



A WATER-SECURE WORLD BY 2030

SUSTAINABILITY



RESILIENCE



INCLUSION



INSTITUTIONS



FINANCING



INTERNATIONAL SEMINAR

21ST DECEMBER 24, 2018,

MNS- UNIVERSITY OF AGRICULTURE, MULTAN, PAKISTAN

WATER SECURE PAKISTAN: ROLE OF TECHNOLOGY AND RESEARCH

The summary of the talks was to find out ways to future water availability scenarios and implementable solutions by using innovative technologies to lead Pakistan from a water-scarce to a water-secure country.

INTERNATIONAL SEMINAR ON

WATER SECURE PAKISTAN: ROLE OF TECHNOLOGY AND RESEARCH

PROGRAM

The International Seminar on the WATER SECURE PAKISTAN: ROLE OF TECHNOLOGY AND RESEARCH “was held 21st December in as part of the University efforts to cater the needs of water secure Pakistan

The initial activity of the Seminar on was the recitation from Holy Quran followed by oral presentations by subject: thematic scientific production; institutional scientific output; information flows; research and policy guidelines for Govt. and farmers.

In the first presentation by Dr. Tariq Rana expounded the “Road map for a Water Secure Pakistan”. As a keynote speaker, Dr Tariq had elucidated the practical entry points for road to a water-secure Pakistan. With rising population and increasing demand for water, water security has become a major concern in Pakistan. This requires extraordinary measures since business-as-usual is no longer an option. In his presentation, he particularized an in-depth analysis of existing data on water availability, water demands, future water availability scenarios and implementable solutions to lead Pakistan from a water-scarce to a water-secure country.

Dr. Tariq Rana has explained the water scenario in Pakistan, with complete past data and future prospects, moreover he quoted that Pakistan has become a water stressed country. Per capita annual water availability dropped from 5,260 cubic meters in 1947 to less than 1,000 cubic meters in 2018; Pakistan is exposed to extreme climate conditions (unprecedented rains, floods and droughts. Heavy flooding in some

SPEAKERS

DR. TARIQ RANA

Dr Tariq Rana is currently working as A/Director, water resource planning in the Policy & Planning sector of the Australian Government. Dr Rana leads an integrated team at Murray-Darling Basin.

Dr Aftab Ahmad

has been working in Australian Government Department of Agriculture and Water Resources as Assistant Director at Murray-Darling Basin Authority, Australia

Dr. Tahmina Rashid

is an Associate Professor of International Studies, Faculty of Arts & Design, University of Canberra Australia.

Patron

Prof. Dr. Asif Ali

VC: MNS- UAM

Organizers:

Prof. Dr. Irfan A. Baig

Prof. Dr. Alamgir A. Khan

years whereas persistent droughts in some other years. Pakistan is among top 10 most climate vulnerable countries on the planet. He modeled the previous data and explained that total avg. flow of our rivers is 144.4 MAF, while on kotri avg annual water flow is 28.55 MAF. He forecasted that in 2030, the water requirement would be 235 MAF, if we will be using the water with same water productivity, which is less than 40%. He moreover emphasized that our half of the water is lost in conveyance from dam to field.

Dr. Rana also predicted the solutions by which we can enhance water productivity and can be water secure countries. He also emphasized that water management from source to sink is a long-term approach, if we will try to cover it overnight it would not be solved. Rainwater Harvesting (Micro catchments, rooftops, polymers etc) has a total potential of 20 MAF potential in barani and irrigated areas. Artificial storage and recharge of groundwater from flood and other resources may save 5 to 10 MAF. Reuse and recycle potential of drainage and other waters after treatment is an ample option. Farm dams must be constructed to regulate the supply of water in accordance to meet the crop water requirement nor by applying the water on weekly turn basis. He also emphasized that there are too many departments working for same cause. Therefore, we need to re-arrange the departments and needs to manage their hierarchy. At the end of his talk, he given following key points to cope up the future water challenge.

- Spatial distribution of water supply and demand in Pakistan
- Refinement of Water Demands and Deficit
- Water for food, energy and job security based analysis
- Shifting of major crop patterns of Pakistan and their water requirements
- Replace some use of groundwater in cities
- Augmented water supply to crops with technologies
- Water efficient crop varieties
- Dams and artificial recharge of aquifers are urgently needed but increased water storage capacity of Pakistan cannot solve the water security problem alone.
- There must be a focus on improved governance, trans-boundary data availability and more extensive water loss analysis at the urban water supply system and irrigation districts levels for targeted improvement of water efficiency, availability and water equity.
- A sustained 10-year effort is needed for a water-secure Pakistan including
- Construction of critical water infrastructure (dams and artificial recharge of aquifers),
- Good governance according to 21st century water management standards, and Technology for water resilience and efficiency.
- The business as usual is no more an option for Pakistan!

2. DR. AFTAB AHMAD

Dr. Aftab explained the need and role of technology and modern practices in improving efficiency of irrigation system both on farm and off farm in the context of water, food and energy security of Pakistan. He discussed different innovative technologies and practices that can potentially be utilized in Pakistan for this purpose.

Pakistan is fast heading towards a situation of water shortage as per capita surface water availability has decreased to 1,200 cubic meters per person per year in 2010 (172 million) from 5,000 cubic meters in 1947 (when population was 34 million). Currently Pakistan (208 million) is a water scarce country with alarmingly reduced availability around 940 m³/capita/annum and is forecast to drop to 800 cubic meters by 2020. The minimum water requirement to being a "water short country" is 1,000 cubic meters. The country's water storage capacity is limited to a 30-day supply compared to 1000 days for Egypt, 900 days for US, 600 days for Australia and 220 days for India, while the global standard is 120 days. He also explained the challenges that agriculture system of Pakistan is facing now a days are as follows.

- Low agricultural productivity
- Increasing population pressure
- Dwindling land for agriculture
- Shrinking water resources
- Limiting/diminishing energy resources
 - ✓ Shortage of electricity
 - ✓ High cost of diesel
- High water losses in irrigation system
- Over exploitation of groundwater

Dr. Aftab also given the solutions; By ensuring that farming tools are environmentally sound, economically affordable, adaptable to local conditions, and resilient in terms of changing weather patterns and climate, Mechanization looks to achieving larger and better harvests and increased income or new jobs for farmers.

Drivers for innovation in agriculture

- Increasing yields
- Using greater efficiency with inputs (including water)
- Reducing pre and post-harvest losses
- Increasing the diversity of staple and cash crops grown
- Boosting the quality of production (including traceability and hygiene)

- Reducing transaction costs
- Being price competitive with imports
- Coping with scarcity of skilled labor
- Coping with increased climate variability

In his concluding remarks he elaborated that, Pakistan is an arid country as 92% area falls under semi-arid to hyper-arid regions. Thus, 74 million hectares out of 80 million hectares are under arid environment. The high intensity rainfall storms in humid to semi-arid environments generate streamflow, which is diverted through a system of channelization for runoff farming. There are around 2 million hectares under this farming system in the country. The development of tubewells and irrigated horticulture is now leading towards a stage of groundwater depletion, or 'water mining', is a major problem associated with the growth of human settlements in arid areas. The groundwater table in the Northern Basin of the Quetta valley is lowering by almost 2 m per annum, while a fall of 0.6 m is reported for its southern basin. The over-exploitation of groundwater through deep tubewells is affecting the Karaizes adversely and some of the Karaizes are now completely dried. This poses serious equity concerns among the poor farmers who cannot afford to install tube wells. Center-pivot sprinkler irrigation system is very much suitable for areas where water is at premium, if these systems are locally manufactured. The large farmers are interested in energy efficient systems. The high electricity prices have forced farmers to shift to diesel prime movers for pumping of water. The efficiency of Chinese single-cylinder diesel engines is low because of low combustion efficiency, low coolant temperature and higher engine speeds. The centrifugal pumps are also not energy efficient compared to direct displacement pumps. Therefore, renewable energy sources cannot be used because of high initial cost until weights balancing direct displacement pumps are locally produced. Therefore, water and energy efficiency in tube well irrigation has become major issues in Pakistan. Local development of water and energy efficient pumping systems should be encouraged to improve profitability of tube well irrigated valley agriculture.

DR. TAHMINA RASHID

An interesting aspect of the Seminar was a focus on cross-disciplinarily and the use of effective technologies by specialists from other areas. DR. TAHMINA from University of Sydney delivered lecture on “development interventions and the challenges of conducting research with rural communities in Pakistan,” in Muhammad Nawaz Sharif University of Agriculture, Multan on December 21, 2018.

Dr. Tahmina Rashid focused on the development interventions and their effects on the rural communities. She that rural rural/ agricultural communities are the backbone our country as these supply food, employment to population and have rich cultural tradition. At the same time, these communities suffer from various challenges: unequal landholdings and gender related issues.

She said that while conducting research in the rural communities and doing some kind of development works concerned persons should keep in mind the dynamics of rural communities. She said that while collecting information about rural communities, it is indispensable to select the location very carefully keeping in consideration the fabric of the society, their language, traditions and social stratification to maintain the accuracy of the data.

She mentioned that while making developmental interventions in rural areas it is pertinent to foresee the effects of these interventions on local cultural practices in vertical and horizontal ways. If not so, such development practices may benefit the few people but could harm the culture in other way.

Dr. Tahmina Rashid stressed on the point that while collecting information one should be honest to the participants on the objectives of the research. She said it is also very important that research should not harm the local communities in any way. It is absolutely important to bring accuracy to the data collected.

DISCUSSION SESSION :

Dr. Alamgir started the session with the briefing on ground water. In his presentation, he sensitized the participants to hold a conversation about water quality. After a dialogue, following recommendations have been finalized.

EMERGENCY FOR SUSTAINABLE WATER USE.

Water is life. Growing pressure on water resources from population and economic growth, climate change, pollution, and other challenges has major impacts on our social, economic, and environmental wellbeing. Many of our most important aquifers are being over pumped, causing widespread declines in groundwater levels. Therefore an emergency of sustainable water use must be implemented.

RESEARCH & EDUCATION ARE NOT INTERLINKED

Scheduling irrigation is very critical for obtaining optimal crop yields. For optimum irrigation scheduling, sound knowledge of the soil water status, crop water requirements, crop water stress status, and potential yield reduction under water-stressed conditions is prerequisite to maximize profits and optimize the use of water and energy. Therefore, the academia and research should work on demand & supply water, rather than on fixed scheduling.

RECHARGING OF AQUIFERS

Overbank flood recharge is increasingly acknowledged as important for estimations of aquifer sustainable yield. Therefore, Govt. should bear the cost of flooded losses and it may be allowed to recharge the water aquifers of the area. The expert also stressed the need of using internationally proven systems like lining of canals, by geo membrane, drip irrigation systems, tunnel farming, mulching, rain and grey water harvesting etc. to conserve water resources of the country.

WATER ZONATION, CROP ZONATION

Water Zonation is required according to aquifers status downstream. The purpose of zoning, as carried out for rural land-use planning, is to separate areas with similar sets of potentials and constraints for development. Specific zonation needs to be formulated to provide the most effective support to each zone.

