

Proceedings of the International Water Conference
November 17th and 18th, 2015 | Karachi, Pakistan

Securing Sustainable Water For All 2015



Hisaar Foundation
a foundation for water, food and livelihood security

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Organizing Committees

Credits

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Proceedings of November 17-18, 2015, International
Water Conference | Karachi, Pakistan

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Foreword

The second international water conference, “Securing Sustainable Water for All: Inclusion, Integration and Innovation” organized by Hisaar Foundation was successfully held on November 17th and 18th, 2015. This conference was noteworthy for many reasons, however from my perspective, three important milestones it achieved stand out, which I will share with you.



The first important milestone was that the conference demonstrated that a citizen's driven body like Hisaar Foundation can serve as a neutral platform for all the key stakeholders to come together to freely express and exchange ideas and information on a public policy matter like water. This conference featured eminent speakers from the government, academia, private sector, media, non-governmental organizations -- all under one roof to offer solutions on issues related to the water sector. In Pakistan, unfortunately, it is quite rare to find such diverse stakeholders coming together on a single platform. That Hisaar Foundation was able to win the trust and confidence of all players is indeed an achievement worth noting and we hope to use this neutral platform for building consensus and agreement on many thorny issues facing us in this sector.

Secondly, we are pleased that the conference also offered continuity of ideas and actions from its previous conference held in 2013. The establishment of Hisaar Foundation's Think Tank on the Rational Use of Water and the Universities for Water Network were cited in the Karachi Declaration on Water Initiatives 2013. At this year's conference we were not only delighted that we kept the commitments made in the previous conference but featured many of the speakers and presenters who comprise our Think Tank and the Universities for Water Network. Not only were members from these groups prominently featured, but also many of the works done under these initiatives were shared at this conference. From any perspective, identification of ideas and putting some of these into action in just a short span of two years is indeed a source of pride for all of us.

The third important milestone was the element of diversity and how coherently it was at display during the two days of conference. It is encouraging and uplifting to see differences in opinion and views being discussed, debated and deliberated about without rancor and intolerance. The conference was rich in diversity of views from the academicians to researchers to practitioners to government to international agencies, to urban/rural perspectives to the innovations in water now made possible by use of the latest technology. All of this was at display and presented in the spirit of finding solutions to our problems through our own talent and resources.

Hisaar Foundation and its board, staff and supporters deserve compliments for holding another event of international stature. All this would not have been possible without the support and encouragement we received from the various sponsors and partners in this endeavor. We all look forward to the next conference scheduled for early 2018.

Zohair Ashir
Chair
Hisaar Foundation



Introduction

Much has happened between the first international conference held on 4th and 5th, December 2013 and the second conference held on 17th and 18th, November 2015. In the intervening two years, Hisaar Foundation has delivered on all its promises made at the first conference: establishing of a Think Tank for the Rational Use of Water, initiation of the Universities for Water Network and the Karachi Declaration on Water Initiatives.



This second international water conference builds on the discussions and is a follow up of the first conference in a number of ways: these bi annual conferences will continue to be held in Karachi, a city recovering from decades of neglect, political instability, terrorism and low levels of commitment by government to improve social services and development. Yet, the city has proved again and again that it is a mini-Pakistan and that is has heart of gold. This conference has reflected this reality as can be seen by the number and range of sponsors and participants.

As Chair of the Academic Committee, I have been able to interact with many young researchers, writers and budding water specialists across Pakistan and in the Pakistani diaspora, as well as professionals and academics from across the globe. I can say with confidence that this conference has brought these young people together with each other and with seasoned professionals and academics to build connections and partnerships to benefit Pakistan's water sector and build the intellectual and technical workforce to manage Pakistan's water systems through this century.

In this conference, we have worked very hard to mainstream women and young people, not just in dedicated sessions, but in every session. In particular, we are proud to have brought together many young women researchers and students from Pakistani universities.

The conference was very rich in papers and presentations and included 58 papers in 20 sessions. All these can be found in the CD enclosed with this report. We have a range of substantive inputs that will support the work of both the Think Tank and the Universities for Water Network etc. and take forward Hisaar Foundation's agenda of building the Hisaar Institute for Interdisciplinary Studies on Water.

Simi Kamal
Chair
Academic Committee



Acknowledgements

First and foremost we would like to thank all our partners and sponsors, in particular Engro Foundation, UNDP, Bank Al Falah and United Bank Limited (UBL) for their support and cooperation throughout this Conference. Without their assistance this Conference would not have been successful. Their logos appear in this publication and they are individually named in different sessions. We would particularly like to thank UI Haque, Manager CSR Engro Foundation, Mr. Marc Andre Franche, Country Director UNDP, Mr. Atif Bajwa, President Bank Al Falah and Mr. Ali Habib, Head of Corporate Affairs and Marketing United Bank Limited (UBL) for their support and interest.



Special thanks also to the following persons who worked very closely with us:

- ◆ Ms. Seema Taher Khan, Airwaves Media (Pvt) Ltd, who provided support in Media Campaign on Water. She also provided facilitation to the session on Role of Media in Integrating Diverse Stakeholders on Water; voluntarily developed and launched the Media Campaign on Water and; promoted Hisaar Foundation through TV One, News One television shows before, after and during the Conference days
- ◆ Mr. Pervaiz Iqbal, and the BBCL team for excellent event management. He and his team created the very relevant ambiance and support system in organizing the Conference smoothly

We would like to thank Mr. Zohair Ashir, Chairperson and Ms. Simi Kamal, Chair, Academic Committee of Hisaar Foundation for giving their precious time, commitment and invaluable strategic guidance which was integral to the conference. We also appreciate Mr. Khalid Mohtadullah, Dr. Pervaiz Amir, Dr. Daanish Mustafa, Dr. Noman Ahmed and Dr. Jamil Kazmi for their valuable inputs during the Conference, and finally, Mr. Hassaan Khan, Ms. Kausar Hashmi and Ms. Sanaa Baxamoosa for compiling the Report.

We acknowledge the cooperation of all the members of the three Conference Committees (Steering, Academic and Management Committees) who provided extensive support. We would also like to extend our acknowledgement to all the organizations who participated in the exhibition and participants who registered and paid to attend.

At Hisaar Foundation, we would like to extend our deepest gratitude to all the hard working and efficient staff members Mr. Aatir Jilani, Mr. Ahmed Palwa, Ms. Dhiya Sudhanandhan, Ms. Kausar Hashmi, Mr. Nadeem Siddiqui, Ms. Rudaina Siddiqui, Ms. Saleha Atif, Ms. Sanaa Baxamoosa, Ms. Suroor Ansari, reporters/note takers, social media team and volunteers for their contribution in the Conference. And last but not least, I want to extend our deepest appreciation to Mr. Danish Khan and Mr. Faraz Ansari for media coordination and Mr. Maazin Kamal for photography.

Dr. Sono Khangharani
CEO
Hisaar Foundation



Conference Declaration



Dr. Daanish Mustafa reading the Conference Declaration

Securing Sustainable Water for All: Inclusion, Integration and Innovation Conference Declaration – November 18, 2015

The theme of this year's conference, 'Securing Sustainable Water for All: Inclusion, Integration and Innovation' was very timely in the background of the emerging water crisis in Pakistan. The theme reflects the re-centering of equity, access and climate adaptation as we develop strategies to mitigate the effects of a dwindling and alarming per capita water availability in Pakistan. Without a very thoughtful and aggressive Water Policy for the country, Pakistan will not be able to maintain water and food security and also alleviate poverty. Therefore, this conference calls upon the government to develop and implement a national water policy and declare the next decade (2016-2025) as the decade of water development and water sharing for all.

We maintain that water is the most valuable resource of the country that has to be shared by all regions, urban and rural areas, irrigated and non-irrigated areas, landed and landless people, men and women. Recent annual flooding has clearly presented a choice to the people of Pakistan: using water resources for development and growth versus mismanaging it and perpetuating poverty and destruction.

We maintain the pro-poor development in Pakistan will have to start with water development and strengthening the water economy. Working towards the objective of equitable and sustainable water development, we have to devise mechanisms to rationalize and depolarize the national, inter-provincial and local level debates on water resources. The debates must recognize the interests and voices of all,

especially the weakest segments of the society and not just the most numerous or the loudest.

We hold that the poorest and the most vulnerable have the greatest dependence on water-based ecosystem services. Addressing the needs of the poorest and the most vulnerable will have to be through protection and preservation of the ecological integrity of water sources.

The demographics of Pakistan with a huge youth bulge require creation of millions of new jobs every year for the next decade or so. This necessitates the rejuvenation of the water economy of Pakistan by harnessing the water resources and bringing 20 million acres of new lands under cultivation in eastern Sindh, southern KP, southern Punjab and Eastern Balochistan. This would require extending the irrigation networks, creating new storages, maintaining existing infrastructures and introducing new water technology for enhancing water use efficiency and new farming practices for increasing water effectiveness for enhanced productivity and smarter agriculture practices. The capacity of government institutions and other organizations dealing with the water economy has to be re-created to meet new challenges, derive and share benefits from land and water resources in Pakistan. This requires the country's academia and training institutions to rise to the challenges. Platform(s) for water conflict resolution across geographical scales is the need of the hour. Such platform(s) will of necessity have to prevail upon the haves to relinquish their predatory appropriation of water resources and blatant violation of laws. Hisaar Foundation offers such a neutral platform with representation from all major stakeholders from the government, civil society, academia, international organizations, businesses, industry and individuals from all walks of life to discuss and work towards benefit sharing and better governance as was evidenced at the recent conference.

We have to narrow the gap between research and policy. We have witnessed innovative water conservation and advances in technological research reported in this conference. Through Hisaar Foundation's Think Tank for Rational Use of Water and Universities for Water Network, as well as deeper partnerships with business, the induction of those technologies in water management in the country can and should be speeded up. On the social side however, there is a dire need for quality research in Pakistani universities. The Universities for Water Network, as well as the potential of the Hisaar Institute for Inter-disciplinary Studies on Water should be made a prime



conduit for generating sources to fund and conduct innovative scientific, engineering and especially social scientific research on water.

Women and youth were identified as special groups of focus in this conference. We remain surprised at the exclusion of women in nearly all spheres of water policy, from grassroots to trans-boundary; and we reaffirm the need to recognize the important role and special responsibilities that women bear with regard to water. We further resolve that women's strengths should be leveraged to meet water needs of all levels.

The youth is disappointingly focused on safe career paths. We believe all ages, especially the youth, need to be educated and made aware, that their deep and profound connection to water transcends educational qualifications. We recognize there is an urgent need of younger water professionals in the sector, not just in water engineering, but also from a social scientific and humanities perspectives.

We recognize the media as a stakeholder and pledge to work closely with print and electronic media on strategy, specific campaigns and call for action.

Water is life and life is political and cultural and these aspects of water cannot be wished away. The political valence of water must be recognized and engaged with so as to bring about paradigm shift in our thinking, practices and management of water institutions.

The conference was attended by over 400 delegates and all the key stakeholders were well represented, including leading figures from the civil society, government, academia, international development organizations, private sector and the media. Among those who addressed the conference included prominent notables like Dr. Ishrat Hussain, Shoaib

Sultan Khan, Zafar Mehmood, Marc Andre Franche, Dr. Conor Linstead, Tasneem Siddiqui, Sardar Tariq, Dr. Zaigham Habib, Maira Hayat, Mahtab Rashdi, Dr. Pervaiz Amir, Dr. Noman Ahmed, Dr. Sono Khangharani, Syed Mahmood Nawaz Shah and Atif Bajwa. Members of the Hisaar Foundation Think Tank also led many of the sessions and were instrumental in the crafting of the Conference Declaration.

After the conference, Hisaar Foundation's Think Tank on Rational Use of Water met at a special session to review the Conference Declaration and fully endorsed the declaration and its intent.

Mirza Qamar Beg	Chair, of the Think Tank
Khalid Mohtadullah	Member
Dr. Salman Shah	Member
Simi Kamal	Convener
Dr. Sarosh Lodi	Member
Dr. Daanish Mustafa	Member
Seema Taher Khan	Member
Aliuddin Ansari	Member
Zohair Ashir	Member



Mr. Zafar Mahmood, Ms. Farzana Saleem,
Dr. Salman Shah and other Participants



Participants of Closing Plenary Session



1. Conference Background

Improving access to water and the quality of water is becoming more urgent as the world faces increasing water scarcity. Better water resource management and water conservation can ensure that there will be enough water to meet competing demands. Distribution of water among energy, industry, agriculture, cities and households should be managed fairly and efficiently. To accomplish this, we need to invest in innovation and integrate good management practices with responsible regulation and proper pricing. This conference aimed at reaching out to all the stakeholders to develop investment in innovation, encourage integration and promote inclusion of all stakeholders in an effort to secure sustainable water for all.

Following its international conference held in December 2013, "Water Cooperation in Action – From the Global to the Grassroots" and the issue of the Karachi Declaration on Water Initiatives 2013, Hisaar Foundation has embarked upon two new initiatives: Think Tank on the Rational Use of Water and the Universities for Water Network. The main purpose of the Think Tank is to provide national leadership in Pakistan on the crucial issue of promoting the rational use of water, its improved management and providing policy directions. The vision of the Universities for Water network is to develop the knowledge and skill base for water sectors, as well as water related disciplines, degrees, departments that will be required by Pakistan in the next 100 years. The main purpose and overarching objective of the network is to set up an international level Hisaar Institute for Interdisciplinary Studies on Water which provides interdisciplinary research, education and training in the water sectors.

1.1 Scope and Aims of the Conference

The scope of the conference reflected the theme of the UN Water dedicated global goal for 2015: "*Securing Sustainable Water for All*." This theme recognized that a coordinated effort to promote human well-being, economic prosperity and the preservation of environmental capital is essential to fostering sustainable patterns of water use, management and conservation.

Promoting *sustainable water for all* implied the protection of water resources from over exploitation and pollution while meeting the needs of water for life, agriculture, energy, environment, industries and other uses. It further implied protection of communities from water-related disasters and recognizing the basic human right to safe drinking water and adequate sanitation. By sharing research findings, technical solutions, innovations, inclusive models, examples of integration and experiences at different levels, policy level dialogue on sustainable water were initiated for ensuring conservation, sustainability and integrated management of water resources in Pakistan, South Asia and globally.

The aims of this conference were to:

- 💧 Identify avenues of integration, innovation and inclusion in order to ensure water security and sustainable water for all
- 💧 Identify strategies for promoting and implementing and inclusive sustainable water policy
- 💧 Reach out to all critical stakeholders including government, academia, civil society, media, business and corporate sector, urban and rural communities, and experts on water to develop integration
- 💧 Showcase models and experiences from across the world that display innovation and integration



Session Audience



1.2 About Hisaar Foundation

Hisaar Foundation - a Foundation for Water, Food and Livelihood Security is a not for profit organization established in 2003. The Foundation provides a platform for identifying solutions relevant to the water-food-livelihood nexus and implementing them through local, national, regional and international partnerships and cooperation. It promotes Integrated Water Resources Management (IWRM) and water conservation in different contexts.

Over the past 12 years Hisaar Foundation has worked extensively on building the cooperation paradigm in Pakistan through its Water Partnerships and Women and Water Network (WWN). To date it has formed 11 urban and rural Water Partnerships at different levels, and 12 WWNs across Pakistan. It has developed and delivered 18 emergency support campaigns responding to droughts, floods, earthquakes and other disasters. It has spearheaded numerous regional initiatives and engaged extensively with government at federal, provincial and local government levels, with media

and corporate sector. It has developed cooperation with 25 implementing partner organizations and 34 sponsoring partner organizations. These include several Rural Support Programs, universities, Pakistani and international banks and companies, the Federation of Pakistan Chambers of Commerce and Industry (FPCCI), NGOs and CBOs.

Hisaar Foundation also has extensive links with international organizations including Global Water Partnership (GWP), Stockholm, Center for Affordable Water and Sanitation Technologies (CAWST), Canada, International Network for Capacity Building in Integrated Water Resources Management (CapNet), Pretoria, South Africa, South Asian Consortium for Interdisciplinary Water Resources Studies (SaciWATERs), and George Washington University, Washington DC.



Hisaar Foundation Team



2. Conference Coverage and Participation

The Conference was attended both by academia and professionals, as well as people from a range of sectors on the premise of securing sustainable water for all.

2.1 Conference Sessions

The two-day conference had 20 sessions. These sessions included an Opening Plenary, a Signature Plenary and a Book launch and Young writer's awards on Day 1; and a Closing Plenary on Day 2. Additionally, there were 16 parallel sessions as under (see conference schedule as Appendix A):

Day 1 (November 17, 2015)

Session 1	Opening Plenary: Sustainable Water in a World with Decreasing Water Security
Session 2	Signature Plenary: Pakistan's Water Economy
Session 3A	Managing Indus Basin: Within Pakistan and Across Boundary
Session 3B	Water for Food: Smart Agriculture Practices
Session 3C	Water Stewardship: Business Sector Leading the Change
Session 3D	Water for people: Overcoming Drinking Water and Sanitation Challenges
Session 4A	Sharing Thoughts on Pakistan Water Policy
Session 4B	Role of Academia: Time to Deliver and Demonstrate Ownership
Session 4C	Woman Champions: Role Models in Water Sector
Session 4D	Rural and Urban Models of Innovation
	Exhibition, Book Launch and Young Writers Awards

Day 2 (November 18, 2015)

Session 5A	Government: Friend, Foe or Fellow Traveler?
Session 5B	Nexus of Water, Climate Change, Food & Energy
Session 5C	Young Men and Women: Harnessing the Demographic Dividend for Water Security
Session 5D	Water for Life: Keep our Rivers Flowing
Session 6A	Role of Media in Integrating Diverse Stakeholders on Water
Session 6B	Managing Groundwater, Floods and Droughts
Session 6C	Role of Stakeholders; Innovation and Affordable Solutions
Session 6D	Water for Cities: Making the Metropolis More Manageable
Session 7	Closing Plenary: Declaration and Decisions for the Future



2.2 Conference Exhibition

In addition there was an exhibition in which the following organizations participated:

- ◆ Engro Corporation
- ◆ Hisaar Foundation
- ◆ TV-One
- ◆ Sukaar Foundation
- ◆ SAFWCO
- ◆ MagTech Pakistan (Pvt.) Ltd.
- ◆ Health and Nutrition Development Society (HANDS)

2.3 Conference Sponsors

The sponsors of the Conference reflected a range of social development and corporate sector organizations. The principal sponsor was Engro Foundation. UNDP, Bank Al Falah and United Bank Limited (UBL) were other main sponsors of the Conference and very supportive partners. Others are shown as under:

Main Sponsors

- ◆ Engro Foundation
- ◆ United National Development Programme (UNDP)

International Sponsors

- ◆ WaterAid
- ◆ Oxfam Novib
- ◆ UN Women

Corporate and Private Sector Sponsors

- ◆ Bank Al Falah
- ◆ United Bank Limited (UBL)
- ◆ Grant Thornton (GT)
- ◆ Raasta Development Consultants (RDC)
- ◆ MagTech Pakistan (Pvt.) Ltd.
- ◆ Pakistan Petroleum Ltd (PPL)
- ◆ HUBCO Power Company

Social Development Sponsors

- ◆ Pakistan Poverty Alleviation Fund (PPAF)
- ◆ Action Aid Pakistan
- ◆ Panjwani Charitable Trust
- ◆ Sustainable Development Policy Institute (SDPI)
- ◆ Urban Unit

2.4 Conference Media Engagement

Advertisement in Newspaper

Engro Foundation sponsored a ¼ page ad three times in the Express Tribune, Dawn, and The News, three leading daily newspapers of Pakistan.

Air Waves Media

Under the banner of Air Waves Media, TV One provided support in filming and photography during the two days of the Conference. It also provided facilitation to Hisaar Foundation in airing the media campaign on water on TV one, News One and Waseb channels.

Media Engagement

Bridge PR was engaged to provide facilitation to Hisaar Foundation to ensure press coverage prior to and during the two days of the conference. Bridge PR was responsible for the pre-conference press release and press release on day 1 and day 2 of the International Water Conference. Bridge PR was also responsible for getting interviews of Hisaar Foundation Chairperson and Founding Chairperson printed in the Express Tribune and Business Recorder newspapers.

Media Coverage

The Conference was extensively covered by electronic and print media teams and the event was reported in their respective news channels, newspapers and other programmes.



The following electronic and print media participated in and reported on the Conference:

Print Media

Royal News	Dunya The Nation	Daily Nai Baat	Independent News Pakistan
Dawn Newspaper	Daily Aman, Karachi	Sindh Tales Daily	Daily Sindh Express Newspaper
Daily Times Newspaper	Press Daily Motion	The Ailan	Daily Kawish, Sindhi Newspaper
Express Tribune	Pakistan Observer	Daily Nawai Sindh	Daily Awami Awaaz, Sindhi Newspaper
Business Recorder	Jasarat	Jeevay Pakistan	Daily Jeejal, Sindhi Newspaper
The News	Basharat	Jehan Pakistan	
Nai Baat	Karachi News	Daily News Zone	
Business Recorder	Nawai Waqt	Daily Pakistan	
Aman	Daily Awam	Daily Shakti	
Jang	Daily Balochistan	Farozaan Magazine	

Electronic Media

TV One	Pakistan Television (PTV)	Geo News	Capital TV
News One	KTN	Health TV	CNBC Pakistan
Metro One News	Dawn News	Hum TV	Samaa TV
K-21	Business Plus	Abb Tak	Mehran TV

Radio

Radio Pakistan	FM 105	FM 93
FM 107	FM 103	



Social Media

The second International Water Conference once again provided Hisaar Foundation a prime opportunity to strengthen its image and create awareness amongst the target audiences. In order to streamline our efforts and to create a strong online presence, the initial targeted social media outlets were Facebook, Twitter, Vimeo and websites.

Facebook

Hisaar Foundation's Facebook page was revitalized to attract more fans and create awareness about the Conference. Two advertisement campaigns, targeted to a specific audience were launched to increase page likes and expand Hisaar Foundation's fan base. The ad campaigns did remarkably well and generated more than 11,000 likes over 10 days! The Facebook page was also used to share news and reports about water related issues in Pakistan and the world. Photographs, water-saving tips, water facts, updates on Hisaar Foundation activities and speaker profiles were also posted on a regular basis.

Facebook: facebook.com/hisaarfoundation

Twitter

Twitter was also used as a primary vehicle on social media to promote the second International Water Conference. One of the main campaigns on twitter was the daily countdown to the Conference. Secondly, twitter was used to create a buzz around the themes of "inclusion, integration and innovation." We also regularly posted all news reports on water issues in Pakistan. Water saving tips, water facts, and Hisaar Foundation project and programme activities were also tweeted about prior to the Conference. During the Conference, twitter was used to give live feeds about the Conference. We had volunteers in each room tweeting about the sessions in real time. We had several hundred tweets over the 2 day duration of the Conference and twitter followers increased to over a 100.

Twitter: @HisaarF

Vimeo

Hisaar Foundation is using Vimeo to create an online library of all videos available. The Bubbles jingle, all public service announcements, and media reports about the Conference can all be viewed on Vimeo.

Vimeo: <https://vimeo.com/user23038552>

Websites

This website contained all Conference related information and was also the primary medium to submit registrations. The website was also used to elicit papers and speakers for the Conference. The conference website will also be used for sharing resources and all papers, presentations and photographs will be archived here.

Website: www.hisaar.org

Hisaar Foundation has extensively begun using social media channels, each of which serves a specific purpose in the larger social media strategy set forth for the coming years. Vimeo will also house the collection of videos of the media campaign on water developed by Air Waves Media.

2.5 Conference Participation

The Conference brought together 466 participants. This event was attended by participants from the corporate sector, international development organizations, embassies, government, non-governmental organizations, universities, faculty members, students, volunteers, representatives of print and electronic media, Hisaar Foundation's Governors, Council Members, members of the Think Tank (TT) and Universities for Water Network (UWN), staff members and women from WWNs to discuss issues and propose solutions for promoting securing sustainable water for all.



L to R: Dr. Zaigham Habib, Dr. Salman Shah, Mr. Sardar Tariq & Mr. Khalid Mohtadullah



Conference Sponsors

We wish to thank our sponsors whose support and encouragement made it possible for us to hold this International Water Conference.

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Sustainable Development Policy Institute



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3. Conference Proceedings

This section summarizes the Conference proceedings. A list of all presentations and distribution material is attached as Appendix B at the end of the report and detailed proceedings are given in the CD inserted in the pocket at the end of the Report.

3.1 Sustainable Water in a World with Decreasing Water Security (Session 1- Opening Plenary)

Facilitator: Ms. Simi Kamal, Founder, Hisaar Foundation

Master of Ceremony: Ms. Sanaa Baxamoosa

Speakers: Mr. Zohair Ashir, Chairperson, Hisaar Foundation
Ms. Simi Kamal, Founder, Hisaar Foundation
Mr. Khalid Mohtadullah, Senior Adviser GWP & Member, Hisaar Foundation Think Tank
Mr. Marc Andre Franche, Country Director, UNDP

The opening plenary session focused on welcoming the delegates, introducing the operating model of Hisaar Foundation, providing an overview of the conference events, explaining the theme of the conference, emphasizing the critical role of water and identifying opportunities for government and private sector partnerships. This session was sponsored by Hisaar Foundation.

Chairperson's Opening Remarks

Mr. Ashir provided a brief overview of Hisaar Foundation's history since its inception, and how it is a shining example of the power of human goodness where concerned citizens with diverse backgrounds, volunteer their time and efforts for achieving a common purpose. Hisaar Foundation is a volunteer driven organization, which is supported primarily by donations from individuals and businesses. The engagement model of Hisaar Foundation is based on bringing together the government, civil society, business and industry and academia. The Hisaar Foundation



Mr Zohair Ashir,
Chair Hisaar Foundation

Think Tank on Rational Use of Water is an example of this coordination of various stakeholders where water experts are joined by leading figures from the government, media, business sector and academia.

Speaking about the Universities for Water Network (UWN), Mr. Ashir remarked that this initiative is designed to effectively incorporate academia into the discussion on water resources and tap into the vast technical and intellectual expertise. Universities from all across Pakistan are already part of this growing network. He informed the audience that Hisaar Foundation was presently working towards establishing the Hisaar Institute for Interdisciplinary Studies on Water.

A selection of some of the success stories of Hisaar Foundation was then presented. Pioneered by Hisaar Foundation, the Karachi Water Partnership (KWP) is a shining example of developing citizen level institutions for creating positive change. Mr. Ashir also spoke about other projects which focus on developing direct solutions to tangible issues faced by communities, such as the Jurio project in Thar where rainwater harvesting structures were built to improve freshwater availability. He mentioned the Hisaar Foundation school program, where schoolchildren were educated regarding the importance of water conservation. Mr. Ashir then concluded his presentation by thanking the supporters



of Hisaar Foundation and the conference. He was especially grateful for the media support in helping Hisaar Foundation raise awareness regarding Pakistan's most pressing water problems.

Why this Water Conference - Overview of Conference

Ms. Simi Kamal, Founder of Hisaar Foundation, then addressed the conference participants. Ms. Kamal mentioned that for Hisaar Foundation, one of the objectives of this second international conference on water is to scale-up the ambitions and scope of work of Hisaar Foundation. She added that Hisaar Foundation has been working diligently and making steady progress over the past decade, but felt that the time has arrived where the organization can "take-off". Ms. Kamal then provided an overview of the conference schedule and the various presentations,



Ms. Simi Kamal, Founder Hisaar Foundation

discussions and plenary sessions that would be taking place over the next two days.

Defining Inclusion, Integration and Innovation - Keynote Address

Mr. Khalid Mohtadullah, member of the Hisaar Foundation Think Tank, was the next speaker. His presentation focused on the conference theme of inclusion, integration and innovation. Mr. Mohtadullah began by discussing the current state of the national economy which showed that Pakistan lagged far behind in several measures of development. He added that if managed effectively, the water resources of Pakistan can spur growth and development across the country. Mr. Mohtadullah identified the lack of a national water policy as an example of the misgovernance of water in Pakistan. Although there are several institutions managing water, there is a lack of coordination and a 'custodian' institution of water resources is missing. He warned that impending challenges of population growth and climate change will further add to the water insecurity of Pakistan.

Mr. Mohtadullah then presented an overview of the hydrology of the Indus Basin where most of the flow is generated by snowmelt. Citing recent findings of climate change impact assessments, he added that the magnitude and timings of the flow in the Indus River would be significantly affected in the future due to higher temperatures. An enhanced understanding of the glacier dynamics and climate change through simulations and modeling studies is required. The presentation then shifted towards groundwater, and an introduction to the Indus Aquifer. He added that Pakistan, a mostly arid country, is fortunate to have such a large reserve of usable groundwater. However, this resource requires careful management to prevent waterlogging, salinization and contamination from surface runoff.

A case for more water storage in the Indus Basin was then made by Mr. Mohtadullah, informing the audience that approximately 80% of the flow in the Indus occurs in the three summer months. Discussing the Indus Water Treaty (IWT), he added that Pakistan lacked sufficient data and technical expertise to scientifically assess impact of the growing number of hydroelectric projects proposed by India on western rivers. He also reminded the audience that the treaty had no built-in provisions for adjustments in light of climate change and environmental degradation.

The presentation concluded with some suggestions on steps that Pakistan could take to extract the most benefits from its water resources. Mr. Mohtadullah called for an increased participation from the private sector in the water sector to support both large and small scale infrastructure projects. He emphasized the importance of building trust between provinces within Pakistan under a benefit sharing approach to improve institutional strength. He added that huge gains can be made by improving water efficiency in irrigated agriculture, and that improved efficiency can only be achieved with a better integration of water and agriculture institutions.



Mr. Khalid Mohtadullah, Senior Adviser GWP & Member of Hisaar Foundation Think Tank



UN Approaches to Global Water



Mr. Marc-Andre Franche, Country Director, UNDP

Mr. Marc Andre Franche, head of UNDP Pakistan was the concluding speaker of the opening session. He spoke about the upcoming COP21 conference in Paris, and emphasized the critical role of water security in climate discussions. He then spoke at length about the huge advances in water availability and sanitation made globally over the past few years, but also warned that with 748 million lacking access to improved drinking water and 2.5 billion without access to improved sanitation, there is still a lot to be done.

Mr. Franche then discussed the recent water projects that UNDP has been involved in recently. He spoke about a drought assessment that was carried out for Balochistan based on a request by the Balochistan Provincial Disaster Management Authority (PDMA). The drought assessment found that 8 districts in the province were under a water emergency. He concluded by reminding the audience that international NGO's can be only nudged in the right direction, and appealed to the "elite" in Pakistan to step up and do their part in solving Pakistan's water problems.



Ms. Sanaa Baxamoosa, Master of Ceremonies



Participants of Opening Plenary



3.2 Pakistan's Water Economy (Session 2- Signature Plenary)

Chair: Dr. Ishrat Hussain, Dean and Director of Institute of Business Administration

Facilitator: Mr. Zohair Ashir, Chairperson, Hisaar Foundation

Presenter: Dr. Salman Shah, Former Finance Minister

Panelists: Mr. Mahmood Nawaz Shah, Sind Abadgaar Board
Dr. Daanish Mustafa, Assistant Professor, Kings College, London
Ms. Simi Kamal, Founder, Hisaar Foundation

This session focused on highlighting the critical role of water in Pakistan's economy. The panelists offered their thoughts on the various water challenges facing Pakistan and discussed possible solutions to those challenges. This session was jointly sponsored by United Nations Development Programme (UNDP) and Engro Foundation.

Presentation on Rejuvenating Pakistan's Water Economy: Policies, Institutions and Infrastructure



Dr. Salman Shah, Former Finance Minister & Member Hisaar Foundation Think Tank

Dr. Salman Shah started the session with a presentation in which he shared his thoughts on the policies, institutions and infrastructure needed to stabilize Pakistan's water economy. Dr. Shah discussed how his interest in Pakistan's water sector first started while he was in the Ministry of Finance (MoF) where he was working on poverty alleviation and economic growth issues. Dr. Shah realized the importance of converting the water resources of Pakistan into a competitive edge for the national economy for growth, employment generation and rural poverty alleviation. During his time in the MoF, the 2005 World Bank report *Pakistan's Water Economy* provided him with insight into the various water issues facing Pakistan and the investments needed to harness the water resources. One of the conclusions that he reached was that while individual large-scale projects existed

in Pakistan, a strategic approach to managing the water resources was lacking. Based on the recommendations in the World Bank report and consultations with experts, the federal cabinet approved a comprehensive development and reform program for the water sector in 2006-2007. Unfortunately, due to subsequent political turmoil, the plan went unimplemented.

Dr. Shah then presented a chronological overview of the development Indus Basin Irrigation System (IBIS), the largest contiguous irrigation system in the world. This system enables Pakistan, one of the world's most arid countries, to grow most of its own food and provided the platform for development of the modern economy of Pakistan. An overview of the Indus Water Treaty (IWT) was provided next, which was the culmination of negotiations lasting close to ten years. Following the Treaty, Pakistan embarked upon the massive "Indus Basin Replacement Works" project, involving construction of dams, barrages and link-canal. These projects continued up till the 1970's, connecting the western rivers to the eastern rivers. He informed the audience that significant work was done in the 1980's to control the waterlogging and salinity issues that had emerged due to the extensive canal system. Dr. Shah termed the period from 1990-2000 as the "decade of stalemate", as political discord prevented major investments into the IBIS. Since then, Pakistan has been able to modernize the IBIS and build major storage and hydropower facilities including Ghazi-Barotha and raising of Mangla Dam.

The presentation then shifted to the economic impact of the IBIS, which enables the agriculture sector to comprise 22% of national GDP, and employ approximately half of the total labor force. Dr. Shah emphasized the link between economic growth and investment in water resources infrastructure and institutions, and called for a recognition of water as a source of both destruction and growth for Pakistan's economy. He added that global trends in the water



sector were highly representative of Pakistan. These trends show that while investments have been made to enhance agricultural production and hydropower growth, human capacity and institutional strength to manage these resources effectively is severely lacking in Pakistan.

Dr. Shah then presented some of his insights gleaned from the 2005 World Bank report. Pakistan is a water stressed country, dependent on a single river system, and urgently requires additional water to be injected into the system. Rapidly depleting groundwater resources and deteriorating water quality require urgent policy reforms to stop them from having a debilitating impact on the economy. He identified poor governance and low water productivity among the major issues facing Pakistan's agricultural economy. According to some estimates, improving the efficiency of current agricultural practices and adding water storage could add up to \$30 billion to the agricultural output. Dr. Shah talked extensively about the projected benefits of Kalabagh Dam and lamented how the project had evolved into a deeply divisive political dispute.

Dr. Shah presented a night time image of Pakistan, noting that areas with availability of water showed up as brightly lit at night. Showing maps of economically deprived districts across Pakistan, he established a correlation between water availability and economic development. Dr. Shah talked extensively regarding the water politics in Sind, conflicts of interest with regards to water resources, and the economic gap between eastern and western Sind. He argued that rural Sindh would have the most to gain from additional water storage, provided they received their share of water. He added that creating awareness among the civil society and politicians in eastern Sind was imperative to building consensus on the Kalabagh Dam. Dr. Shah concluded his presentation by suggesting various methods of financing large infrastructure projects. He suggested using minimal surcharges on consumers and raising abiana rates to generate funds for construction of major dams.

Panel Discussion

Dr. Daanish Mustafa started the discussion by inviting the audience to think about the development future that they wanted for Pakistan? He asked whether "we were going to choose our future as the one shown to us by the United States and Europe, or do we want a future where we live in harmony with nature?"

Mr. Mahmood Nawaz Shah then passionately shared his thoughts. He claimed that people in Sind recognize water as the most important issue affecting their everyday life. This is something that even the political parties recognize, where water issues are often used to gain political support. Agreeing with Dr. Salman Shah's recommendation of improving agricultural practices, he said that Pakistan's agricultural GDP could be increased manifolds with yield improvements. He added that we can find within Pakistan examples of high productivity agriculture, without looking to adopt methods in other countries. However, Mr. Nawaz Shah questioned whether Pakistan had the capacity to handle surplus agricultural production if agricultural productivity was increased. We lack institutions which can effectively manage additional agricultural produce, and the surpluses often end up being wasted.



Ms. Simi Kamal, Dr. Salman Shah, Dr. Ishrat Hussain, Mr. Syed Mahmood Nawaz Shah & Dr. Daanish Mustafa

He lamented the regular flouting of existing water laws in Sindh by the politically influential, citing recent expansion of sugar mills. He questioned the wisdom behind cropping paddy rice in water scarce districts such as Sanghar and Khairpur. While laws exist to prevent paddy production, there is no implementation of these regulations.

Mr. Nawaz Shah voiced concerns regarding major dams in the upper Indus. He reminded the audience that everywhere around the world, lower riparian states worry about upstream dams. He added that significant work needs to be done in Pakistan to build confidence and trust between Punjab and Sind before any major storage could be added to the system. He also challenged the perception that there is surplus water flowing through Sind, and claimed that there were still disagreements between water experts regarding flows downstream of Kotri Barrage. These disagreements are borne out of a lack of transparency and data on flows in the lower Indus, even after implementation of telemetry systems in 2000. Mr. Nawaz Shah called for improvement in water systems analysis and simulation capability in Pakistan to scientifically resolve our water issues. He concluded



by highlighting water quality issues affecting the province, and appealed for controls on wastewater effluent entering the Indus upstream of Sind. Dr. Daanish Mustafa then spoke about the relative energy efficiencies of farmers in the US and Pakistan, the Pakistani farmers being considerably more efficient. He also clarified that flood irrigation is not an issue of water and that a big reason behind farmers practicing flood irrigation is to utilize the silt in the floodwater that leads to better crop yields. He agreed with Mr. Nawaz Shah's contention that there was a lack of transparency from Punjab regarding its water usage. He reiterated the importance of building trust between Sindh and Punjab.

Ms. Simi Kamal started by noting that in the World Bank report on Pakistan's water issues, most of the chapters emphasize improving the existing efficiency of the system. However, the conclusion instead proposes building more storage, contradicting the earlier text in the book. Ms. Kamal reiterated that she was not against adding storage capacity; her concerns are regarding the methods and infrastructure we deploy to add that capacity. She warned that we cannot think solely in terms of economic impact when deciding on the best development pathway for the Indus.

While thinking about investing in our water infrastructure, we need to be mindful of the impacts on the Indus delta. With regards to financing the large infrastructure projects in the water sector, she highlighted the importance of becoming more self-sufficient. Ms. Kamal urged that Pakistan should raise its own financing instead of being dependent on support from large development banks. She agreed with the points raised by Mr. Nawaz Shah earlier regarding deficiencies in our food trade policy and

emphasized the importance of improving both the water productivity of farmers and the management of the resulting food surpluses. Ms. Kamal concluded by attributing the lack of a national water policy to the trust deficit between provinces, and emphasized that it was the responsibility of Punjab to act like the 'big brother' and build trust.

Conclusions



Dr. Ishrat Hussain, Dean & Director of Institute of Business Administration

As Chair, Dr. Ishrat Hussain presented the concluding remarks and reminded the audience that projected increases in population and urbanization along with increased literacy will have an impact on water demands. Along with predicted decreases in the flows in the Indus due to climate change, there will be increased risk of

both inter-province and international conflicts. Excess crop production is not necessarily bad, as long as we have an institutional setup that prices the agricultural produce correctly. Dr. Hussain added that monopolies lead to inefficiencies. For us to improve our agricultural productivity, we need to allow competition, and introduce markets for water, land and produce. On the issue of need for storages, he ended by stating that policy reforms will have a greater impact than big storage projects. Finally he reiterated that the water resources need to be better utilized for the economic development of Pakistan.



Participants of Signature Plenary Session



3.3 Managing Indus Basin: Within Pakistan and Across Boundary (Session 3A- Papers and Consultation)

Chair: Mr. Khalid Mohtadullah, GWP and Hisaar Foundation

Facilitator: Ms. Simi Kamal, Hisaar Foundation

Presenters: Ms. Simi Kamal, Hisaar Foundation
Mr. Ahmad Rafay Alam, Advocate
Mr. Zulfiqar Halepoto, Environmental Researcher
Dr. Hamid Shah, University of Agriculture, Faisalabad

This session featured presentations addressing the international and interprovincial water sharing mechanisms for the Indus River. The speakers' identified challenges in formulation and implementation of regulations governing water usage in the Indus River. Different strategies promoting efficient usage of water resources, with examples from around the world, were discussed. This session was sponsored by United Bank Limited.

Papers and Presentations



Advocate Ahmad Rafay Alam

Mr. Ahmad Rafay Alam began the session by presenting his paper Legal Analysis of Issues, Challenges and Opportunities in Indo-Pak Transboundary Groundwater Cooperation. He emphasized the absence of water laws, water rights and legal water entitlements framework in Pakistan. In a country that is severely water stressed, a legal

framework is crucial, however every time a legal evaluation of water has been raised the answer has always been to refer to the Indus Water Treaty (IWT). Mr. Alam argue that the IWT addresses the control of Indus Rivers, which come under a surface water transboundary issue, but it does not take into account groundwater. Groundwater is equally important, as it also connects both the countries. According to a report by the Stimson Center, both India and Pakistan are over pumping their aquifers, creating another transboundary water issue that needs to be addressed. The report mentions that groundwater depletion is at record levels in both countries.

Mr. Alam's paper revolved around the legal aspects of this transboundary groundwater issue, addressing the laws that regulate groundwater in both countries. The thrust of the paper is how groundwater changes the discourse of how countries relate to each other; most importantly it applies this principle of equitable and reasonable utilization and participation, which is a move away from the traditional stance we take on the IWT. Mr. Alam concluded by calling for groundwater research that will help establish the current hydrogeologic conditions. Furthermore, it is about time that we look at the water issue with a regional approach. The water issue in South Asia is highly securitized, but we need to be able to break this securitization in order to allow other elements into this transboundary conversation.

The second speaker was Mr. Zulfiqar Halepoto, who spoke on Indus Basin Treaty: A Non-Conventional CBM between Pakistan and India for Trans-boundary Water Cooperation. He stated that several international rivers are shared by two or more riparian countries, where the lower riparian often suffers at the hands of the upper riparian. With the IWT, the main point of contention between India and Pakistan is that India wants to apply all permissive clauses as it has a natural advantage whereas Pakistan wishes to apply restrictive clauses as it has an inbuilt weakness of being lower riparian. Mr. Halepoto emphasized that Pakistan



Mr. Zulfiqar Halepoto

needs to ensure that it protects itself and constantly evaluate the Treaty. He advocated that Pakistan should use existing international protocols that can help build



its case with strong international lobbying. To find an innovative solution, Pakistan will have to come out of the traditional paradigm of the IWT and look at other international examples. He concluded by suggesting that Pakistan increase its lobbying in the international community to obtain our rightful share from upper riparian. This, he added, can only be achieved if we have our own house in order with a holistic water governance approach.

The next speaker was Dr. Hamid Shah, who presented his work on effective management of brackish irrigation water. The paper focused on identifying a water pricing mechanism that would enable effective valuation and utilization of irrigation water. Dr. Shah presented a conceptual modeling framework for utilizing brackish water for a network of farms around river water. Using scenario analysis, he showed different water allocation and pricing methods to mitigate the demand and supply gap for canal water. Discussing smart methods of water pricing, Dr. Shah added that inefficient upstream users could be persuaded to not use their share of water in return for compensation. Water pricing can be applied on canal level, river level, and transboundary level. He concluded by reminding the audience that water trading could improve water productivity and help control losses.

The last speaker was Ms. Simi Kamal, who presented her paper "Managing Indus Basin: What needs to be done?" In her work, she highlighted the Murray Darling

basin in Australia as an example of a transboundary basin in a water scarce region. Ms. Kamal pointed out that many factors have changed in the Indus Basin over time, including the per capita water availability, climate change and land usage. Waterlogging, salinity grow and large-scale surface water have increased. However, our farming practices have not kept up with the changing conditions. Flood irrigation continues to be practiced, and land ownership continues to act as a proxy for water rights.

She lamented that in Pakistan, the price of water does not represent its value, which leads to wastage. She also criticized the existing water sharing mechanisms across Pakistan, which are rooted in historic rights and have not adapted to the changing socioeconomic and climatic changes across the country. She cited examples from the Murray-Darling basin in Australia where strong institutions and legislation helped in transforming the water economy and increasing efficiency tremendously. She also commended their efforts in controlling groundwater abstraction to ensure sustainable usage. Ms. Kamal added that if we want local area programs to work, they need to be anchored into the provincial framework, which need to be anchored in the national policy.



Session participants



She further expressed that achieving such goals in Pakistan requires long term planning. In a federal state, it is necessary to achieve water coordination of all rivers, so the 1991 water sharing Accord needs to be expanded to incorporate other aspects. She reiterated that any inter-provincial water sharing agreement needs to be dynamic to adapt to changing systems. She concluded by emphasizing that the benefits derived from our water economy should be inclusive of all in Pakistan.

Questions and Answers

Mr. Alam was questioned about cooperation with India to which he replied there is no constituency of cooperation as everyone only refers to the IWT. He said there is much more to water in India and Pakistan than surface water which is what the IWT addresses, adding that groundwater opens a whole new dialogue. Another question was directed at Ms. Kamal about the need for using other countries as a model for inspiration. Ms. Kamal replied that it is always helpful to take inspiration from models around the world and structure them according to our conditions.

Conclusions

Mr. Khalid Mohtadullah concluded the session by reiterating that climate change has the potential to exacerbate Pakistan's water problems. Being a water economy, any stress will be reflected in our economic health. He recommended reducing wastages in the agricultural sector as a starting point, but warned that significant investment in terms of knowledge, time and money need to be made. He concluded by raising two questions for the participants: (i) how do we undertake a review of our treaty implementation, without undermining the sanctity of the treaty. (ii) how do you build economic and social incentives that can bring about rational use of water where we bring harmony between social economic considerations? He reminded participants that incentives, rather than laws, drive change.



Session Chair Mr. Khalid Mohtadullah with Ms. Simi Kamal



3.4 Water for Food: Smart Agriculture Practices (Session 3B – Papers and Consultation)

Chair: Mr. Shoaib Sultan Khan, Chairperson, National Rural Support Program

Facilitator: Dr. Pervaiz Amir, PWP and Hisaar Foundation

Presenters: Dr. Altaf Ali Siyal, Mehran University of Engineering and Technology (MUET)
Dr. Abubakr Muhammad, Lahore University of Management and Sciences (LUMS)
Ms. Maira Hayat, University of Chicago
Professor Ismail Kumber, University of Agriculture, Tando Jam
Mr. Favad Soomro, Engro Foundation

This session aimed to highlight innovative practices in agriculture, such as alternate irrigation techniques, use of technology and stronger water distribution institutions. The speakers presented examples of implementation of these practices from their research across rural areas in Pakistan. This session was sponsored by Engro Foundation.

Papers and Presentations

Dr. Altaf Ali Siyal presented his research focusing on spate irrigation in Sindh: Issues and Options. Dr. Siyal remarked that Pakistan is experiencing stagnant agricultural productivity due to the inability to bring arable land into the system. Arable land needs to be brought into cultivation to meet growing food needs and economic revival. He identified specific ways to bring arable land into cultivation, including rainfall conservation, efficient irrigation, spate irrigation and extraction of groundwater.

Further highlighting spate irrigation, he added that it had been practiced for centuries in districts of Sindh, KPK, Baluchistan and Punjab. Water flowing through natural canals called rods or *kohi* is used for 11 percent of total cultivated area where approximately 15 million people live. This promising technique can be used to supplement current agricultural practices. About 2.3 million hectares can be cultivated with this method. He also identified three potential regions for rainwater harvesting in Sindh including Tharparkar district (Kroonjhar), Arora Hills near Sukaar and the large stretch of area from Karachi to Larkana (Khairthar Mountain). Using geospatial analysis, he estimated that harvesting 60 mm of rainfall can help collect almost 1 MAF of usable water. He ended by noting that alternative farm irrigation methods (e.g. irrigation every alternative line) need to be further explored.

The next presenter was Dr. Abubakr Muhammad, from LUMS, who presented on Water Informatics, Decision

Support and Smart Infrastructures. Dr. Muhammad stated that working on water issues from an electrical engineering background allowed him to incorporate ICT into water use. His research considered technologies that can be scaled up for agricultural and farm purposes. The current infrastructure in Pakistan is very hydraulics focused, but electronics can be incorporated into this system. Given the extensive spatial scale of Pakistan's irrigation system, technology can enable efficient management of the water resources including measuring water quality and quantity, and automating gate systems.

Use of technology will also help improve transparency and prevent distrust and political conflict over water management. He said that research performed at the International Water Management Institute (IWMI) in Lahore over three years showed the utility of using technology to vastly improve canal flow data monitoring. Using in-house software allowed the project to keep costs low. However, he added that the use of technology in water resources still required relatively high initial investment. Dr. Muhammad concluded by stating that governments can install expensive data collecting mechanisms for decision-making while smaller communities cannot. If communities are to be empowered to manage their own water, then they need data collected from such electronic systems.

Next, Ms. Maira Hayat presented her work on theft of water and social dimension of water rights. In her work, theft is not just explored through the formal cases but also in terms of allegations and rumors through conversations with stakeholders in Kasur, Punjab. There is no absolute definition of theft, she said, and added that stakeholders understand theft differently based on their point of view.



Most accusations of theft are brought either through a lawsuit by a private person or by the government. However these lawsuits are often settled with meagre fines, which legitimizes theft to some degree. Expanding upon the underlying problem, Ms. Hayat added that *Nehri Patwaris* are bribed by large landowners to divert water to their lands. Manual data collection measures combined with low paid *patwaris* entails endemic corruption. To prevent incidences of water theft, the World Bank and the Punjab government developed a smartphone app to monitor field staff – “smart monitoring”. However she concluded by warning that quantitative data by itself is not enough to fix difficult policy problems. Any solution needs to incorporate input from the stakeholders, which is often lacking in most development projects.

Next, Professor Ismail Kumber presented his work on sustainable agriculture for achieving food security. He stated that Pakistan has a multitude of problems facing its agricultural sector including lack of water and climate change. Turning his attention to agriculture in Sindh, he added that Sindh has agriculturally productive zones and its economic growth depends on crops such as rice, sugarcane, cotton and wheat. Professor Kumber said that the problems of the agricultural sector in Sindh include environmental degradation, stagnation of crop yield, stress on land and water resources and natural disasters. To further worsen the situation, there is no land policy in Sindh and a non-availability of credit and insurance.

He then discussed a whole suite of different solutions for improving agricultural production through sustainable practices. Some of these practices include selecting pure seeds, integrated pest management,

using organic matter in crop production, and mixed intercropping. He concluded by noting that the use of fertilizer and pesticides is prevalent simply because it increases yield and if sustainable agricultural practices were made available to farmers, they would reduce their usage of the fertilizers and pesticides.

The last speaker of the session was Mr. Favad Soomro of Engro Foundation, who presented findings from work done with farmers to reduce water use in irrigation. He informed the audience that their research determined that an alternate wetting and drying practice on the farmer's field can reduce water usage by up to 25–50%. They used a smart device that helped measure water level so that the entire field does not have to be flooded. Further, their research found that the method of direct seeding was more productive than the traditional practice of transferring rice plants in nursery form.

Conclusions

The Session Chair, Mr. Shoaib Sultan Khan concluded by stating that whether it is food security or water conservation, unless we make research people-centric, those findings remain in universities or research institutes. Offering a solution, he added that Rural Support Programs (RSP) can be used to implement research findings. RSPs, covering about 39 million people, can provide three-tiered social mobilization from local support organization at the UC level working with village organizations and community organizations. He added that stakeholders involvement should be included at research and implementation levels.



L to R: Ms Maira Hayat, Dr. Pervaiz Amir, Mr. Shoaib Sultan Khan, Mr. Favad Soomro, Dr. Abubakr Mohammed, Prof. Ismail Kumber and Dr. Atif Ali Syal,



3.5 Water Stewardship: Business Sector Leading the Change (Session 3C – Papers and Consultation)

Chair: Mr. Aliuddin Ansari, Engro Corporation

Facilitator: Mr. Zohair Ashir, Hisaar Foundation

Presenters: Dr. Conor Linstead, WWF - U.K.
Mr. Ali Hasnain, WWF - Pakistan

Discussants: Ms. Farhana Mowji, Razaque Steels
Mr. Siddique Sheikh, FPCCI

This session included presentations on the role of the private sector in solving Pakistan's water challenges. Various initiatives where businesses affected change in the water sector were highlighted. The discussion also highlighted investment opportunities in the water sector for corporations. This session was sponsored by WWF-Pakistan.

Papers and Presentations



Presenter Dr. Conor Linstead, WWF

Dr. Conor Linstead began the session by presenting the WWF Water Stewardship Programme which aims to reduce the impacts of increased water use and water pollution on the Indus Basin, while meeting the needs of businesses and agricultural development. Freshwater ecosystems have declined by 76%, and continue to do so,

leading to low pressure flows in dams and the possibility of habitat loss. When assessing water-risk perspectives, it is important to look at three areas, namely: the government, the corporate sector and civil society. If the government fails to manage water effectively, social, economic and environmental impacts are felt vastly. For the corporate sector, the risks are more reputational, regulatory and economic. For the civil society on the other hand, the risks are felt primarily by people and their environment, with an overall lack of ecosystem services.

Dr. Linstead stated that studies showed that 27% of businesses have already experienced detrimental impacts relating to water. WWF's Water Stewardship

hence advocates for a shared interest in achieving sustainable water, using businesses, NGO's and water institutions as allies to achieve common goals. The theory of change mandated includes water awareness, and expanding knowledge of risks and impacts to promote collective action, in attempts to influence governmental policies. In order to do this, Mr. Linstead emphasized the need to rethink our approach to water by associating impacts to risks, equating cost-saving to risk mitigation, and connecting efficiency to stewardship.

Mr. Ali Hasnain was the second presenter of the session, discussing the possibility of businesses being at the forefront of change. While indicating that water resource management usually happens in the public sector, he addressed the importance of corporate social responsibility (CSR), specifying that projects are not necessarily altruistic, and still need a business case in order to balance the use of company resources.



Session presenter Mr. Ali Hasnain, WWF

The Alliance for Water Stewardship (AWS), which includes 31 organizations from all over the world is a great example of what can be done. AWS includes partners from the government, NGOs, private sector, education sector and research institutions that came together to talk about water governance, water quality and water quantity, working towards remedies which are practical and can be implemented on the ground. In Pakistan, AWS can be used as a tool to better water and energy management practices. Remarking that



water is everybody's business, Mr. Hasnain stated that civil and corporate level partnerships, such as the one between WWF and Coca Cola (which installed two water filtration plants in 2015) can be highly beneficial moving forward.

Panel Discussion



Discussant Mr Siddiq Sheikh, FPCCI

Mr. Siddique Sheikh of FPCCI commenced the panel discussion by addressing the importance of pressurizing the government to manage water more effectively. While lauding the efforts of organizations such as WWF and Hisaar Foundation, he noted that effective management of water requires substantial investment, something

that only the private sector has the ability to do. Ms. Farhana Mowji added that adequate resources are required to separate clean water from sewage water, for example. Currently, it seems like management is undertaken by those who are either not qualified or are unable to do their job efficiently. Therefore, there is a need to restructure existing mechanisms that are involved in managing water, and a requirement for other sectors to start collaborating.

Questions and Answers

The audience questioned whether it is in the interest of businesses to engage in poor and water scarce areas, and asked where social development issues stand with businesses, given that businesses prioritize their profits. Mr. Ali Hasnain responded that the private sector is very powerful. For example, Faisalabad, which is now more affluent than Lahore, started out as a 'poor' area. The power of the private sector in Faisalabad has made the city what it is today. The awareness of civil society, coupled with private sector pressures are what drive the government. Further, many social development projects can also be beneficial for businesses. Treatment plants for example, in addition to bettering water systems in the country, can also be financially rewarding for businesses that choose to invest in it.

Conclusions

Session Chair, Mr. Aliuddin Ansari concluded the session by addressing water scarcity in Pakistan. He stated that for businesses, risks associated with working with water must be acknowledged, and accordingly, businesses should measure their own consumption and sustainability goals. He acknowledged the efforts of all involved with the AWS program and called on CSR departments to focus on water-related projects. It was agreed that investing in solutions to water issues was also a wise option for businesses. For example, investing in a program which works towards lining canals could double water availability. Introducing better agricultural techniques can also save up to 30% of water in Pakistan, which also presents a huge business opportunity. It is therefore important for businesses to work with the water sector in order to alleviate our national water challenges.



Session Chair Mr. Aliuddin Ansari, Engro Corporation



L to R: Mr. Ali Hasnain, Mr. Siddique Sheikh, Mr. Aliuddin Ansari, Farhana Mowji & Dr. Conor Linstead



3.6 Water for people: Overcoming Drinking Water and Sanitation Challenges (Session 3D – Paper and Consultation)

Chair: Mr. Mohammed Siddiq Khan, WaterAid Pakistan

Facilitator: Dr. Daanish Mustafa, Kings College, London

Presenters: Dr. Sher Jamal Khan, National University of Sciences and Technology (NUST)
Mr. Shah Jahan Baloch, Regional Program Manager, ActionAid
Dr. Daanish Mustafa, Reader at Kings College, London

This session featured presentations revolving around the safe drinking water challenges in Pakistan. Various technological, institutional and political solutions were identified to ensure provision of safe drinking water to all. The need to adopt unconventional and innovative solutions was also highlighted. This session was sponsored by Water Aid.

Papers and Presentations

Opening the session, Dr. Sher Jamal Khan, from the National University of Sciences and Technology (NUST), presented his work developing a low cost sewage treatment solution for rural areas. He began by highlighting the need for sanitation in Pakistan, and the limitations of existing wastewater treatment methods used in Pakistan. Dr. Khan then explained the benefits of using an anaerobic baffled reactor with a peat filter, including lower energy requirement and lower sludge generation.

He presented the schematics of the design developed by his team at NUST, and the methodology used to assess its performance. Laboratory testing of the prototype reactor showed that this new technology was effective in removing substantial amounts of contaminants in the wastewater, thus improving the effluent water quality. The service life of the peat filter is estimated to be 75 days. The testing also helped determine the optimal treatment conditions needed to allow reuse of the effluent water for agricultural usage. Dr. Khan concluded by laying out the plan for future research to further refine this technology.

Next to present was Mr. Shahjahan Baloch, regional program manager for ActionAid Pakistan, who talked about drinking water as a basic human right. Mr. Baloch started by discussing the importance of drinking water in the recently released UN Sustainable Development Goals (SDGs). He then presented an overview of the drinking water conditions in Pakistan,

where tremendous health costs are borne due to lack of universal availability of safe drinking water. High inequities in drinking water provision, coupled with ambivalence on the part of local authorities has created dire conditions for marginalized communities.



Presenters Mr. Shahjahan Baloch, Dr. Daanish Mustafa and Session Chair Mr. Mohammed Siddiq Khan

He argued against the commodification of water being pushed by a corporate agenda through the World Water Council (WWC) in the UN. Mr. Baloch argued for strengthening citizen voices regarding their rights to clean drinking water, and for regulation to ensure accountability of local governments in water provision. He concluded by asking that the corruption in the water sector be controlled and the role of the commercial sector in water be minimized.

Dr. Daanish Mustafa, Reader at King's College London then presented his work on deep-rooted problems with Karachi's water supply system. This study used key informant interviews, participant observations and focus group discussions to identify the underlying issues of water distribution in Karachi. Arguing against the prevailing story line of Karachi's water problems which focuses on supply-demand gap and system inefficiencies, Dr. Mustafa said that Karachi's major problem was of conceiving water in terms of a networked water system. Calling the tanker water supply de facto privatization of water, he also argued that water access in the city aligned with the hyper-capitalist ethos of Karachi.



Interviews from various water users across Karachi were then presented where access to water was especially troublesome for women. Dr. Mustafa concluded by providing solutions to Karachi's water issues beyond the piped network paradigm. He suggested revisiting groundwater water storage and modular water systems. He reminded the audience that water was linked to the politics and culture of the society, and any solution to the water issues needs to address these factors.

Questions and Answers

A lively discussion started with an audience question regarding the viability of a non-piped based water delivery approach in a big metropolis like Karachi. Dr. Daanish Mustafa responded by citing the example of Kathmandu, Nepal's capital city, where communities have dug water storage ponds which are filled with every precipitation event. The pond then recharges the underlying aquifer. Each house around the pond has a shallow well which they use to extract groundwater for domestic consumption. Dr. Daanish Mustafa added that there is an urgent need for us to think outside the box to mitigate Karachi's water problems.

The next question from the audience was directed to Dr. Sher Jamal Khan regarding the costs of manufacturing and maintenance of the water treatment peat filter developed. Dr. Khan explained that the first step was to test the hypothesis that an energy free, low cost solution can be feasible. The second phase, which is ongoing, consists of beta-testing this technology in the field. It is in the beta-testing that the costing details will become clearer, depending on the number of houses served and the characteristics of the wastewater.

In response to Mr. Shahjahan Baloch's presentation on ensuring availability of water, an audience participant noted that water delivery in cities should be based on the model of solid waste management companies, such as the one in Lahore. When private companies are involved, they will be accountable to the people. Providing water without any charges will lead to misuse of water. An important aspect of water rights, is a discussion of the service charges incurred to provide that water to millions. Another audience member suggested that instead of using the term water pricing, we use 'service charges', since we are not charging for water, but rather the costs of distributing it on a large scale.

Another audience member challenged the claim there is enough water for Karachi and that if water tankers were removed, Karachi's water problems would be resolved. She asked Dr. Daanish Mustafa for his thoughts on the role of water tankers in Karachi. Dr. Mustafa explained that there is no one single fix to Karachi's water issue and that we need to think of solutions outside the piped-distribution network paradigm. In addition, more 'rational' use of water in Karachi is required, noting that approximately 80% of water in Defense Karachi is used for horticulture. There are many areas in Karachi where if you remove tankers, they wouldn't have water since there are no water connections over there. He added that we need to think of a solution practical to our region.

Conclusions

The Chair concluded the session by highlighting that there is a need to think outside the box for solutions to Karachi's water problems. It was agreed that politics and culture issues also need to be addressed in terms of developing solutions. Wastewater treatment and other technologies should be explored for additional water.



Session Chair, Mr. Mohammed Siddiq Khan



3.7 Sharing Thoughts on Pakistan Water Policy (Session 4A – Papers and Consultation)

Chair: Dr. Salman Shah, Former Finance Minister Pakistan

Facilitator: Dr. Pervaiz Amir, PWP and Hisaar Foundation

Presenters: Mr. Sardar M. Tariq, Pakistan Water Partnership
Dr. Zaigham Habib, water sector expert
Dr. Mahmood Ahmad, SJIBPP
Ms. Areeba Syed, NED University of Engineering and Technology

Discussant: Dr. Pervaiz Amir, PWP and Hisaar Foundation

This session included presentations discussing historic and current state of regulations and legislation relating to water management in Pakistan. The role of various institutions in implementing these policies was also discussed. Success stories from policy development in other water scarce countries were highlighted. This session was sponsored by Bank Al Falah.

Papers and Presentations

The Session Chair, Dr. Salman Shah began the proceedings and invited Mr. Sardar Tariq to present his paper on a proposed National Water Policy (NWP) for Pakistan. He said that the prime opportunity for developing a NWP was after the Indus Waters Treaty in 1960 and that it was a shame Pakistan did not have a water policy at present. He remarked that yet another opportunity to formulate a policy was lost at the time of the Indus Apportionment Accord in 1991. Since then, problems and issues in the water sector have aggregated.

Mr. Sardar Mohammad Tariq stressed that a comprehensive National Water Policy was urgently needed in light of the water challenges facing Pakistan. He provided the background for the NWP currently being developed in association with various think tanks and the planning commission. Mr. Tariq said that a national water policy should state the government's vision with respect to water. He explained that the current proposed policy took into account the 18th Amendment and mentioned how previous drafts of the water policies had not taken the provincial governments on board. He said provincial water policies would emerge from a national water policy. He further submitted that water should be part of the national security of Pakistan.

Next, the Session Chair invited Dr. Zaigham Habib to present her paper on a review of the water policies and governance in Pakistan in the past 70 years (Water



Session Facilitator Dr. Pervaiz Amir & Chair Dr. Salman Shah



Mr. Mohammed Sardar Tariq with other participants



Governance Model and Divide on Water Policy). She said the state of the water system in Pakistan is better than its perception. She said we have moved from a "role and rule" form of governance and added institution after institution to a state now where the system has expanded to become too big to manage. Dr. Habib said before 1947, strict water rules and SOPs for canal infrastructure existed and were implemented.



Dr. Zaigham Habib, Water Specialist

She said this period was also characterized by intense inter-state water dialogues, which aided the British use of the canal system to give them maximum economic returns.

Dr. Habib said the first paradigm shift took place after 1950 with the preparations and negotiations leading up to the Indus Waters Treaty of 1960. She said institutions such as WAPDA were developed but without any accompanying change in water management procedures. Dr. Habib submitted the second paradigm shift took place after 1990 with new institutions and procedures such as PIDAs, IRSA, Climate Change Policy etc. introduced into the system along with inputs from international NGOs. She said, at present, we have a multi-layered system of water governance in the country.

Next, the Session Chair invited Dr. Mahmood Ahmad to deliver his paper focusing on irrigation policies and options available to Pakistan. Having worked with the Food and Agriculture Organization (FAO) in Egypt, Dr. Ahmad shared his experiences with water challenges globally. He began by providing a conceptual overview of development of water resources in water scarce countries which evolves from supply enhancement to demand management. Expanding on the existing conditions across the world, he identified the MENA (Middle East and North Africa) region to be the most water scarce.

Dr. Ahmad then spoke about some of the water policy issues most relevant to Pakistan. Emphasizing the need for integrated water resource management, he added that a diverse group of multidisciplinary stakeholders needs to be formed to develop relevant policies. He recommended solar energy for desalination plants. He highlighted the importance of adequate pricing of water and irrigation services, and submitted that in the future, Pakistan would have to produce more food with less water. He ended by noting that water rates pre-Partition were 40% of input costs whereas they have now fallen to less than 10%.

Next, Dr. Shah invited Ms. Areeba Syed to present her work on analysis of the historic flows of the Indus River to identify trends in streamflow and explore possible reasons for the imbalance between demand and supply of water. She began by providing an overview of the climatic characteristics of flow in the Upper Indus Basin, where glacial melt and monsoon summer precipitation accounts for most of the flow. For this study, flow data on eight stations along the Indus River from Tarbela to Kotri were analyzed. Since flow data is also dependent on the precipitation in the basin, a trend analysis for the rainfall data was also conducted. Ms. Syed highlighted the deficiencies in data available to her for this analysis and spoke of the methods employed to overcome those data gaps.

The monthly flow analysis showed no strong trend in flows at Tarbela or Kalabagh, however a decreasing trend is seen in flows at all other gauges downstream of Kalabagh. Statistical tests were performed to assess the strength and direction of the trends. The precipitation analysis for the station at Saidu Sharif revealed an increasing trend. Ms. Syed said that there was not enough data to reach firm conclusions but her hypothesis was that increased water flows above Tarbela were due to corresponding high precipitation in the catchment area. She concluded by stating that decreased water flows below Tarbela pointed to inefficient water management practices, rather than climate vagaries.

Conclusions

The session facilitator, Dr. Pervaiz Amir spoke briefly and thanked the speakers for presenting their papers. He concluded by stressing how water allocation was tied to poverty alleviation in Pakistan. The session ran overtime so there was no question and answer session.



3.8 Role of Academia: Time to Deliver and Demonstrate Ownership (Session 4B – Presentations and Consultation)

Chair: Prof. Dr. Sarosh H Lodi, Dean, Civil Engineering and Architecture, NEDUET

Facilitator: Ms. Simi Kamal, Hisaar Foundation

Presenters: Dr. Shoaib Zaidi, Habib University
Dr. Syed Imran, Ahmed NED University of Engineering and Technology

The discussion in this session focused on existing deficiencies in Pakistan's approach to higher education, and ways to improve the quality and utility of research generated from Pakistani institutes of higher education. The speakers presented their initiatives towards improving the discourse on water in academia. This session was sponsored by Panjwani Charitable Trust.

The session facilitator Ms. Simi Kamal spoke about the need for intellectual capital to secure our water future. For this purpose, the Universities for Water Network (UWN) was established following the Hisaar Foundation water conference in 2013. A Hisaar Institute for Interdisciplinary Studies on Water is being formed that will support inter-disciplinary research on Pakistan's water challenges. The initial work by the UWN focuses on recognizing water related intellectuals and practitioners, research institutes, providing awards to students enrolled in water related fields, as well as developing an e-portal for water related literature. The ultimate goal is to develop a curricula for water studies. The UWN and the Hisaar Foundation Think Tank for Rational Use of Water work concurrently. Current projects include drought issues and Baluchistan's water issues.

Papers and Presentations

The first presenter, Dr. Shoaib Zaidi, spoke about educational resources in Pakistan. In terms of primary education, higher education and health, Pakistan ranks very low globally, based on the World Economic Forum surveys. The education indicators are similar to those of sub-Saharan African countries. Pakistan is not close to any of the countries that matches its population in terms of numbers. Thus, Dr. Zaidi posited whether it was realistic to expect miracles in higher education with the current status of primary and secondary education.

Dr. Zaidi remarked that water issues are complex and intertwined, unlike the straightforward math and science problems that our schools teach. Students are not trained to encounter complexity in a manageable



Ms. Simi Kamal presenting memento to Dr. Shoaib Zaidi

way, thus they are unable to tackle complex problems. He added that focusing on outcome based learning, emphasizing open-ended questions and mandating social sciences and humanities courses for every student are ways in which the current education could be improved.

Dr. Zaidi said that open-ended questions are the gateway to thinking of problems in a complex way. It allows for students to express their individuality. Holistic, broad-based education such as the one provided at Habib University is an alternative model. Citing an example, he added that Habib University, instead of teaching a stand-alone science course – e.g. chemistry for electrical engineering students – teaches a course called energy where issues of water, energy, policy and management intersect. Students conduct experiments on energy. Dr. Zaidi concluded by informing the audience that after the course on energy, Habib University will be developing a course on water so that students have tactile knowledge on various dimensions of water use.

Next, Dr. Syed Imran Ahmed from NEDUET, spoke about the Water Modeling Center (WMC) established at NED. Started in 2013, the WMC aims to provide better understanding of water resources management under the civil engineering department in NED. Before



Ms. Simi Kamal with Dr. Sarosh Lodi & Dr. Imran Ahmed

the WMC, water resources was the least popular area in Civil Engineering, however since the modeling center has been established, there has been an overwhelming increase in interest from students. The goal for the WMC was to help students apply their theoretical knowledge to water problems being faced in the region.

Dr. Ahmed informed the audience that the WMC is equipped with a variety of modeling software dealing with climate change assessment, hydrology, hydraulics, and groundwater. He added that models can help assess impacts of various social, climatic and political changes on water resources. The suite of software provides confidence to practitioners and aims to develop a group of trained and knowledgeable individuals on the topic. He concluded by emphasizing the importance of modelers working closely with all stakeholders, making knowledge available and providing practical solutions.

Questions and Answers

The first comment from the audience was regarding the need for academia to be integrated with community and policymakers. Obviously, making scientific models is not enough if these models do not incorporate human behavior and if this modeling then does not lead to tangible changes in policy and implementation. Dr. Shoaib Zaidi added that people who work in a particular sector are alienated from policymakers in that sector. Decisions in Pakistan are made by people who are least impacted by them. Ms. Ilaria Carpen in the audience pointed out working with international organizations like UNDP can allow the UWN to leverage policy makers.

Another participant stated that there is a lack of jobs in the water sector. Dr. Imran Ahmed replied by stating that such was not the case anymore. Corporations and

companies want water modeling experts who use complex models. He spoke of over 50 trained individuals who had obtained employment in the water sector after graduating from NEDUET. The questioner responded by saying that though jobs might be sufficient for civil engineering students, water resource management graduates do not get sufficient attention. Speakers identified that it can be a challenge to define or redefine certain jobs in the public sector.

The final question of the session was regarding the failure of higher education often stemming from the teaching faculty itself being a product of an inferior education system. Dr. Zaidi agreed and added that there has been a push in recent times by the Higher Education Commission (HEC) in Pakistan to improve teaching faculty at universities. Dr. Zaidi added that human capital needs to be developed through the selection of the right people, training them well and looking after them post-training.

Conclusions

The session concluded with a resolve to focus on existing deficiencies and challenges in academia and develop relevant solutions to address the missing gaps. The session also highlighted the need for academia to be integrated with community and decision makers.



3.9 Woman Champions: Role Models in Water Sector (Session 4C – Presentations and Consultation)

- Chair:** Ms. Mahnaz Rahman, Aurat Foundation
- Facilitator:** Dr. Daanish Mustafa, Kings College London
- Presenters:** Dr. Rahat Jabeen, WISP,
Ms. Mahtab Rashdi, MPA,
Dr. Ghazala Rahman, SZABIST
- Discussants:** Ms. Seema Taher Khan, Airwaves,
Dr. Daanish Mustafa, Kings College London

The session celebrated the efforts of remarkable women who have been working in the water sector and have been engaged on multifaceted water related issues. The urgent need for involving women in decision-making with regards to water management was highlighted, along with possible methods of empowering women at the local level. This session was jointly sponsored by Raasta Development Consultants and Pakistan Petroleum Limited.

Presentations

The first speaker of the session was Dr. Rahat Jabeen who has devoted more than 17 years to the field of water and water resource management. She is currently engaged as an environment specialist with the Water Sector Improvement project in Sindh, funded by the World Bank. She started by speaking about her instrumental role with the WWF in the development of a policy document on Pakistan's Wetlands Action Plan. She mentioned that she had travelled extensively across Pakistan in harsh terrains including the Chagai Desert in Baluchistan and Pashtun valley in Gilgit Baltistan.



Presenter, Dr. Rahat Jabeen

Dr. Jabeen, who has represented Pakistan in various international environment and water conferences, remarked that as a woman working in the water sector, she has to constantly prove her technical expertise "as more than just a sociologist". She concluded by noting that very few women are working in a technical capacity in the water sector, which needed to change.

The second speaker was Ms. Mahtab Akbar Rashdi, who was the first woman to join Sindh Government and served at various important positions till her retirement. She was the former Sindh secretary for Information and Education. She spoke about the importance of having women involved in decision-making with regards to water management and highlighted the need for women to be involved in the water sector. Ms. Rashdi remarked that due to the domestic setup of our society, it is the role of the women to gauge how much clean water will be utilized for domestic purpose, making them the biggest stakeholders of water. She attributed the absence of women from policy formulation to the massive gender gap in policy making in Pakistan.



Ms. Mahtab Rashdi, MPA

Ms. Rashdi added that female involvement in the water sector would make policies more effective. For instance, in the corporate sector, firms that have gender equality have higher sales and better performance. She pointed out that women face significant challenges at the community level, where the male population finds it difficult to accept women



leadership. She called for women to be strong leaders and courageous to fight against a discriminatory system. She concluded by calling for increased opportunities for women involvement in water resources.



Dr Ghazala Rahman, SZABIST

The third speaker was Dr. Ghazala Rahman, who is the founding director of Sindh Abhyas Academy at SZABIST that conducts research, disseminates publications and provides courses in Sindh Studies. She is also a founding mother of the Women's Action Forum, and has over 14 years of experience in

Southern Sindh's public and non-governmental school systems including Karachi slums and coastal villages. She began by discussing the importance of education for students regarding water challenges in Sindh.

She noted that in her program, she has incorporated a seminar on Irrigation of Sindh. Dr. Rahman read out various excerpts of research performed by her students on Sindh's water issues. She emphasized that education on this subject matter is crucial as it forces young minds to engage critically with civic issues. Improvement in water resources management requires sustained efforts, with continued investment to raise the consciousness of young minds especially college and university students who need to understand the challenges involved in securing sustainable water for all. Her program operates with this objective. She ended by noting that there is a need to inform the "downstream generations" about the meaning of lower riparian.

The last speaker Ms. Seema Taher Khan spoke about the contribution that the electronic media can make in improving women's participation in the water sector. Ms. Khan, a prominent media personality with a career that has spanned over two decades, has worked extensively on raising awareness regarding Pakistan's water challenges and is spearheading water conservation initiatives on her channel. She agreed with previous presenters and stated that women are decision-makers at the domestic level yet they are not engaged in water policies.

Ms. Khan remarked that conferences were only one part of the solution, which needs to be supplemented



Ms Seema Taher Khan, Think Tank Member
Hisaar Foundation

with active engagement through the media. The concept of water must be romanticized for women which, she explained, meant portrayal of stories that depict women water champions and their struggles. She added that songs were also a good way of engaging the audience and delivering a message. She concluded by noting the lack of women role models, and urged the media to help propagate the notion that even an average woman can become a role model in the water sector.

Conclusions

In the end, the session facilitator, Dr. Daanish Mustafadiscussed the gender gap that exists in historical writings. When the experience of the biggest stakeholder of water, i.e. women, is missing from our history, how can we expect to learn from our mistakes? Therefore it is crucial for women to be involved in the issue of water. The Session Chair, Ms. Mahnaz Rahman concluded the session by pointing out that women need to engage in self-assessment and increase self-respect. They need to be reassured that they are capable, for there to be more women water champions.



L to R: Dr. Ghazala Rahman, Co-Chair Ms. Farzana Saleem,
Dr. Daanish Mustafa, Chair Ms. Mahnaz Rehman,
Ms. Seema Taher Khan, Dr. Rahat Jaboon



3.10 Rural and Urban Models of Innovation (Session 4D – Papers and Consultation)

Chair: Dr. Nasir Javed, Urban Unit

Facilitator: Mr. Zohair Ashir, Hisaar Foundation

Presenters: Mr. Theerat Kumar, Sukaar Foundation
Dr. Nasir Javed, Urban Unit
Mr. Mir Mazhar Talpur, Mag Tech
Dr. Abubakr Muhammed, LUMS

This session featured presentations on the role played by various governmental and non-governmental organizations along with academia in improving water security using innovative policy approaches and technology. The discussion also focused on the importance of involving local population to ensure sustainability of solutions. This session was sponsored by Urban Unit.

Papers and Presentations

The first presentation of the session was given by Mr. Theerat Kumar of Sukaar Foundation, who spoke about Tharparkar's water issues. With a population of 1.5 million, Thar severely lacks infrastructure to access water, making it very water scarce with frequent episodes of droughts. He added that Tharparkar can be divided into 8 ecological zones on the basis of vegetation, soil, and rainfall. Apart from rainwater, groundwater contributes a major portion of total water use, with a small percentage coming from surface water.



Teerath Kumar

in water availability, WSP partners with various stakeholders to submit findings and strategy plans to provincial and national assemblies. He ended by stating

Mr. Kumar informed the audience that Sukaar Foundation has prepared the "Water Security Plan of Tharparkar" (WSP). This plan will be implemented in 75 targeted communities to provide reliable access to water of sufficient quality. By holding household level surveys, undertaking capacity building mechanisms, and analyzing the gaps

that WSP aims to address the roles and responsibilities of households, community organizations and district governments to implement projects needed to ensure water security for the native population.

Dr. Nasir Javed of Urban Unit was the next speaker, presenting the Punjab Municipal Water Act, a draft of which was recently forwarded to the Punjab Cabinet. He started by identifying the goal behind the draft: to provide water facilities to at least 100 million people in the next 20 years in Punjab. Dr. Javed remarked that the biggest water challenge is that of mismanagement rather than water scarcity. The Punjab Water Act touches upon the lack of institutions that work towards managing water. He warned that, before we have institutions, we need laws and guidelines for those institutions to follow.



Dr. Nasir Javed

The starting point is to formulate a holistic water policy covering issues such as a deadline for completing the project, levels of subsidiary and financing options. He added that the role of provincial governments, then, is to build capacities and integrate the policy into practice. He highlighted the need for a comprehensive water act, comprising diverse stakeholders (public and private sector alike), identifies primary sources of water (such as rain water and groundwater) and accordingly addresses the regulation of water treatment, water extraction, bulk supply, storage, retail distribution, sewerage collection, disposal, and tariff; all of which are covered in the current draft of the Act. He concluded by noting that existing water schemes are non-sustainable, and without any regulatory framework,



the future water challenges are likely to become even more damaging.



Mr. Mir Mazhar Talpur, Mag Tech

Next Mr. Mir Mazhar Talpur of Mag Tech Pakistan (Pvt.) Ltd presented an approach to treat dead water using magnetic energy. He informed the audience that water in Pakistan has a generally high pH value of above 8, indicating its poor quality. Mag Green, a project of Mag Tech has recently launched structured water

technologies in agricultural development which can be implemented at low costs.

Explaining the technology, Mr. Talpur said that when water is run through a Mag Green device, it changes its structure by breaking down cluster of salts and minerals and makes them more biologically available to plant cells. Ultimately, this leads to healthier plants and a greater yield, while also reducing the amount of water needed to harvest crops. He claimed that the technology is 100% free of chemicals, has no running or operational costs, uses no raw materials and the equipment has a minimum 10 year life. He concluded by adding that the Mag Green technology can be used with brackish water, on saline and waterlogged land, and to improve seed germination.

The last presentation of the session was by Dr. Abubakr Muhammed from LUMS who began by discussing problems related to low productivity in the water sector. He said that poor economics, outdated methodologies and inadequate infrastructure, coupled with negative driving forces (such as climate change, water hazards and population growth) lead to a number of water-related problems. Some of these can be tackled by information and communications technology (ICT) and automation in the agricultural sector. He cited an example of a World Bank sponsored project in Punjab which implements smart water metering at the distribution level. He added that drones could be used for aerial mapping of irrigation canals to identify silt deposition. By automating the survey process, drones can measure geometries of canals and find where drilling is needed, significantly reducing the amount of labor required in the process.

Dr. Muhammad noted that the vast spatial expanse of the irrigation network posed a problem in monitoring and maintaining geographically established infrastructures. Collecting information and reacting within a short time span is a challenge, as is an inability to scale human expertise across institutions. In all these cases, automation can help. Through robotic revolutions, we can empower the poor and better the agricultural sector. Robotics allow for a generic, robust and easy to use platform which can run mechatronic applications for common farming tasks, increasing productivity of small farms to the level of a large mechanized farm. He ended by presenting aerial robotics, autonomous vehicles, and use of sensors as examples of ICT enabled projects that can tackle problems in the agricultural sector.



L to R: Dr. Abubakr Mohammed, Dr. Nasir Javed and Mr. Mir Mazhar Talpur

Questions and Answers

Participants raised questions about using technology to monitor water. Specifically, there were questions about whether or not technology will need to be balanced, depending on individual cases, or if it can be used as a 'solution to everything'. Dr. Abubakr Muhammad responded that the 'human' element cannot be removed from technological solutions. No matter how sophisticated the technology, there is still a possibility of people tampering with them. The solution then, is to spread knowledge and ensure the current views of people and institutions are changed, so that their intentions are pure in working towards a common goal with respect to water.

Conclusions

The session highlighted innovations in rural and urban contexts in water sector. The session concluded with a focus on using technology to maximize the benefits and improve the water sector.



3.11 Exhibition, Book Launch and Young Writers Awards

Hosts: Ms. Saleha Atif, Hisaar Foundation
Ms. Kausar Hahsmi, Hisaar Foundation

The Conference also had an exhibition in which a total of seven organizations participated. In addition, three books were also launched, highlighting different aspects of water crisis facing Pakistan. Young writers were celebrated and also given the opportunity to participate in this conference. The book launch and young writers awards session was hosted by Ms. Saleha Atif and Ms. Kausar Hashmi of Hisaar Foundation.

Exhibition

There were seven exhibitors who took part in the conference exhibition:

- ◆ Engro Corporation
- ◆ Hisaar Foundation
- ◆ TV-One
- ◆ Sukaar Foundation
- ◆ SAFWCO
- ◆ MagTech Pakistan (Pvt.) Ltd.
- ◆ HANDS

Book Launch

The session was hosted by Ms. Saleha Atif, Assistant manager Operations, Hisaar Foundation and authors spoke about their publications. The following books/reports were launched:

- ◆ Hydro Politics and Water Wars in South Asia by Mr. Iqtidar H Siddiqui
- ◆ Water Diplomacy: Transboundary Conflict, Negotiation and Cooperation in South Asia, published by HANDS and compiled and edited by Mr. Zulfiqar Halepoto
- ◆ Report on Demonstrating Inclusion, Integration and Innovation, Hisaar Foundation Two year Report 2014 & 2015, written and compiled by Ms. Sanaa Baxamoosa

Hydro Politics and Water Wars in South Asia by Mr. Iqtidar H Siddiqui. Mr. Iqtidar H Siddiqui, a former Regional Advisor on Water Resources to the UNESCAP, he has also served as a Director General, IWASRI, and as a Chief Engineer, Planning and Investigation Division, WAPDA in Pakistan. He is the author of several books on water this book is his fifth book. He said that this book gives a wake-up call to the country in view of diminishing water resources, expected 'water disaster' due to climate change and hydro-political forces in the country.



Mr Iqtidar H Siddiqui

Water Diplomacy: Transboundary Conflict, Negotiation and Cooperation in South Asia, published by HANDS and compiled and edited by Zulfiqar Halepoto. Mr. Halepoto is a water and environmental activist doing doctoral research on River Diplomacy and Transboundary Water Cooperation Issues between Pakistan and India. His Professional scope of work is Rights based Advocacy & Campaigning, Networking & Lobbying with Diplomatic Enclave, Political Parties Leadership, Legislators, Civil Society and Media. He worked with leading national and international organizations, research institutes, and think tanks including SDPI, LUMS, Privatization Commission of Pakistan, University of Sindh, Aurat Foundation, International Republican Institute (IRI), World Vision, SAFWCO, TRDP. He has compiled and edited several books and authored travelogues.



Mr Zulfiqar Halepoto



Report on Demonstrating Inclusion, Integration and Innovation, Hisaar Foundation Two year Report 2014 & 2015, written and compiled by Ms. Sanaa Baxamoosa. Ms. Baxamoosa is an environmental



Programme Manager, Ms Sanaa Baxamoosa
Hisaar Foundation

practitioner with more than 8 years of experience in the water sector. She graduated with a degree in Environmental Studies with a concentration on Water Politics from Hampshire College, MA in 2007. Her undergraduate thesis "Where the River Runs Dry" focused on the detrimental ecological and socio-economic impacts of large dams on the Indus Delta. She

has been working with Hisaar Foundation since 2009 in various roles and capacities as an integral member of the team. Currently, she is serving as Secretary of the Think Tank on the Rational Use of Water and as Convener of the Universities for Water Network. She said that the report will give the idea of the foundation progress and work done in the previous two years. She further said that this is a follow-up to Report on Demonstrating Inclusion, Integration and Innovation, Hisaar Foundation Two year Report 2014 & 2015, written and compiled by Ms. Sanaa Baxamoosa. Ms. Baxamoosa is an environmental practitioner with more than 8 years of experience in the water sector. She graduated with a degree in Environmental Studies with a concentration on Water Politics from Hampshire College, MA in 2007. Her undergraduate thesis "Where the River Runs Dry" focused on the detrimental ecological and socio-economic impacts of large dams on the Indus Delta. She has been working with Hisaar Foundation since 2009 in various roles and capacities as an integral member of the team. Currently, she is serving as Secretary of the Think Tank on the Rational Use of Water and as Convener of the Universities for Water Network. She said that the report will give the idea of the foundation progress and work done in the previous two years. She further said that this is a follow-up to Hisaar Foundation published report for the 2013 International Water Conference which covered the first 10 years of the activities and history and from this year the foundation decided to publish progress report annually.

Young Writers Awards

The session was hosted by Ms. Kausar Hashmi, Manager Research and Documentation and Secretary Conference Academic Committee, Hisaar Foundation. Ms. Hashmi said that Hisaar Foundation wanted to mainstream youth and young water professionals in the water sector. The conference academic committee especially Dr. Pervaiz Amir and Ms. Simi Kamal initiated the young writers competition, who are writing in Urdu, Sindhi and other regional languages. In this regard many young writers participated in this competition. She further introduced the three member jury of the competition and thanked them for their support and for giving their precious time. The panel of judges were as follows:



Host Ms Kausar Hashmi

- ◆ Mr. Mehmood Alam Khalid, Editor and Publisher of Monthly Farozan, only regular Urdu Magazine of Pakistan on Environment and environmental columnist/writer of all leading Urdu Newspapers.
- ◆ Ms. Shahida Sajid Ali, senior capacity building officer at Aurat Fopoundation. She is also Coordinator Women and Water Network (WWN)-Pakistan and has long term association with Hisaar Foundation as a volunteer trainer.
- ◆ Ms. Shabina Faraz, journalist, columnist and features, articles, and travelogues writer. She holds a Masters degree in Urdu literature. She is a Karachi-based journalist passion for environment that helped bring climate issues to the mass-circulating Urdu press.

Ms. Hashmi then invited Dr. Pervaiz Amir and Ms. Simi Kamal to distribute the prizes and certificates to the four winners of the competition:

- ◆ Winner, Ms. Warda Shakir
- ◆ 1st Runner-up, Ms. Syeda Nazaan Jabeen
- ◆ 2nd Runner-up, Mr. Sikander Ali Soomro
- ◆ 3rd Runner-up, Ms. Fariha Fatima



Engro Foundation stall



HANDS stall



Mag Tech stall



SAFCO stall



Sukaar Foundation Stall



TV One stall



Ms. Syeda Nazaan Jabeen 1st runner up, Ms. Wardah Shakir winner & Ms. Fariha Fatima 2nd runner up of Young Writers Competition



3.12 Government: Friend, Foe or Fellow Traveler? (Session 5A – Presentation and Consultation)

- Chair:** Mr. Zafar Mehmood, Chairman WAPDA
- Facilitator:** Mr. Zohair Ashir, Chairperson, Hisaar Foundation
- Presenter:** Mr. Zohair Ashir, Chairperson, Hisaar Foundation
- Panelists:** Mr. Tasneem Siddiqui, SAIBAN
Ms. Mahtab Rashdi, MPA Sindh
Mr. Idris Rajput, Water sector expert
Mr. Samar Ali Khan, MPA Sindh

This session comprised of a presentation followed by a discussion on the role of government in providing solutions to Pakistan's water challenges. The panelists, all of whom had served extensively with the government, expressed their opinions regarding the shortfalls on the government's behalf in involving civil society and the private sector in the water sector. This session was sponsored by Grant Thornton Consulting (Private) Limited.

Presentations



Mr. Zohair Ashir, Chairperson Hisaar Foundation

Mr. Zohair Ashir, Chairman of Hisaar Foundation introduced the topic of the session by drawing on Hisaar Foundation's experiences. He explained the role of government in solving water challenges currently facing the country as follows:

- Government as a foe: There are 18 million people who lack access to safe water in Pakistan, and 68 million people lack access to adequate sanitation. Since 1947, water availability has decreased by 80%. These statistics, along with the public and media reactions to the heat wave in Karachi, for

example, show that the government has not taken adequate steps to improve conditions.

- Government as a friend: This is difficult to articulate, however Hisaar Foundation had a good relationship with the old government, and the foundation had been placed on various companies and at times approached as consultants on water issues.
- Government as a fellow traveler: Karachi Water Partnership (KWP), between 2006 and 2008 worked with the local government for the benefit of the community. The project was primarily based in Gulshan-e-Iqbal, the largest township in the district of Karachi. By working with media, academics and civil society, KWP presented a plan of action to the city government, stressing the need to keep a record of water wastage by going to residences, checking leakages, and advocating water conservation. KWP developed guidelines for mosques, industries, and households, which the city government printed and circulated (almost a million copies), in a matter of months. Water inspectors were also provided from the government.

Mr. Ashir then spoke about another initiative of Hisaar Foundation: the Jurio project of 2014 which was established as part of the emergency response to droughts in Thar in 2013, using surplus funding. It aimed to create a long-term plan to ensure the community is better prepared for the future. Beneficiaries in the Jurio district consisted of 2400 households, 30,000 children, 27 villages and 50 schools. Using a total budget of 14 million rupees, storage tanks were constructed at household, community and village levels. Additionally, shrub and tree plantations were established to provide fodder for livestock, and berries for human consumption.



A water pumping and filtration system was put in, which supports a community for up to 6 months. He identified the drawbacks from devolution where the federal government has absolved itself of certain responsibilities, by attributing water to the provincial governments. He lamented that many provinces have not acted upon critical issues surrounding water due to lack of clarity regarding where the responsibility lies.

Panel Discussion

Next to speak was Mr. Tasneem Siddiqui of SAIBAN, who has worked with the government for 40 years in various positions. He started his presentation by underlining the importance of a clearly articulated vision. He advocated against viewing the government as a foe, and cited the example of the education sector where individuals developed parallel institutions instead of improving the institutions already in place. This has been one of the primary reasons for the deterioration of the education sector.

Mr. Siddiqui remarked that if one approached the government with a clear vision and a model to implement, the government would accept it, and try to develop a partnership with members of the civil society. Efficiently implementing and delivering results in the social sector is one of the government's basic responsibilities. He added that it is important to see the government as a friend or a fellow traveler in order to work together and redefine the roles of various stakeholders. Without the support and backing of the government, it is very hard to improve current conditions.

Ms. Mahtab Akbar Rashdi, MPA from Sindh, stated that the government has all the resources and power to implement adequate policies, yet it fails to do so. In reality, democracy is a façade and traditional pressures and mindsets are the driving forces behind governmental actions. While we look to the government to find a friend, we usually find a foe instead. She called for a better arrangement of work in the water sector which allows donors, civil society and NGOs to work with the government. This can only be possible with an understanding of how the government operates. She concluded by stating that given the lack of safe drinking water, proper sanitation facilities, food shortages etc., time is running out for urgent measures to be implemented.

Mr. Idris Rajput, former secretary of Irrigation in Sind, divided water management into three areas: irrigation,

floods, and drinking water. In Pakistan, government agencies such as WAPDA and the Federal Flood Commission handle the management of water. In some



Mr. Idris Rajput speaking at the session

cases, the government is acting as a foe. For example, the Basha Diامر dam project, announced in 2006, has still not been completed as priorities of governments lie elsewhere. He believed that while the government may act as a friend in KPK and Punjab, it continues to act as a foe in Sindh.

The last panelist to speak was Mr. Samar Ali Khan, MPA from Sindh, who presented a slightly different approach to the topic. For him, the government is incapable of making a difference due to high levels of corruption and levels of illiteracy prevalent in the water sector. The only way we can make the government our 'friend' is by promoting true representation in elections, develop options in consultation with all relevant stakeholders, present a low cost solution and not ask the government for any financial backing.

Conclusions

Mr. Zafar Mehmood, Chairman of WAPDA concluded the session by discussing the human need for water, health and sanitation. WAPDA's role has always been to develop water and power by working with stakeholders. Even though there are numerous international treaties on water, the federal government needs to empower local governments, who will ultimately have better access and resources to practically implement water projects. He ended by warning that until there is inter-provincial consensus regarding the management of water, the various water challenges cannot be resolved.



3.13 Nexus of Water, Climate Change, Food & Energy (Session 5B – Papers and Consultation)

Chair: Mr. Marc-Andre Franche, Country Director, UNDP

Facilitator: Ms. Simi Kamal, Hisaar Foundation

Presenters: Ms. Zeenia Shaukat,
Dr. Abid Hussain, ICIMOD
Dr. Abubakr Muhammad, LUMS
Mr. Ghulam Hussain Dars, MUET
Dr. Lubna Ghazal, University of Karachi

This session focused on identifying areas where water, climate, food and energy overlap in Pakistan. The presentations highlighted challenges at both the local and country levels, and offered political, social and technological solutions to the challenges. This session was sponsored by United Nations Development Programme (UNDP).

Session Chair, Mr. Marc-Andre Franche began the session by stressing how intricately linked the issues of water, food and energy are and how these linkages are particularly explicit in the case of Pakistan.



Session Chair, Mr. Marc Andre Franche, Country Director UNDP Pakistan

Papers and Presentations

He then invited Ms. Zeenia Shaukat to present her findings on dealing with disasters – both climate related and man-made. She began by remarking that the best adaptation measure for disasters is to empower the most marginalized, particularly women. Communities where women were empowered were able to recover quicker from disaster as a community. Women are heavily involved in those areas during post-disaster recovery and response.

Ms. Shaukat pointed out that when the non-profit sector worked on floods, it was realized that services the state provides cannot be replaced. The government, at all levels, needs to be active in its response because no one else can complete the enormity of the task that is the state's responsibility. She added that the level of development and women's empowerment is very low in Sindh. While Hyderabad and Karachi are far more developed than the rest of Sindh, some areas of Sindh are at par with sub-Saharan Africa with extremely low human development indicators. She linked this low level of development with the fact that women were not involved in household decisions regarding property, marriages, voting, education and health.

Ms. Shaukat's research showed that relocation allowed women to be more empowered. Following the flooding in recent years, seven million people in Sindh were dislocated and came to urban areas. This was the first time many women came in contact with a different social setting and had stepped outside. Women became involved in voluntary services in the camps. Women surveyed in areas where households had



Session presenters Ms. Zeenia Shaukat, Mr. Hussain Dars and Dr. Lubna Ghazal



relocated and shifted back were more confident. She recommended that marginalization needed to be addressed through access to assets and social protection. Ms. Shaukat concluded by stating that the water-climate-energy nexus is essentially a development challenge and investments need to be made into women's empowerment.

Dr. Abid Hussain then presented his research on the linkages between water and food security due to climate change in Nepal and Pakistan. In a survey of Upper Indus Pakistani households and households in Koshi, Nepal, survey results showed that climate change was perceived as causing natural disasters, livestock disease and difficult weather. He began by stating that food security is attained through food availability, accessibility and utilization. Climate change impacts on food security include reduced agricultural productivity, income, increased dependence on external food sources, rise in food prices, reduced food variety and dietary diversity, and increased health hazards due to disasters. In other words, climate change impacts all aspects of food security.

In both Nepal and Pakistan, approximately 40 percent reported reduced agricultural productivity in their main crops due to climate change. Households are now more dependent on external food sources resulting in spending more monthly household incomes on food. Households are adapting to climate change by switching crops, decreasing livestock rearing, changing planting practices, and by investing in disaster preparedness. He clarified that water availability will not be affected in the Indus Basin until 2050, however, the frequency of natural disasters is projected to increase.

Further, he stated that there is a lack of scientific data in relation to climate change. Data is required to make appropriate changes. The chair pointed out that communities are already adapting to climate change such as shifting crops and these changes need to be capitalized on.

Dr. Abubakr Muhammad, from LUMS, was the next presenter. He introduced integrated water systems analysis and began by stressing the complexities of a watershed when we take a systems approach. In addition to freshwater usage, water systems analysis incorporates additional aspects of water management including water technologies, ecosystem, climate change, energy, agriculture, technology, land use and demography. Thus, he argued, there is a need for these data driven models in governance. Participatory irrigation management, water entitlements, water



Dr. Abubakr Mohammed from LUMS speaking at the session

accountability all need modeling systems before they can be implemented.

Modeling water systems in Pakistan are complicated by our highly engineered irrigation network, weather uncertainties such as floods, droughts and abstruse water sharing mechanism. However, modeling systems can integrate all of these elements. Water systems analysis can be linked with food production through data. If data shows that a particular location is getting a certain amount of water, the level of food production in that area can be predicted. If these figures do not match, the reasons for that can be explored. Hydropower can also be included in this integrative system. Dr. Muhammad concluded by expressing his interest in how hydro-kinetics can be linked to power smart infrastructures like telemetry and gate automation.

Mr. Ghulam Hussain Dars presented his research on the potential impacts of climate change on extreme precipitation in the Columbia River Basin in the US. He used multiple climate change models to predict future precipitation and discovered that every model has its own set of weaknesses and uncertainties. When four different General Circulation Models (GCM's) were used in a multi-model analysis, it was more accurate in predicting winter precipitation. He informed the audience that there is no "perfect" climate change model for predicting future weather because every model has its weakness or uncertainties. When a variety of different GCM's were used in a multi-model analysis, it was more accurate in predicting winter precipitation.

Dr. Lubna Ghazal was the last presenter of the session. She showcased her work on the impact of depleting water resources on food production in the rural areas



of Karachi. She informed the audience that the demand for food and water in Karachi was growing with the rapid increase in population. Groundwater is being depleted around Karachi thus reducing agricultural productivity in peripheral areas. Tubewells were installed, especially in years of drought leading to more groundwater being depleted.

A geospatial land cover analysis of Karachi has shown that vegetation has generally declined though some new areas of vegetation have emerged. Dr. Ghazal added that whenever rainfall has increased, so has vegetation. This can be seen in Gadap and other adjoining rural areas, demonstrating the dependence of Karachi on rainfall. Agricultural crops grown and cultivated lands are completely dependent on water availability in this region. Sand and gravel excavation from rivers for urbanization, reduced rainfall, and depleting groundwater resources are negatively affecting the production and incomes of farmers around the Karachi areas. Dr. Ghazal warned that while the government, NGO's and the communities have introduced new varieties of crops and irrigation systems, there was more work needed to be done. She concluded by calling on all stakeholders to work in tandem and increase collaborative research.

Questions and Answers

Ms. Shaukat pointed out in response to a question concerning ways to empower people that the basic requirement for empowerment is more state in the lives of citizens. She added that women require access to assets and access to skills, citing research that shows that women who have benefitted from skills and assets program are more empowered in their households.

A major point of discussion was ways of integrating academic research findings with policy. The most pertinent research findings are often presented in academic conferences where relevant stakeholder presence is low. Research institutes should collaborate with NGOs to impact policy and community. Dr. Abid informed the audience that all research of ICIMOD is shared with government. ICIMOD also organized a conference in Islamabad and presented all of its research to all stakeholders. However, research is generally disconnected from policy in Pakistan. We need to, as a country, think of ways to integrate research with policy.

A question was asked about the impact of Bahria Town on rural areas near Karachi. Dr. Ghazal responded by predicting that Bahria Town is going to diminish surrounding agricultural areas. She mentioned that

no environmental assessment was done before the Bahria Town project began and stressed the need for such impact evaluations before new projects are started.

Warabandi system also came under discussion. Dr. Muhammad stated that in his experience *warabandi* schedules were done fairly well in Bahawalpur district. However that region has a significant presence of irrigation department and may not be representative of the entire province. He said more research is needed to see other areas and come to a definitive conclusion about *warabandi*. Moreover, *warabandi* has not yet been compared with any other system to see which works better. The last question asked was regarding best mechanisms for agriculture in an arid zone. Dr. Hussain pointed out that climate-smart agriculture is a concept under which considerable research is being done. The Pakistan Agricultural Research Council is also working on this.

Conclusions

The session highlighted the challenges and the importance of the water, climate change, food and energy nexus and brought to light its relevance in today's world. It was agreed that more work needs to be done on this nexus of water, climate change, food and energy.



3.14 Young Men and Women: Harnessing the Demographic Dividend for Water Security (Session 5C – Panel Discussion)

- Chair:** Mr. Sarfaraz A Rahman, Engro Foods
- Facilitator:** Dr. Daanish Mustafa, Kings College, London
- Panelists:** Mr. Tofiq Pasha Mooraj, Hisaar Foundation
Dr. Imran Ahmed, NEDUET
Mr. Favad Soomro, Engro Corporation
Mr. Hassaan Khan, UMass Amherst
Ms. Beenish Qureshi, Funverks Global
Ms. Hadiqa Maqsood, NEDUET

The objective of this interactive session was to enable a dialogue between the voices of experience and the young professionals starting their careers in Pakistan's water sector. The discussion revolved around the alarming lack of awareness regarding Pakistan's water challenges among the youth. Various ways to involve the youth in solving water issues were debated. This session was jointly sponsored by Mag Tech, Action Aid and Hubco.



Session chair Mr. Sarfaraz A Rahman with exuberant & young session panelists Ms. Beenish Qureshi, Mr. Hassaan Khan and Ms. Hadiqa Maqsood

Opening Remarks

Session Chair, Mr. Sarfaraz Rahman introduced the interactive session designed to discuss ways to leverage the youth bulge in Pakistan in relation to the environment and water. The session was comprised of two parts. In the first part, the speakers introduced themselves and spoke briefly about the challenges of engaging the youth in Pakistan's water sector. In the second part, the audience expressed their opinions on the topic.

Panel Discussion

The first discussant was Dr. Imran Ahmed, professor at NEDUET, who spoke about how the lack of expertise in the field of environment motivated him to pursue this field. With a PhD in water quality modeling from Iowa State, he has served as a research fellow in the US and Canada for several years. He noted that based on his experiences in the US, Canada and Pakistan, he found the Pakistanis to be the least concerned with regards to water issues. He urged the youth to pursue this issue in a social and technical capacity.

The second discussant was Mr. Tofiq Pasha Mooraj, who started by emphasizing how every individual is part of the environment and hence a stakeholder in the issue of water. He mentioned how a rural tree plantation program got him involved in the water sector. He added that water is synonymous with life and it is an essential part of life. He emphasized the alarming state of water challenges in Pakistan, and warned that today's youth will be the most affected by these issues in their adult lives. Thus, it is their responsibility to engage with the water sector and work to develop solutions.



Panelists-Voice of Experience Mr. Favad Soomro, Mr. Tofiq Pasha Mooraj, Dr. Imran Ahmed with session chair Mr. Sarfaraz A Rahman



The third discussant was Mr. Favad Soomro, from Engro, who spoke about the importance of water as a key component of the value chain in all major corporations. During the course of his career, he has been inspired by many personalities that were present in the session. He wants to create more consciousness in the business community about water.

The fourth discussant was Ms. Beenish Qureshi, who pointed out that there is a knowledge deficiency in environmental studies in Pakistan. This field has been ignored historically, but can be revived through awareness campaigns in schools and colleges focused on the role of youth in solving the water problems. She added that as a primarily agricultural country, water and irrigation engineering were very important fields. She encouraged the youth to reach out to professionals working in the water sector.

The next discussant was Mr. Hassaan Khan, a PhD candidate in environmental and water resources engineering at the University of Massachusetts Amherst. He spoke about the pushback he faced when he decided to pursue environmental engineering in his undergraduate study. Due to lack of awareness, very few individuals could understand the scope of his field. Highlighting the knowledge gap in Pakistan's water sector, he added that the lack of turnover in water resources professionals in the government institutions prevents the younger generation from getting involved. He added that there is a huge intellectual vacuum in Pakistan's water sector which presents opportunities for the youth to get involved.

The last discussant was Ms. Hadiqa Maqsood, a research associate at the Water Modeling Centre (WMC) at NEDUET. During her undergraduate education in urban engineering, she was exposed to water systems analysis. That motivated her to pursue water modeling as a career and obtain her masters in water management in the UK. During her time there, she realized that Pakistani youth are very talented and given the awareness and opportunities, they can provide solutions to the current water issues.

Discussion

Mr. Sarfaraz Rahman began the discussion by noting that a major reason for failure of water discourse in Pakistan was a lack of public awareness. He admitted that even with his extensive marketing experience in Pakistan, he has struggled to raise awareness regarding water challenges. Based on his experiences in the private sector, he mentioned that it takes years of efforts and investment to create sustained awareness,

something that only the state is capable of doing. Mr. Khan replied that one way to engage the youth is by exposing them to opportunities in the water sector while they are still in college and considering which careers to pursue. Ms. Qureshi added that it is necessary to raise awareness at a much earlier stage in primary school, along with reaching out to parents to educate them. Mr. Pasha remarked that reaching out to teachers might be the most effective and sustainable way of raising awareness.

Mr. Soomro pointed out that a significant number of the Pakistani youth was not in schools and suggested we look beyond the formal education system to create an active consciousness about the value of water. Noting that a lot of the youth actively used the internet, Ms. Beenish Qureshi added that the power of social media could be harnessed. Dr. Daanish Mustafa took the discussion further by emphasizing the importance of a social sciences-based approach to studying water problems in Pakistan where water issues are usually associated with engineering. He added that most of the water challenges are social issues, which is why it must also be studied under the lens of sociology, anthropology and even literature.

An audience member highlighted the challenges faced by those who pursued careers in the water sector due to a lack of consumerism for water. He attributed this to the low value placed on water by a society, where water is often effectively free. Dr. Ahmed then emphasized his point about a lack of concern regarding our water issues by asking the audience if they knew the source of their water. Most of the audience was unaware. Highlighting wastages in the water sector, he added that agriculture accounts for 93% of total water usage in Pakistan, of which 50% is wasted.

Conclusions

Mr. Sarfaraz Rehman concluded the session by thanking the panelists and the audience for a lively discussion and warned that future generations will suffer gravely if Pakistan's water issues continued to be ignored.



Session participants



3.15 Water for Life: Keep our Rivers Flowing (Session 5D – Papers and Consultation)

Chair: Mr. Hammad Naqi Khan, WWF-Pakistan

Facilitator: Dr. Pervaiz Amir, PWP and Hisaar Foundation

Presenters: Ms. Tayyaba Makhdoom, University of Sindh
Ms. Sanaa Baxamoosa, Hisaar Foundation
Dr. Rahat Jabeen, WISP
Mr. Maqbool Ahmed Durrani

The presentations in this session highlighted the importance of sustaining ecosystem services in the Indus River, especially in the delta. The discussion pointed out how the environmental and economic impacts of dwindling river flows are often not fully acknowledged and incorporated in water management in Pakistan. This session was sponsored by Hisaar Foundation.



Dr. Rahat Jabeen, presenter, with Session Chair, Mr. Hammad Khan and Dr. Pervaiz Amir

The Session Chair, Mr. Hammad Naqi Khan, opened the proceedings by stating the subject was close to his heart and explained how, in the early 1990s, the WWF-Pakistan was able to introduce the concept of “environmental flows”. He remarked that people often talk about “flows downstream from Kotri”, without fully understanding the importance. WWF-Pakistan’s stance was that rivers should not run dry. He then invited Ms. Tayyaba Makhdoom to present her paper.

Papers and Presentations

Ms. Makhdoom introduced herself as a business student who had conducted some research on fishing downstream of Kotri Barrage. She submitted that natural resources per se do not guarantee wealth; they must be properly allocated. Her research had

uncovered that decreases in storage water downstream of Kotri have a negative impact on fish populations. The Pakistan Fisherfolk Forum report states that fisheries have declined from 5,000MT in 1951 to 292MT in 2011. She said water flows downstream of Kotri remained persistently below the minimum environmental requirements.

She provided an overview of the fishing industry in Sindh and spoke about the methodology of her research on the Palla fish. She concluded by stating attention should be drawn to the fishing industry in Sindh and that there was a positive correlation between fish production and water flows down-stream of Kotri. She added that official information about the number of fishing licenses granted did not reflect the practice. She concluded by noting that during low-flow periods, fisherman often resisted obtaining a license because of the costs involved and hence made it difficult to properly ascertain fish production properly.

Next, Ms. Sanaa Baxamoosa presented her paper on the sustainability of the Indus Delta. She submitted that the Delta needed to be understood within the larger context of the country. Whilst presenting an overview on the Delta, she pointed out that available information on the Delta was either too scant or too old. She provided the methodology of her study and spoke of the Indus Apportionment Accord of 1991 as a “historic event”, as the recognition of environmental flows led to the Accord providing for 10MAF downstream of



Presenter, Ms. Sanaa Baxamoosa, Hisaar Foundation



Kotri Barrage. She said silt in the Delta was down from 400MT to 100MT and that sea-level rise was recorded at 1.1mm per year and that number of Mangrove forests had dwindled from 8 to just 3.

Ms. Baxamoosa argued that although the Diamer-Bhasha Dam had a storage capacity of 8.1MAF, a significant volume would be lost in delivery and that only 2.3 MAF would actually reach the farm-gates. She said an equivalent amount of water could be provided without recourse to Diamer-Bhasha Dam through better management of water resources downstream. She lamented the discourse on the Delta was framed around Punjab and Sindh and submitted the discourse needs to be redefined to Head-Middle-Tail and between Rain-Fed/Irrigated.

Responding to a question, Ms. Baxamoosa discussed the political economy of the changes proposed. Dr. Parvaiz Amir submitted that principled pragmatism was required. Given that most water in Pakistan accumulates in the Kharif period and during precipitation in the winter months, he warned that river flows could not be regulated through better downstream management alone. He added climate change threatened the entire Delta and remarked that the challenges to small communities must be placed in the context of the larger challenges in the country.

Dr. Rahat Jabeen was next to present on the importance of adequate ecosystem management practices in the Indus Basin. She began by remarking that water was a driver of nature and outlined the various ways in which water acts as the transport mechanism for many of the Earth's processes including the water cycle, nutrient replenishment and habitat for several different species. Emphasizing the importance of ensuring sustainable river flows, she mentioned that in many areas, river recharge is a significant component of groundwater flux. Dr. Jabeen highlighted the cultural importance associated with rivers, and the historical importance of rivers in supporting ancient civilizations.

She then provided an overview of the water resources of Pakistan and a comparison of the areas drained by various water bodies. Dr. Rahat called attention to the ironic state of affairs where the Indus Delta was rapidly receding due to reduced river flows, while at the same time desert area in southern Punjab was over-irrigated leading to waterlogging. She provided pictorial evidence showing the dramatic negative impact on flows in the Indus River due to the Kotri Barrage. The images of the Indus River showed significantly reduced channel

flow with detrimental effects on the fishing industry in lower Sind. She warned of graver consequences for the region if the rivers were not kept flowing and concluded by noting that currently there was no political will to affect change in water management practices.

The Session Chair then requested Mr. Maqbool Durrani to screen his thought-provoking documentary. Mr. Durrani explained the documentary took over a year to produce, mostly because of the time taken for location shots.

Conclusions

Mr. Hammad N. Khan, the Session Chair then concluded by restating the need for a proper study of the Basin and for reliable data on the Basin. Without reliable information, the discourse on the Basin had become politicized. He submitted the need of the hour was to navigate away from extreme positions.



Presenter, Ms Tayyaba Makhdoom with
Mr Maqbool Durrani, filmmaker



3.16 Role of Media in Integrating Diverse Stakeholders on Water (Session 6A – Panel Discussion)

Chair: Mr. Taher A Khan, Chairman, Airwaves Media Pvt Ltd

Facilitator: Ms. Simi Kamal, Hisaar Foundation

Presenter: Ms. Seema Taher Khan, Airwaves

Panelists: Mr. Azhar Abbas, Geo News
Mr. Shakeel Masud Hussain, Dawn News
Mr. Arshad Zuberi, Business Recorder
Mr. Mohammad Aslam Kazi, Kavish

This session, involving several members of the electronic and print media, focused on the importance of media in raising awareness regarding Pakistan's water challenges. The current shortfalls in coverage of water issues were discussed along with tangible steps that can be taken to ensure a sustained effort to effectively bring the water issues into national discourse. This session was sponsored by Airwaves Media.

Presentation on Role of Media in Integrating Diverse Stakeholders on Water: Ground Reality and Alarming Facts

Ms. Seema Taher Khan started the proceedings by speaking about water as a finite resource in Pakistan. Mentioning the lack of storage capacity, she added that we are moving from water stressed status to water starved status due to a lack of planning around water. There is a lack of storage facilities. Existing resources need to be managed and protected from both contamination and wastage. There is wastage resulting from things as simple as crop choices. She presented various images from around the world and Pakistan displaying the dramatic impacts of water scarcity on people's lives. From drought-stricken barren lands to corpses of livestock to people drinking severely polluted water, the images conveyed the urgency of the situation and the tangible impacts on people's lives.



Session presenter
Ms. Seema Taher Khan, Airwaves

Ms. Khan bemoaned the lack of a narrative or lobbying on the transboundary water issues. Media can play a vital role, she said, in raising awareness and pressurizing both the federal and provincial governments through the digital, social and print media. She concluded her presentation by calling on media representatives to take ownership of the issue and consider a comprehensive water strategy for 2015-2025.

Media Campaign on Water

Hisaar Foundation's television campaign for water awareness was then presented. Leaders of Media Houses shared their thoughts on the campaign followed by an open discussion involving the audience. The various media outlets gathered at the session acknowledged their responsibility and stated their willingness to raise awareness for the water problem through their channels. However, they stated the need for the civil society and water experts to develop an action plan for the media based on achievable goals.

Panel Discussion

The panelists agreed that water issues in Pakistan are multi-dimensional, however current discourse on water issues in the country lacks nuance to deal with the complexities of water management, such as international transboundary issues, interprovincial water accords and climate change. The issue needs to be segmented with relevant messages to relevant people. This further augmented the need for a defined action plan with relevant audiences. The panelists reiterated that complex issues need to be simplified and tailored for relevant audiences. They added that farmers and agriculturalists cannot understand complex media messages and may not even have



access to media. Regional media needs to be heavily involved in this campaign with targeted messaging for the rural end-user.

The discussants also highlighted the need for sustained awareness regarding the water issues. Media messages that are remembered by people are those that are repeated daily so a talk show once in a while is not sufficient coverage. People have short attention spans so media campaign needs to be long, comprehensive and consistent. Some participants suggested that corporations use their CSR funds to buy primetime airtime. If the water challenges can be framed in terms of a controversy, then it can get the attention it merits.

Media needs to involve itself in order to get all stakeholders involved. The government needs to lead the way and encourage the private sector to invest in developing resilient water infrastructure. The panelists complained that the government's thinking is limited to securing money for infrastructure projects from international financial institutions. They also identified certain factors as major hindrances to good governance and inability of government to look at the water problem. Distrust between provinces can prevent potentially useful water conservation projects.

Conclusions

It was acknowledged that the media itself needs education on the topic. Current coverage of water issues in Pakistani media is constrained to a few English language papers and journalists who have a personal stake in the environment. It was agreed that view on media is always engineering-centric, often mirroring the one-dimensional approach taken by the government to tackling the water issues. This needs to be replaced with a contextual understanding of water – encompassing the social, economic and environmental dimensions.

It was recognized that a media campaign needs to be organized, which is clear and results-oriented. The participants acknowledged the enormous power that rests with the media to change the narrative around water. An action plan that goes beyond debates, talk shows and advertisements needs to be jointly adopted by the media houses. Experts, government, end-users all have to come together to work on problems and solutions that are beyond politics. Keeping the message apolitical will ensure its integrity. The session ended with remarks from the audience on the need to decide what the priorities should be for Pakistan in terms of its water use.



Session chair Mr. Taher Khan, presenter Ms. Seema Taher Khan with panelists Mr. Azhar Abbas, Mr. Shakeel Masud Hussain, Mr. Mohammad Aslam Kazi, Mr. Arshad Zubari & Ms. Simi Kamal



3.17 Managing Groundwater, Floods and Droughts (Session 6B – Paper and Consultation)

Chair: Mr. Khalid Mohtadullah, GWP and Hisaar Foundation

Facilitator: Mr. Zulfiqar Halepoto, Environmentalist

Presenters: Ms. Ilaria Carpen, UNDP Balochistan
Ms. Sanaa Baxamoosa, Hisaar Foundation
Mr. Hassaan Khan, UMass Amherst
Ms. Hadiqa Maqsood, NEDUET
Dr. Abdul Latif Qureshi, MUET

Presentations in this session focused on scientific approaches to managing water hazards in Pakistan. The discussion touched on the alarming levels of groundwater depletion in Punjab and Balochistan, drought assessment in Balochistan and economically optimal water allocation in Sind. This session was jointly sponsored by Sustainable Development Policy Institute (SDPI) and Oxfam.

Papers and Presentations

The first presenter, Mr. Hassaan Khan from UMass Amherst, presented his work on a groundwater model developed for Punjab. He started with the state of existing literature on groundwater policy in Pakistan and mentioned that most water resource management studies in focus solely on surface water. The existing groundwater models for Pakistan are limited in their spatial extent, as they are mostly for a district level or a specific canal. The two objectives of the study were to develop a physically based groundwater model for the province of Punjab, and to use that calibrated model to evaluate groundwater dynamics in the future. The future scenarios comprise of controls on groundwater pumping, canal infrastructure improvements and precipitation changes.

Mr. Khan informed that the results indicated that seepage of canal water into the aquifer forms the biggest component of the groundwater flux, while



Mr. Hassaan Khan, UMass

the effect of changing precipitation is negligible. He added that under status quo conditions, the average province-wide pumping cost is projected to increase by 270% in 23 years. Areas in southern Punjab were most vulnerable to water logging. The results indicate a much worse situation for main urban centers, where even in the best case scenarios groundwater tables are projected to decrease. Mr. Khan concluded by emphasizing the need for regular groundwater monitoring. He also highlighted the need to re-evaluate our canal water allocations and enforce some control on groundwater usage.

The second presenter was Ms. Sanaa Baxamoosa who spoke about drought management in arid zones. She started by identifying different kinds of droughts and added that droughts can be managed with the proper institutions. She explained four basic experiences of drought: meteorological drought which is lack of precipitation over specific time and region, hydrological drought is the effect of the former drought on surface and reservoir level, agricultural drought is the effect of former on productivity and lastly socio-economic drought which is a decline in food entitlement where the demand exceeds the supply due to weather related hazards. Ms. Baxamoosa explained how drought is experienced specifically in the agro-pastoralist area.

Ms. Baxamoosa remarked that vulnerability to drought depended on several factors including physical asset base, land, livestock, cash, human capital and social capital. Based on her work, she called for a better understanding of vulnerability indicators along with a need for integration of coping strategies and designing resilience and awareness programs. She concluded by noting that a framework of drought based on agro climatic zones needs to be formulated and tailored to the different sectoral and geographical areas to build robust drought resilience.



Presenters Ms. Ilaria Carpen and Ms. Sanaa Baxamoosa,

Next, Ms. Ilaria Carpen of UNDP presented results from a drought assessment in Baluchistan, carried out in response to a request from the Baluchistan Provincial Disaster Management Authority. She said that the objective of the drought assessment project was to understand the nature of droughts in the province, analyze coping mechanism and to provide policy recommendations. The assessment revealed very high levels of groundwater abstraction resulting in a rapid decline in groundwater tables. The district of Pishin, Mastung and Loralai were found to be especially vulnerable to agricultural droughts. The study also found that extended drought resulted in a reduction in cropped area of 17-40%, and a reduction in cereal crop and vegetable crops of approximately 10% along with a loss of livestock animals.

Ms. Carpen also spoke about the social impact of drought, including impact on child education and gender equity. She remarked that women are affected more by drought because they have to travel longer distances to fetch water. While acknowledging the challenges in mitigating drought in Baluchistan, Ms. Carpen presented some recommendations including formulation of provincial drought policy to provide a framework for risk-averse management and establishing a provincial drought task force for implementation and monitoring of the policy. She ended by highlighting the need for increased quality research on water resources in Baluchistan.

The next presenter was Dr. Abdul Latif Qureshi, who presented results from a water systems analysis for the Jamal Shah distributary of Rohri Canal. He started

by emphasizing the importance of effectively managing our water resource to maximize benefit to the society. In the study he presented, a linear optimization systems model was developed to determine the optimal levels of various decision variables to maximize farm output. An analysis of the flow delivered into the Jamal Shah distributary command revealed a shortfall of up to 26% of the total crop water requirement. He added that the model was developed and calibrated using discharge data, cropping patterns, cropping intensity, net return including availability and operational factor of the tubewell water.

The model indicated that the actual net benefit computer for one crop year comes to Rs 288.7 million. Furthermore to increase the maximum net benefit, various scenarios were developed with different cropping patterns and utilizing tubewell water during the shortfalls. He added that the results suggested prioritizing cropping of vegetables and utilizing groundwater only on hot days, when the crop water requirement is high. Dr. Qureshi ended by recommending that storage reservoirs be developed at the head reach to make up for the shortfall in crop water requirements.

The last presenter was Ms. Hadiqa Maqsood, who spoke about a modeling study for assessing the hydro-ecological impact of Thar Coal produced water. The objective of the study was to evaluate the hydrological byproducts of mining and to design an adequate disposal mechanism for the produced water. Explaining the details of the study, she informed that approximately 25-40 cusec groundwater was being pumped and needed to be disposed safely. A proposed disposal pond had been identified and the study evaluated whether the site was adequately designed.

The work involved using surface and subsurface water modeling to assess the hydrologic impact. Rainfall accumulation was determined and added to the annual disposal volume of produced water. Results show that the proposed site will become fully saturated in 822 days. The model also showed precipitation to have a negligible effect on inundation of the site. Once the disposal site is filled up, the water would inundate the neighboring villages and wetlands, extending southwards towards the Indian border. She concluded by proposing an alternate design with adequate storage to safely dispose the produced water.

An audience member highlighted the disconnect between policy and science in Pakistan and asked Mr.Khan how the results from his groundwater modeling could be used in developing policy.



Mr. Khan acknowledged the gap between policy and science, but added that policy formulation was out of the hands of the researchers. Another audience member asked which government organizations were responsible for monitoring groundwater data. Mr. Khan mentioned the SMO division in WAPDA was responsible for collecting the data, but they do so only in KP and Punjab. He further added that due to lack of groundwater observation data, he could not extend his model to include Sind.

Conclusions

The Session Chair, Mr. Khalid Mohtadullah concluded the session by thanking the presenters and highlighted the impending crisis of saltwater intrusion into the aquifers. He added that groundwater is a great endowment for Pakistan, and suggested that it is our strongest safeguard to deal with climate change. He also pointed out that legislation only is not enough; he recommended that we have to incentivize our approaches. Mr. Mohtadullah closed the session by noting that Pakistan must also develop storages to cope with water demand.



Session Chair, Mr. Khalid Mohtadullah



Session participants



3.18 Role of Stakeholders; Innovation and Affordable Solutions (Session 6C – Presentation and Consultation)

Chair: Mr. Sarfaraz A Rehman, Engro Foods

Co-chair/Facilitator: Mr. Zohair Ashir, Hisaar Foundation

Presenters: Dr. Sono Khangharani, Hisaar Foundation
Mr. Waqas Ahmed, MUET
Dr. Safi Moh Kori, MUET
Ms. Farzana Abbasi, SIDA

Presentations in this session focused on the role of stakeholders in the water sector in terms of developing innovative solutions and using technologies to better manage water resources. This session was sponsored by Bank Al Falah.

Papers and Presentations

The first presenter was Dr. Shafi Muhammad Kori who gave a presentation on 'Laboratory Study of Tile Drainage on Different Soil Textures'. His presentation was based on a comprehensive laboratory study on tile drainage was carried out in the Institute of water resources engineering and management, Mehran University of Engineering and Technology, Jamshoro. This research work includes the development of empirical formulae of drain spacing using two different soil textures. The hydraulic data i.e. flow rates (q) for various hydraulic heads (h), hydraulic conductivity of soil (k), drain depth above the impervious layer (D), drain radius (r) and spacing between the lateral drains (L) were collected. The relationships, in the form of empirical equations, for qL^2 with kh , kD and kh^2 were established. The results revealed that the drains spacing increases with increase of drain depth from impervious layer and soil hydraulic conductivity; and the drain spacing decreases with increase of drain size and drain specific discharge.

Ms. Farzana Abbasi was the second presenter in the session who spoke on 'Farmer Organizations (FOs) & Participatory Irrigation Management (PIM)'. The presentation was aimed at advocating the case of performance of 100+ beneficiary Farmer Organizations (FOs) which successfully implemented the Participatory Irrigation Management (PIM) Model at Minors & Distributaries level. Unfortunately their contribution in success of PIM was not recognized. In particular case of the beneficiary FOs they were not constituted under SWSIP or orientated by SIDA. They were adopted by SIDA and their capacity building was undertaken under SOFWMP. The major strength of the PIM may

be attributed primarily to the intensive involvement of Farmer Organizations (FOs) in consultations, decision-making, monitoring the implementation process.

The beneficiaries FOs expressed their deep appreciation for water reaching at tail ends increase in GCA, reduced number of breaches and water logged area, water reliability in terms of design discharge and need, increased water availability according to gauge, increased cropping area in tail reach and increased per acre yield of *kharifandrabi* crops. Equity in water distribution by using proxy indicators such as number of legal /illegal water courses, incidence of water tempering was found invisible. Satisfaction in terms of water availability in time and conflict resolution, increased confidence building and frequency of General Body (GB) meetings were reported. The Socio-economic indicators such as increase in sources of income at household level, number of earning members, improved health & education status of children and families were also found. In addition to above the FOs also reported increased perception and belief in democratic practices such as; re-elections, *Abiana* collection, Channel Operation & Maintenance and increased interest in developmental activities.

The third presenter was Mr. Waqas Ahmed. He presented the 'Hydroinformatics: How technology can help in involving all stakeholders in water resources planning?' His presentation was provide a framework for IT based decision support tool for water resources infrastructure investment, which will include stakeholders concerns as an input. This tool will provide decision makers to justify their investment in front of all related stakeholders. He further discussed that as far as water resources planning is concerned there is a conflicting world. He said that engineers are not the only ones making the decision, there are a number of stakeholder involved such as citizens, NGO's, politicians and media. The solution to the problem is possible with developing an IT based decision support



tool, which is acceptable to all stakeholders. Acceptability to stakeholder means that it should address their concerns (such as water distribution according to law etc.) as input to the decision process, so that the output such as to construct the water storage or water distribution is acceptable by all stakeholders.

He said the question is, whether big water reservoirs should be constructed or not? Even if the purpose is to ensure water supply to the cities/agriculture, power generation or to protect the downstream against floods, the project faces political conflicts, national or provincial over the water rights, which makes the decision process not only continue for decades but also leads to a political deadlock.

Dr. Sono Khangharani was the last presenter of the session. Dr. Khangharani presented the 'Innovative and Affordable Solutions: Success Stories in Tharparkar. In his presentation he gave statistics on the district Tharparkar and the drought crisis of 2014-15. He spoke of the causes of drought, and the impact of drought on human life, land and livestock as well. He also proposed solutions of surface water management and groundwater management. He said the rainwater harvesting is the only opportunity for using surface water at household, *mohallah* and village levels. He further discussed the household level solution, *mohallah* level solution and village level solution in detail. He also discussed the benefits of rainwater harvesting. He said that groundwater can be managed through dugwells. He said that the burden of women who normally have to pull water from the wells can be eased due to solar powered dugwells. In the end he gave recommendations of low-cost but effective innovations using a gender-friendly approach, indigenous knowledge, community engagement, and proposed environmentally friendly technologies that were rooted in local contexts.



Dr. Sono Khangharani, CEO Hisaar Foundation

Conclusions

Mr. Sarfaraz Rehman, Session Chair, concluded that innovation and affordable water solutions are to be designed in the context of poor communities and their needs. He emphasized that academia, research institutions, executing agencies and civil society organizations should share their new ideas with all the stakeholders and devise a mechanism whereby the final product is adopted and scaled up by end users (community). He thanked all the speakers for their valuable inputs and closed the session.



Dr. Sono Khangharani, Session Chair Mr. Sarfaraz A Rehman, Ms. Farzana Abbasi, Mr. Waqas Ahmed and Dr. Safi Moh Kori



3.19 Water for Cities: Making the Metropolis More Manageable (Session 6D – Papers and Consultation)

Chair: Dr. Noman Ahmed, NEDUET
Facilitator: Dr. Pervaiz Amir, PWP and Hisaar Foundation
Presenters: Dr. Ihsanullah Khatak, University of Peshawar
 Ms. Rabia Tabbasum, FAST NUCES
 Dr. R. B. Mahar, MUET
 Mr. Usman Mirza, LEAD Pakistan

The objective of this session was to highlight approaches towards ensuring sustainable urban water supplies. The presenters spoke about various technological and economic assessments to help utilities conserve, provide and price water accordingly. This session was sponsored by United Bank Limited.

Papers and Presentations

Dr. Ihsanullah Khattak, from the University of Peshawar opened the session by presenting his paper on the available and projected water resources in Karachi. Karachi, the commercial hub of Pakistan, has the highest population growth rate in the country, leading to a rapid increase in demand for water. The city, with an average daily demand of 1000 MGD, receives only 630 MGD, resulting in a large deficit. Additionally, about 35% of supplied water is usually lost due to leakages and faulty delivery infrastructures. Currently, water supply in Karachi is intermittent, irregular and inequitable.



Dr. Ihsanullah Khatak, University of Peshawar

Dr. Khattak identified and mapped existing water resources for the city using high Resolution Satellite Remote Sensing (SRS) data, and explored alternate water sources for the future. He presented an overview

of the surface and groundwater availability in Karachi over the past few decades. Currently, most of Karachi's water supply comes from Indus River and Hub River. Groundwater resources, already minimal due to the low precipitation in the area, have been tapped rapidly and are now depleting. He emphasized the urgent need for developing alternate water treatment technologies such as desalination to meet the growing water demands. He added that there is an urgent need to increase water conservation efforts. He concluded by recommending an increased water supply to Karachi from the Indus River since desalination was not an economically feasible option currently.

Next, Ms. Rabia Tabbasum from FAST presented her paper on the estimation of water demand for commercial units in Karachi. Ms. Rabia began by providing a comparison of the water usage between domestic, commercial and industrial sources in Karachi. Commercial usage accounts for 10% of total water usage in the city. She defined commercial water use as that which take place in office buildings, hotels, restaurants and other non-industrial commercial facilities. Due to an increase in Karachi's commercial activity, there has been a higher demand for water. A survey of 300 commercial outlets was conducted to assess the daily water usage.

Results show that the mean total water use in commercial areas is estimated to be about 47 liters per day. The survey showed that the commercial water requirements were significantly greater than their current water allocation. From the survey, mean daily water consumption per employee was 10 liters. Ms. Tabbasum added that per capita water usage in Karachi was significantly lower than that of other major cities. She ended by noting that a comparison of the water use by various commercial entities revealed that restaurants have the highest water consumption average, whereas cosmetic shops have the least.

Next, Dr. Rasool Bux Mahar of MUET presented his study which aimed to quantify the *wudu* (ablution)



water generated from mosques, and enable recycling of that grey water. Under the Water Demand Management program, the study aimed to use a proactive method that enhances the quality and efficiency of water distribution. In order to quantify greywater produced from ablution, a flow meter was installed in a designated tap in mosques. In some cases a bucket was placed underneath the tap to collect the water and estimate water use.

An analysis of the results obtained through a survey of water usage in mosques across Hyderabad revealed that, on average, 7.4 liters of water (per person, per prayer) was consumed. Higher rates of water usage were observed in the summer months compared to the winter. Water quality parameters including pH, electricity conductivity, and turbidity for the greywater samples collected from the mosques were then analyzed. The analysis showed that ablution greywater was of sufficient quality for reuse in many household applications. Dr. Mahar concluded by stating that minimal treatment of this water can make it fit for usage and alleviate urban water scarcity.

The last speaker, Mr. Usman Mirza from LEAD, discussed water pricing, and the need to promote equity, efficiency and sustainability in Faisalabad. He began by stating that the allocation and distribution of water becomes a challenge in cities, and has a direct impact on socio-economic development. Inefficiency of water distribution leads to wastage of water in some areas, while other areas are completely devoid of water resources. Faisalabad is the third largest metropolis in Pakistan by population. Each of the various drinking water sources in the city is priced differently, depending on whether they are managed by governmental or non-governmental agencies.

Surveys conducted in Faisalabad showed a relationship between distance to water sources and the income of households. In high income areas, there is more access to water, while restrictions to purchase and consume clean water are placed on low income households. Household surveys revealed that people are willing to pay up to Rs. 3 per liter for access to clean and reliable drinking water. Such statistics can assist in analyzing the perceptions of consumers, which in turn provide useful insights to price water.

Conclusions

Dr. Noman Ahmed, Session Chair, concluded the session by recognizing all the presentations for their valuable insights and thanking all the speakers for enriching the discussion on Urban Water Management.



Dr. RB Mahar giving presentation, with Dr. Pervaz Amlr, Session Chair Dr. Noman Ahmed, and Mr. Usman Mirza



3.20 Declaration and Decisions for the Future (Session 7- Closing Plenary)

Master of Ceremony: Ms. Suroor Ansari

Speakers: Mr. Aman-ul-Haque, Manager CSR Engro Foundation
 Mr. Atif Bajwa, CEO Bank Alfalah
 Dr. Sono Khangharani, CEO Hisaar Foundation
 Dr. Daanish Mustafa, Assistant Professor King's College London
 Dr. Pervaiz Amir, PWP and Hisaar Foundation
 Ms. Seema Taher, CEO Airwaves Media
 Mr. Zohair Ashir, Chairperson Hisaar Foundation

The objectives of this session were to:

- **Present the Conference Declaration reflecting the insights gained throughout the conference based on presentations, discussions and views shared by the participants**
- **Facilitate conference partners in expressing their views on the issues raised at the conference**

This session was sponsored by Hisaar Foundation.

Presentation on Building on Partnership for Development



Mr Aman ul Haque, Engro Foundation

The closing plenary began with a presentation by Mr. Aman Ul Haque, of Engro Foundation, in which he spoke about building on partnership for development. Mr. Haque started by congratulating Hisaar Foundation for an engaging and stimulating

two days of discussion of Pakistan's water issues by stakeholders from all across Pakistan. He acknowledged that the water issues facing Pakistan were grave, and how one could easily get disillusioned if the problems were viewed at a macro level. However, he urged everyone to focus on the smaller scale and take steps in their personal spheres to develop solutions that can be scaled up.

Mr. Haque then briefed the audience on the history and development of Engro Pakistan. He mentioned the tremendous growth that Engro has experienced over the past decade, where revenue improved from Rs 10 billion to Rs 200 billion. Mr. Haque spoke about Engro's principles for investment in developing countries, and mentioned that Engro Foundation invests 1% of annual profits generated into communities. He emphasized the importance of enhancing capacity of its value chains and implementing inclusive business model. Citing an example of a technical college set up by Engro in Ghotki, Sind, Mr. Haque highlighted the benefits of promoting public private partnerships.

Mr. Haque then reviewed the impact of Engro Foundation's work in the agricultural and water sector and highlighted the various donor, implementation and knowledge partners that Engro continues to work with. He then presented his vision of an ideal project partnership where various partners including academia, provincial governments and the private sector combine to develop solutions to actual problems and where a business case for the solution can be made. He remarked that the best way to get private sector involvement is by presenting the business case. He concluded his speech by noting the importance of meaningfully involving the government in projects due to their ability to create substantial change on a large scale.



Future Directions

Mr. Atif Bajwa, CEO of Bank Alfalah, was then invited to share his thoughts. Mr. Bajwa lauded the efforts of



Mr Atif Bajwa, Bank Al Falah

Hisaar Foundation in raising awareness among the corporate sector about the water issues facing Pakistan. Mr. Bajwa recalled that the first time he realized the gravity of the problem was during the floods in 2010 when Dr. Salman Shah, ex-finance minister of Pakistan, remarked that "Pakistan had just dropped \$5 billion in the ocean". Mr. Bajwa highlighted the social and environmental

certification process introduced by Bank Alfalah, which requires customers to demonstrate that their projects don't have detrimental environmental outcomes. He remarked that this measure had reduced the business conducted by the Bank, as customers would rather go to another bank than consider the environmental impact of their actions. He added that this was a long and hard battle and one that Bank Alfalah was committed to fighting.

Changing the Water Paradigm In Pakistan

The next speaker was Dr. Sono Khangharani, CEO of Hisaar Foundation, who presented briefly on the vision



Dr. Sono Khangharani, Hisaar Foundation

of Hisaar Foundation and the recent projects that Hisaar Foundation has been involved in. He remarked that Hisaar Foundation's goal is to link the haves and

the have-nots, and to bridge gaps in knowledge, finance and policy. This vision is reflected in the various partnerships developed by Hisaar Foundation since its inception. He presented some of major nationwide projects initiated by Hisaar Foundation including school rehabilitation programs and water infrastructure projects in Thar and Jamshoro. Dr. Khangharani emphasized the importance of catering to the needs at the household level to ensure water security at the macro level.

The presentation then shifted to a discussion of the Think Tank priority areas for the next three years and the progress achieved on those priority areas. Next, Dr. Khangharani presented an update on activities of the Universities for Water Network (UWN) and briefed the audience on linkages between UWN and the Think Tank. He concluded his presentation by revealing Hisaar Foundation's vision for the next 5 years which focuses on consolidation of the Think Tank, growth and strengthening of the UWN and the establishment of the Hisaar Institute for Interdisciplinary Studies on Water.

Conference Declaration

Dr. Daanish Mustafa was then asked to read the conference declaration. Dr. Mustafa explained that this was a draft of the declaration and comments on the draft were welcome. The declaration emphasized the need to rationalize and depolarize the national, provincial and local level debates on water resources. It called for greater cooperation from the 'haves' who



Dr. Daanish Mustafa, Think Tank Member

appropriate the scarce water resources and violate relevant water usage laws, most notably in rural Punjab and Sind. The declaration also recognized that the poorest and most vulnerable populations have the greatest dependence on water based ecosystem services, and thus protection and preservation of the water ecology is required to address the needs of the most vulnerable.

The declaration highlighted the need for higher quality innovative water research based on good science. It especially emphasized incorporation of a social science dimension in water research beyond the traditional



confines of engineering. Gender and youth were identified as key focus areas in this conference. The consequences of continued exclusion of women in nearly all spheres of water policy were also mentioned. The declaration recognized the importance of attracting younger professionals from engineering, social science and humanities perspective to work in the water sector. Dr. Mustafa concluded the reading my reminding the participants that the inherent link between water and politics needs to be acknowledged and engaged with to develop pragmatic solutions to Pakistan's water challenges.

Remembering Dr. John Briscoe



Dr. Pervaiz Amir, Council Member, Hisaar Foundation

Following the declaration reading, Dr. Pervaiz Amir, the Hisaar Foundation Think Tank member presented a short tribute to Dr. John Briscoe, who passed away in November 2014. Terming Dr. John Briscoe a long term friend of Pakistan, he recounted several contributions made by Dr. Briscoe to Pakistan's water resources. The most notable of Dr. Briscoe's

work was a comprehensive World Bank report he co-authored in 2005 on Pakistan's water challenges and opportunities. He was an accomplished water expert and had worked extensively over four decades around the world. Dr. Briscoe was known for always speaking his mind, even if it ruffled feathers.

Dr. Briscoe believed that Pakistan's water sector was suffering from a lack of vision. He was critical of the inaction and ambivalence displayed by Pakistan's water agencies over the past decades. Dr. Briscoe was also very well versed with the water relationship between Pakistan and India, having spent 3 years living in New Delhi. He wrote extensively on the recent disputes between Pakistan and India with regards to activity upstream on the Indus, and remarked that the water issue was an existential issue for Pakistan. Dr. Amir concluded his tribute by thanking Dr. Briscoe for his contributions to Pakistan.

Water Tableau and Launch of Media Campaign on Water



AMI Students Water Tableau

This tribute was followed by an entertaining tableau performed by children from The AMI School. The performance artistically depicted the relationship between an agricultural community and the water cycle. Following the children's performance, Ms. Seema Taher Khan, CEO of Airwaves, spoke about the upcoming media campaign to raise awareness about water conservation. She began by showing the audience some of the promotional videos, featuring several prominent celebrities. Mr. Amir Yusuf was the creative force behind the graphics while the music was composed by Mr. Waqar Ali. The lyrics for the promotional song were written by Ms. Khan herself. She acknowledged the celebrities who took part in this campaign free of cost, and who have pledged to make themselves available in the future as well in support of this cause.



AMI students performing tableau during closing session



Abbreviations and Acronyms

AWS	Alliance for Water Stewardship	NGOs	Non-Government Organizations
BBCL	Big Bang Communications Ltd	NRSP	National Rural Support Programme
CBOs	Community Base Organizations	NUST	National University of Science and Technology
CEO	Chief Executive Officer	NWP	National Water Policy
COP	Conference of Parties	PDMA	Provincial Disaster Management Authority
CSR	Corporate Social Responsibility	PhD	Doctor of Philosophy
DC	District of Columbia	PIM	Participatory Irrigation Management
FOs	Farmer Organizations	PIDAs	Provincial Irrigation Development Authorities
FAO	Food and Agriculture Organization	PPAF	Pakistan Poverty Alleviation Fund
FAST NUCEs	National University of Computer and Emerging Sciences	PPL	Pakistan Petroleum Ltd
FPCCI	Federation of Pakistan Chambers of Commerce & Industry	PWP	Pakistan Water Partnership
GCM's	General Circulation Models	RDC	Raasta Development Consultants
GB	General Body	RSP	Rural Support Programs
GCA	Gross Command Area	SDGs	Sustainable Development Goals
GDP	Gross Domestic Product	SDS	Social Development Specialist
GWP	Global Water Partnership	SaciWaters	South Asian Consortium for Interdisciplinary Water Resources Studies
HANDS	Health and Nutrition Development Society	SAFWCO	Sindh Agricultural and Forestry Workers Coordinating Organization
ICT	Information and communications technology	SDPI	Sustainable Development Policy Institute
IBA	Institute of Business Administration	SJIBPP	Shahid Javed Burki Institute of Public Policy
IBIS	Indus Basin Irrigation System	SIDA	Sindh Irrigation and Drainage Authority
ICIMOD	International Center for Integrated Mountain Development	SRSO	Sindh Rural Support Organization
INGOs	International Non-Government Organizations	SRS	Satellite Remote Sensing
IRI	International Republican Institute	SWSIP	Sindh Water Sector Improvement Project
IRSA	Indus River System Authority	SZABIST	Shaheed Zulfikar Ali Bhutto Institute of Science and Technology
IT	Information Technology	TRDP	Thardeep Rural Development Programme
IWMI	Integrated Water Management Institute	UBL	United Bank Ltd
IWRM	Integrated Water Resource Management	UoM	University of Massachusetts Amherst
IWASRI	International Waterlogging and Salinity Research Institute	UN	United Nations
IWT	Indus Water Treaty	UNDP	United Nations Development Programme
KPK	Khyber Pukhtoonkhwa	UNESCAP	United Nations Economic and Social Commission for Asia and Pacific
KWP	Karachi Water Partnership	USPCAS-W	United States Pakistan Center for Advanced Studies in Water
LUMS	Lahore University of Management Science	UWN	Universities for Water Network
MA	Master of Arts	WAPDA	Water and Power Development Authority
MDGs	Millennium Development Goals	WISP	Water Sector Improvement Project
MENA	Middle East and North Africa	WMC	Water Modeling Center
MPA	Member of Provincial Assembly	WSP	Water Sanitation Programme
MT	Million Tons	WSP	Water Security Plan
MUET	Mehran University of Engineering and Technology	WWNs	Women and Water Networks
MoF	Ministry of Finance	WWF	World Water Forum
NEDUET	Nadirshaw Eduljee Dinshaw University of Engineering and Technology	WWC	World Water Council
		WWF-P	World Wildlife Fund-Pakistan



Time	Session & Topic	Session & Topic	Session & Topic
9.30 – 11.00	<p>Session 5A - Government: Friend, Foe or Fellow Traveler? Chair: Zafar Mehmood (WAPDA) Presenter: Zohair Ashir (Hisaar Foundation) Panelists: Tasneem Siddiqui (Saiban), Mahtab Rashdi (MPA), Idris Rajput (Water Expert), Samar Ali Khan (MPA)</p>	<p>Session 5B - Nexus of Water, Climate Change, Food & Energy Chair: Marc-Andre Franche (UNDP) Presenters: Dr. Abid Hussain (ICIMOD), Ghulam Hussain Dars (MUET), Dr. Abubakr Mohammed (LUMS), Zeenia Shoukat, Dr. Lubna Ghazal (Karachi University)</p>	<p>Session 5C - Young Men and Women: Harnessing the Demographic Dividend for Water Security Chair: Sarfaraz Rehman (Engro Foods) Panelists: Voice of Experience: Tofiq Pasha Mooraj (Hisaar), Favad Soomro (Engro Foundation), Dr Imran Ahmed (NEDUET) Exuberant & Young: Hassaan Khan (UMASS), Beenish Qureshi (Funverks Global), Hadiqa Maqsood (NEDUET)</p>
11.00 – 11.15	Tea Break		
11.15 – 12.45	<p>Session 6A - Role of Media in Integrating Diverse Stakeholders on Water Chair: Taher Khan (Interflow) Presenter: Seema Taher Khan (Airwaves) Panelists: Azhar Abbas (GEO News), Shakeel Masud Hussain (Dawn News), Mohammad Aslam Kazi (Kavish), Arshad Zubairi (Business Recorder)</p>	<p>Session 6B - Managing Groundwater, Floods & Droughts Chair: Khalid Mohtadullah Presenters: Sanaa Baxamoosa (Hisaar Foundation), Hassaan Khan (UMASS), Dr Abdul Latif Qureshi (MUET) Ms. Iaria Carpen (UNDP) Hadiqa Maqsood (NEDUET)</p>	<p>Session 6C-Role of Stakeholders; Innovation and Affordable Solutions Chair: Sarfaraz Rehman (Engro Foods) Presenters: Dr. Sono Khangharani (Hisaar Foundation), Waqas Ahmed (MUET), Dr. Safi Moh Kori (MUET), Farzana Abbasi (SIDA)</p>
12.45 – 13.45	Tea Break		<p>Session 6D-Water for Cities: Making the Metropolis More Manageable Chair: Dr. Noman Ahmed (NEDUET) Presenters: Dr. Ihsanullah Khatak (Univ of Peshawar), Rabia Tabbasum (FAST), Dr. R B Mahar (MUET), Usman Mirza (LEAD)</p>
14.00 – 16.00	<p>Session 7 - Closing Plenary: Declarations and Decisions for the Future Building on Partnership for Development, Aman-ul-Haque (Manager CSR, Engro Foundation) Future Directions, Atif Bajwa (President Bank Alfalah) Inclusion, Integration, Innovation: Hisaar Foundation Way, Dr. Sono Khangharani (Chief Executive, HF) Conference Declaration, Dr. Daanish Mustafa (Assistant Professor, Kings College, UK & Member of Hisaar Foundation Think Tank) Remembering John Briscoe, Dr. Pervaiz Amir (Economist & Member of Hisaar Foundation's Universities for Water Network) Water Tableau , The AMI School Launch of Media Campaign on Water, Seema T. Khan (CEO Airwaves and Member, Hisaar Foundation Think Tank) Closing Remarks , Zohair Ashir (Chair of Hisaar Foundation)</p>		
16.00– 17.00	<p>Parallel all day exhibition, speaker's corner and networking room High Tea and Networking</p>		



Appendix – A Conference Schedule

Day 1 – Tuesday, November 17th, 2015

Time	Session & Topic	Session & Topic	Session & Topic	Session & Topic
9.00 - 10.00	Registration			
10.00 - 11.30	Session 1 - Opening Plenary: Sustainable Water in a World with Decreasing Water Security Welcome Address, Zohair Ashir (Chairperson , Hisaar Foundation) Why This Water Conference? Simi Kamal (Founder, Hisaar Foundation) Defining Inclusion, Integration & Innovation, Khalid Mohtadullah (Senior Adviser GWP & Member of Hisaar Foundation Think Tank) & UN Approaches to Global Water, Marc-Andre Franche (Country Director, UNDP)			
11.30 - 12.00	Tea Break			
11.15 – 13.00	Session 2 - Signature Plenary: Pakistan's Water Economy Chair: Dr. Ishrat Hussain (Dean & Director of Institute of Business Administration) Presentation: Dr. Salman Shah (Former Finance Minister & Member Hisaar Foundation Think Tank) Discussants: Dr. Daanish Mustafa (Kings College London), Syed Mahmood Nawaz Shah (Sindh Abadgaar Board), Simi Kamal (Founder, Hisaar Foundation)			
14.00 – 15.30	Session 3A-Managing Indus Basin: Within Pakistan and Across Boundary Chair: Khalid Mohtadullah Presenters: Advocate Rafay Alam, Zulfiqar Halipoto (Environmentalist), Syed Hamid Shah (UAF) & Simi Kamal (Hisaar Foundation)	Session 3B-Water for Food: Smart Agriculture Practices Chair: Shoaib Sultan Khan(RSPN) Presenters: Altaf Ali Syal (MUET), Dr. Abubakar Mohammed (LUMIS), Maira Hayat (Univ of Chicago) & Prof. Ismail Kumber (Agri Univ. Tandojam) Discussant: Favad Soomro (Engro)	Session 3C-Water Stewardship: Business Sector Leading the Change Chair: Aliuddin Ansari (Engro Corporation) Presenters: Conor Linstead and Ali Hasnain, (WWF) Discussants: Farhana Mowji (Razzaque Steel) & Siddiq Sheikh (FPCCI)	Session 3D-Water for People: Overcoming Drinking Water and Sanitation Challenges Chair: Mohammad Siddiq Khan (Wateraid) Presenters: Dr. Sher Jamal Khan (NUST), Shahjahan Baloch (Action Aid), Dr. Daanish Mustafa (Kings College London)
15.30 – 15.45	Tea Break			
15.45 – 17.15	Session 4A-Sharing thoughts on Pakistan Water Policy Chair: Dr. Salman Shah Presenters: Sardar M Tariq (PWP) Dr. Zaigham Habib (Water Specialist), Dr. Mahmood Ahmed (BIPP) & Areeba Syed, NEDUET Discussant: Dr. Pervaiz Amir (Hisaar Foundation)	Session 4B-Role of Academia: Time to Deliver and Demonstrate Ownership Chair: Dr. Sarosh Lodi (NEDUET) Presenters: Dr. Shoaib Zaidi, (Habib University), Dr. Imran Ahmed (NEDUET)	Session 4C - Women Champions: Role Models in the Water Sector Chair: Mahnaz Rehman (Aurat Foundation) Co-chair: Farzana Saleem Presenters: Dr. Rahat Jabeen (WISP), Mahtab Rashdi (MPA), Dr. Ghazala Rahman (SZABIST) Discussants: Seema Taher (Airwaves) & Dr. Daanish Mustafa (Kings College London)	Session 4D-Rural and Urban Models of Innovation Chair: Dr. Nasir Javed (Urban Unit) Presenters: Teerath Kumar (Sukkar Foundation), Mir Mazhar Talpur (Mag Tech) & Dr. Abubakar Mohammed (LUMS)
17.15 – 17.45	Book Launch & Young Writers Awards , hosted by Saleha Atif and Kausar Hashmi Parallel all day exhibition, speakers' corner and networking room			
19.30 – 23.00	Conference Dinner & Entertainment, moderated by Rudaina Siddiqui			



Session 4B - Role of Academia: Time to Deliver and Demonstrate Ownership

- Presentation on Role of Academia in Water Sector, Dr. Shoaib Zaidi, Habib University
- Presentation on Water Modeling Center (WMC), Dr. Syed Imran Ahmed, NEDUET
- Presentation on Universities for water Network-Goals and Objectives, Prof. Dr. Sarosh Hashmat Lodi, NEDUET

Session 4C - Women Champions: Role Models in the Water Sector

- Presentation on Role Model in the Water Sector, Dr. Rahat Jabeen, WISP
- Presentation on Sindh Abyas Academy - SZEIBIST, Dr. Ghazal Rahman, SZABIST

Session 4D - Rural and Urban Models of Innovation

- Paper and Presentation on Water Security Planning Tharparkar, Mr. Teerath Kumar, Sukaar Foundation
- Presentation on Scientific Solution Treating "Dead Water" Naturally Using Magnetic Energy, Mr. Mir Mazhar Talpur, MagTech (Pvt) Ltd.
- Presentation on Water Informatics, Decision Support and Smart Infrastructures, Dr. Abubakr Mohammed, LUMS
- Presentation on Punjab Water Act (draft), Dr. Nasir Javed, Urban Unit

Session 5A - Government: Friend, Foe or Fellow Traveler?

- Presentation on Government: Friend, Foe or Fellow Traveler? Mr. Mohammad Idris Rajput, Water Sector Expert
- Presentation on Government: Friend, Foe or Fellow Traveler? Mr. Zohair Ashir, Hisaar Foundation

Session 5B - Nexus of Water, Climate Change, Food & Energy

- Paper and Presentation on Water and food security linkages in the face of climate change in the Hindu-Kush Himalayan region: Evidences from Koshi and Upper Indus Basins, Dr. Abid Hussain, ICIMOD
- Paper and Presentation on Potential impacts of climate change on extreme precipitation over the Columbia

River Basin based on multi-model ensemble average, Dr. Ghulam Hussain Dars, MUET

- Presentation on Beyond Hydro-power: The Need for Integrated water Systems Analysis, Dr. Abubakr Mohammed, LUMS
- Presentation on Building the voices of women in the climate change, food, water nexus, Ms. Zeenia Shoukat
- Paper and Presentation on Assessing the Impact of Depleting Water resources on the food Production in Selected Rural Areas of Karachi, Dr. Lubna Ghazal, University of Karachi

Session 5D - Water for Life: Keep our Rivers Flowing!

- Paper and Presentation on Fishing in Kotri downstream: Is water wasted or is it a blessing?, Ms. Tayyaba Makhdoom, University of Sindh
- Presentation on Water for Life: Keep our Rivers Following, Dr. Rahat Jabeen, WISP
- Presentation on Sustainability of Indus Delta, Ms. Sanaa Baxamoosa, Hisaar Foundation
- Documentary: "Pani aur Aabgahein" by Mr. Maqbool Ahmad Durrani

Session 6A - Role of Media in Integrating Diverse Stakeholders on Water

- Media Campaign on Water
- Presentation on Role of Media in Integrating Diverse Stakeholders on Water: Ground Reality and Alarming Facts by Ms. Seema Taher, CEO Airwaves and Member, Hisaar Foundation Think Tank

Session 6B - Managing Groundwater, Floods, and Droughts

- Paper and presentation on Drought Assessment in Balochistan, Ms. Ilaria Carpen, UNDP
- Paper and presentation on Drought Management in Arid Zone, Ms. Sanaa Baxamoosa, Hisaar Foundation
- Paper and presentation on Guiding Groundwater Policy in the Indus Basin of Pakistan Using a Physically-Based Groundwater Model, Mr. Hassan Khan, University of Massachusetts, Amherst



Paper and presentation on Optimization of Water Resources with an attempt to utilize Groundwater for Maximum Net-benefit: A case study of Jamal Shah Distributary of Rohri Canal, Prof. Dr. Abdul Latif Qureshi, MUET

Paper and presentation on Modeling hydro-ecological impact of Thar coal produced water, Ms. Hadiqa Maqsood, NEDUET

Session 6C - Role of Stakeholders; Innovation and Affordable Solutions

Presentation on Innovation and Affordable Solutions for water scare areas, Dr. Sono Khangharani, Hisaar Foundation

Paper and presentation on Hydroinformatics: How technology can help in involving all stakeholders in water resources planning? Prof. Waqas Ahmed, MUET

Paper and presentation on Laboratory Study of Tile Drainage on Different Soil Textures, Prof. Dr. Safi Mohammad Kori, MUET

Paper and presentation on Farmer Organizations (FOs) & Participatory Irrigation Management (PIM), Ms. Farzana Abbasi, SIDA

Session 6D - Water for Cities: Making the Metropolis More Manageable

Paper and Presentation on Available Water Resources and it's Future Prospects in Karachi Metropolis, Dr. Ihsanullah Khatak, University of Peshawar

Paper and Presentation on Estimation of water demand for commercial unit in Karachi City, Ms. Rabia Tabasum, FAST University

Paper and Presentation on Potential of Greywater Recycling from the Wudu (Ablution) Water Generated from the Masjids (mosques) of Hyderabad, Dr. Rasool Bux Mahar, MUET

Paper and Presentation on Water Pricing to Promote Equity, Efficiency and Sustainability in the Growing City of Faisalabad, Pakistan, Mr. Usman Mirza, LEAD Pakistan

Session 7 - Closing Plenary: Declarations and Decisions for the Future

Presentation on Building on Partnership for Development, Mr. Aman Ul Haque, Manager CSR,

Engro Foundation

Presentation on Changing the Water Paradigm in Pakistan, Dr. Sono Khangharani, CEO of Hisaar Foundation

Launch of Media Campaign on Water by Ms. Seema Taher, CEO Airwaves and Member, Hisaar Foundation Think Tank



Appendix – C

Profile of Chair, Speakers, Panelists and Other Distinguished Featured Participants

Listed in order of appearance; for full profile please refer to the CD.

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| Mr. Zohair Ashir, Hisaar Foundation | Ms. Farzana Salem, Cap-Net Pakistan |
| Ms. Simi Kamal, Hisaar Foundation | Dr. Nasir Javed, Urban Unit (Pvt) Ltd. |
| Mr. Khalid Mohtadullah, GWP | Mr. Theerat Kumar, Sukkar Foundation |
| Mr. Marc-Andre Franche, UNDP | Mr. Mir Mazhar Talpur, MagTech Pakistan |
| Dr. Ishrat Hussain, IBA Karachi | Mr. Zafar Mehmood, WAPDA, Lahore |
| Dr. Salman Shah, Former Finance Minister | Mr. Tasneem Siddiqui, SAIBAN |
| Mr. Mahmood Nawaz Shah, Sindh Abadgaar Board | Mr. Muhammad Idrees Rajput, Water Expert |
| Dr. Daanish Mustafa, King's College, London | Ms. Zeenia Shaukat, Climate Change Expert |
| Mr. Ahmad Rafay Alam, Advocate | Dr. Lubna Ghazal, University of Karachi |
| Mr. Zulfiqar Halipoto, Environmental activist | Dr. Abid Hussain, ICIMOD –Nepal |
| Dr. Syed Hamid Hussain Shah, UAF | Mr. Ghulam Hussain Dars, (USPCAS-W) MUET |
| Mr. Shoaib Sultan Khan, RSPN | Mr. Sarfaraz Ahmed Rehman, Hisaar Foundation |
| Dr. Altaf Ali Siyal, (USPCAS-W) MUET | Mr. Taufiq Pasha Mooraj, Hisaar Foundation |
| Dr. Abubakr Muhammad, LUMS | Ms. Beenish Qureshi, Funverks Global (Pvt) Ltd. |
| Ms. Maria Hayat, University of Chicago | Ms. Hadiqa Maqsood, NEDUET |
| Prof. Mohammad Ismail Kumbhar, SAU | Mr. Hammad Naqi Khan, WWF-Pakistan |
| Mr. Favad Soomro, Engro Foundation | Ms. Tayyaba Makhdoom, Sindh University |
| Mr. Ali Ansari, Engro Cooperation | Ms. Sanaa Baxamoosa, Hisaar Foundation |
| Dr. Conor Linstead, WWF U.K. | Mr. Maqbool A Durrani, Film Maker |
| Mr. Ali Hasnain Syed, WWF Pakistan | Mr. Taher A. Khan, Interflow |
| Ms. Farhana Mowji, Razaque Steels | Mr. Azhar Abbas, Geo News |
| Mr. Siddique Sheikh, FPCCI | Mr. Muhammad Aslam Kazi, KTN |
| Mr. Mohammad Siddiq Khan, WaterAid | Mr. Shakeel Masud Hussain, Dawn News |
| Dr. Sher Jamal Khan, NUST | Mr. Arshad Zubairi, Business Recorder |
| Mr. Shahjahan Baloch, ActionAid Pakistan | Mr. Hassaan F. Khan, University of Massachusetts |
| Mr. Sardar Muhammad Tariq, PWP & GWP-SAS | Prof. Dr. Abdul Latif Qureshi, (USPCAS-W) MUET |
| Dr. Zaigham Habib, Water Sector Specialist | Ms. Ilaria Carpen, UNDP |
| Dr. Pervaiz Amir, PWP and Hisaar Foundation | Dr. Sono Khangharani, Hisaar Foundation |
| Dr. Mahmood Ahmad, BIPP | Prof. Waqas Ahmed Pattan, (USPCAS-W) MUET |
| Ms. Areeba Syed Student, NEDUET | Prof. Dr. Shafi Mohammad Kori, (USPCAS-W) MUET |
| Prof. Dr. Sarosh Hashmat Lodi, NEDUET | Ms. Farzana Abbasi, SIDA |
| Dr. Shoaib Zaidi, Habib University | Prof. Dr. Noman Ahmed, NEDUET |
| Dr. Sayed Imran Ahmed, NEDUET | Prof. Ihsanullah Khattak, University of Peshawar |
| Ms. Mahnaz Rahman, Aurat Foundation | Prof. Dr. R.B. Mahar, (USPCAS-W) MUET |
| Dr. Rahat Jabeen, WISP-World Bank | Mr. Usman Mirza, LEAD Pakistan |
| Mr. Mahtab Akbar Rashdi, MPA-Sindh | Ms. Rabia Tabassum, FAST |
| Dr. Ghazala Rahman, SZABIST | Mr. Aman ul Haque, Engro Foundation |
| Ms. Seema Taher Kahn, Airwaves (Pvt) Ltd. | |



Hisaar Foundation

a foundation for water, food and livelihood security

(set up under section 42 of the companies ordinance 1984)

Approved Non-profit Organization under section 2(36) (c) of the Income Tax Ordinance. 2001

CSO Certification Award: PCP - 2012/231

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