Conference Report

TECHNOLOGICAL TRANSFORMATION IN PAKISTAN: AN ASSET OR LIABILITY?

22nd February 2021

"CGSS is a public policy institute with a mission to help improve policy and decision-making through analysis and research"

Printed in Pakistan

Published in April, 2021

ISBN 978 969 7733 31 6

CGSS
Center for Global & Strategic Studies

5th Floor Khyber 4 plaza, G-15 Markaz, Islamabad, Pakistan

Tel: +92-51-2328615

Email: infocgss@yahoo.com Web: www.cgss.com.pk

Table of Contents

Brief Overview of the Conference

On 22nd February 2021, Center for Global & Strategic Studies (CGSS), Islamabad and Hanns Seidel Foundation (HSF) Pakistan jointly organized a Conference on the topic of "Technological Transformation in Pakistan: An Asset or Liability?" at Margala Hotel, Islamabad.

The discussion commenced with the opening remarks by Mr. Ashfaq Ahmed Gondal, Former Federal Secretary Information and Broadcasting and Senior Member Board of Advisors, Center for Global & Strategic Studies (CGSS), Islamabad. Dr. Steffen Kudella, Resident Representative, Hanns Seidel Foundation Pakistan presented welcome remarks at the occasion.

The Speakers of the Conference included:

- His Excellency Ali Muhammad Khan, Minister of State for Parliamentary Affairs, Government of Pakistan, Chief Guest
- Barrister Waqas Aziz Qureshi, Senior Law Expert and Managing Partner, Transact Advisory
- Mr. Amir Zafar Durrani, President, Reenergia (Expert on renewable energy, development, trade and connectivity)
- Mr. Ammar Jaffri, Director General, Center of Information Technology (CIT)
- Mr. Jawad Majid, Director, Silk Bank
- Mr. Tariq Malik, Former Chief Technology Officer, GHQ
- Dr. Minhas Majeed Marwat, Department of International Relations, University of Peshawar
- Mr. Aamir Ghauri, Editor, The News
- Ms. Bareerah Fatima, Program Liaison Officer Associate, Pakistan Council of Research in Water Resources (PCRWR)

The event was attended by approximately 120 participants, and was moderated by Ms. Palwasha Nawaz, Project Executive, CGSS.


Center For Global & Strategic Studies (CGSS), Islamabad
CGSS_PAKISTAN
Conference
TECHNOLOGICAL TRANSFORMATION IN PAKISTAN: AN ASSET OR LIABILITY?
22nd February 2021, Islamabad
Hanns Seidel Foundation
HSF_PAKISTAN


Side Events
Conference
TECHNOLOGICAL TRANSFORMATION IN PAKISTAN: AN ASSET OR LIABILITY?

Concept

Artificial Intelligence (AI) has introduced both opportunities and challenges. Policymakers in developing countries like Pakistan are both optimistic as well as concerned about the quantitative as well as the qualitative impact of technology on the State's economy and the lives of people. This implies that technological change might be widening the socioeconomic gap between societies by benefiting some while discriminating against others while in certain aspects it may also prove to be a blessing for a developing country like Pakistan. 2020 has been the year that saw a major pandemic taking over the entire world. COVID-19 lead to an accelerated pace of technological boom thus increasing more reliance on machines rather than human capital. It has also profoundly impacted employment patterns, and business processes, thereby generating various challenges like displacement of jobs, social inequality, etc. Automation in more recent times appears to polarize the labor market in the developing nations. The medium-skilled, routine-based occupations have been impacted the most by automation, such as machine operators and clerical jobs. Moreover, the wave of automation caused by the AI revolution will displace a very large number of jobs across domains and value chains. The wave of this Technological Transformation, particularly in the post-Covid19 period, may prove to be a 'creative destruction' leading to more efficiency and future viability depending on how the states tackle the ongoing paradigm shift. It may also turn out to be a 'destructive creation' leading to mass unemployment fueling social problems, and to loss of control over key decision-making processes. However, all of this depends on the pattern and momentum of the advancement and diffusion of these technologies. It is therefore imperative to analyze these developments and discuss challenges of Technological Transformation and their possible solutions. This concept looks at technological transformation in Pakistan in the context mentioned above, and asks questions such as whether it is an asset or a liability.

Executive Summary and Key Takeaways

1. **Understanding Technological Transformation:**

   a. Artificial Intelligence (AI), technological change and industrial revolution 4.0 have introduced both opportunities and challenges. The Policymakers in developing countries like Pakistan are both optimistic as well as concerned about the quantitative and qualitative impacts of technology on society, politics and the economy.

   b. The year 2020 saw a major pandemic taking over the entire world. Covid-19 led to an accelerated pace of the technological boom, thereby, increasing more reliance on machines and digital sources rather than human capital.

   c. The pandemic has also profoundly impacted employment patterns, and business processes, thus, generating various problems like displacement of jobs, social inequality, economic instability and many more.

   The outcomes of technological revolution depend on the pattern and momentum of the advancement and diffusion of the latest technologies. In this regard, joint platforms, effective laws, and a road map are required for further progress. The emerging technologies need to be understood under an eco-system.

2. **Impacts of Covid-19 on Economy, Technological Transformation and Financial Sector: An Analysis**

   a. In present times, digital technology is changing the traditional patterns, global value chains, and geography of the jobs. The examples of the technological shift are remote work, digital customer service, shift to e-commerce, greater use of self-service, changes in retail, new business models, increasing digital platforms, and online jobs.

   b. Due to the pandemic, digital platforms have enabled cluster of businesses to form in under-developed rural areas as well.

c. Internet banking or e-banking transactions have increased up to 22% and are expected to go further at the same ratio.[1]
d. During the past decade, the government's focus has shifted towards the financial inclusion made by the Financial Action Task Force (FATF), State Bank of Pakistan, e-commerce, digitalization, or Telco Banks.
e. In the post-Covid era, there has been major digitization in Pakistan. The new initiative by the government has been introduced in the form of Telco banks. This creates many opportunities for youth employment in the future.
f. Branches of the Telco banks can be established in the rural areas and the local youth can be an agent or facilitator in this process to serve in their respective area. This would increase the digital footprints all across Pakistan with a robust and modern mechanism.
g. There has to be a greater partnership among commercial banks, Fintech's and other players in the market with an open application programming interface, followed by internet-banking systems.
h. Furthermore, there are certain policy options including investment in human capital, social protection, establishing data centers, innovative education, new digital cities, and reduced labor market rigidities. This will allow the people to move into transition jobs and bring socio-economic positive change.

3. Challenges to Social Security under Technological Transformation in Pakistan: Risk Analysis

a. According to Oxford Economics Analysis 2019, up to 20 million manufacturing jobs worldwide will be lost because of robots by 2030. Forrester predicts that job losses of 29% by 2030 will only compensate 13% of job creation.

[1] Source: E-banking transactions rise 22pc to Rs21.4 trillion, Business Column, *International The News,* 10 April, 2021. https://www.thenews.com.pk/print/806408-e-banking-transactions-rise-22pc-to-rs21-4-trillion

b. Moreover, as per the World Economic Forum's Report 2020, 85 million jobs may be displaced by a shift in the division of labor between humans and machines. The Mckinsey Global Institute anticipated that worldwide, there can be enough new job creation to offset the impact of automation.
c. In this aspect, 'data' is the key element for this era, which includes Artificial Intelligence, machine learning, deep learning, data signs, etc. Technology has the ability to revolutionize all the segments of life and create jobs in different sectors by using relevant data.
d. There are several employment domains where people work in Pakistan like education, agriculture, commerce, etc. All these domains have their database. This data can be collected via artificial intelligence, machine learning, or deep learning.
e. To curtail the negative impacts of technology on business, more focused and revised business policies are needed. Furthermore, higher number of skilled labor and IT specialists are also the requirements of Pakistan.
f. Moreover, the government has to understand technology's impact. It has to make important and effective planning regarding economy & business, leadership, awareness programs for citizens, digital and coding skills, data literacy, tech-savviness, and adaptation of flexible and modern policies.

4. Education and Technological Transformation: A Comprehensive Analysis

a. Pakistan is on the cusp of digitalization drive. The ratio of e-learning is expected to improve with the support of Pakistan's education ministry. The special focus of the government is on the upcoming digital initiatives for the youth.
b. Educational technologies are those materials, procedures, organizations, ideas, devices, instruments, and machines, which make the teaching and learning process more effective and successful.
c. Technology has changed the orthodox ways of teaching. Now, the patterns of learning and education are more inclined towards advanced instruments or patterns vis-à-vis technology.

d. The opportunities for formal learning have also gone digital because of online degree programs, courses, sessions, and much more.
e. However, technology comes with certain challenges as well, particularly in developing nations like Pakistan.
f. According to the United Nation Education Index of 2018, Pakistan's education system ranks 146th out of the 187 countries in the world and around 25 million children are out of school.
g. Moreover, access to higher education is less than 8% and almost 5 million teachers are required to meet the demands of existing students in Pakistan.
h. If the existing education system is unable to provide sufficient opportunities to Pakistani youth, several social and political problems are likely to arise.
i. Hence, there should be advanced and effective teacher training programs facilitated by the government at a broader level that rely on understanding, accepting and using technology.
j. Technology can also create solutions that can help bridge existing gaps in education, policy, capacity building and modern means.

5. Impact of Technological Transformation on Media: Outcomes and Way Forward

a. With the rise of technology and the growth of the media, a lot of challenges have been created. The trend of fake news is at its peak. There is no mechanism to reach the actual source or propagators of the fake news.
b. In this regard, different social media platforms can act as a medium to spread such false news. Then these applications are being misused in a negative way to spread chaos in the state.
c. Broadcasting and journalism are two different dimensions but unfortunately, with the access of smartphones and the internet to almost everyone, both fields are colliding, thereby, resulting in creating an issue for accessing real news.
d. A proper system of checks and balances by the government needs to be in place in accordance with legal laws.

e. The policy and lawmakers of the State need to understand the advancement of the technology and related challenges so that they can devise effective policies, which on one hand encourages technological development, but on the other, also ensures no one exploits such opportunities. Accountability along with usage need to be in place.
f. Moreover, the government needs to facilitate legal, ethical, and professional trainings to social media groups/houses.
g. Effective media regulations will impact all the digital sectors and result in fruitful outcomes.

6. Role of Pakistan Council of Research in Water Resources (PCRWR) in Digitalizing the Agriculture Sector:

a. PCWR is a federal government organization, working under science and technology. The mandate of the organization is to conduct, organize, coordinate and promote research on all aspects of water resources including irrigation (surface and groundwater), drainage, soil reclamation, drinking water and wastewater management.
b. The National Policy includes Pakistan's Vision 2025, sustainable development goals, National Water Policy and National Water Research Agenda.
c. With the help of technological development, PCRWR has determined the advanced crop water requirement of 12 different crops using the lysimetric. Moreover, the discovery of the hydraulic property of the soil is one of the best achievements of the organization.
d. Furthermore, tech-development has enabled PCRWR to create its own Indus telemetry system. There are four big data systems under the Indus Telemetry system which are: groundwater, Canal flows and a 7-day weather fore-caste system.
e. The canals system has velocity, radar sensors and cameras that transmit data every day. In this regard, the 7-day forecast system has facilitated the farmers for the expected rain patterns.

f. Through NASA satellites, data is downloaded on the server located at PCRWR, then it is combined with the local data and thus generates an advisory message on the farmers' mobile phone. PCWR has an in-house capacity to download the data from NASA satellites and use this information for groundwater planning.

7. Technological Transformation in Pakistan: Initiatives Taken by the Government of Pakistan

a. The most recent initiative taken by the Pakistani government is the "amendments in foreign exchange manuals chapter 20". It pertains to changes concerning holding companies. This change has allowed establishing an open set up so that money can be channelized in Pakistan by a legal mechanism.

b. Another important initiative is the creation of special technological zones. To establish such zones, the government of Pakistan provides the initial capital and expertise. This mechanism has been updated recently so as to enhance the sphere of technological development.

c. Another important area is the growth of software houses. Pakistan is one of the largest software exporters. In this aspect, the government of Pakistan is also taking significant steps to harness the true potential of the respective sector.

d. The tech-companies of Pakistan have the potential to become the future's unicorns and change the image of Pakistan at the international level.

Opening Remarks

Mr. Ashfaq Ahmed Gondal, Former Federal Secretary Information and Broadcasting and Senior Member Board of Advisors, Center for Global and Strategic Studies (CGSS), Islamabad

Mr. Ashfaq Ahmed Gondal welcomed all the participants of the conference. He highlighted the importance of the topic and stated that technological transformation is an asset as it opens new paradigms of opportunities and prosperity. Moreover, he said that applicable solutions should be discussed for the challenges emanating from technological transformation.

Speech by

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

Dr. Steffen Kudella welcomed all the participants and speakers of the conference. While explaining Artificial Intelligence, he stated that an algorithm is a mechanistic formula that automatically produces an answer for each new case that appears. This happens with no or with very minimal human intervention. He also highlighted that Artificial Intelligence is one of the greatest challenges of our future. During his discussion, he raised an important question that: Should we, human beings, be afraid of Artificial Intelligence? To tackle this important question, Dr. Kudella said that we first need to analyze what algorithms actually do. Algorithms have two kinds of tasks. One, they classify data by telling us what kind of situation we are facing. For instance, they tell us whether there is a circle or a square in the picture. Second, algorithms make predictions. They tell us what is going to happen based on the available past data. For instance, an algorithm can calculate what the weather will be tomorrow based on past weather observations and based on the currently observed weather data. Both of these tasks take observations relevant to a current situation, and draw a conclusion from these data.

Dr. Kudella elaborated that Artificial Intelligence can only formulate answers to immediate practical questions, such as speech recognition systems in phones, navigation tasks, or computer vision software that uses past images to learn to identify something in new images. He also explained that these systems use a large number of example cases to learn modelling associations. They work via trial and error, just like a naïve child does who tries to do something repeatedly and in different ways until it is successful or until it stops trying.

While giving briefing on the topic, Dr. Kudella also highlighted the important limitations which algorithms face: they do not seek to understand how the world actually works. They do not have imagination. They do not have any understanding of the underlying causality or any other super-human skills. He stated that Artificial Intelligence can answer questions such as “we have observed something, what can be expected to be observed next?”. However, they cannot answer questions like “what does this mean?” Or:

"what would have happened if we hadn't done this before?" Therefore, Artificial Intelligence is still far away from having real super-human abilities.

He emphasized that it is important for us to see not only the potential, but also the limitations of Artificial Intelligence. He stated that the algorithms are becoming more and more complex and powerful in classifying past and in predicting future events. However, it is extremely unlikely that they will be able to replace human beings completely in the future. Dr. Kudella stated that human beings can and should adjust their skills through education and training to the needs of the future society.

While concluding his speech, he looked forward to the discussions on the advantages and disadvantages of technical developments in the case of Pakistan, and how to respond best to them. He said that Pakistan with its young and tech-savvy population has a lot of potential to benefit from technological transformation. But it faces national challenges too, such as mass unemployment, rising poverty, or information conflicts. Dr. Kudella expressed his gratitude to the Hanns Seidel Foundation and Center for Global & Strategic Studies (CGSS) to support the conference and organizing such events at a broader level.

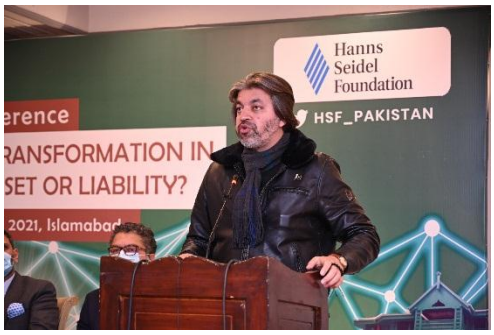
Closing Remarks:

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

Dr. Kudella stated that technological development is indeed a challenge but as a matter-of-fact, it is not a curse for the Pakistani nation if it keeps on learning and developing. He stated that the art of technology needs to be used for the benefit of the people. He also appreciated the efforts of CGSS and HSF team for a great job in organizing the conference on a major non-traditional security issue. He thanked CGSS for being one of the best partners of HSF and thanked all the distinguished guest speakers and the participants for attending the conference.

ANNEXURE 1: PROFILES OF THE SPEAKERS

His Excellency Ali Muhammad Khan, Minister of State for Parliamentary Affairs, Government of Pakistan - Chief Guest



His Excellency Ali Muhammad Khan is a Pakistani politician who is the current Minister of State for Parliamentary Affairs and in office since 17 September 2018. He has been a member of the National Assembly of Pakistan since August 2018. He is a Lawyer by profession. Previously he was a member of the National Assembly from June 2013 to May 2018.

Barrister Waqas Aziz Qureshi – Senior Law Expert

Barrister Waqas is the Member Board of Experts, CGSS, Islamabad. He is the Chairman of the Transact Advisory Services where he had the honor to provide Legal Consultation to the Government of KP for Industrial Cooperation Projects under the CPEC Framework. He is also the Chairman Board of Directors and Director General of Strategic Studies Institute Islamabad (SSII). SSII routinely hosts workshops, seminars and conferences focusing on contemporary issues in International Relations, specifically in the realm of Strategic Studies, Arms Control and Disarmament, and International Law in order to create an effective interface between the country's public/private sector institutions and policy making organizations to facilitate informed decision making.

Mr. Amir Zafar Durrani, President, Reenergia

Mr. Amir Zafar Durrani is the President of Reeneergia. He is also a renowned expert on renewable energy, development, trade, and connectivity. He has served in the World Bank also.

Mr. Ammar Jaffri, Director General, Center of Information Technology (CIT)

Mr. Ammar Jaffery is Director General, Center of Information Technology (CIT). Mr. Jaffery is the Former Additional Director General FIA and Pioneering Head of NRC3. Currently, he is heading the initiative of cyber secure Pakistan and engaged in awareness campaigns on Cyber Security locally and internationally.

Mr. Jawad Majid, Renowned Economic Expert

Mr. Jawad Majid Khan is a seasoned financial sector professional. He is Group Head (Senior Executive Vice President) Emaan Islamic Banking (Silk Bank Limited). He is a renowned economy expert. He has appeared as Guest Speaker at various national and international Conferences. He is a Graduate in Economics with Specialization in Development Economics and International Monetary Policy, from Quaid-e-Azam University, Islamabad; an alumnus of the Harvard Business School (HBS), Boston USA and National Defence University (NDU), Islamabad. He has the distinction of being the youngest Country/Group Head of a Bank in Pakistan's Banking

and Industry. He has many milestones to his name in the banking industry in a span of about 20 years in banking.

Mr. Tariq Malik - Former Chief Technology Officer, GHQ

Mr. Tariq Malik served as the Former Chief Technology Officer GHQ. Mr. Tariq Malik, is currently working as Chief Technical Advisor, United Nations Development Program (UNDP), and has been the former chairman of the National Database and Registration Authority (NADRA) Pakistan. Prior to joining UNDP, he held the position of a Senior Technical Consultant at World Bank. He was a member of the core team who helped to initiate the worldwide 'ID for Development' (#ID4D) Program.

Dr. Minhas Majeed Marwat – Chairperson, Department of International Relations, University of Peshawar

Dr. Minhas is a Ph.D. Scholar from the University of Peshawar and focused her thesis on the "Role of Religion on Foreign Policy particularly US and Pakistan". She also has done research on foreign policy decision-making, the U.S. and Pakistan; theories of International Relations, Foreign Policy decision-making, Conflict resolution, US and Pakistan Relations; Clash of Civilizations, Regional Politics of South, South West and Central Asia. Currently, she is serving in the Department of International Relations, University of Peshawar.

Mr. Aamir Ghauri, Editor, The News

Mr. Aamir Ghauri is a senior journalist, broadcaster, and author. Mr. Ghauri helped launching The News in 1990 and served as a news editor and later as a deputy editor. In 1998, he was posted in London as the paper's foreign correspondent. Three years later he joined ARY Digital as head of news and current affairs. He has also worked at Dunya TV and Geo News, The Nation, and the Frontier Post. He also worked for the international news media including BBC. He regularly appears as a political commentator on such television networks as CNN, Sky and Aljazeera English. He holds an MSc in International Politics and at one time briefly practiced law after graduating from the University of the Punjab Law College. However, he quit law and took up journalism in the late 1980s. Ghauri is the author of "The Divine Destruction", a pictorial commentary on the devastating 2005 South Asian earthquake. Currently, he is serving as the Editor of The News.

Ms. Bareerah Fatima, Program Liaison Officer, Pakistan Council of Research in Water Resources (PCRWR)

Ms. Bareerah Fatima is an Agricultural Engineer having an advanced qualification of Masters in Engineering Management Degree. During her professional career, since 2008 she has worked in diverse aspects of water resources management and planning while working as employed or self-employed professional. Having an overall scope of water resources management starting from commercial dairy farm project, she then invested her skills as freelance consultant for a diverse range of research projects. As Federal government employee, she has work experience in financial planning for mega water resources development projects in Pakistan.

ANNEXURE 2: SPEECHES BY THE SPEAKERS

SESSION 1

Speaker 1
Barrister Waqas Aziz Qureshi, Senior Law Expert and Managing Partner, Transact Advisory
Topic: Legal and Legislative Perspective on the Technological Transformation in Pakistan

This is a great initiative by CGSS in partnership with HSF. This initiative is gaining momentum. I would commence my comments by the last time where I ended. I said that technology is inescapable. The reality is that technology has been there since the start. When man discovered fire or made the wheel, technology was there. As society progresses and moves forward, technology is evolving as well. Now we are talking about Artificial Intelligence (AI) and algorithms. The most important thing in my perspective as a lawyer is to talk about what is happening in the legal atmosphere, which will not only facilitate the technology but also the economic situation in Pakistan.

Credit must be given where it is due. The incumbent government has done a lot in this regard. In a developing country like Pakistan, technology comes with a lot of investment. Without investment there is no technological development. This is something where entrepreneurs play a very important role. Unfortunately, due to lack of investment in Pakistan, a lot of ideas suffered from this menace. The government has taken some excellent initiatives in this regard now. The most recent one is the amendments in Foreign Exchange (FE) Manual chapter 20, which pertains to changes concerning holding companies. But the biggest problem is not the fact that there is a lack of ideas but that there is a lack of investment.

Pakistan is more inclined toward the traditional areas of investments, for example, mills, factories, etc. The biggest problem is because the people of Pakistan have not realized the importance of technology. We have looked for other sources like the first world countries located in Europe, America, China, and other far-east countries. Their technology has transformed their economies and they are willing to participate in technological transformation with third world and developing countries. The government has taken an

excellent initiative in terms of amending the foreign exchange manual. It has allowed the setup that allows money to be channeled in Pakistan through a legal mechanism. It allows people sitting outside Pakistan to transfer their money via the company located there, and then the money is transferred in Pakistan to the companies to enable them to grow.

Another important initiative that the government has taken is special technology zones to facilitate industrialization. However, the special technology zones are intended only to facilitate the technological-based platforms and the companies which have an interest in technology or technological infrastructure. Investment incentives that were given to special economic zones are now given to technology-based companies. For instance, if you are setting up a technology-based company or technological zone, incentives like exemption from payment of sale tax, exemption from payment of income and turnover tax, etc. are given. Other than that, the developers that are developing those technology parks are given incentives in terms of them being allowed to import machinery and other capital goods which are necessary for the development of the special technological zones. We have noticed in the past few years that companies like Bykea and Careem have the potential of becoming unicorns and changing Pakistan's economic condition as well as image on the global level.

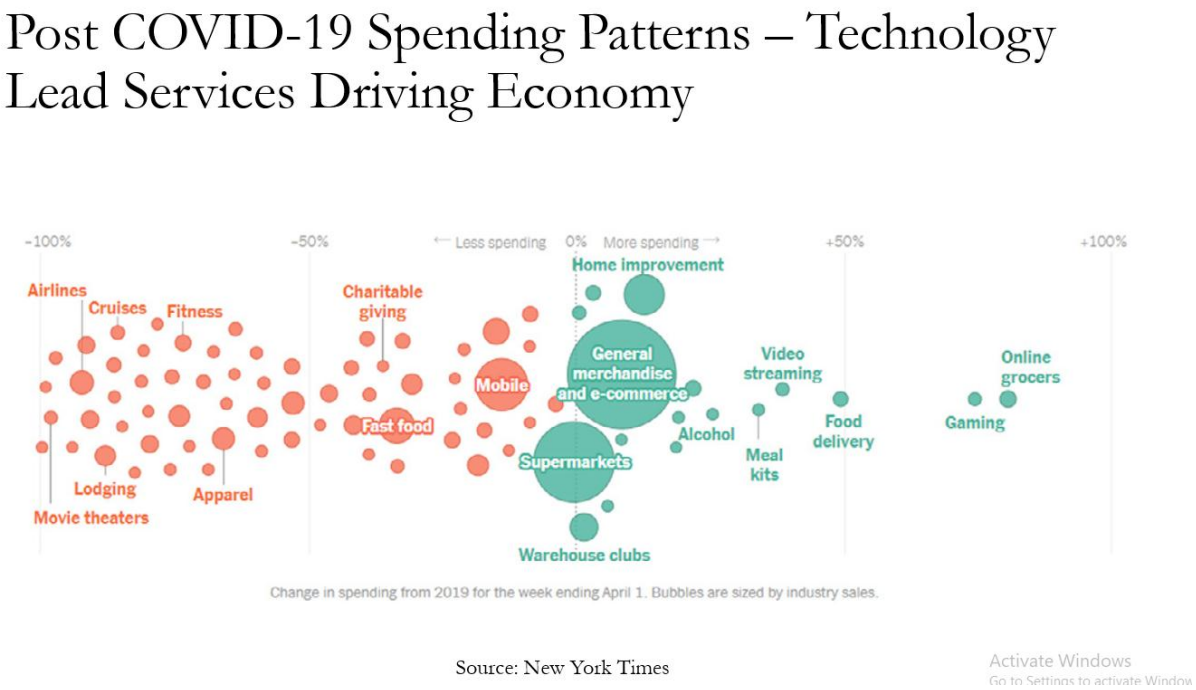
Another very important area is the software houses. Pakistan is one of the largest software exporters but this is an area where the government has not truly harnessed the potential. We have the resource pull available in Pakistan but due to the lack of opportunities and funding, a lot of our talent chooses to go abroad where prospects are much better. We need to focus on harnessing our assets and ensure that we facilitate them in Pakistan. There is a lot to be done but clearly, a platform like this and government initiatives can play a key role.

Speaker 2

Mr. Amir Zafar Durrani, President, Reenergia (Expert of renewable energy, development, trade and connectivity)

Topic: Impact and Challenges of Technological Transformation in the field of Economy and Finance: Policy Options for Pakistan

The COVID-19 pandemic has compressed the arrival of technology. Interestingly, the biggest compression in terms of technology and overtaking is happening in Asia. The following graph shows that the spending is being done on the technology driven services.



Before we go further there are a few myths. Cultures are very difficult to change but what pandemic has told us that few things are here to stay and the technological shift is by far one of these things. Similarly, the concept of remote work is emerging, it is changing the nature of the cities and the geography of jobs. Then there are other important things like digital customer service, shift to e-commerce, staying home, outsourced IT, customer focus on saving, safety, cleanliness and health.

Life is changing, and thus, the opportunities for the lower-skilled workers are also changing drastically. Manufacturing is going to see a major shift. Retail has also changed in Pakistan.

It is important to learn who survived best during this pandemic, and that is again the story of technology. We find that resilient businesses that were either ready with the technology or adapted fast with technology survived. They had the efficiency to harness technology to streamline operations and automate manual processes and immediately set up work remotely.

Robots and Artificial Intelligence (AI) are the future and a lot of people are going to lose their jobs. In 2020, there were 3 million new industrial robots that got into operation, more than double the operational stock over the seven years spanning 2014-2020. So, the people from the lower tier of society are going to lose their jobs.

Robots and AI are here to stay, and you will lose your job if you are not 'skill resilient'..

- Traditional humans are increasingly done by robots and artificial intelligence – from production line to paralegals
- Low-skill jobs and routine tasks are most susceptible to automation and offshoring
- 2020, there were 3 million new industrial robots in operation, more than double the operational stock over the seven years spanning 2014-2020

Source: The World Bank Group

The premium for resilient skills is rising. Social behaviors and critical thinking are equal to cognitive. People who can understand societies and the behavior of other people better, plus those people who can critically analyze and do game theories and critical thinking, is the class of labor the world will be demanding in future.

Premium for resilient skills is rising – cognitive and socio-behavioral

- Since 2001, the share of employment in occupations intensive in non-routine cognitive and socio-behavioral skills has increased
  - From 19% to 23% in emerging economies
  - From 33% to 41% in advanced economies
- Earnings are higher for those who have a combination of critical thinking and socio-behavioral, or cognitive skills
- Demands higher for adaptable skills that enable workers to transfer more easily from one task to another

Source: The World Bank Group

Another good thing happening is that the geography of jobs is changing because of the emerging digital platforms and technology is moving onto the rural areas.

The gig economy is a huge big fallacy. The Mackenzie article said that in 2030, 60% of all jobs in the USA are going to be individual contractors and then the term came gig economy. The gig economy is not working because free-lance work today is less than 0.3% to 0.5% of the total economic labor force in the world.

Moreover, another important thing that is happening and requires so much care in our trade policy on that, is the value chains. One of the biggest debates happening in the WTO, World Bank, World Economic Forum, and a lot of multilateral forums is that the global value chains are going to survive re-shoring. There are four things we need to know as a nation. **1. Invest in human capital by introducing life-long learning. 2. Invest in and improve social protection, which a lot of countries after the pandemic have realise 3. Internet for all as we cannot do without connectivity. 4. Reduce labor market rigidities, which will allow people to move and transition jobs.**

Rural power, internet, innovative education, e-government, data centers and new cities are the future of Pakistan. This is the soft revolution and this is how we deal with the technological revolution. **1. Reduce rural energy poverty.** 140 million Pakistanis have either no access to power or have partial access to power. All the services that we are going to have to deliver are going to happen through technology. 2.

Governments' policy options – from incentives and regulations to infrastructure projects and taxation

- Invest in human capital (knowledge, skills, and health) – lifelong learning (workers to adapt to future labor markets)
- Innovative social protection – UBI – upgraded tax structures to create fiscal space
- Reform financing arrangements and labor market norms – facilitate work transitions (reduce disincentives to creation of formal jobs)
- Ensure affordable access to the internet and protect data privacy and protection and improve competition rules (regulate better to keep digital platforms competitive)

Ibid and adapted from: The World Bank Group

Internet/connectivity 3. **Innovative education. 4. Government has to meet the IT**

sector's demand. 5. Data centers. We have ignored building massive data centers. Data centers need three things. One, clean energy, second, the temperate climate and third, the higher literacy rate.

Speaker 3
Mr. Ammar Jaffri, Director General, Center Information Technology (CIT)
Topic: Technological Transformation in Pakistan through BRI & CPEC

Ladies and Gentlemen, transformation has been there for centuries. However, it is important to note that there is a nexus and cooperation between the transformation and criminals around us. Criminals always take advantage of change. To my understanding, there are few things we should think about. AI, Internet, industrial internet of things, blockchains, and combining all these, the industrial revolution 4.0, clout solutions, cybersecurity.

Deep machine learning, face recognition, the use of bitcoins, Bluetooth technology are going to make the existing business of today the products of tomorrow. Everything which is the part of today will become a part of tomorrow. Blockchain is fundamental to the internet. It is a platform. It was used and invested by the people who promoted cryptocurrency in 2008. Blockchain is bringing transparency, fairness and good governance. Take the example of Estonia. In 2007, they had their first crisis. Their entire system was jammed by the Russians. They recovered from there. Today, every Estonian entity in the government and private sector is blockchain-enabled.

We need to have joint platforms, laws, and a road map to cope with emerging technologies and understand them under the eco-system. As a nation, we know how to respond to crisis. There is an urgent need for partnerships and joint projects. For that, we have to learn and avail the opportunities. The biggest asset we have is our youth, who need guidance. Tourism is another asset. The community needs to engage and tourism organizations need to come forward. We have to think about infrastructure, human and sustainable development goals (SDGs).

SDGs have targets and every target has its indicator. Every indicator has its attribute and every attribute has its entity, which for tell results. We have to think about changing our attitudes and learn together. Pakistan is on a strategic position and CPEC depends on

stability in Pakistan. CPEC is our lifeline now. It is the global economy of the future and has the potential of becoming a huge asset if handled carefully.

Speaker 4

Mr. Jawad Majid, Director, Silk Bank

Topic: Impacts of Technological Transformation on Pakistan's Financial Sector

To start from a micro level, what our generation has seen in the last two decades is the major technological transformation. Simultaneously, what we have seen in the last year is the COVID19 is another transformation, which has changed everything for the globe and coming generations. Simultaneously, we see that the next curve of this transformation is called the bio-tech and the info-tech. How, as a nation, are we addressing all these global transformations, and what are the opportunities and the threats that we have?

Pakistan is the 42nd largest economy in the world with the 8th largest population in the world. We are one of the youngest nations in the world. In actual terms, we are talking about 26-27 million youth entering in the job market in the coming future. There are two main challenges; security and economy. The economic situation of the country is such that even before COVID19, Pakistan has serious economic problems. The growth rate came down from 5.8% to less than 2%.

In the post COVID19, there have been some major developments that have put things in the right direction. First is the re-scheduling of our loans that has created some fiscal space. Secondly, the policy of curtailing the demand was devised. The smart lockdowns, social distancing, and the subsectors closing down have in a way helped that and we are seeing results with lower inflation.

One of the biggest challenges is that Pakistan's economy has is revenue/tax collection. It is linked with the phenomenon that about 35% of the currency in circulation never gets back to the banks. It means that we have a huge informal market. One reason is that people are tax evasive and second, they think that it is an interest-based system so they do not want to be a part of it. Third, FBR's tax collection method is challenging and has many loopholes. Starting from the policy to the execution level. We are majorly relying on indirect taxes which contribute about 60% of our taxation. Our income and direct tax

are very less. Even today in 2021, we have less than 2 million people who are paying direct tax and even 70% of those are mostly salaried people. Hence the tax is deducted at the source.

The financial transformation in post-COVID is such that the financial sector has evolved in this one year which otherwise would have taken another 15 to 20 years. The biggest bank in Pakistan has not more than 1500 branches. We have started to include the Telco banks. Even then if you see today, the entire merchants are not more than 400,000 across the country. In post-COVID, there has been a lot of digitization and we see that there are a lot of opportunities for youth employment. In the pre-COVID era, the banks were not interested in going digital. But in the post-COVID, banks reinvented their internal and external mechanisms by investing in the IT infrastructure and other innovative techniques. It has increased the footprints of digital banking.

The opportunity for the youth through digital banking is to include them in the financial sector as merchants or agents. Most of the youth belong to the rural areas where the Telco banks do not have any branches. So, all we need to do is to have the payment solutions in their mobiles and give them the initial capital that can be done from the No-Jawan Support Program of the government.

There has been a lot of transformation in the last year. If we see the data the alternative delivery channels have multiplied. ATM transactions have increased by 17% month on month. In absolute terms, it has reached about 1.8 trillion in value. Internet banking transactions have grown about by 22% and are expected to go further at the same ratio. Mobile banking saw a peak of about 36 million and the value stood about a trillion for every quarter. While mobile internet banking is growing, I see a great future for alternative delivery channels.

Looking at the future outlook, there are three key areas where the government, private sector, and financial sector need to focus. We must view this change through the customers' lens as opposed to the products looking for a home. The biggest use case for cash substitution has to be digital purchase and e-commerce. There has to be a greater partnership between commercial banks, fintech, and other players in the market with an open application programming interface followed by open banking. Combining the innovative DNA of the fintech along with the deep pockets of the commercial bank can

provide a win-win scenario for everyone. Last but not least the government, both at the provincial and federal level must take the lead in creating an environment where government-to-person and person-to-government payment can become a norm

Speaker 5
His Excellency Ali Muhammad Khan, Minister of State for Parliamentary Affairs, Government of Pakistan
Topic: Role of Technology in E-Governance

"IQRA BISMI RABBIKAL LAZI KHALQ", was the first message and first of the revelation, which was revealed upon the greatest man in the history of mankind Prophet PBUH. The first revelation in the cave of Hira that came upon the Holy Prophet was IQRA ("read"). The message that came upon us 1400 years ago, upon which our forefathers did very well in all fields including medicine, technology, algebra, chemistry, and so forth. The start was taken by the Muslims but later on, we lost track.

On many of the occasions in the Holy Book, it is been established and the direction has been given that the only way forward is knowledge. Taking the example of Germany that what has given this impetus to Germany after being getting destroyed twice in the last 100 years and still re-gaining the market and ruling the world with knowledge.

As the Germans suffered in WW2, so did the Japanese, but they have emerged as modern countries in the world through the power and help of knowledge. They deserve to be honored. Honor is not something that you demand, rather it is something you command. The same is the case with our next-door neighbor, China. Pakistan and China both came into being nearly at the same time. The Chinese focused on their agriculture, technology, and economy. Now, in this unipolar world, the only power that can claim to rival the US is China. The US is in debt to China.

So, what is the key which has taken these great nations forward? It is the urge to learn and gain knowledge. Pakistan has enormous human resource, natural resources, land, strategic location and immense potential. Therefore, the only way forward is knowledge and adding up in the technological transformation. Once Muhammad Ali Jinnah the father

of the nation was asked that how do you perceive Pakistan. He replied that I want Pakistan to become the pivot of the world.

We can become real leaders in terms of knowledge and education. There are many success stories in Pakistan. Pakistan has achieved one of the greatest achievements that every country aspires; nuclear technology. We have proven to the world that if we want to do something if we act as a determined state, we can achieve anything. Pakistan is the first Muslim nation to have nuclear power for deterrence and safety. PM Imran Khan has established NUML University in Mianwali which indicates his interest and focus on education. 23% to 25% of the budget of the province is invested in education.

We have invested in health and education. We are trying to invest and bring Pakistan into a new era of prosperity and success. We have a lot of potential and opportunities. I believe that we need to take advantage of the grand pool of experience which we have. I hope and pray that we can bring Pakistan to that era where we can lead the world and proudly claim that yes, I am from Pakistan. I thank you all with this hope that we can make Pakistan a real superpower in terms of education and technological transformation. We have a lot of potential.

SESSION 2

Speaker 1
Mr. Tariq Malik, Former Chief Technology Officer, GHQ
Topic: Challenges to Social Security under the Technological Transformation in Pakistan

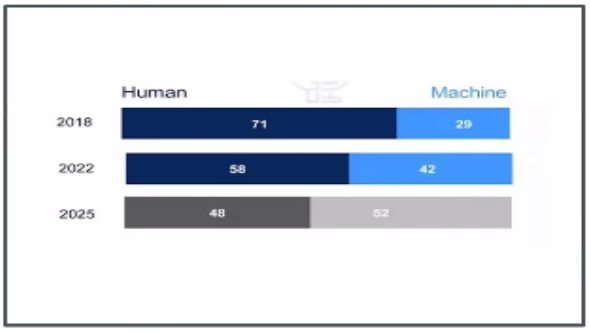
I am going to give some statistics first and then discuss the technologies which are changing the world and impacting humans as well.

IS ARTIFICIAL INTELLIGENCE (AI) GOING TO BE A JOBS KILLER?

- McKinsey Global Institute: between 40 million and 160 million women worldwide may need to transition by 2030.
- Oxford Economics: up to 20 million manufacturing jobs worldwide will be lost to robots by 2030
- Forrester predicts job losses of 29% by 2030 with only 13% job creation to compensate
- World Economic Forum: 85 million jobs may be displaced by a shift in the division of labour between humans and machines

However, companies like Boston Consulting Group, a very large and respected organization in the US, did a survey result. The details of the survey results, along with Europe and US-based ZipRecruiter's survey, is mentioned herein below in which concerns of job seekers in the US have been addressed:

BUT OTHER REPORTS PROVIDE A MORE POSITIVE TAKE:

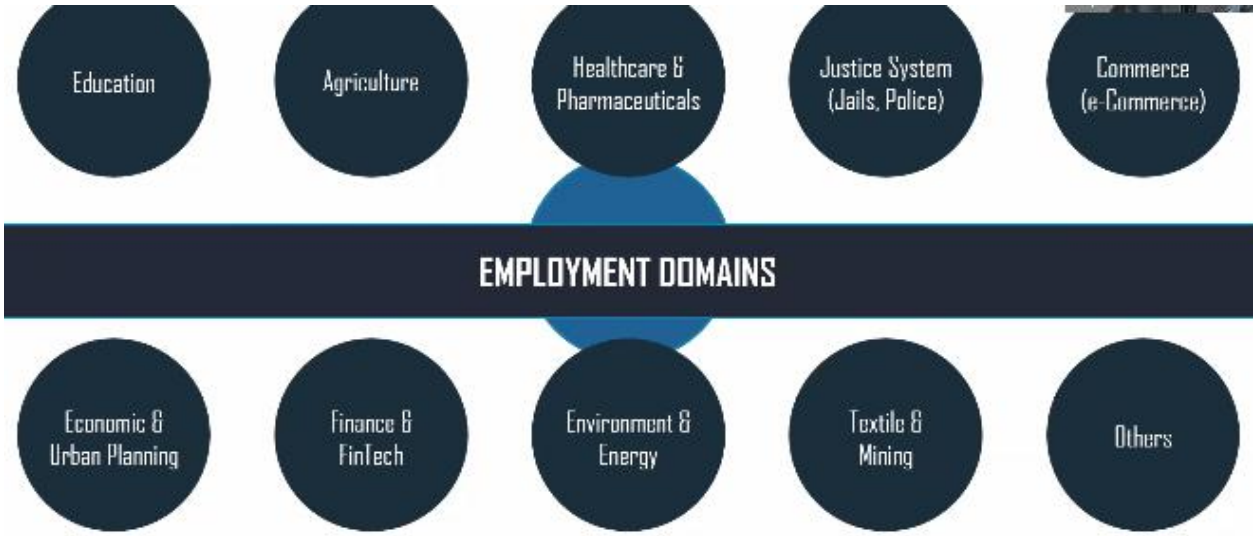


- Boston Consulting Group: 67% of Chinese executives and 50% of US executives expect a reduction in the number of employees over the next 5 years due to advanced robotics (global survey of more than 1,300 executives and operations managers).
- ZipRecruiter: One in five job seekers fear they will one day lose their job to AI (survey of more than 11,000 job seekers in the US)

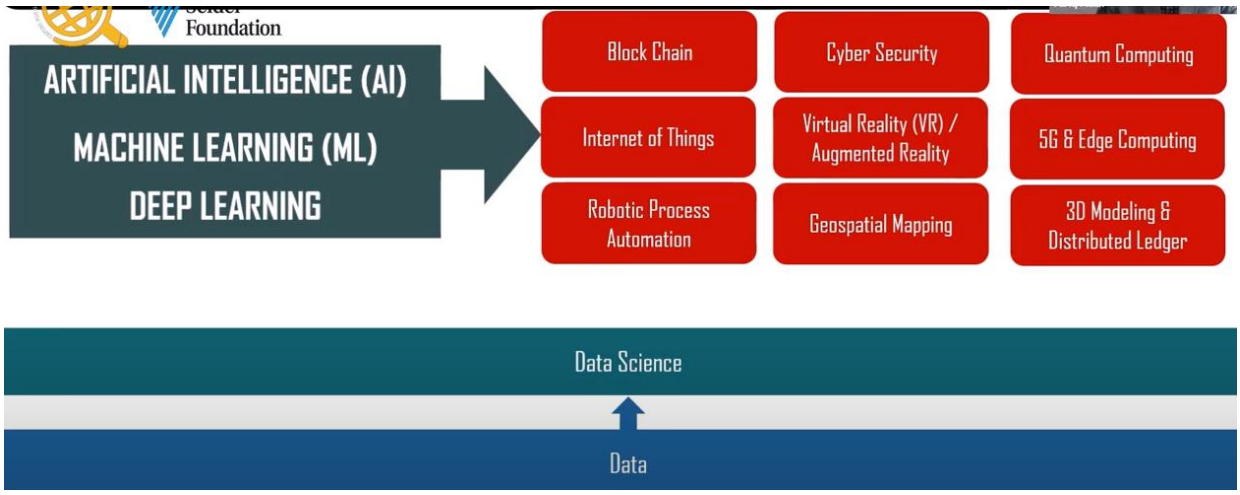
As mentioned before, The World Economic Forum is also optimistic that by 2025, 97 million new roles can emerge. Gartner, McKinsey Global Institute and Forrester also share this view and have given their statistics about new jobs from the Artificial Intelligence sector.

Until now I have only given you numbers and statistics from 2018 to 2020. During the industrial revolution steel was the raw material for the industrial age. Now, data is the new raw material for this era which includes artificial intelligence, machine learning, deep learning, then people are using data signs. It has the ability to revolutionize all the segments of life and create jobs in those domains.

There are several domains where people work in Pakistan. Education is a sector where people are getting educated. Similarly, 60% to 70% of our population is linked with agriculture. The details of other domains which have been mentioned herein below:



All these domains have their data. When this data is gathered and collected, and data analytics is run on it for example the artificial intelligence, machine learning, or deep learning, you can come up with a future workforce who can be technology graduate, agriculture graduate, finance, economic, and so forth. Hence, whatever someone's field is, there is and there will be a need to understand data of one's domain. This way, we can revolutionize these sectors and create jobs in those domains by using that data.



The World Economic Forum states that data science skills in various industries require resources and the need of which is being felt internationally and this is the new change coming. The details of the industries are mentioned herein below:

Ranking priority order of roles which require data science skills, by industry

Industry	AI and Machine Learning Specialists	Data Analysts and Scientists
Automotive, Aerospace, Supply Chain and Transport	2	1
Aviation, Travel and Tourism	4	2
Chemistry, Advanced Materials and Biotechnology	2	6
Consumer	3	1
Energy Utilities and Technologies	8	1
Financial Services and Investors	2	1
Global Health and Healthcare	3	1
Information and Communication Technologies	2	1
Infrastructure	33	2
Mining and Metals	8	4
Oil and Gas	14	1
Professional Services	11	5

Source: *Future of Jobs Report 2018*, World Economic Forum.

As mentioned below, Forrester is claiming that automation is not a singular trend which is going to change the future job trend of the market. Pakistan is one of those countries which have the largest number of freelancers. We get over a billion US dollars of foreign exchange via freelancers. It is happening because of the gig economy. It doesn't matter where the worker is sitting, you offer them online tasks and the people bid for them. So that way you are saving cost, you are getting someone to do your job and the work is being done without spending money on physical resources. This is eliminating the national or industrial boundaries where resources can be utilized from anywhere.

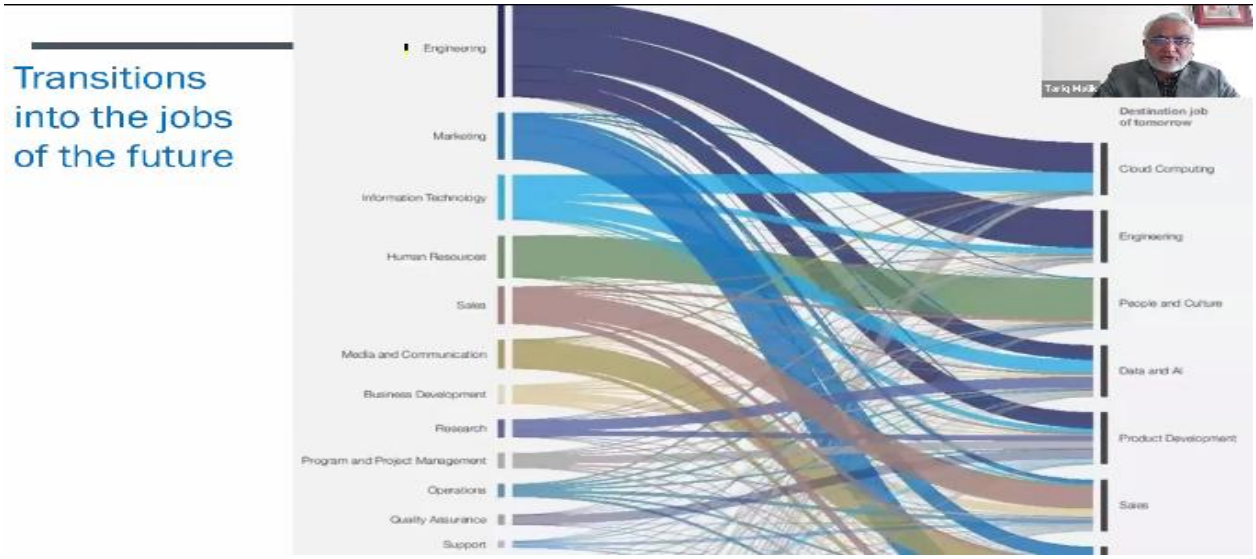
The fact is that technology and unemployment are 2 sides of the same. If a person cannot cope with technology change then there is an equal chance for them to face unemployment.

Pakistani experts are getting foreign exchange from abroad. However, the technological-knowledge which we possess is very little. Normally, the majority of our work is done on web development, Javascript, Python, etc. Our technology export sector is at the lower end of the food chain. Furthermore, there are fewer opportunities for Pakistani labor in the Middle East because of our largely unskilled labor who does not know how to use the latest machinery. Similarly, we are also not getting our people into the finance, banking industry, because they don't have exposure to the latest software, nor how to churn the

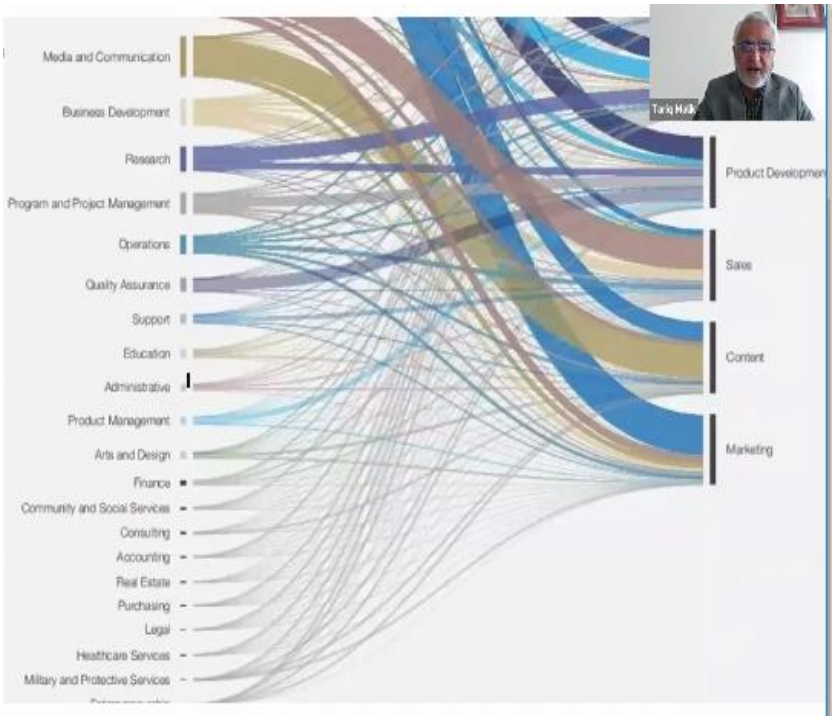
numbers. We are not getting the IT people here because again because there are very few people who understand the latest technology. Moreover, the gap between the hiring of our professionals will also continue to increase because we are not producing people with those skills or that education which is required in the worldwide economy now. When we are part of the global economy, we have to change ourselves as well.

Nations and individuals who are embracing the technological trends are getting new jobs and benefits. The agriculture and the pharmaceutical industry have got new work profiles because of technology.

New roles have been mentioned herein below, which are the destination jobs of tomorrow.



The other half of the diagram given above also talks about various services. For example, you cannot do health services without AI.



According to World Economic Forum's latest data collected in 2020, a list of fields in which there is growing job demand exists We need a business transformation strategy that we are trying to build at the moment. Furthermore, we also don't have specialists in the higher segments of IT.

1. Data Entry Professionals
2. Administrative and Executive Secretaries
3. Accounting, Bookkeeping and Payroll professionals
4. Accountants and Auditors
5. Assembly and Factory Workers
6. Business Services and Admin Managers
7. Client info and Customer services workers
8. General and Operations Managers
9. Mechanics and Machinery Repairs
10. Material-Recording and Stock-Keeping Professionals

The World Economic Forum has also issued a list of the decreasing job demands. The business process automation and robotic process automation will start taking some of these jobs away except audit. Call centers are also going to disappear. At the start of the

industrial revolution, people thought there will be more unemployment but actually, industrialization did the opposite and created more jobs than it destroyed. Now, these electronics and robotics are set to bring the same technological change and they will destroy the unskilled labor but demand for skilled workers and expertise will be increased. But it is a warning bell for Pakistan because we don't have skilled labor and we don't have the expertise in all the verticals which I mentioned.

THE START OF THE INDUSTRIAL REVOLUTION WAS ASSUMED AS NEGATIVE IMPACT OF TECHNOLOGY ON EMPLOYMENT

INDUSTRIALIZATION CREATED MORE JOBS THAN IT DESTROYED

ELECTRONICS AND ROBOTICS ARE SET TO BRING THE SAME TECHNOLOGICAL CHANGE, DESTROYING JOBS FOR UNSKILLED LABORS AND INCREASING THE DEMAND FOR SKILLED WORKERS AND EXPERTISE.

There are not going to be jobs for life. It will be important for getting comfortable with tech tools as well. Understanding data for better decision-making is also important. Digital skills are also important for example for a health care professional, IT expertise is not required but the need to understand the healthcare or pharmaceutical data, tech-savvy is important. There will be more job opportunities if we embrace technology.

The government has to understand the technology's impact. The detailed points are mentioned in the slide below:

- Understand technology's impact.
- Economic planning (maximize opportunity while minimizing impact on local jobs),
- Business planning (good-by graceful planning cycles, hello disruptive forces), and
- leadership planning (learn to manage humans and machines).
- Most important, awareness for Citizens: Individuals become learners — learning core skills, adapting to new working models, and understanding what it means to be ready and fit for the future.

Technology always changes the nature of jobs whether it was 20 years ago or 30 years ago. Previously, you used to go to a bank to take money, now you have ATM. 60 years ago there were in-house looms then the big factories came. We need to start from primary

education to post-graduate to improve the quality and add the subjects which I mentioned in one of my slides. There is nothing permanent except change.

- Technology changes the nature of jobs. Some jobs will become redundant, but will create many more employment opportunities than it eliminated.
- Continuous learning and updating the skills is the need of the hour
- Upgrading skills to mold ourselves into newer types of jobs
- Starting from Primary education to post graduate

Speaker 2

Dr. Minhas Majeed Marwat, Department of International Relations, University of Peshawar

Topic: Involving Education sector in the prism of technological transformation: Challenges and Solutions

Today many of our inventions are focused on creating faster ways of communication with each other. In the process, we are creating more data than a human mind can comprehend and similarly now we see a new tool, Artificial Intelligence (AI) which is emerging at the nexus of all this. Technology has impacted almost every aspect of life today and education is no exception.

Educational technologies are those materials, procedures, organizations, ideas, devices, instruments, or machines which make the teaching of learning process more effective, successful and unforgettable. If we compare both the traditional teaching and non-traditional ways of teaching there is a great difference between the two. Traditionally, classrooms have been relatively isolated, students remaining mostly passive and collaboration has been limited to other students in the same classroom or building in the school.

Now technology has changed the role of both teachers and students. Today's classrooms are packed with technology. From smart-telephones to tablets, computers, white screen televisions to interactive whiteboards. The fact however is that technology has profoundly changed education in many ways. Technology has greatly expanded access to education. In the past, when books were rare and only the elite class would have access

to educational opportunities, individuals would travel to centers of learning to faraway areas to get education.

Access to learning opportunities today is unprecedented in scope because of the technology. Presently, a massive amount of information is available at one's finger points through the internet, and opportunities for formal learning are available online through online degree programs and much more. Students today can share what they are learning with the students of other classrooms and other cities and states who are tracking the same expeditions. Students can also collaborate on group projects using technology-based tools such as google docs.

The walls of the classrooms are no longer barriers as technology enables new ways of learning, communicating and working collaboratively. As an academician, I have seen that with the application of educational technology, students can independently progress in mastering teaching materials to choose the pace of work to repeat the material which is not sufficiently clear or to reproduce what has already been produced adding more to the previous production. And that after tests are performed, they know that they can immediately get results and track their progress.

Interactive multimedia content provides a great advantage of modern learning over traditional learning and with the application of educational technology, we get feedback between the teacher and the students, i.e., both types of interaction these stakeholders have with each other during class because of this technological advancement. We can say that technology has introduced not only opportunities but it has also introduced challenges. Not only educationist, but policymakers in developing countries like Pakistan are optimistic as well as concerned about the qualitative and quantitative impact of technology not only on the State's economy and the lives of people but also on education.

If it is about the socio-economic pattern of life, technological change might be widening the socio-economic gap between societies by benefiting some and discriminating against others. While in certain aspects it may prove to be a blessing for a developing country like Pakistan because 2020 has been a year that saw a major pandemic taking over the entire world. Because COVID-19 led to an accelerated way of technological boom, which increased more reliance on machines rather than human capital.

The challenges in Pakistan are particularly acute because according to the UN Education Index of 2018, Pakistan's education system ranks 146th out of the 187 countries in the world. Around 25 million children are out of school. Pakistan's literacy rate is just 58%. 1.5 million teachers are needed to meet the demands of existing students. So, access to higher education is less than 8%. So, we have to bridge this gap and increase the opportunities for the people, for the population, to get their children enrolled in school and get the teacher trained to be at part with other countries that are more relying on technology because this is the world of technology and we cannot stay behind at any cost.

Meanwhile, Pakistan's demographics are at once a potential challenge and a potential opportunity. Pakistan is a very young country, 60% of the population is comprised of youth. If the education system is unable to provide sufficient opportunity to Pakistani youth, several social and political problems may arise. But if Pakistan can find a way to educate its young people to face the challenges of a rapidly changing world and if the education can successfully unleash the talent of these young people then there is no way that when Pakistan can do in the future.

What can Pakistan do to ensure that its education system is preparing its young people for this new world and one of the answers for this which kept coming to my mind was technology. Like many other countries, Pakistan is on the cusp of a digitalization drive. Pakistan's education system had a mixed engagement with digitalization and emphasis on digital education in Pakistan has lagged in the past. However, schools and universities are now being embarked to actively embrace digital work although there are still very few educational institutes that are providing facilities for digital education.

But the ratio is again expected to improve with the support and help of the education ministry and the special focus of the government is on education with the upcoming digital initiatives by the government in the future. Now, while technology lies at the heart of the many changes which are disrupting the existing educational paradigm, technology can also create solutions that can help education bridge existing gaps in policy, capacity, and access in a different type of education system in Pakistan.

Technology does not always bring the best quality education to the student and we increasingly see venality being privileged over quality and this is one of the risks of using technology more in our classrooms. Meanwhile, there are countless examples of

educational systems which have purchased large amounts of shiny and expensive new gadgets only for this equipment to sit unused and gathering dust with students and teachers unclear how to make the best use of it. So, this is another risk of relying on technology that we need to focus on.

However, when the technology in educational institutions is utilized effectively and when policymakers deploy a specific type of technology in a thoughtful and targeted way to meet particular problems specifically the problems which educational institutions are having, then it has the potential to revolutionize education. If technology can be used to collect an almost infinite amount of data, it can be used to improve educational models as well. So, in Pakistan, we need to give students the skills they need to succeed in the labor market. We also see teacher's roles shifting due to students becoming more independent in their learning, using technology to gather relevant information.

Are we using technology as an enabler, are we able to redesign the learning phases to enable this new model of education, foster interaction and small group activities? It will be up to the policymakers or instructional designers and educational technologies to make the most of the opportunities provided by technology to change education so that effective and efficient education is available to everyone and everywhere. With the world changing so rapidly and the rise of technology in every aspect of life, we must integrate these changes and introduce reforms in education. technology is important for education, especially, if we want to compete with the world.

Speaker 3
Mr. Aamir Ghauri, Editor, The News
Topic: Technological Transformation Impacting Media: Increasing Challenges and the Way Forward

In the last 20 years, media has dramatically changed in Pakistan. With the growth of the TV networks, media has progressed in Pakistan. However, the growth of media has created a lot of challenges. When Geo news started in Pakistan, it was the biggest news network for Pakistan in terms of the newspaper and magazine. Now, the nature of programming has changed in Pakistan. The biggest challenge that we are facing is fake

news and misinformation. The people who spread fake news are aware of the power of the media. Anyone who has internet access and a smartphone can record the video and spread it.

When a person records a clip and it gets viral on social media, the person gets into the limelight. The propagators have gone into the field of media. Everything which is written is not the truth. Another aspect is that of the lawmakers, who have been left behind because of technological speed. They need to catch up and create new laws to combat the threat and impact of new technology. Now social media is only inclined towards providing entertainment. Social media applications are also creating negativity.

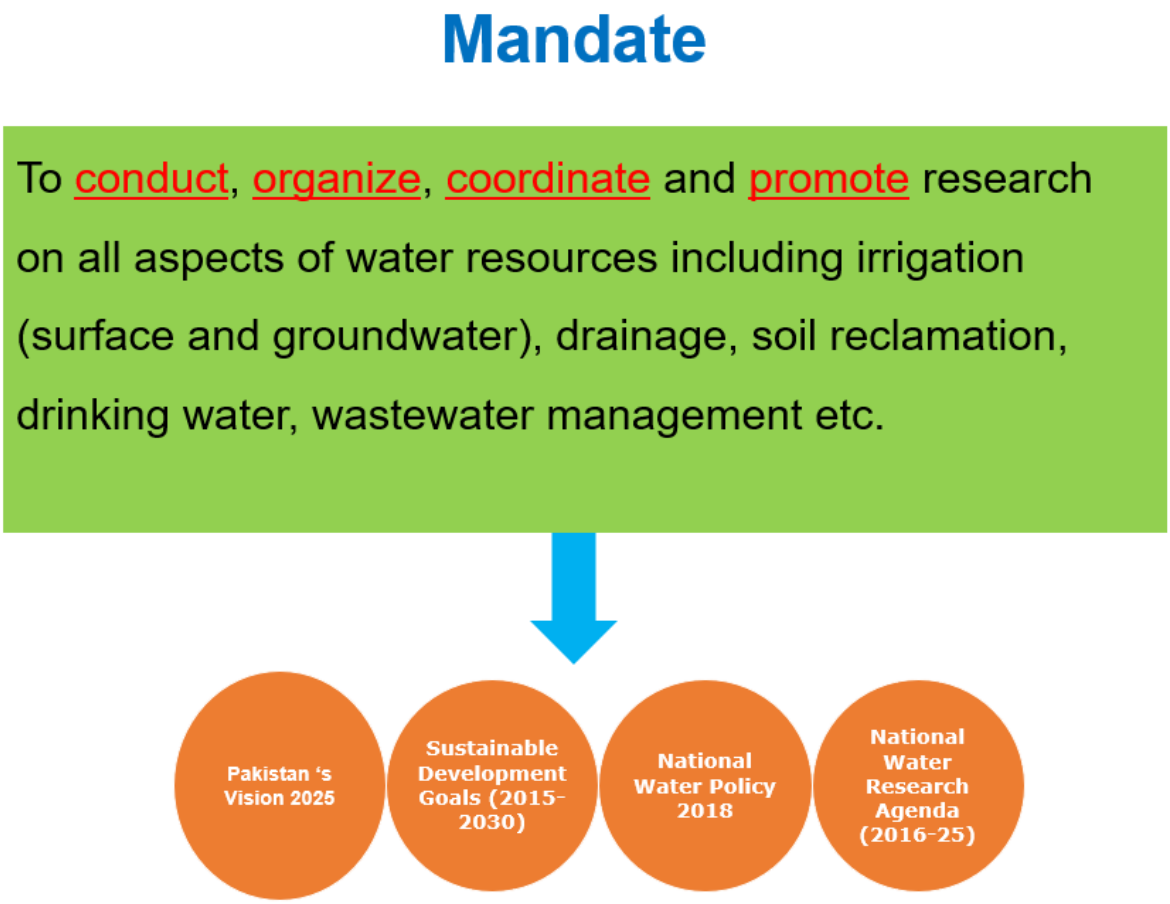
Irresponsibility is another challenge. The media industry needs to know what to broadcast and what not to broadcast with a responsible behavior. Another challenge for us is the fear of losing the race in social media. The growth of media has also created challenges for practitioners, employers, and professionals. Another problem is of internal fake accounts. For example, a person who has created 30-40 accounts so how to catch him because it is also the responsibility of the main-stream media to chase that person.

Right now, so many unemployed people have this opportunity that they can create money via YouTube channels. Our media tools are not working for youth. There are no ethical or professional programs now. So, the one way forward is that the law-making in Pakistan needs to improve and understand what media is. The government needs to give legal, ethical, and professional training to social media users.

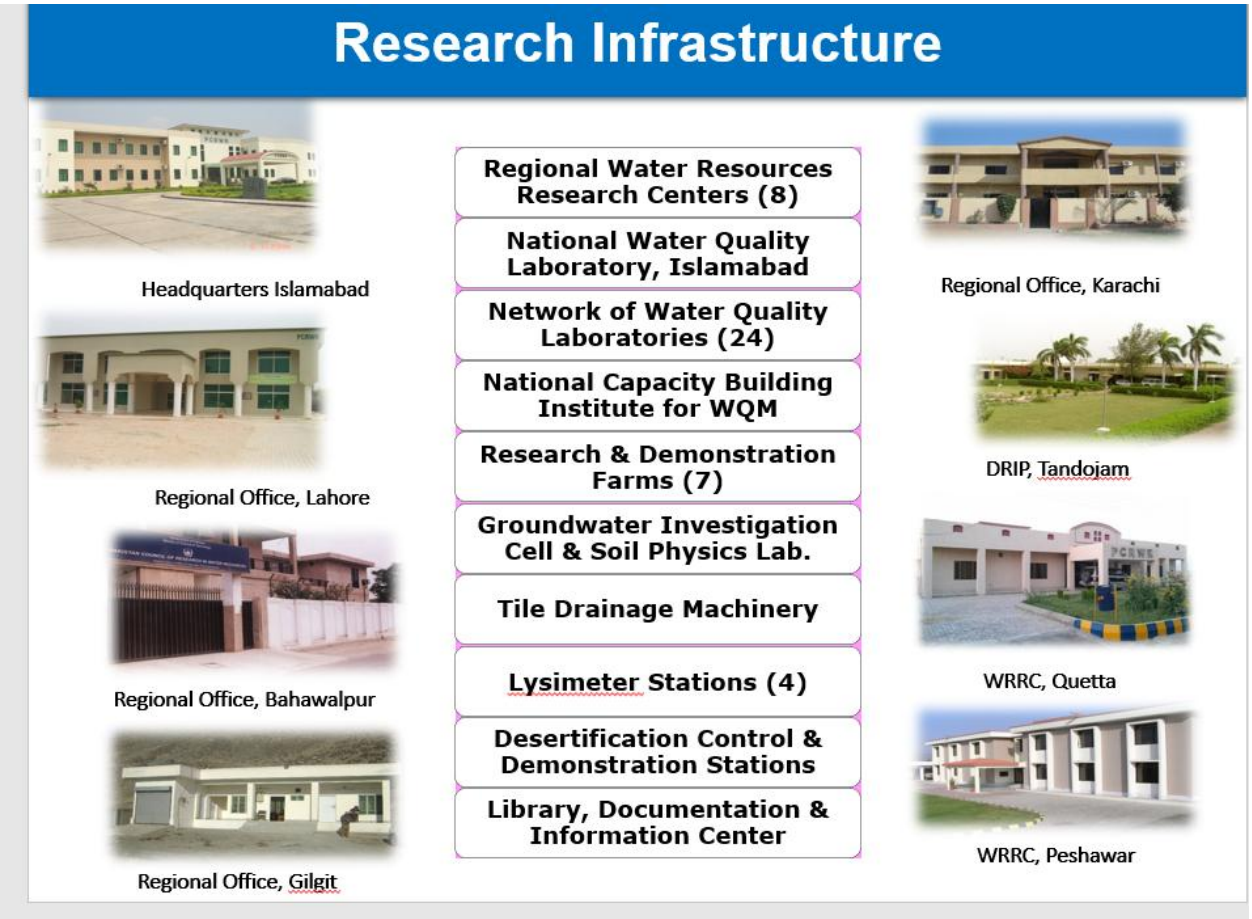
Speaker 4
Ms. Bareerah Fatima, Program Liaison Officer, Pakistan Council of Research in Water Resources (PCRWR)
Topic: Application of technological intercessions for water resource management in Pakistan

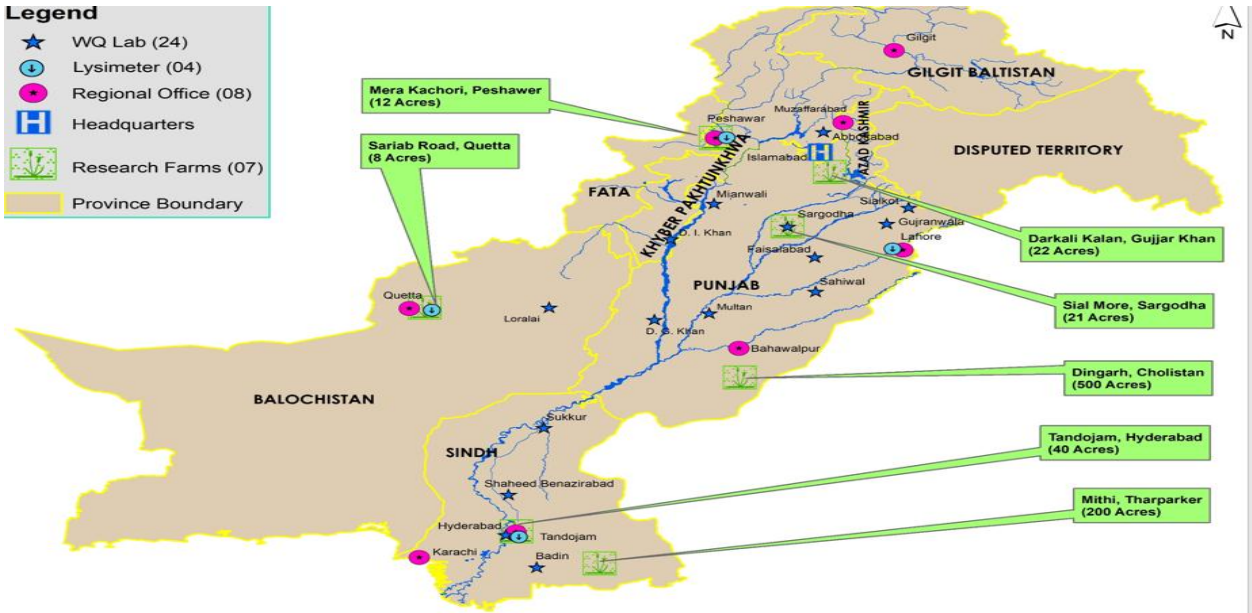
Pakistan Council of Research in Water Resources (PCRWR) is a federal government organization and working under science and technology. The mandate is to conduct, organize, coordinate and promote research on all aspects of water resources including irrigation (surface and groundwater), drainage, soil reclamation, drinking water,

wastewater management, etc. Our national policy includes Pakistan's Vision 2025, Sustainable development goals, National Water Policy, and national water research agenda.



PCRWR operates from Gilgit to the Coastal areas till Quetta. The regional infrastructure details are mentioned below in the figure that includes our regional offices and technological infrastructure.





Water Resource Management is PCRWR's overarching focused research area but we are specialized in water quality because we have ISO 7 or 25 accredited lab, which is serving the public of Pakistan. We have 34 water testing labs in different district.

Focused Research Areas

Water Management	• Crop Water Requirements • Water Conservation • Groundwater Investigations – GIS/RS • Recharge of Depleted Aquifers • Watershed Management • Drainage and Land Reclamation
Rainwater Harvesting and Desertification Control	• Rainwater Harvesting • Sand Dune Stabilization • Rangeland Management • Grassland Development • Saline Agriculture
Water Quality	• Water Quality Assessment and Management • Simple and low cost analytical solutions for water quality monitoring • Innovative Water Treatment Technologies

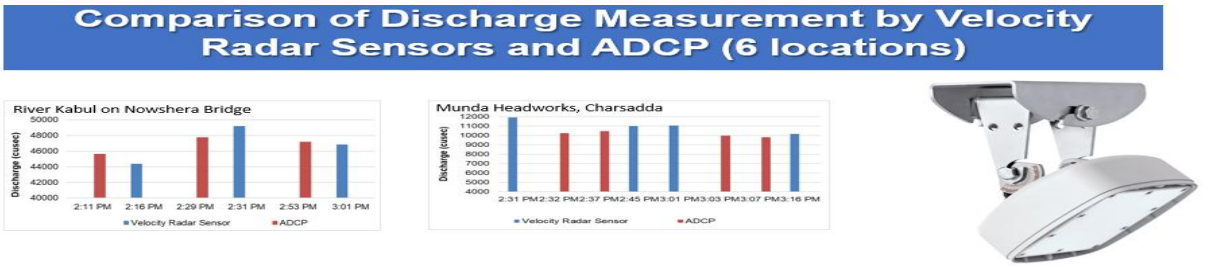
We have created a many diverse products, with the help of technology, for the use of general public. This includes determining the crop water requirement of 12 crops using these lysimetric. This information is collected after years of research. PCRWR also has a physical soil laboratory, where the hydraulic property of the soil of all eastern rivers is examined. This has lead to PCRWR being able to calculate actual values, which in turn are used for flood forecasting.

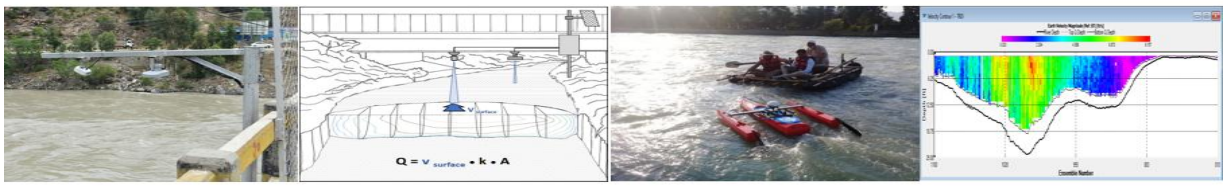
Crop Water Requirements and Hydraulic Properties

- **Determined crop water requirement of major crops (12 Nos.) in Punjab and Sindh through lysimetric studies – assist farmers for reducing wastage of water**

- **Determined soil hydraulic properties of the eastern rivers - an input in flood forecasting model for Flood Forecasting Division (previous models were based on meteorological data only)**

With the help of the International Water Management Institute, we have developed the Indus Telemetry System. There are four big data systems under this Indus Telemetry system. Groundwater, Canal Flows, Weather fore-caste system, 7-Day Weather Forecast. The canals system, have velocity radar sensors and cameras that transmit data every day and when the data reaches the server it displays the data on the screen.

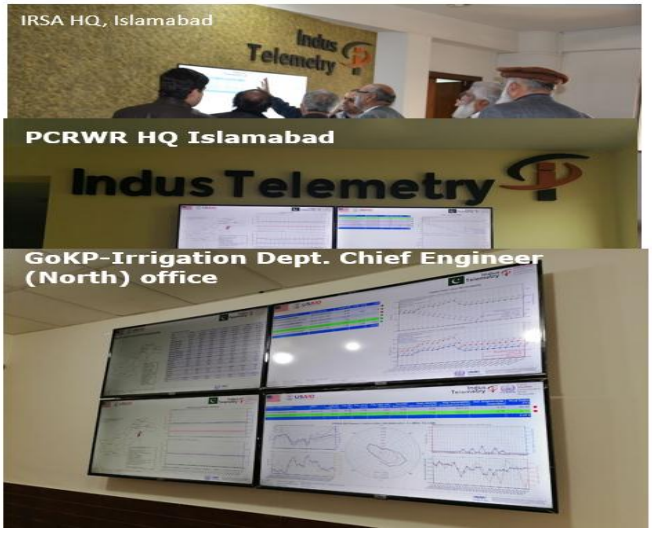




This system is conflict-free as it is not based on the manual data collection system that might cause conflict among the provinces. In the beginning, it was challenging for PCRWR to convince provinces to utilize the new system, but PCRWR managed to overcome reservations.

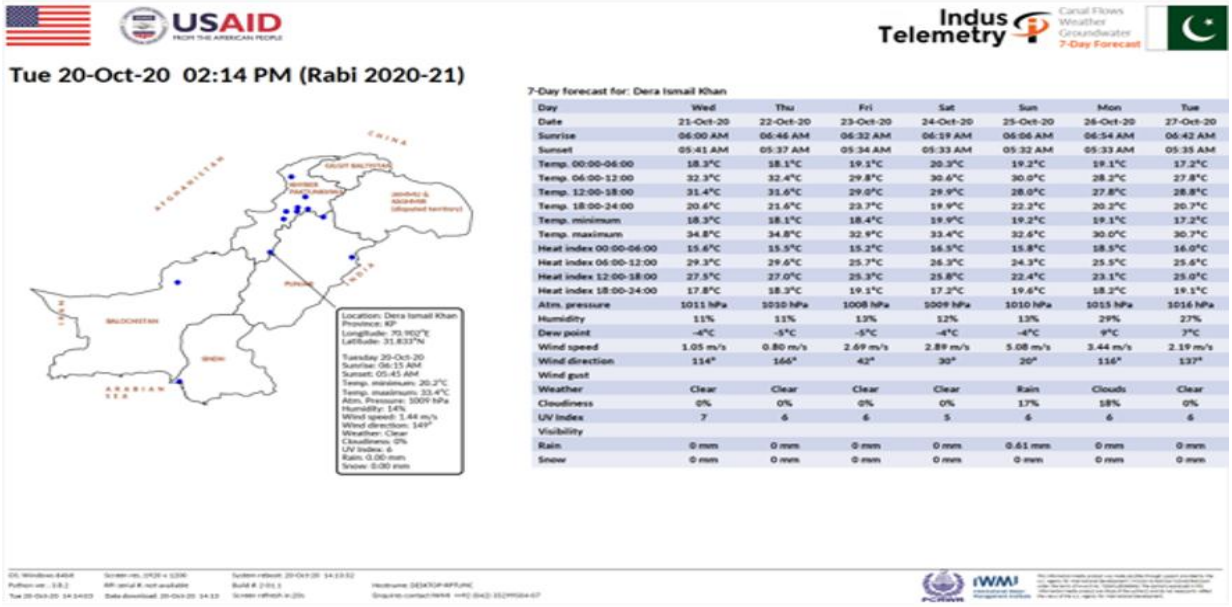
Indus Telemetry – An Initiative of IWMI and PCRWR

- Groundwater
- Canal Flows
- Weather
- 7-Day Weather Forecast



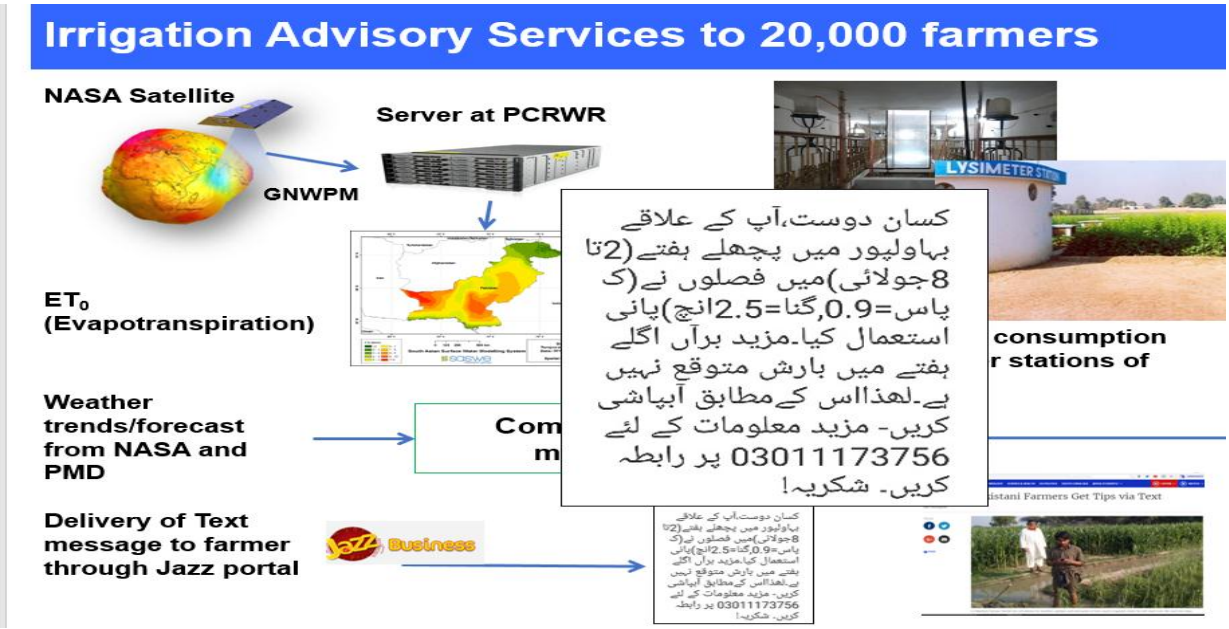
The 7-day forecast is important for the farmers because if they want to apply irrigation and fertilizer and there is rain expected then their fertilizer will go to waste.

7 days Weather Forecast



Day	Wed	Thu	Fri	Sat	Sun	Mon	Tue
Date	21-Oct-20	22-Oct-20	23-Oct-20	24-Oct-20	25-Oct-20	26-Oct-20	27-Oct-20
Sunrise	06:00 AM	06:46 AM	06:32 AM	06:19 AM	06:06 AM	06:54 AM	06:42 AM
Sunset	05:41 AM	05:37 AM	05:34 AM	05:33 AM	05:32 AM	05:33 AM	05:35 AM
Temp. 00:00-06:00	18.3°C	18.1°C	19.1°C	20.3°C	19.2°C	19.1°C	17.2°C
Temp. 06:00-12:00	32.3°C	32.4°C	29.8°C	30.6°C	30.0°C	28.2°C	27.8°C
Temp. 12:00-18:00	31.4°C	31.6°C	29.0°C	29.9°C	28.0°C	27.8°C	28.8°C
Temp. 18:00-24:00	20.6°C	21.6°C	23.7°C	19.9°C	22.2°C	20.2°C	20.7°C
Temp. minimum	18.3°C	18.1°C	18.4°C	19.9°C	19.2°C	19.1°C	17.2°C
Temp. maximum	34.8°C	34.8°C	32.9°C	33.4°C	32.6°C	30.0°C	30.7°C
Heat index 00:00-06:00	15.6°C	15.5°C	15.2°C	16.5°C	15.8°C	18.5°C	16.0°C
Heat index 06:00-12:00	29.3°C	29.6°C	25.7°C	26.3°C	24.3°C	25.5°C	25.6°C
Heat index 12:00-18:00	27.5°C	27.0°C	25.3°C	25.8°C	22.4°C	23.1°C	25.0°C
Heat index 18:00-24:00	17.8°C	18.3°C	19.1°C	17.2°C	19.6°C	18.2°C	19.1°C
Atm. pressure	1011 hPa	1010 hPa	1008 hPa	1009 hPa	1010 hPa	1015 hPa	1016 hPa
Humidity	11%	11%	13%	12%	13%	29%	27%
Dew point	-4°C	-5°C	-5°C	-4°C	-4°C	9°C	7°C
Wind speed	1.05 m/s	0.80 m/s	2.69 m/s	2.89 m/s	5.08 m/s	3.44 m/s	2.19 m/s
Wind direction	114°	166°	42°	30°	20°	116°	137°
Wind gust							
Weather	Clear	Clear	Clear	Clear	Rain	Clouds	Clear
Cloudiness	0%	0%	0%	0%	17%	18%	0%
UV Index	7	6	6	5	6	6	6
Visibility							
Rain	0 mm	0 mm	0 mm	0 mm	0.61 mm	0 mm	0 mm
Snow	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm

Information is disseminated on to their mobile phones. Data from the NASA satellite is downloaded on the server located at PCRWR. We combined that data from local data and generate an advisory message. In 2017, PCRWR started this advisory service with the help of the University of Washington, USA. When the Indian government came to know about this service, they sent their experts to the same university in the USA and asked them to downscale these in India. Now the Indian and Bangladesh governments are providing the same services to their respective farmers. If you search for the 50th anniversary of NASA, you will see that NASA celebrated PCRWR services on their 50th anniversary.

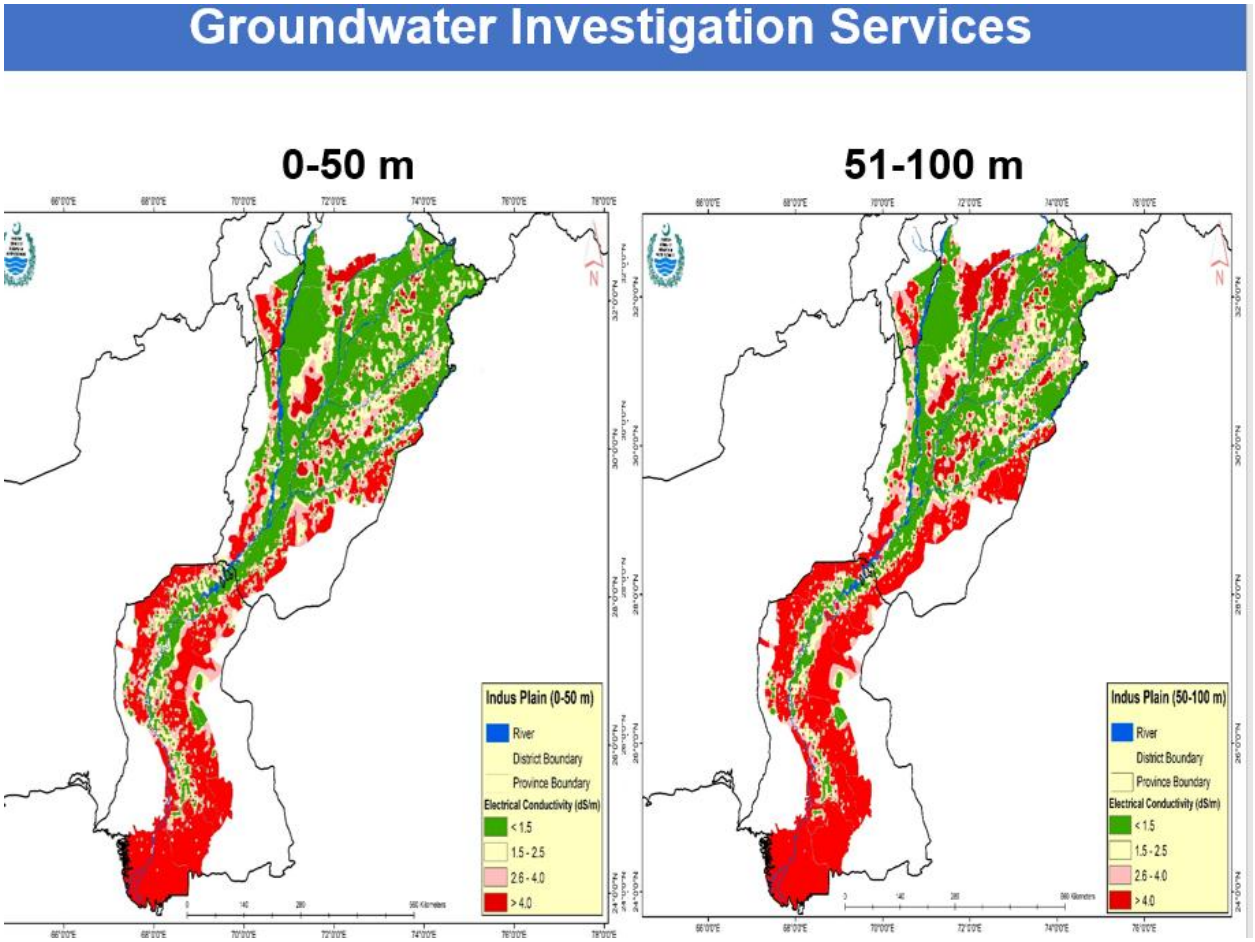


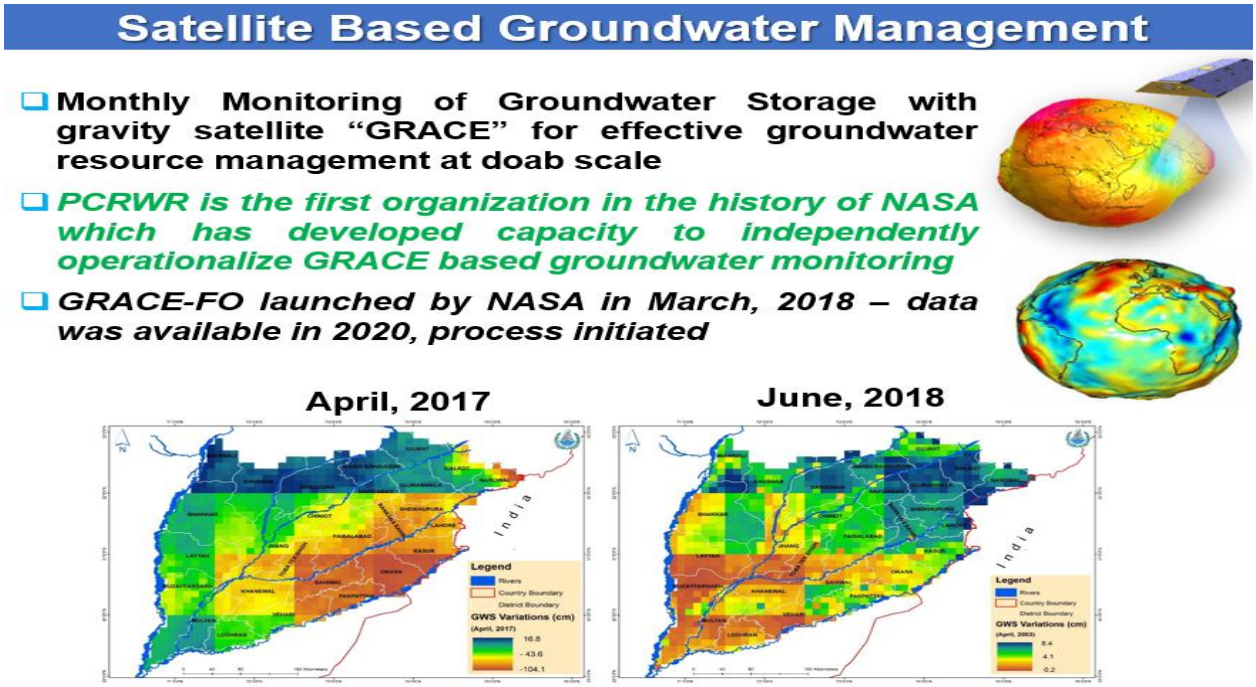
We also not only provide information to the farmers but also get feedback which helps us in realizing the need of the farmers of the technology more.

Farmers Feedback

- The irrigation advisory services for vegetables may also be included
- Rainfall prediction be included for the next 15 days for better transplantation of rice
- Improved water application methods be also told; such as irrigation using saline water (other than mixing)
- Fertilizer and pesticide application advisory be included
- Irrigation advisory be issued for fruit orchards like orange, guava, mango, lemon etc.
- Crop sowing/harvesting advisory be included
- Voice recorded advisory message in local language may also be added

Some years ago, we have started Groundwater Mapping System. It took us ten years to develop a groundwater quality profile up to 500 meters. Now with the help of satellite technology we are using it in a matter of weeks. PCRWR has an in-house capacity to download the data of NASA and use this information for groundwater planning. The maps of the upper Indus basin and groundwater quality scenario are mentioned below in the slides:



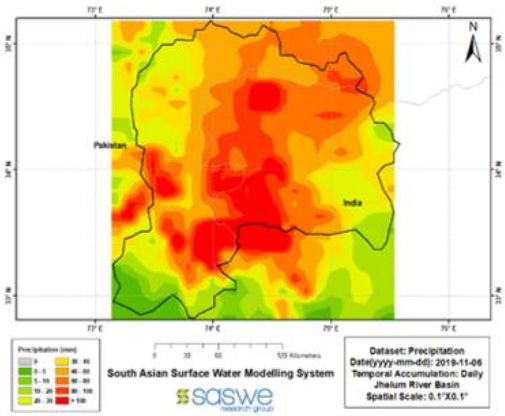


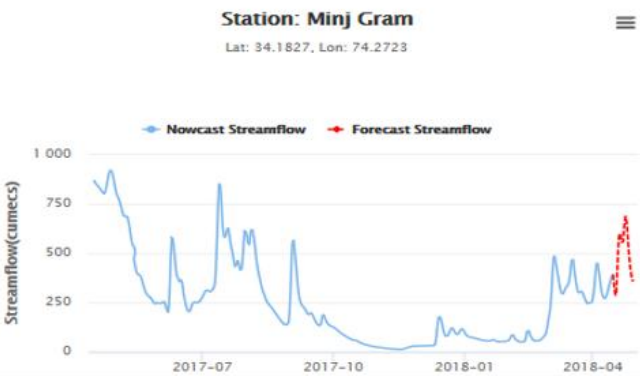
We have also applied the satellite altimetry technique on transboundary issues. The graphs below show Minj Gram, which is only 50-60km from the border joining Indian

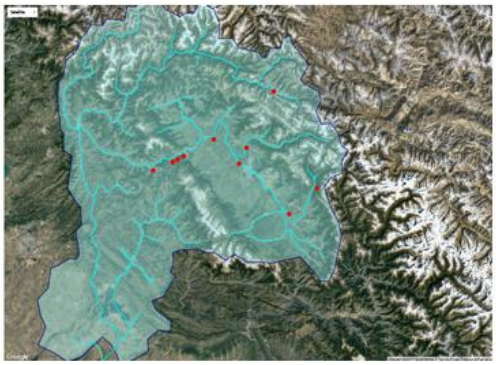
controlled Kashmir and Pakistan. So, we utilized the satellite altimeters data and measured the depth of the river of that point and we get the information of the discharge of that point at Jhelum river and helped the Mangla dam authority in operating reservoirs.

Satellite Based Water Resource Management

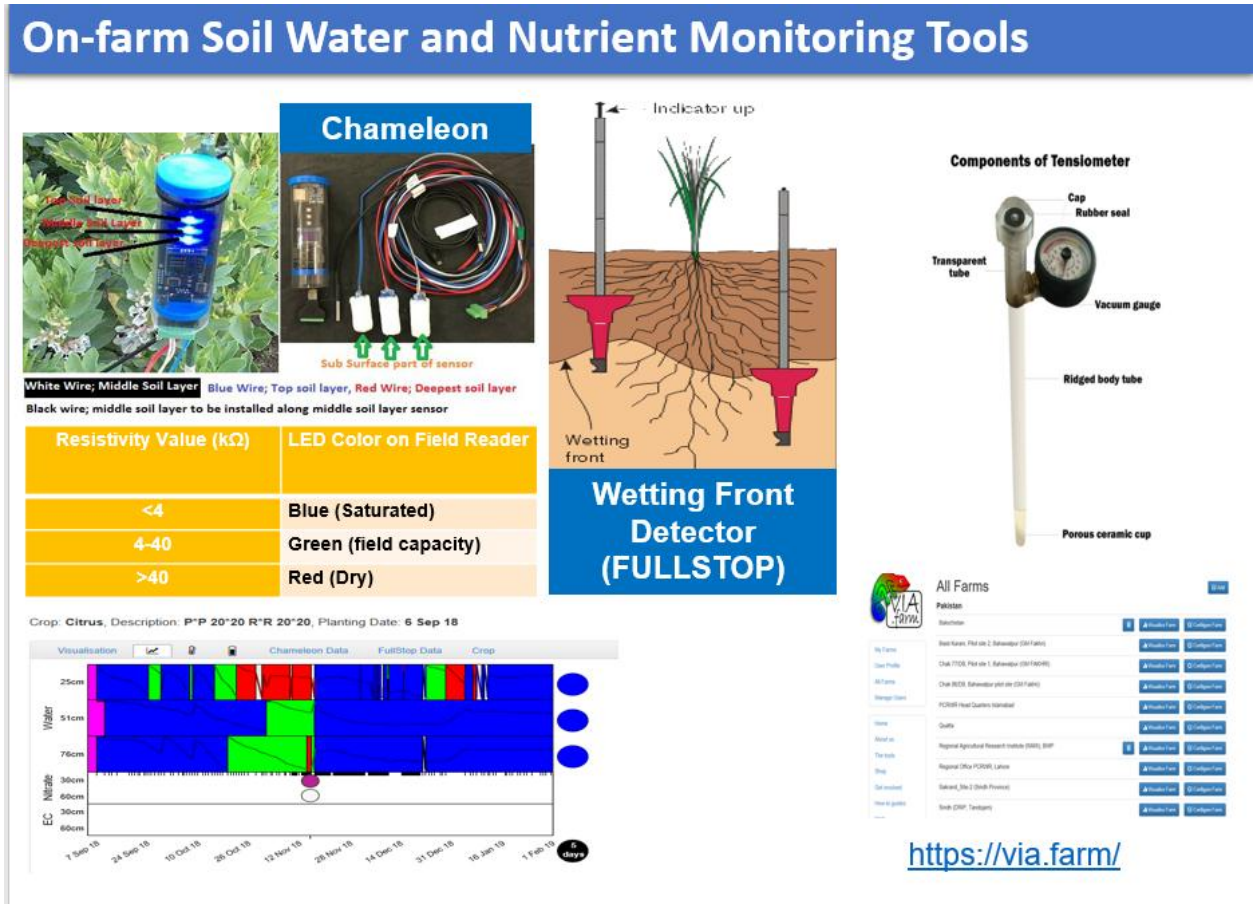
- Monitoring of reservoir discharges for flood mitigation using satellite altimeters – presently doing for Mangla reservoir
- Jaxa-GSMAP precipitation crawler
- SWOT Early Adopters: Water logging in the vicinity of large canal in Sindh







We have tested small testing sensors with farmers. We helped the farmer in getting to use these sensors and they helped us back in developing and improvising this technology. We started with version 0.5 and now we are at version 1.1 with the help and support of farmers. The sensor has a meter as well and the farmer connects this with his smartphone and uploads data on the cloud.



The transformation of digital agriculture is our assets. High import cost is our lability. We lack good researchers and experts in the organization who do not understand the technology. We are not producing enough human resources in digital agriculture technology.

Picture Gallery

Presentation of Memento to Chief Guest of the occasion His Excellency Ali Muhammad Khan, Minister of State for Parliamentary Affairs, Government of Pakistan

Presentation of Memento to Mr. Ammar Jaffri, Director General, Center of Information Technology (CIT)

Presentation of Memento to Barrister Waqas Aziz Qureshi – Senior Law Expert and Managing Partner, Transact Advisory

Presentation of Memento to Mr. Jawad Majid, Director, Silk Bank

Presentation of Memento to Mr. Amir Zafar Durrani, President, Reenergia

Presentation of Memento to Mr. Aamir Ghauri, Editor, The News

Presentation of Memento to Ms. Bareerah Fatima, Program Liaison Officer Associate, Pakistan Council of Research in Water Resources (PCRWR)

Presentation of Memento to Dr. Steffen Kudella, Resident Representative, Hanns Seidel Foundation Pakistan for cohosting the Conference

Center for Global & Strategic Studies
Islamabad

5th Floor Khyber 4 Plaza, G-15 Markaz, Islamabad, Pakistan

Tel: +92-51-2328615

E-mail: infocgss@yahoo.com Website: www.cgss.com.pk