of agrochemicals on the environment. Mr. Zeeshan Hasib Baig, Country GM Syngenta, shared the landscape of country's agriculture, key challenges of the sector and the work of Syngenta for facilitation of farmers in Pakistan through agricultural innovation and provision of crop protection, biologicals, seeds, and crop enhancement products along with several digital services.

Honorable Senator Seemi Ezdi (Chairperson Senate's Standing Committee on Climate Change) was of the view that women in agriculture have an important role to play in ensuring the food security of the country. Honorable Dr. Shahida Rehmani, MNA, praised the timely initiative taken by the PIPS and Syngenta Pakistan and expressed the hope that the Roundtable's report would undoubtedly facilitate parliamentary committees in promoting and overseeing the development of national climate-smart agriculture policies. Honorable Executive Director, PIPS Mr. Muhammad Anwar said that increasing agricultural productivity necessitates the adoption of sustainable agriculture. Mr. Muhammad Anwar presented vote of thanks to the participant of the dialogue and appreciated PIPS Research Wing and Syngenta Pakistan for organizing the high-level dialogue.

The roundtable discussion resulted in following set of recommendations.

- o Agriculture sector to be given the status of an "industry"
- o Develop policy processes and Instruments to support the adoption of Climate Smart Technology
- o Promote crop diversification, corporate farming and cooperative farming while encouraging crops clusters
- o Improve water management
- o Increase access to credit and crop insurance
- o Promote regenerative agriculture
- o Strengthen climate information and advisory service
- o Invest in research and development
- o Expedite the development and approval of import and other regulatory policies for climate smart technologies and products
- o Align the agriculture sector's short and long-term policies
- o Strengthen linkages between academia and Industry
- o Empowering Women in Agriculture Sector should be made a priority as it has wider economic benefits in addition to the social ones
- o Promote Public Private Partnerships
- o Improve farm productivity with precision technology
- Promote the use of drone technology in agriculture by providing a conducive regulatory environment and encouraging the private sector to import and locally manufacture the UMVs for commercial purposes in the agriculture sector
- o Encourage private investment in Precision Agriculture technologies
- o Promote resilient and high yielding livestock breeds
- o Focus on capacity building and awareness raising of farmers
- o Encourage banks to introduce green banking initiatives
- o Transform Agriculture Sector through crop clusters development
- o There is a lack of collaboration among different stakeholders resulting in less effective interventions. This necessitates coordinated and inter-sectoral efforts at all fronts.
- o Roles and responsibilities of all stakeholders involved in the agriculture sector shall be defined.
- o Safe and responsible usage of pesticides shall be promoted and farmers shall be educated in this regard.
- o Climate change poses an existential threat to Pakistan. Serious efforts including mitigating the climate risks to local agriculture and food security shall be undertaken.
- Financial constraints faced by local farmers is a key reason for low average farm yields in the country. To cope with this, partner ships shall be established to provide access to finance.
- o Locations shall be identified based on their suitability for development of different agricultural products.
- Pakistan's freshwater resources are depleting at an alarming pace. Measures shall be taken to deal with the injudicious/indiscrimi nate use of water resources and water pollution including ground water
- Government shall work towards ensuring that agricultural land is not used for any other purpose. In this regard, industries and housing sector shall be encouraged to utilize non-agricultural land for industrial and urbanization purposes.
- o Introduce and promote the use of biologicals and bio-pesticides.
- Soil health is deteriorating mainly because of monocrop culture, less organic matter and lower microbial activity resulting in poor uptake of nutrition by plants. Crop rotation and biodiversity shall be promoted to deal with this.

PROCEEDINGS OF POLICY DIALOGUE ON CLIMATE SMART AGRICULTURE MARCH 07, 2023

The Program began with introductory remarks by Ms. Tehseen Khalid, Director Research Pakistan Institute for Parliamentary Services to set the scene and agenda of the policy dialogue. She apprised the guests on the topic by highlighting the impeding food security crisis in the coming years due to adverse impacts of climate change, water scarcity and the declining food production. The session was then followed with the recitation of verses from the Holy Quran and a round of introductions by the participants.



Mr. Rashid Mafzool Zaka, Director General Research, Pakistan Institute for Parliamentary Services:



The policy dialogue formally began with welcome remarks from Mr. Rashid Mafzool Zaka, Director General Research, Pakistan Institute for Parliamentary Services. He welcomed all the Honorable members of the Parliament and other distinguished guests. He said that the dialogue has been organized at a time when the country has witnessed one of the worst climate disasters in history which have left thousands of people homeless and unable to access the basic amenities of life like food, shelter, education and healthcare. He said that the recent disastrous flood inundated 90 districts in the country, most of which were engaged in agriculture. He further said that the changes in land use for accommodating increased demand for agricultural lands is responsible for at least 23% of the net greenhouse gas emissions from anthropogenic activities and is a major

contributor to climate change. Moreover, the country is also confronted with water scarcity challenges which could affect 60% of the country's farmland by 2050. Pakistan's neighboring countries including India and Afghanistan are also building dams to for this challenge. He stressed that debates on water and agriculture are strategic need of the hour for sustainable future of the coming generations. He stressed that sustainable economic growth, water security and food security are crucial for a healthy and resilient nation as well. In this regard, climate smart and resilient agriculture are the key to ensuring sustainable agricultural production which can support trade and economic growth of the country. He said that the dialogue is an effort to bridge the gap between policy makers, private sector and academia on climate smart agriculture to meet the agricultural demand amidst climate change. He also said that the event is the first at the national level and will be also be organized in provinces. He further informed that the policy scaling up recommendations from the session will be presented to the relevant standing committees of the Parliament for further deliberation and actions.

Honorable Chaudry Muhammad Ashraf, Member National Assembly of Pakistan:



Chaudry Muhammad Ashraf, Member National Assembly of Pakistan was the first speaker of the session. He said that Pakistan has a long history of agricultural issues. Even in the first official visit to United States, the Honorable Prime Minister Liaquat Ali Khan took up the issue of low trade and export volume of the recently independent country. While the country's people were engaged in agriculture, the sector was still struggling with low productivity to support the engine of economic growth. To support the newly independent democratic state, the Truman government offered Pakistan soft loans to facilitate economic and agricultural development. However, the government of Pakistan instead insisted on support in the areas of science and technology which led to the development of an agriculture-based economy. He said that the agriculture sector thrived in production of wheat, cotton, jute etc. and through the

establishment of Pakistan Industrial Development Corporation (PIDC), the country emerged as leader in textile sector, capturing competitive edge in the global market. He said that the agriculture sector provided essential economic support ensuring the country's independence from loans despite the poor economic conditions at the time of independence. He stressed that democracy supported a conducive ecosystem for development and prosperity and if the country's democratic governance structure was not overtaken by dictatorship, there would have been no demand for loans and aid. He stressed that if Pakistan reverts to being an agriculture-based economy; strengthen export of rice, potato, cotton and wheat, the country's dependence on loans to support the economy can be averted. He said that agriculture had established the strong foundation of economy and resurrecting the sector to its former glory is the key to ensure sustainable development.

Dr. Faiz-ul-Bari, Natural Resource Management Advisor, FAO:

The second speaker of the dialogue, Dr Faiz-ul-Bari remarked that climate smart agriculture is not only important for agriculture but for human security in Pakistan. He said that food security has been a constant challenge for the past many decades, even before the onset of climate change and has intensified in recent decades. He said that the food security crisis is further triggered by availability, declining purchasing power and lack of access to food particularly in rural areas despite the productivity of the sector. Poor farmers with low-income levels in rural areas had been confronted with high price and poor quality of agricultural inputs even before climate change. He emphasized that climate change undermines not only agricultural productivity and food security but also the health, livelihoods and



water availability which has an unproportioned and severe impact on the already vulnerable farmers and communities. He said that the recurrent extreme climate events, such as floods, droughts and heatwaves continue to undermine the agricultural productivity, food security, livelihoods and nutrition of the people. He highlighted that about 94% of surface water has been exhausted by agriculture causing major water stress for industries and domestic use and in the wake of worsening climate change; water availability will become more compromised. He said that climate change and poor early warning systems undermine the coping mechanism of the community, resistance and recovery during and post disasters. Moreover, lack of timely pivot with

climate change to alternative technologies and practices are contributing to decline in agricultural productivity as lands historically engaged in agriculture are no longer resilient and suitable due to changes in precipitation and weather patterns.

Unlike progressive farmers, majority of small farmers fear taking the risk to pivot to alternative crops. He said that in these conditions, agricultural productivity of the country will continue to deteriorate unless the small farmers are provided the necessary support. Sharing some of the initiatives, he informed that FAO and Ministry of Climate Change are implementing a Green Climate Fund Project worth US \$47 Million to transform the Indus Basin with Climate Resilient Agriculture and Water Management targeting 5 districts in South Punjab and northern Sindh. The initiative is aimed at changing behavior and attitude towards agriculture and water management through advocacy and awareness. In another initiative, FAO in collaboration with Ministry of Climate Change, Metrological Departments and stakeholders are creating an information portal named "Agriculture Water Information Portal" to consolidate water, climate and agricultural data. This data will be analyzed and communicated with farmers in simple languages so they can prepare themselves in the face of any types of shocks. FAO in collaboration with the Agriculture Departments of Sindh and Punjab are carrying out ecological zoning to analyze and reevaluate which crops are suitable for a particular area to adapt to changing climate.

Dr. Muhammad Naveed Tahir, Associate Professor/ Project Director PMAS-Arid Agriculture University:



The first speaker from the academia was Dr. Muhammad Naveed Tahir, who briefed the audience about various innovative practices being implemented and verified by PMAS-Arid Agriculture University. He informed that Pakistan's first ever "Centre for Precision Agriculture in Pakistan" has been established by PMAS Agriculture University to innovate and indigenized technologies for precision agriculture, bring these technologies to the farmers, and reduce impact of agrochemicals on environment and climate change. He highlighted that the global precision agriculture market currently is at US\$6 Billion with a potential to increase up to US\$20.36 Billion by 2032. On the other hand, in Pakistan, despite discussions, no practical measures have been taken for their adoption at

farm level. He stressed that technology and information play a crucial role in optimizing the use of agricultural inputs and resources through precise and targeted application. He informed the audience about various technologies including GPS-enabled seed drills equipped with auto-steer systems for seed plantation in straight lines which enable higher quality and yield, optimized application of water. Auto-steer and guidance system is a globally used technology which has demonstrated high plant population and productivity with reduced usage of fertilizers and chemical inputs. He highlighted that the global UAV market size was US\$ 102.38 Billion in 2022 and is expected to grow by 25% to US\$279 Billion. 80% market is dominated by drone technology as it is applied in seeding, sowing, fertilizer and pesticide application, pest and disease monitoring, plant genotyping etc. In the incidence of pest attacks and disease, the mitigation window is very small and drones can enable a timely detection, real-time monitoring, data collection as well as timely and accurate application which prevent optimal application. To overcome the financing gap, these technologies must be provided through rental service providers to avert the financing issue. A Smart Data Driven Decision platform is being developed in collaboration with PMAS, PMAR and SUPARCO based on data driven AI technology has 26.7% market growth potential from 2022-2030 and is projected to grow from US\$ 1254- 8308 million.



Smart IoT farming can improve crop productivity from 20-23% by precise water and fertilizer management. The capacity of farmers in climate smart technologies should be developed through field demonstration sessions of precision agriculture technologies at farmer fields. In order to bridge the financing gap, funds should be established at federal and provincial levels for indigenization of Precision Agriculture technology, encourage private investment and promoting Service Provider Model at each division.



Mr Zeeshan Hasib Baig, Country General Manager Syngenta:



Country General Manager Syngenta Pakistan, Zeeshan Hasib Baig while sharing his views on the subject said that nations who lose connection with their roots embark on the journey to failure which is exactly what transpired in Pakistan's agriculture sector. Elucidating the bleak situation, he expressed that the yields of our key crops were either on the decline or were stagnant. At the same time the country's population continues to grow by about 2% annually which means that the sector is not even producing enough to meet the domestic food demand let alone enough to export. He highlighted that if the sector's productivity can be improved by 10%, an additional US\$7Billion can be generated in addition to the present share of US\$70 Billion to the GDP. Briefing the

participants about the products being offered by the company, he said that leading in agricultural innovation and technology, Syngenta offers crop protection against diseases and pests, bio-stimulants, high quality seeds for crops, fruits and vegetables,crop enhancement products and digital services through more than 900 Naya Savera franchises. He further informed that Syngenta has introduced a New Farming Ecosystem in Pakistan namely Centrigo, which includes much-needed measures such as crop insurance, drone spraying services, e-commerce services in selected franchises, Cropwise Grower mobile application for pest and disease detection, weather updates, agronomy advice, and as well as a one-stop solution for all farming concerns through newly established Centrigo Centres. A similar initiative in China called Modern Agriculture Platform (MAP) has been able to create significant benefits for the farmers and China's economy. He said that Syngenta Pakistan has come forward to create a similar kind of ecosystem-based service delivery model in Pakistan.



He raised the alarm that although agriculture contributes over 22.7% to the GDP and has provided direct employment to over 37.4 percent of the labor force, the sector is standing at crossroads with food security and climate change as two of the biggest issues facing the sector. He warned that 50% additional food will be

locally needed by 2050 and that if no immediate action is taken, climate change and water shortages will cause over 10% yield losses and will result in loss of over 4.6% of country's GDP by the same year. However, he said that collective efforts from policy makers, academia, industry and farmers can change this trajectory and adoption of climate smart technologies is the key to achieving this. This situation calls for increasing farm productivity, yet conserve and optimize the use of resources like water and soil. The soil health has degraded substantially and cropping patterns combined with cultivating unfavorable crop types are major reasons behind these issues. He further expressed that sectoral policies have historically been misaligned, which led to promoting unsustainable practices in the agriculture sector. He emphasized the need to reevaluate the crops particularly rice and sugar cane in terms of their input demand as well as environmental footprint. He highlighted that low crop yields have resulted from declining soil heath, climate change, climate vulnerable seed varieties, outdated farming practices such as lack of crop rotation, cover crops, poor cropping patterns, unavailability of enablers such as crop inputs, finance, insurance, at the right time, lack of encouragement in Research and Development and high post-harvest losses, which must be addressed.

Honorable Senator Semi Ezdi:

Honorable Senator Seemi Ezdi, Chairperson Senate's Standing Committee on Climate Change, was of the view that women in agriculture have an important role to play in ensuring the food security of the country. Women as potential stakeholders can play a pivotal role in acquiring these objectives in our society. "Most of the labor force in the agriculture sector constitutes of women workers. It also is an indication of promoting more female farmers who are equipped with the latest technologies for dealing with climate change and productivity issues," she said.



She also informed the participants that this year the theme of UN International Women's day is "DigitAll: Innovation and technology for

gender equality". In rural areas, majority of women are deprived of technology. There is a need to align this objective in order to develop CSA and ensuring food security in our country. Agriculture, water, forestry and fisheries are among the sectors impacted by climate change and women are engaged in these sectors as full-time labor or secondary workers in addition to their dependence on natural resources for their livelihood. "We need to empower women to not only improve their livelihood but also to improve food security situation prevailing throughout the country," she said.

Declining crop yields, scarcity of water, lack of fuel and fodder, rural out-migration, frequent natural disasters and unpredictable rainfall patterns triggered by climate change have increased the vulnerability of communities especially women who struggle to survive in these rapidly changing scenarios, she said. Women workers in horticulture are especially involved in sowing, transplanting, and weeding, harvesting and post-harvest operations such as threshing, grinding, husking and storage. For livelihood, women clean shelters, treat sick animals, cut and collect fodder, care for poultry, convert manure into fuel or fertilizer and process milk and wool, among others.

Most women farmers lack decisional power related to productive resources such as sale, purchase and renting of farmland using farm machinery and available credit. Their decisions can positively affect the adaptation of CSA practices at the farmland, she said. She was of the opinion that females with more decisional powers and innovativeness adopt more CSA practices than women in weaker decisional powers.

Sustained agricultural practices can help Pakistan combat the food shortages, inflation and food insecurity. Climate change's negative impacts are already been felt in the form of increasing temperatures, shifting ecosystem boundaries, invasive crops and pests and very frequent extreme weather events such as heat waves, droughts followed by very heavy monsoon which led to devastating floods that Pakistan witnessed last year. Climate change is reducing crop yields, the nutritional quality of major cereals and livestock productivity. Substantial investments will be required to improve current yields. Agriculture today is major part of the climate problem. It generates 19-29% of the total Greenhouse gas emissions. This percentage could increase further if prompt action is not taken, she warned. We have to adapt to new realities of climate change, she said. This would include moving towards smart agricultural practices such as switching to high yield crops, efficient water management by reducing water losses, and building small and medium size dams to build water reservoirs. This in turn will boost agricultural output. The Climate Smart Agricultural approach enhances agricultural productivity to support an equitable increase in income, food security and development. Through local climate resilience project, Pakistan can restore ecosystem and plan how to adapt to the growing impact of climate change. Building a climate resilient agriculture system should be viewed holistically as a management system with multiple stakeholders, she said. CSA financing schemes under green banking may be launched by ecofriendly agricultural project including green warehouses, sustainable agricultural supply chain network, solar powered tube wells, and irrigation system for minimizing electricity consumption. New technologies like the use of drip and sprinkler irrigation system to minimize water wastage may be launched. Agricultural waste managing system such as bioplastic production, hydroponic technologies, vertical urban farming, rainwater harvesting system, digital agricultural projects such as drone technology in crop maintenance, nanotechnologies, artificial intelligence among other can be achieved by agricultural financing schemes under green banking. Banks can reschedule agricultural loans in flood affected areas to help farmers in these difficult times as in many areas farmland is still under water and farmers are facing 100 percent crop losses, she said. She also suggested that farmers should be trained with the new agricultural sustainable technologies.

Honorable MNA Dr. Shahida Rehmani, Member National Assembly of Pakistan:

No single person in Pakistan is unaware of the harsh impacts of climate change. Climate change is being experienced in its extreme forms by Pakistan especially during the recent catastrophic floods. The recent floods due to unprecedented rains are an outcome of climate change and call for adaptation and mitigation strategies and redeveloping resilient infrastructure after such catastrophes. She stressed that such unprecedented climate events are inevitable as the threat of climate change becomes harsher. However, she stressed that instead on remaining inactive, public bodies must take necessary actions for prevention and mitigation of such risks and reduce the probability of similar damages in future. She emphasized on close coordination between academia, climate and agricultural researchers and policy makers are crucial to find solutions to the challenges imposed by climate change rectify the issues in agriculture and empower women in agriculture for sustainable and comprehensive development.



Remarks by Honorable Raja Pervaiz Ashraf, Speaker National Assembly of Pakistan/ President PIPS BoG



Honorable Raja Pervaiz Ashraf, Speaker National Assembly of Pakistan was the Chief Guest of the session. In his remarks, he said that despite the low contribution made by Pakistan to the net global GHG emissions, the country has experienced worsening impacts of climate change ranging from droughts, flash floods, heatwaves etc. The people of Pakistan have fallen victim to the harshest impacts of climate change as evident from the recent floods experienced in the country. He stressed the role of academia and researchers to raise knowledge of the ground realities and in reaching solutions for effective mitigation of the challenges imposed by climate change for transforming the country's current perilous situation. He remarked that we must find the silver lining in the climate crisis ourselves and find solutions by pivoting to alternative crop varieties and adopting technologies for increasing the sector's productivity. He urged that the impediments in implementation of transformational ideas must be analyzed, identify solutions to these challenges and true and earnest

implementation of policies must be ensured by increasing the role of Parliament through oversight and accountability for economic progress of the country. He appreciated the efforts of the PIPS Research Wing and Syngenta Pakistan for organizing the much-needed dialogue in an effort to highlight it in the policy corridors.

"We have arrived at a turning point in our history. We shall overcome all of the challenges that our country is currently experiencing through perseverance and resilience."

> HONORABLE RAJA PERVAIZ ASHRAF SPEAKER NATIONAL ASSEMBLY OF PAKISTAN

ROUNDTABLE DISCUSSION

The presentations were followed by a discussion where each of the participants expressed their views on the challenges confronting the agriculture sector viz-a-viz climate change and food security, followed by recommendations to overcome these challenges.

Prof. Rehmat Ullah Qureshi, HoD, Department of Botany, PMAS UAAR:



The first speaker in the panel discussion was Prof Rehmat Ullah Qureshi, from the department of Botany, PMAS. Shedding light on the potential of industrial hemp as an alternative export crop, he informed that the international market for industrial hemp and CBD or cannabis oil extracted from the flowers is worth US\$4 trillion. This does not include the market share of the narcotic component or other varieties. Elucidating the high value of different hemp products, he informed that cannabis seed oil has high nutritional value, is quite similar to olive oil and one acre crop of CBD oil can yield profit between Rs. 1-1.5 crore. The fiber from hemp plant is used as making construction material called hempcrete, is used in textile

manufacturing including jeans, car parts, paper pulp industry. He informed that a pilot project was initiated in Institute of Hydroponic Agriculture (IHA) on 100-acre land and crop of CBD Oil has been harvested. He stressed that hemp offers the potential to serve as an alternative to cotton on a commercial level and fiber can be used for textiles. Moreover, the crop has high pest resistance, low demand for agricultural inputs, yet maintains high yield and profitability. Its low demand for inputs has a low environmental footprint and offers the additional benefit of carbon sequestration making it highly sustainable. He remarked that the northern regions of Pakistan with colder climate are highly conducive for CBD Oil harvest, however, indigenization of new seed varieties should be focused to reduce import reliance and cost.

Professor Dr. Mazhar Qayyum, Dean, Department of Zoology, Wildlife and Fisheries, PMAS, UAAR



The second speaker of the discussion expressed that research in aquaponics offers the potential to promote sustainable organic fish farming to meet the food demand. He suggested utilizing natural aquifers like Attabad Lake for freshwater fish production and creating livelihood opportunities for local communities. He said that poor inbreeding for decades has reduced the productivity of fish breeds resulting in stunted and lower nutritional value. He was of the view, that the country should import fresh indigenous fish breeds that are of higher quality and performing selective breeding to improve quality of sources of animal proteins. And strengthen the genetics of local fish breeds to be improved to increase the population of local fish breeds which are at risk

of endangerment due to import and breeding of invasive exotic breeds. Fish feed production also needs to be prioritized, with increasing the use of local crops like soya bean to reduce reliance on imported materials which can protect the sector from inevitable imports shocks as well as provide support to local agriculture as well.

Ms. Amina Bajwa, Food Security Consultant, Asian Development Bank:



Ms. Amina Bajwa stressed on reducing the cost of inputs and technology as critical factors in the success of any climate smart intervention. She said that the cost of agriculture inputs has increased significantly, which will reflect in the agricultural productivity as sustenance farmers in particular are struggling to afford inputs. She emphasized the need for increasing awareness about regenerative farming among the farming community and simplifies their access and information about various modern technologies and how to purchase and use them. She said that the world is moving towards higher quality livestock breeds to improve the productivity while simultaneously reducing the enteric GHG emissions from livestock sector. At the same time, the need to improve quality of feed and fodder cannot be stressed enough to increase productivity and

reduce emissions. She urged that the public livestock departments must proactively take measures to improve livestock breeds and fodder, to reduce the sector's net footprint on the environment. She was of the view that people do not pivot to new ideas and technology due to lack of awareness and experience. She therefore suggested that in order to convince farmers to pivot to smart agriculture technologies, demonstration and trainings plots are a pre-requisite where farmers can witness the application and efficiency with their own eyes. She stressed on liberalizing markets from non-conducive government regulations and interventions. She alarmed that encroachment of commercial housing societies over the agricultural lands is a food security disaster in the making and must be addressed to prevent such disasters.

Dr. Hiz Jamali, Climate Change Consultant Specialist, Asian Development Bank:

Dr. Hiz Jamali, expressed that the adoption of climate smart agriculture should be analyzed from the perspective of sustenance farmers to identify obstacles hindering them from making headways in this direction. He said that farmers will adopt a new technology if there is a clear monitory incentive for them and the technology solves a pain point for them.



Dr. Mushtaq Ahmed, Chairman, Department of Plant Sciences, Quaid-i-Azam University:

Dr. Mushtaq Ahmed remarked that ensuring that climate smart technologies are cost effective for sustenance farmers and simplifying the use of technology is critical to ensure inclusivity and fast-track their adoption. He stressed that the natural gene of the crops must be preserved and reinforced while climate smart technologies are promoted and adopted. He said that food security, energy security and health are interconnected issues which must be addressed with a combined approach to reinforce progress towards them rather than making isolated efforts. He drew attention to the fact that India and China are proactively seeking solutions to the nexus of food, energy and



health security by researching anti-aging crops and high nutritional foods. He was of the view that Pakistan must also research and develop alternative crops with health benefits like anti-aging for health and food security while ensuring their cost-effectiveness as well. He said that along with promoting climate smart agriculture in the country, it is pertinent that policy makers are convinced to ensure the policies and regulations are inclusive and serve the small sustenance farmers as well and not the commercial farmers alone.

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Mr. Tauseef ul Haq, Head R&D and Business Sustainability Syngenta:

Mr. Tauseef ul Haq expressed the benefits of bringing drone technology in the agriculture sector but said that the availability and adoption of this technology is hindered by policy barriers. He stressed that any policy concerns must be addressed through consensus of all stakeholders to facilitate import, assembly and indigenous production of drone technology. He said that the benefits of modernizing the agriculture sector outweigh any disadvantages and standardized automation of farm through government and public-private partnerships should be vigorously promoted for equitable growth of the sector. He reiterated that the need for increasing awareness regarding climate smart and precision technologies through in field demonstrations. He stressed on mobilizing private investments and allocation of public funds for indigenization of precision agriculture. However, he maintained that the promotion of climate smart agricultural technologies must be evaluated in terms of accessibility, profitability and

affordability. He informed that Syngenta is collaborating with HBL Limited and Salam Takkaful to offer financing and weather-based crop insurance to extend protection to poor farmers from economic losses due to extreme climate events. He further added that Syngenta Pakistan has implemented a research-based program for promotion of exportable rice called "Exportable Rice Initiative". Through this initiative, partnerships have been established with rice exporter and farmers are being trained on residue management for production of residue-free rice for exports and local consumption.

Dr. Zia ur Rehman Mashwani, Assistant Professor, PMAS UAAR:

The sixth speaker was Dr. Zia ur Rehman Mashwani, who remarked that the regulatory frameworks concerning the import of drone technology must be simplified as well as those governing the security concerns. He further said that the infrastructure for safe and efficient use of UAVs must be upscale pre-empting the potential increase in air traffic as well as upskill service providers and users to enable efficient use of drones. He urged for a cost effective model to meet the urgent need for modernizing agriculture. He expressed that the demand for adoption of smart technologies will increase exponentially in the coming years and warned of a potential inflation in the cost of technology. He suggested developing market for service-based model with particular focus on the poorer and climate vulnerable areas in the country to prevent the financial burden on small farmers.





Dr Naveed Iqbal Raja, Associate Professor, PMAS UAAR:

The last participant, Dr. Naveed Iqbal Raja stressed ensuring not only the affordability of agricultural inputs but also their availability at the right time. He urged the government bodies to increase vigilance over quality and price management in the market to facilitate farmers particularly sustenance farmers. He further said that to bridge the gap for innovations, the quality of academic research must be aligned with the industry demand by strengthening collaboration and linkages. He expressed that sustenance farmer's lack scientific knowledge about even conventional farming, the appropriate seed types based on their soil type and quality and topography. Therefore, modernization to smart technology must go hand in hand with building the capacity and knowledge of the farmers. He said that the productivity of the country's agriculture sector is struggling due to farmers' insistence on cultivating crops which are no longer suitable for their lands. He emphasized that to resurrect the sector's productivity, cultivating



selective and appropriate types of crops for a particular region or district is the optimal solution.

SET OF RECOMMENDATIONS

Climate change is having a significant impact on agriculture in Pakistan, with changing weather patterns, increased frequency and severity of extreme weather events, and declining water availability all posing major challenges for the country's farmers and food security. To address these challenges, policymakers in Pakistan can consider the following recommendations for promoting climate smart agriculture:

A. Develop policy processes and Instruments to support the adoption of Climate Smart Technology:

Developing policy processes and instruments to support the adoption of climate smart technology is critical for promoting sustainable agriculture and mitigating the impacts of climate change. Some specific steps that policymakers can take are:

- i. **Conduct assessments:** Conduct assessments of the current state of technology adoption in agriculture and identify key gaps and opportunities for promoting climate smart technologies. This can include assessments of the technical, economic, and social barriers that are preventing farmers from adopting these technologies.
- **ii. Develop policy frameworks:** Develop policy frameworks that support the adoption of climate smart technologies, such as low carbon technologies, renewable energy, and precision agriculture. This can include providing incentives for investment in these technologies, such as tax breaks, subsidies, and grants.
- **iii. Establish technical support:** Establish technical support mechanisms that provide farmers with the knowledge and skills needed to adopt climate smart technologies. This can include training programs, demonstration farms, and technical extension services.
- **iv. Enhance market access:** Enhance market access for climate smart technologies, by promoting public-private partnerships and developing innovative financing mechanisms. This can include developing credit lines and other financial products that provide affordable financing for climate smart technology adoption.
- v. Foster partnerships: Foster partnerships between research institutions, the private sector, and farmers to develop and scale up climate smart technologies. This can include collaborative research and development projects, joint ventures, and technology transfer initiatives.
- vi. Monitor and evaluate: Develop monitoring and evaluation mechanisms to assess the impact of policy interventions on climate smart technology adoption. This can include performance indicators and impact assessments that measure the effectiveness of policy interventions.
- vii. The development of a supportive regulatory environment for the adoption of climate smart technologies such as drones is critical for promoting sustainable agriculture and mitigating the impacts of climate change. By working with relevant stakeholders, developing policy frameworks, establishing technical standards, enhancing coordination, and monitoring and evaluating policy interventions, policymakers can ensure that these technologies are used safely and effectively in agriculture.
- **B.** Promote crop diversification: Encourage farmers to diversify their crops to reduce their dependence on water-intensive crops such as rice and sugarcane, which are vulnerable to water scarcity and drought. Promoting drought-tolerant crops and introducing new crop varieties can help farmers adapt to changing climate conditions.
- **C. Improve water management:** Encourage the adoption of water-efficient irrigation technologies and practices, such as drip irrigation and mulching, to reduce water use in agriculture. Policies can also focus on improving water storage infrastructure and promoting rainwater harvesting to increase water availability during periods of water scarcity.

- **D.** Increase access to credit and insurance: Develop policies that improve access to credit and insurance for smallholder farmers, who are most vulnerable to the impacts of climate change. This can help farmers invest in climate-resilient technologies and practices, as well as protect them against crop losses and other climate-related risks.
- **E. Promote regenerative agriculture:** Encourage the adoption of regenerative agriculture practices, such as minimum tillage, crop rotation, and cover cropping, which can improve soil health and water retention, while also reducing greenhouse gas emissions from agriculture.
- **F. Strengthen climate information and advisory services:** Improve the availability and accessibility of climate information and advisory services to help farmers make informed decisions about planting, irrigation, and other agricultural practices. This can include developing weather forecasting systems and mobile-based advisory services that reach smallholder farmers in remote areas.
- **G.** Support research and development: Encourage investment in research and development to identify and promote climate-resilient crops, technologies, and practices, as well as to develop innovative financing mechanisms to support climate smart agriculture.
- **H. Expedite the development and approval of import and other regulatory policies for climate smart technologies** and indigenize their development in the country to reduce the import burden. It is critical to identify key climate smart technologies that are needed in the agricultural sector, taking into consideration the specific needs and context of the country. This can be done through consultations with stakeholders, including government agencies, industry associations, research institutions, and farmers.
- I. Align the agriculture sector's short and long-term policies with the long-term implications of climate change, and redevelop the sector with greater resilience to climate change and other stressors for more productive sector-wide growth.
- J. Strengthen linkages between academia and Industry: Strengthen linkages between academia, agriculture industry and policy makers to approach the nexus of challenge posed by climate change, increasing food demand, food insecurity, declining agricultural productivity and quality with a holistic approach and make concerted efforts that reinforce actions to boost the country's agriculture.
- **K. Empower Women in Agriculture Sector:** Empower women in agriculture in terms of ownership and decision making and increase their access to technologies and agriculture financing to expedite adoption of climate smart agriculture in an inclusive manner. Here are some ways to empower women inagriculture:
 - i. Increase access to agricultural technologies: Women farmers often have limited access to agricultural technologies and equipment, which can hinder their productivity and resilience to climate change. Providing women farmers with access to climate smart technologies, such as drought-resistant seeds, seedcare products and irrigation systems, can help them to increase their productivity and income, while also building their resilience to climate change.
 - **ii. Increase access to agricultural financing:** Women farmers often have limited access to finance, which can make it difficult for them to invest in agricultural technologies and other inputs. Providing women farmers with access to agricultural financing, such as loans and credit, can help them to invest in climate smart technologies and other inputs, which can increase their productivity and income.
 - **iii. Promote women's ownership and decision-making:** Women farmers often have limited ownership and decision-making power in the agriculture sector. Promoting women's ownership of land and other productive assets, as well as their participation in decision-making processes, can help to increase their influence in the sector and ensure that their perspectives are taken into account when designing climate smart agriculture interventions.

- **iv. Provide training and capacity building:** Providing women farmers with training and capacity building on climate smart agriculture practices, as well as on business and financial management, can help to increase their productivity and income. This can include training on climate smart technologies, sustainable agriculture practices, and marketing and entrepreneurship.
- v. Foster supportive policies and institutions: Fostering supportive policies and institutions that promote gender equality in the agriculture sector is critical for empowering women farmers. This can include policies that promote women's land ownership and inheritance rights, as well as institutions that provide support for women farmers, such as extension services and agricultural cooperatives.
- L. Promote Public Private Partnership: Promote public private partnerships and linkages with academia to accelerate demand-driven research on the inter-relations between climate change, decline in agricultural productivity and food insecurity and how these challenges can be mitigated through seed innovations, crop rotation, increasing resource efficiency etc. Some ways to promote public-private partnerships in agriculture can be:
 - i. Create a platform for collaboration: Establish a platform for collaboration between the public and private sectors, as well as academia, to identify research priorities, share knowledge, and coordinate efforts. This can include the creation of a Climate Smart Agriculture Working Group, which brings together stakeholders from different sectors to share best practices and develop joint research projects.
 - **ii. Develop incentives for private sector investment:** Develop incentives to encourage private sector investment in climate smart agriculture, such as tax credits or other financial incentives. This can help to mobilize private sector resources and expertise to support the development and adoption of climate smart technologies.
 - **iii. Promote technology transfer:** Promote technology transfer between the private sector and farmers to increase the adoption of climate-smart agricultural technologies. The private sector can play a critical role in developing and disseminating agricultural technologies that are adapted to local conditions and can help farmers to adapt to climate change.
 - **iv. Facilitate knowledge sharing:** Facilitate knowledge sharing between public and private sector actors to build a shared understanding of the challenges facing the agricultural sector and the potential solutions. This can include organizing workshops, conferences, and other events to bring together stakeholders from different sectors to share knowledge and experiences.
 - v. Develop policy frameworks to support public-private partnerships: Develop policy frameworks that support public-private partnerships in climate-smart agriculture. This can include providing incentives for private sector actors to invest in climate-smart agriculture, creating a conducive regulatory environment, and providing support for research and development.
- **M.** Improve Crop Yield with precision technology: It is possible to improve crop yields by implementing the following measures.
 - i. Establish funds at federal and provincial levels for indigenization of Precision Agriculture technology: The government can strive for creation of funds at both federal and provincial levels to promote the adoption and indigenization of Precision Agriculture technology in the country.
 - ii. Automation of farm machinery/implementation with the support of Government and private financial institutions: The government and private financial institutions can provide support for the automation of farm machinery and implementation, thereby promoting the adoption of technology in agriculture e.g. introduction of modern harvesters can reduce 15-20% losses in agriculture.

- iii. Adopt variable rate technology through provincial agriculture departments: Provincial agriculture departments can adopt variable rate technology. This technology allows for the precise application of inputs like fertilizers and pesticides, reducing waste and increasing efficiency.
- iv. Awareness and field demonstration sessions of precision agriculture technologies at farmer fields: This initiative can encourage farmers to adopt these technologies.
- v. Agriculture drone policy/strategy implementation for quick adoption, assembling, and import: The government can implement an agriculture drone policy/strategy that will promote the quick adoption, assembling, and import of drones for use in agriculture. This is another initiative aimed at promoting the adoption of technology in agriculture and improving crop yields.
- vi. Use of precision irrigation: Precision irrigation involves using sensors and data analytics to determine the precise amount of water needed by crops. This can help to optimize water use, reduce water waste, and improve crop yield.
- vii. Precision fertilization: Precision fertilization involves using sensors and data analytics to determine the precise amount and timing of fertilizer application. This can help to optimize nutrient use, reduce fertilizer waste, and improve crop yield.
- viii. Use of drones and satellite imagery: Drones and satellite imagery can be used to monitor crop growth and identify areas of the field that may be experiencing stress or other problems. This information can be used to optimize crop management practices and improve crop yield.
- **ix. Use of precision planting:** Precision planting involves using sensors and data analytics to determine the precise spacing and timing of seed planting. This can help to optimize seed use, reduce seed waste, and improve crop yield.
- **x.** Use of precision harvesting: Precision harvesting involves using sensors and data analytics to determine the precise timing of harvest. This can help to optimize harvest quality, reduce waste, and improve crop yield.
- xi. Adoption of climate-smart agriculture practices: Climate-smart agriculture practices, such as regenerative agriculture, can help to improve soil health, increase soil fertility, and improve water management. These practices can help to improve crop yield while also contributing to climate change adaptation and mitigation.
- **xii. Promote Service Provider Model :** There is a need to promote the use of climate smart agriculture practices by facilitating service providers. This can help farmers access the necessary knowledge, technology, and resources to adopt climate-smart agricultural practices.
- **N.** Promote resilient and high yielding livestock breeds: The government can promote resilient and high-yielding livestock breeds to meet the nutritional demands of the growing population of the country. This can be achieved by promoting the development and growth of the livestock sector through the use of resilient and high-yielding breeds that can withstand the effects of climate change. Promoting resilient livestock breeds can also contribute to reducing the environmental impact of the livestock sector, as these breeds can require less feed and have lower greenhouse gas emissions. Additionally, promoting the use of high-yielding breeds can help meet the increasing demand for animal protein in the country, thereby improving food security.
- **O.** Incentivize the adoption of climate smart technologies for both sustenance and commercial farmers by providing clear financial benefits that can offset potential risks. Providing incentives for the adoption of climate smart technologies can encourage individuals and businesses to invest in these technologies, which can help mitigate climate change and reduce its negative impacts. Incentives may come in the form of tax credits, subsidies, grants, or other financial rewards that help offset the costs of adopting and implementing these technologies.

- **P.** Conserve and promote endemic fish breeds: There is a need to protect and promote the survival of native fish species that are naturally found in a specific region or ecosystem. This can be achieved by reducing the import of non-native or "alien" fish species that can be harmful to the natural habitat and populations of endemic fish species. Moreover, to support the growth of the fishing industry, there is a need to increase the number and quality of fish hatcheries. This involves setting up facilities that are designed to breed and raise fish, including endemic species, in a controlled environment. By doing so, it may be possible to increase the availability of endemic fish species for commercial use, without depleting natural populations. Government should promote the use of local products in the manufacture of fish feed. This approach supports the use of locally-sourced materials that are more affordable, sustainable, and provide good nutrition for fish. This can help reduce the cost of fish farming operations, increase profitability, and promote the growth of the sector.
- **Q.** Capacity building and awareness raising of farmers: Government can also develop a strategy to promote the adoption of modern smart technologies and practices among farmers. This strategy can include following focus areas: providing technical training, organizing on-field demonstrations and orientations, and creating awareness among farmers through advocacy campaigns in local languages in order to increase access to vital information including weather patterns, early warnings, agricultural advice and advantages of switching to modern farming practices. By improving the technical capacity and knowledge of farmers, it can help improve their farming practices, increase crop yields, and promote sustainable agriculture.
- **R.** Encourage banks to introduce agriculture-focused instruments: There is a need to promote the adoption of sustainable practicesby encouraging banks to introduce "green" initiatives that support the transition to climate smart agriculture.
 - i. **Crop Insurance:** One such initiative is crop insurance, which can help protect farmers against crop damages due to extreme weather events, pests, or diseases. By providing financial protection, crop insurance can help farmers take risks and invest in sustainable farming practices, without the fear of losing their investment.
 - **ii.** Availability of Loans: Another initiative can be the provision of small loans for the purchase of smart agriculture technologies. These loans can help farmers invest in modern technologies, such as precision agriculture tools, irrigation systems, or renewable energy sources. By making such investments, farmers can increase their productivity, reduce costs, and mitigate the negative impact of climate change.

The initiatives of supporting sustenance farmers in taking risks when switching from traditional to climate smart agriculture are critical because many small-scale farmers may not have the financial resources or the knowledge to make the transition to sustainable practices. By providing access to affordable credit and financial services, banks can help farmers overcome financial barriers and encourage the adoption of sustainable practices.

- **S.** Promote equitable growth in the agricultural sector: This can be achieved by ensuring that all farmers, regardless of their location, size of land, or level of technology, have access to markets, credit, and information. This can help promote inclusive growth and reduce inequality in the sector.
- **T. Transform Agriculture Sector through cluster development:** Cluster development involves grouping together similar agricultural enterprises in a geographic area to create economies of scale, reduce costs, and increase competitiveness. By supporting the development of cluster crop systems based on changes in climate, weather patterns, and soil quality, the government can help promote sustainable and resilient agricultural practices that are tailored to local conditions.

- i. The government can prioritize the promotion and development of selective crops and livestock breeds that offer better food security, higher export potential, lower environmental footprint, higher yield potential, and high nutritional value. This can be achieved by providing incentives to farmers who grow these crops and livestock breeds, and by promoting their use in international markets.
- ii. In addition to promoting specific crops and livestock breeds, the importance of promoting sustainable and resilient agricultural practices cannot be ignored. This can include the use of regenerative farming methods, the adoption of climate-smart technologies, and the promotion of sustainable water management practices.

Overall, the development of policy processes and instruments to support the adoption of climate-smart technology can help create an enabling environment for farmers to adopt sustainable practices that can help mitigate and adapt to the impacts of climate change.

CONCEPT NOTE

Dialogues on Climate Change, Food Security & Sustainable Agriculture in Pakistan

Climate Change and Food Security are the defining challenges of our time. Often times, we think of climate change as something that will happen in the future. However, it is an ongoing process which is affecting the ecosystems and communities around the world. From rising sea levels that increase the chances of devastating floods to shifting weather patterns that threaten the food production and security, the impacts of climate change on food security are wide-ranging, unprecedented and global in scale. Global temperatures have increased by over 1.1°C from 1901 to 2022 along with an increase in sea levels and fluctuating weather patterns between extremities of drought and flooding. Millions of people are already suffering from the catastrophic effects of extreme disasters exacerbated by climate change– from prolonged droughts, deadly heatwaves, and wildfires to devastating tropical storms and floods sweeping across different countries. In Madagascar last year, a prolonged and intense drought has driven millions of people to the brink of what is being described as the world's first "climate change-induced famine".

While climate change impacts are seen across the world in different sectors of society and are interrelated, these impacts are not uniformly affecting different regions — agriculture sectors in developing countries such as Pakistan are more vulnerable and have the highest exposure to climate hazards with fewest resources to respond to natural emergencies; climate change is one of the largest obstacles facing today's food systems. Changes to temperature, as well as to the frequency and severity of extreme weather events, are already hampering crop yields and productivity around the world. These effects are compounded by the increasingly warm and wet climates that many growers are working in, allowing weeds, pests, and fungal diseases in crops to thrive. Even the nutritional values of major food crops are affected by increasing CO2 levels, having potentially harmful implications to human health and development. Although farmers and researchers may be able to adapt some agricultural techniques and technologies or develop new ones to cope with climate change, some changes will be difficult to manage. Increased temperatures, drought and water stress, diseases, and weather extremes create challenges for the farmers who put food on our tables. Global estimates suggest that agriculture has fed over 5 billion additional people over the last 70 years and will need to feed an additional 2 billion people by 2050 which would require the food production to increase by 50% while relying on the decreasing amount of available land and other resources. ¹

On one hand, climate change has a direct impact on our food systems. On another, agriculture and land use change are also significant contributors to climate change – in total being responsible for at least 23 percent of all man-made greenhouse gas emissions. Much of this relates to land clearance and deforestation to expand agriculture; however, direct emissions of carbon dioxide, methane, and nitrogen from agriculture, form approximately half of this, at around 10-12 percent of all emissions.

Over the course of past two decades, Pakistan's agriculture sector has changed as the farm productivity has improved slightly by and large due to availability of new technologies, better seeds for some crops, improved crop protection products, mechanization, specialization and favorable government policies. Still, local

¹ United Nations, Department of Economic and Social Affairs, Population Division (2022). *World Population Prospects 2022, Online Edition,* FAO, https://www.fao.org/3/i2280e/i2280e06.pdf IntechOpen, Mohammad Fakhrul Islam, Sheikh, and Zahurul Karim. 2020. 'World's Demand for Food and Water: The Consequences of Climate Change'. Desalination - Challenges and Opportunities. IntechOpen. doi:10.5772/intechopen.85919.

agricultural potential has not been completely exploited: the sector contributes only 22.7 percent to the GDP and has provided direct employment to over 37.4 percent of the labor force whereas more than 65 percent of the population depends on agriculture for their livelihood. The main issues for the agriculture sector in Pakistan include climate change, shrinking arable land, crop diseases, water shortages, large population, and labor migration from rural to urban areas. Increasing agricultural productivity, therefore, requires adoption of sustainable agriculture which refers to the efficient production of safe, high-quality agricultural products, in a way that protects and improves the natural environment, the social and economic conditions of the farmers, their employees and local communities, and safeguards the health and welfare of all farmed species. This is essential for food security in the country as well since over 20.5% of the population is undernourished, 44% of children under 5 are stunted and 36.9 percent of the households in Pakistan labelled as "food insecure".² From the provinces, KP and Gilgit Baltistan are considered to be relatively more food secure than Sindh and Balochistan. Furthermore, the estimates of FAO suggest that the country lags behind the progress of lower-middle income countries in all four dimensions of food security.³ In Pakistan, the population is expected to increase by 56% over the next 30 years⁴ while the country is ranked 8th among the most climate change-affected countries in GermanWatch's Long-Term Climate Risk Index.⁵ According to the World Bank's Climate-Smart Agriculture Report in Pakistan, average temperatures in the country are expected to increase by 2.5 °C by 2050 with northern parts of the country seeing an increase of as high as 2.8 °C in average temperatures.⁶ This alarming situation is not expected to improve on its own - we are at the crossroads where our actions today will define the survival of our future generations.

The urgent need to address climate change and food insecurity in Pakistan has become even clearer with the recent unprecedented super floods which have impacted over 33 million people and have resulted in significant losses of lives, infrastructure, crops & livestock. Thus far, over 1100 deaths (including hundreds of children), loss of over 2 million acres of crops and 794,000 livestock, and destruction of over 949,000 houses have been reported besides severe damage to infrastructure.⁷

The policy dialogues on climate change, food security and sustainable agriculture aim to bring together key stakeholders from public, private, development and academic sectors to discuss how we can make our farming communities climate-resilient, our country food secure and our agriculture sector sustainable by sharing existing best practices and the way forward. Thus, these dialogues will help in creating understanding about climate change and food security from a systems perspective with inputs from policymakers, researchers, private sector, development partners and field staff. These dialogues will also act as a call to take immediate steps to change course as the longer we take to do this, the more we will have to rely on costly technologies that could have harmful impacts.

³ SBP, https://www.sbp.org.pk/reports/quarterly/fy19/Third/Special-Section-2.pdf

² WFP, https://docs.wfp.org/api/documents/WFP-0000147774/download/?_ga=2.56517547.1680790615.1681197131-

 $^{1984646407.1681197131 \&}amp;_gac = 1.249743666.1681197131. EAIaIQobChMIo6_4nbTw-QIVBsPVCh3U3woBEAAYASAAEgJ89 fD_BwE , SBP, https://www.sbp.org.pk/reports/quarterly/fy19/Third/Special-Section-2.pdf$

⁴ World Population Prospects Report 2022

⁵ GermanWatch, https://germanwatch.org/sites/default/files/Global%20Climate%20Risk%20Index%202021_1.pdf

⁶ Climate Smart Agriculture in Pakistan, https://climateknowledgeportal.worldbank.org/sites/default/files/2019-

^{06/}CSA-in-Pakistan.pdf

⁷ UN OCHA, https://www.unocha.org/fr/node/957676

Policy Dialogue on Climate Smart Agriculture and Food Security: Challenges and Way Forward for Pakistan

For Honorable Members of Senate and National Assembly of Pakistan Program Agenda

Date: Tuesday, 7th March, 2023

Venue: Board Room, PIPS

Objectives:

- i. Understanding the concept of Climate Smart Agriculture by exploring the nexus between climate change, food security and sustainable agriculture
- ii. Identifying the impact of climate change on agriculture sector of Pakistan: Risks and solutions
- iii. Identifying agricultural challenges and opportunities for Pakistan to generate policy recommendations and way forward through roundtable deliberations

Target Audience

- i. Members of Standing Committees of National Food Security and Research, Climate Change of the Senate and National Assembly of Pakistan
- ii. Relevant Government Departments, International Development Organizations and Civil Society Organizations
- iii. Academia, Researchers and Area Experts

Time	Session	Facilitator
09:00 am	Registration of Guests	
09:30 am-09:50 am	Welcome and Opening •Recitation of Holy Quran Welcome Remarks Inaugural Remarks	Qari Anees ur Rehman, PIPS Mr. Muhammad Anwar, Executive Director, PIPS Mr. Zeeshan Hasib Baig, Country GM, Syngenta Pakistan
09:50 am-10:00 am	Climate change, agriculture and Food Security - Lessons from global best practices for Pakistan	Dr. Faizul Bari, NRM Advisor FAO
10:00 am-10:10 am	Climate Smart Agriculture: Challenges & Opportunities for Pakistan	Representative from World Bank
10:10 am-10:20 am	Remarks by the Guest of Honor	Honorable Chaudhary Tariq Bashir Cheema, Federal Minister for National Food Security & Research
10:20 am-10:30 am	Address of the Chief Guest	Honorable Raja Pervaiz Ashraf, Speaker National Assembly of Pakistan / President PIPS BoG

10:30 am-10:40 am	Presentation of mementoes to guests	
	Working Tea continues during Session	
	PANEL DISCUSSION	
10:40 am-10:50 am	Precision Agriculture in Pakistan	Dr Naveed Tahir, PMAS University of Arid Agriculture, Rawalpindi
10:50 am-11: 00 am	Role of Government in ensuring Food Security	Dr. Syed Waseem ul Hasan, Food Security Commissioner
11:00 am-11:10 am	Challenges & Opportunities in achieving Climate Resilient Agriculture in Pakistan	Representative from ADB
11:10 am-12:00 pm	Roundtable Discussion	Participants to share recommendations/comments
12:00 pm-12:10 pm	Food Security and Role of Parliament	Hon. Rao Muhammad Ajmal Khan, Chairperson of NA Standing Committee National Food Security & Research
12:10 pm-12:20 pm	Way Forward for Climate Smart Agriculture in Pakistan	Hon. Senator Seemi Ezdi, Chairperson Senate Standing Committee on Climate Change
12:20 pm-12:40 pm	Vote of Thanks	PIPS and Syngenta Pakistan
12:40 pm-01:00 pm	Presentation of Mementoes and Group Photo	
01:00 pm-02:00	Lunch and Close	

Glimpses of Policy Dialogue on Climate Smart Agriculture and Food Security





Group photo of Policy dialogue on Climate Smart agriculture and food Security



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