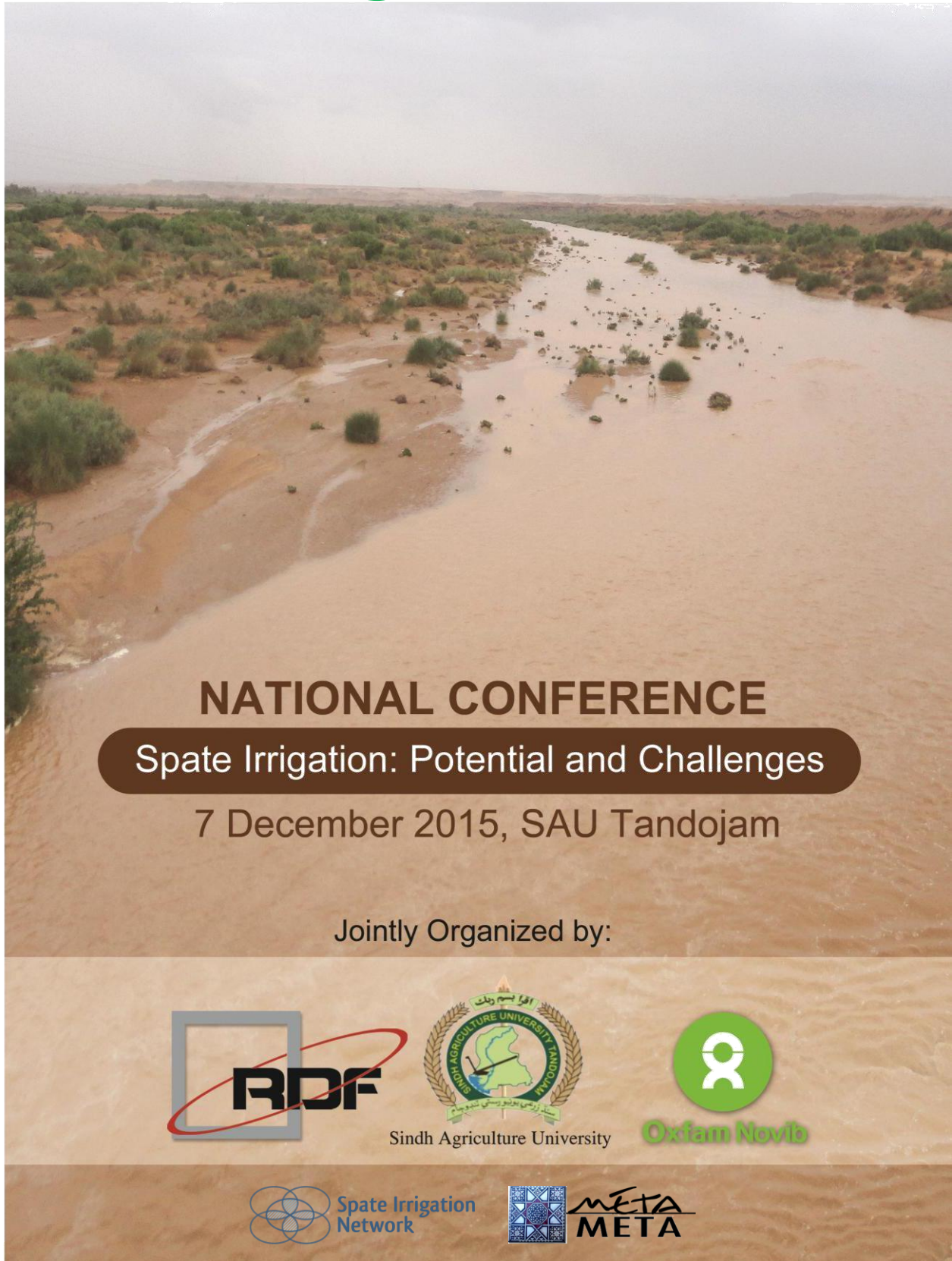


# Proceedings



## NATIONAL CONFERENCE

Spate Irrigation: Potential and Challenges

7 December 2015, SAU Tandojam

Jointly Organized by:



Sindh Agriculture University



Oxfam Novib



## Introduction

The Spate Irrigation Network - an international network promoting flood based farming, MetaMeta, Research and Development Foundation (RDF), a national NGO and Sindh Agriculture University (SAU) Tandojam organized a one day national conference on "Spate Irrigation: Potential and Challenges" on 7th December 2015 2013 at A.M Shaikh Auditorium Sindh Agriculture University Tandojam, in collaboration with Oxfam Novib.

Foreign and national experts on spate irrigation presented their papers, speeches, shared experiences about the spate management in the conference. Besides stakeholders including farmers, civil society representatives, university students, teachers and journalists attended the day long conference.

The purpose of the conference – held after 30 years gap in Tandojam – on this important and otherwise neglected component of irrigation sector was to sensitize and draw attention of federal and provincial governments to pay serious attention to it so that climate change adaptation becomes a bit easier for people as well as government departments. It aimed to address water conservation and ensure efficient utilization of available precious water resource whose availability is otherwise become scarce if climate change phenomenon is anything to go by.

The Conference was attended by around 350 participants, representing academia, civil society and farmer community, media and the government departments. The conference program is given as Annex A to this report. This report provides summary of what speakers discussed about the spate management, legal framework in Pakistan, successful spate structure, and abstract of presentations.

## Objectives of the Conference

- Presenting best practices of spate irrigation in various areas of Pakistan in order to alleviate poverty from the arid zones, particularly mountainous areas of Pakistan
- To discuss and share efficacy of the spate management structures and facilities in Pakistan
- To provide information to the academia to introduce spate technology subject in higher studies

## Inauguration Session

After recitation from Holy Quran, Prof Ismail Kumbhar welcomed the speakers, guests, faculty members, students and farmers for turning out in large number to be part of the campaign for promoting spate irrigation in the country. His welcoming remarks followed presentation of cultural gifts – **Sindhi ajrak** – and shields to speakers and guests. Vice Chancellor SAU Prof. Dr. Mujeebuddin Memon Sahrai chaired the inaugural session of conference. He presented shield to Dr Frank van Steenberg, who is the CEO of the MetaMeta Research Netherlands. Mr. Masood Mahesar presented shield to VC SAU and Dr Safar Mirjat. VC SAU presented shield to Director Pakistan Agriculture and Research Council (PARC) Mr. Zaheer-ul-Ikram.

The session was opened with a short documentary on spate irrigation that threw light on potential and challenges of irrigation and how the land could be brought under spate irrigation by raising different structure of diverting annual flows from torrents and streams that otherwise go waste. The documentary shows that water flows can easily be diverted to livestock bearing, cultivation of crops like sorghum, barley, cluster beans, oilseed, cumin seed etc. It said that value of these crops should have been much higher considering the fact that these are cultivated without use of any kind of pesticides.

Mr. Ashfaq Soomro of RDF informed the audience that conference on this topic is being held after 1984. The first one was organized by Pakistan Agriculture and Research Council. He briefly discussed RDF's endeavors in this regard in order to promote spate irrigation among local community and seek government's attention.

## Welcome Address and Sharing Objectives of the Conference

Masood A. Mahesar  
Executive Director, RDF

Mr. Masood welcomed participants and he thanked SAU being co-host of the national conference. Mr. Masood dwelt at length on how important the subject of spate irrigation which is important for the nation and the country. He said that everything right from life to economy is dependent on water in every sector and mentioned for one cup of coffee we need 140 litres of water or one kilogram of beef requires 1500 liters of water therefore no one could underestimate significant of this precious commodity. According to him one quarter of Pakistan's GDP comes from



agriculture sector and this sector couldn't perform unless are adequate flows of irrigation water for achieving desired per acre productivity in different crops.

He then tried sensitize people about vital role of spate irrigation. He said that it is an important source of irrigation for cultivating crops in those areas which are rain-fed and not connected with any canal command system of any of the Sindh's three barrages. Around 80,000 to 200,00 acres of land can easily be brought under cultivation through on yearly basis, depending on flows from streams and hill torrents. He identified areas of Khairpur, Qambar Shahdadkot, Jamshoro, Thatta which are ideally fit for spate irrigation.

He also mentioned challenges that are confronting this sector primarily because spate irrigation system is not regularized yet in Sindh and only local communities are managing this water source, as compare to other provinces. In Sindh it is something managed by community on its own. He called for exploiting potential of this resource. He disclosed that RDF is serving community in disaster mitigation area and for humanitarian services and is collaborating with international organisations as well simultaneously.

That's why, he said, RDF launched a campaign along with community in spate irrigation sector and got a research conducted through Mr. Karim Nawaz. He expressed the hope that it would go a long way in shaping the lives of people. RDF is committed to harness potential of this resource with support of community and civil society and seek governmental attention also to regulate this area in larger interest of community.

### **Water Management and Role of SIDA in Spate Management in Sindh** **Speech by: Mr. Nazir Essani Memon,** **General Manager SIDA**



General Manager Sindh Irrigation and Drainage Authority (SIDA), shared the work of SIDA in Sindh, which mainly work on canal irrigation. He very candidly said that he was astonished to receive an application from farmers of spate irrigation area for registration of their farmers organization (FOs) which SIDA registers in area under its administration. He said that before this application he himself wasn't aware of potential of irrigation in this sector because SIDA primarily looks after

canal command system and rarely did anyone discuss this sector. He appreciated RDF's efforts for organizing this conference to draw attention of government to address issues of this area.



Though, non-command area has been ignored, this spate farmers organization has taken up the matter and SIDA happily registered it, he said. Spate irrigation should have structured system so we may try to reach these spate irrigation farmers. Those institutions working on non-command area, should look in to the matter as there is more potential. He realized that there is no response by the government to pay heed to this matter and design planning and invest on such projects.

Sharing his experiences, he said Spate area is more poverty stricken, hence the government should put it on priority to resolve the issues and promote it.

He pointed out that Sindh Small Dams Organization has built Darawat Dam but it is silent over water distribution in spate irrigation area in Jamshoro and how to ensure overall land governance/tenure system. He was, however, critical of the fact that water rights are missing in spate irrigation area and this needs to be looked into. He was of the view that often there are factors which are neglected but the very factors become the game changer in development phenomenon and referred to 2010 Super Floods when flash floods from Koh-e-Suleman changed the whole floodwater scenario, breaching embankments in Sindh. There is tendency among people that unless one takes to the street or block roads government machinery remains unmoved and then look whether this or that item/sector should be on climate change agenda. He strongly advocated for executing projects in spate irrigation sector that would help alleviate poverty in its area and change life style of people.

### **Case Study of Darawat Dam Presented by: Engineer Gul Mohammad, Project Director Darawat Dam**

Project Director Darawat Dam, Gul Mohammad Junejo in his speech informed Darawat is first gravity based dam in Sindh by Wapda although it was initially Sindh irrigation department's baby. shared about the importance of that specific dam, its benefit, capacity of water storage through reservoir and dependency of small scale farmers.

He said after the study and feasibility of Darawt Dam in 2007-2008 the work was started. But again we updated its design in 2010 to see that major Nain Barran and other rainy rivers were passing through the Darawt Dam area. He said that it is completed, but there are some land acquisition problems that require resolution. He appreciated spirit of people whose lands are acquired for the dam and they didn't get any single penny yet. He termed it first dam that is built with assistance and cooperation of people. He said that it has gross storage capacity of 121,605 acre ft. with a surface area of 33 [sq.km](#). He said that its stored water would be sufficient to irrigate 25,000 acres of land. He informed that 46km long lined channels including one main canal, one minor and three distributaries are built for providing water to growers. He said that when the system would be switched over to high efficiency irrigation system in second phase more acreage would brought under cultivation.

**Concluding Remarks by the Chair of the Session By: Prof. Dr Mujeebuddin Memon Sahrai, Vice Chancellor SAU Tandojam**

In his concluding remarks, Prof Mujeebuddin appreciated the efforts of RDF and SAU team for organizing conference on spate, which is first of its kind to explore and share what best practices are there in various areas of Pakistan with regard to the management of spate water. He said this topic of spate irrigation is emerged again after many years. He was visibly excited to see turnout of people in



conference, held after 30 years gap on the topic. He said engineers' have to work hard to ensure optimum use of available water 50 percent of which, according to him, is lost in canals. He said, it is policymaking issue that where spate or canal irrigation is to be promoted. Floods are an asset but people tend to make a mountain out of a mole hill when average flows are received. He urged engineers and students to have honest utilization of funds be it from international donors or provincial and federal governments.



## Technical session 1: Spate Management and Potential in Pakistan

The session was moderated by Prof. Dr Safar Mirjat, Dean Faculty of Agriculture Engineering, SAU Tandojam

### Sharing Global Experiences of Spate Management

**By: Dr Frank van Steenberg**

**CEO MetaMeta Research Netherlands**

Dr Frank threw light on background of spate irrigation with reference to prophet Solomon and queen of Sheba. , said there is more work on spate irrigation in the world. But there is need to improve spate management in Sindh province of Pakistan, because Sindh has huge potential in arid zone to save water through technology. He said that it has long history in Pakistan and abroad. Normally, he said, floods are considered disaster although they are in fact an asset, which just need proper management in larger interest of community and economy. Floods are crucial for livestock breeding and agriculture. So, he said, Sindh needs management given climate change scenario in which climatic conditions are either of moderate, dry or extreme events are seen. Globally, he said, 2.6m ha of land is under spate irrigation with nine to 13m people are dependent on it.

Dr Frank said that spate irrigation helps recharge groundwater aquifers. He said that many structures are designed considering Sedimentation in flows. Riverbed stability in channels during flows is important when flows are received from streams or torrents.

Soil moisture conservation and water management techniques should be given consideration. He said that local seed

varieties are grown with oilseed or pulses or fodder crops cultivation are excellent options. He called for investment for raising structure for spate irrigation with simple diversion. He added that it these should be developed like canal command system.



He said besides promoting agriculture crops in spate areas, agro forestry and livestock are major components to be benefitted. He also shared the spate problems in development in other countries like Africa, Middle East, Iran etc. He portrayed the spate water diversion and control structure, soil and field water management, saying spate systems build up its own soil, with very high fertility. He said sediments is an important factor for agriculture growth and recharging groundwater.

**Spate Irrigation: Potential in Sindh**  
**Presentation by: Karim Nawaz,**



Karim Nawaz, an expert on spate irrigation, from Balochistan in his presentation touched basic issues relating to spate irrigation. He was of the view that people don't know much about spate irrigation because it is not part of syllabus. He simultaneously deplored the fact

that even primary data in this regard although the spate irrigation methodology in irrigation sector is around 9,000 to 11,000 years old technique. He explained spate irrigation in details in view of his research he had conducted for RDF. He said that flows of torrents could last for few hours or few days that are diverted on field-to-field basis by community. He dispelled the impression that floods are a bane, saying these are converted into opportunity by communities.

Currently, 2m hectares of land is under spate in Pakistan that is nine to 10 percent of irrigated area, he said. Lack of knowledge about it is main reason as it is not part of syllabus. Kohistan range in Sindh gets 0.5MAF of run-off with 100mm-150mm of annual rainfall. Sindh has 1.4m acres of ideal land for spate. He reminded the audience that even Karachi's water supply is largely linked with Hub Dam, which is again dependent on spate flows.

He said that this system could help address food security and make climate change adaptation easier. There is need for research for focusing soil moisture conservation techniques, making spate part of annual development programme and introducing seed varieties including those which are drought resistant with integrated approach. He called for institutionalizing this irrigation methodology as is being seen in other provinces.



## **Work Done by PARC on Spate in Pakistan**

### **Presentation by: Zaheer UI Ikram, Director PARC**



Director Pakistan Agriculture Research Council Zaheer UI Ikram asserted that Pakistan has plenty of waters but management of such flows is entirely missing. He raised some very basic points regarding spate irrigation in his presentation, backed by statistics. He cautioned engineers against creating diversion structures in main channel that receives spate water flows. He quoted an example of Punjab where

he said command area has increased by eight to ten times due to spate irrigation. He was supportive of the fact that an integrated water resource management is needed if desired results are to be obtained out of it. He even suggested that storage reservoirs should also be built in spate areas to avoid migration of people in search of water and food. He said that Sindh's 1.36m acres of land is dependent on spate. He explained how to build main, secondary and tertiary channels to divert water flows with consent of up and downstream users while building storage facilities as well given nature of location of lands. He maintained that due attention should be paid while building structures given location of the area and farmers should also share the cost so that they have as sense of participation.

## **Drought Situation and Climate Change in Arid Zones of Sindh**

### **Presentation by: Dr Azmat Hayat, Director Pakistan Met Department**

Director Pakistan Meteorological Department Dr. Azmat Hayat Khan said that climate change has led to seasonal shift in rainfall trends. For instance Tharparkar is getting rainfall in Sept instead of July so it needs adaptation to cope with this shift in special rainfall trends. He informed that Pakistan Met Department have data of all the changes including drought and rainfall and temperature in arid zones of Sindh and his department is monitoring the system regularly. He offered cooperation and the services of Pakistan Met Department to research institutions, academia, NGOs if they want to work on drought mitigation in arid zones of Pakistan.

## **Farmers' Problems in Spate Areas of Jamshoro District**

### **Speech by: Mr. Raza, Representative of Farmer Organization**

Mr. Raza Mohammad Tangwani, General Secretary of Sindh Barani Abaadgar Association, said that the area he lives in is totally dependent on rainfall which

follows preparation for sowing as flows from **Nai** (hill torrents) start reaching the area. He said that single crop is cultivated and no spray or pesticide is used. He complained that although it is a kind of organic farming yet farmers of his area don't get due price of their crops like millet, bajra, corn, beans. He opined that government has much to do for the development of spate in their areas. He said that Sindh agriculture engineering department is considering something of the sort but he doesn't any details of it.

He said they did not have taken crop products for the last five years, because of shortage of rainfall and now in this year they have sown crops and liked the hope for prosperity. He said the road infrastructures in the area have damaged the rivers and disrupted the water flow. Otherwise, there were many rainy rivers passing through from there t benefit the farmers and livestock holders.

### **Spate Potential in Baluchistan Case Study Presented by: Prof Dr. Maqsood Ahmed**

Prof. Maqsood from Balochistan University of Engineering, Science and Management, pointed out that as two-third of floodwater of spate area is unutilized, equal to size of storage of Tarbela dam. He discussed it in Balochistan's perspective which forms 44 percent of Pakistan and only its two districts have canal command system out of 32. He



disclosed that Balochistan's six agro ecological zones include high lands, plains, coastal areas where barley, cumin seed, sorghum, wheat and beans are cultivated.

Of Balochistan's area, he said, 1.93m ha is cultivated area – lowest as compared to other provinces. Irrigated area is 1.28m ha, representing 66 percent of cultivated area. Canal command is 0.59m ha that is 46 of total irrigated area and spate irrigated area or *sailba* in local language is just 0.65m ha. Four million ha is potential spate area which could triple current cultivated area if developed, he said. Spate's importance is evident from the fact that it contributes one-third of total cultivated area even in a dry year and there is huge potential for development of neglected system. He said that 36pc of spate area is found in plains. He complained that no federal/provincial government funded programme is seen with the result that the system is faced with deterioration. He said that although structures are raised with different designs but a state of art structure is yet to be built which is acceptable by farmers therefore a research is long overdue now.

**Role of Women in Spate Areas of Sindh**  
**Presentation by: Ms Anila Memon, PhD**  
**Student**

A PhD student and PARC official, Anila Memon shared her findings in womenfolk participation in fields in spate irrigated areas. She said that women work more than their male counterparts, spending eight hours in the fields, three hours with livestock, one hour with their children, four hours at home and take only six hours rest. She said that women in these areas suffering from non-existent health and education facilities with the result that maternal deaths are common.

**Concluding Remarks by the Chair**  
**by: Prof. Dr Abdul Ghafoor Siyal, SAU Tandojam**

Prof Dr. Abdul Ghafoor Siyal, presided over the technical session and in this concluding remarks said that this sector needs academia's attention as well. He encourage graduates to conduct more studies on issues, including spate areas to identify problems and suggest solutions.

He said that problems should be accordingly identified and presented to SAU which would then come up with its solution.

**Spate Management by Communities in Nangarparkar, Tharparkar**  
**District Case Study Presentation by: Dominic Stephen, Director PVDP**

Dominic Stephen of Participatory Village Development Programme, Nagarparkar also shared his study on spate irrigational water flows received through Karonjhar hills in Nagarparkar which he said directly go to Run of Kutch thus wasted. He called for harvesting this water for crop sowing in the area and it could also help recharge groundwater with the result that small scale farming would stand benefited. He mentioned that normal rainfall in the area is 340mm which is ideal for farming.

**Operation and Management of Spate in Modern Structures Presentation**  
**by: Mr. Allah Bakhsh, Coordinator Spate Network Pakistan**

Mr. Allah Bakhsh Baloch, Coordinator Pakistan Spate Network observed that since it is neglected sector in Sindh nothing tangible is so far done here. He said for launching a movement in this area so that authorities pay attention to it. He believed that spate is something largely volume and size specific. In spate irrigation, its riverbed is also divided for right and left side



commands, he said. He said that even water rights are defined in this sector as is witnessed in Dera Ghazi Khan. He referred to different management practices under this system in different regions. He called for defining parameters first before going for some particular design of structure.

### **Case Study of Spate Potential in Dera Ghazi Khan, Punjab**

Mr. Matloob Ahmad, Lecturer Dera Ghazi Khan University Punjab in his presentation on Management of Spate in Dera Ghazi Khan and Rajanpur, Punjab shared his study findings, saying in Punjab spate irrigation area, includes DI Khan and Rahjanpur. He said major hill torrents receive rains in seasons both in monsoon and winter. It is up to areas where farmers receive early and later rainfall and they use water for producing their crops, like grains and fodder. In DG Khan, he shared people use groundwater for cultivation in case of shortage of rain in these areas.





**At the end of the Conference, Mr. Ashfaq and Prof Ismail presented DECLARATION, which is called the 'Tandojam Declaration'**

### **Tandojam Declaration**

**Adopted unanimously by the participants of National Conference on Spate Irrigation: Potential and Management, 7<sup>th</sup> December 2015, Sindh Pakistan.**

The National Conference on Spate Irrigation, jointly organized by Sindh Agriculture University Tandojam, Sindh Pakistan and Research and Development Foundation (RDF), held on 7<sup>th</sup> December 2015 at Agriculture University Tandojam Sindh, the event was attended by more than 300 researchers, practitioners, faculty members and potential farmers, considers and urges that the spate irrigation system should be mainstreamed into operational sectors in order to alleviate poverty from the arid areas, particularly mountainous areas of Pakistan and that the conference affirms that Pakistan has huge potential of spate flows, but this water is not used optimally and as a result it is causing scouring, sedimentation and damages to costly infrastructures, settlements, lands and other properties. This conference raises that the Spate irrigation system is neglected as sector, particularly in Sindh, however its management must be improved as sometime natural streams cause disastrous situations for communities.

Reaffirming that the development of alternate water resources is key to self-sufficiency in the country, to meet growing needs of the food security and other uses, thus spate management facilities, programs and opportunities must be accelerated for the farmers, communities living in spate areas of Pakistan, which are in fact least developed. These areas have large piedmont plains with fertile alluvial soils where sustained irrigation systems can be developed. There is enough potential for the development of new lands around current irrigated fields, once spate irrigation structures are established. Indigenous knowledge and practices are vital aspects of this sector and we need to understand them before planning and addressing the hill torrent and spate irrigation sector.

Having taking into account the importance of spate for academia, students, future development projects, it is affirmed that spate should be included in academics at higher studies in Pakistan. Research avenues for the students may be developed with facilities by the academia and the Government's relevant departments in order to explore various management models as well as to learn from the natural assets and provide recommendations. In this regard, those scientists and organizations that are associated with the spate irrigation system, should provide problem statements and list of practical issues of the spate water to the universities.

The Conference, recognizes the importance of environment, rangelands and surface and groundwater resources of the spate areas, thus it emphasizes that before launching of any Spate Irrigation Development Program, assessment be conducted and spate irrigation projects must have an integrated approach to hill torrents. Under an integrated development approach both upstream (watershed/catchment) and command areas need to be developed at the same time in order to foster sustainable development.

Conference values and commits to ensure that water right and local rules pertaining to spate irrigation system must be protected by all means when organizations work on spate development and rules should be codified where they do not exist. Care must be taken to establish and strengthen local water user association/farmer organizations to supervise and manage these spate flows according to local rights.

The Conference considers its importance to promote low cost solutions like simply diverting water, guiding and spreading it on wider areas for agriculture, rangeland development, storing of spate water for livestock and human consumption and recharging aquifers are preferred over costly solutions like making dams and reservoirs. However, community reservoirs and storage facilities must be promoted, protected and improved. The guiding and diverting spate flows through low cost but improved designed structures in these areas would not only help in the development of sustained irrigation system but would also save costly infrastructure from frequent flood damages and at the same time will help recharging aquifer.

Considering, disaster risk of the flash floods, it is inevitable to prepare climate scenarios, provide weather information and have early warning systems and information system in spate irrigated areas in order to avoid huge damages to the public and private properties in spate areas of Pakistan. Since, climate change has affected pattern of the precipitation, thus for the poverty alleviation, off farm livelihood strategies should also be designed and implemented in order to make vulnerable self sufficient.

The conference determines that Spate agriculture areas don't have round the year cropping and that the spate flows are mostly unpredictable, thus urges the Government may design and implement market driven alternative livelihood opportunities for the poverty alleviation in the spate areas of Pakistan.

The National Conference on Spate Irrigation also recommends that the organizations working on spate irrigation and Government departments consider ways and means for the implementations of the recommendations as set out in this declaration.

## Annex A: Conference Program

### Conference Program

<b>Inaugural Sessions</b>	<b>10:00-11:15</b>	<b>Chair: Vice Chancellor SAU</b>
<b>Recitation</b>	Participant	5 Minutes
Documentary on Spate Irrigation in Sindh	RDF	10 Minutes
Welcome Remarks and Objectives of the Conference	Prof. Ismail and Masood A. Mahesar, Executive Director RDF	10 Minutes
Remarks by Project Director USPCAS-W	Prof. Dr. Bakhshal Lashari, Project Director USPCAS-W MUET Jamshoro	10 Minutes
Remarks by Additional Chief Engineer Darawat Dam	Additional Chief Engineer Darawat Dam	10 Minutes
Water Management & Role of SIDA in Spate Management	Mr. Nazir Essani Memon, GM SIDA	10 Minutes
Concluding Remarks by the Chair	Dr Mujeebuddin Memon Sahrai, VC SAU	10 Minutes
<b>Tea break</b>	<b>11:15-11:30</b>	
<b>Session2: Potential of Spate in Pakistan</b>	<b>11:30-1:15</b>	<b>Chair: Dr Safar Mirjat</b>
Farming Practices in Spate areas of Sindh	Rep of Barani Abadgar Association Jamshoro	10 Minutes
Potential of Spate in Sindh	Mr. Karim Nawaz	10 Minutes
Global Experiences of Spate Management	Dr Frank van Steenberg, CEO MetaMeta Research & Spate Foundation Netherlands	10 Minutes
Drought and Rainfall in Arid Zones of Sindh	Dr Azmat Hayat, Director Met Department Islamabad	10 Minutes
Spate Management-Case Study of Balochistan	Prof. Dr. Maqsood Ahmad, Professor of Environmental Sciences/Engineering Baluchistan University of Technology, Engineering & Mgt.	15 Minutes
Role of Women in Spate Areas of Sindh	Ms. Aneela Memon , PhD Student of MEUT Jamshoro	10 minutes
Spate as water Economical Water Resource	Prof. Dr. Safar Mirjat, Dean Faculty of Agriculture Engineering SAU	5 Minutes
Work done by PARC in Spate areas of Sindh	Mr. Zaheer-ul-Ikram , Director PARC Islamabad	15 Minutes
Concluding Remarks by the Chair	Dr. Safar Mirjat, Dean Faculty of Agriculture Engineering, SAU	10 Minutes
Questions and Answers	Participants & Panel	20 Minutes
<b>Lunch</b>	<b>1:15-2:00</b>	<b>45 Minutes</b>
<b>Session 3: Technical Session</b>	<b>2:0-3:30</b>	<b>Chair : Dr. Frank</b>
Management of Spate in Dera Ghazi	Prof. Matloob Ahmad, Department of	15 Minutes

Khan and Rajanpur, Punjab	Agriculture Engineering, Gazi University DG Khan	
Changing O & M culture in Spate Management.	Mr. Allah Bakhsh Khan, Spate Foundation Pakistan	15 Minutes
Spate System in Nangarparkar area	Mr. Dominic Stephan, Executive Director PVDP Sindh	10 Minutes
Challenges in the Management of Spate System in KPK	Rep of Intercooperation, Peshawar	10 Minutes
Concluding Remarks by the Chair	Dr Frank, Spate Foundation Netherlands	10 Minutes
Questions and Answers	Participants and Panel	20 Minutes
Vote of Thanks	Prof. Ismail , SAU	5 Minutes