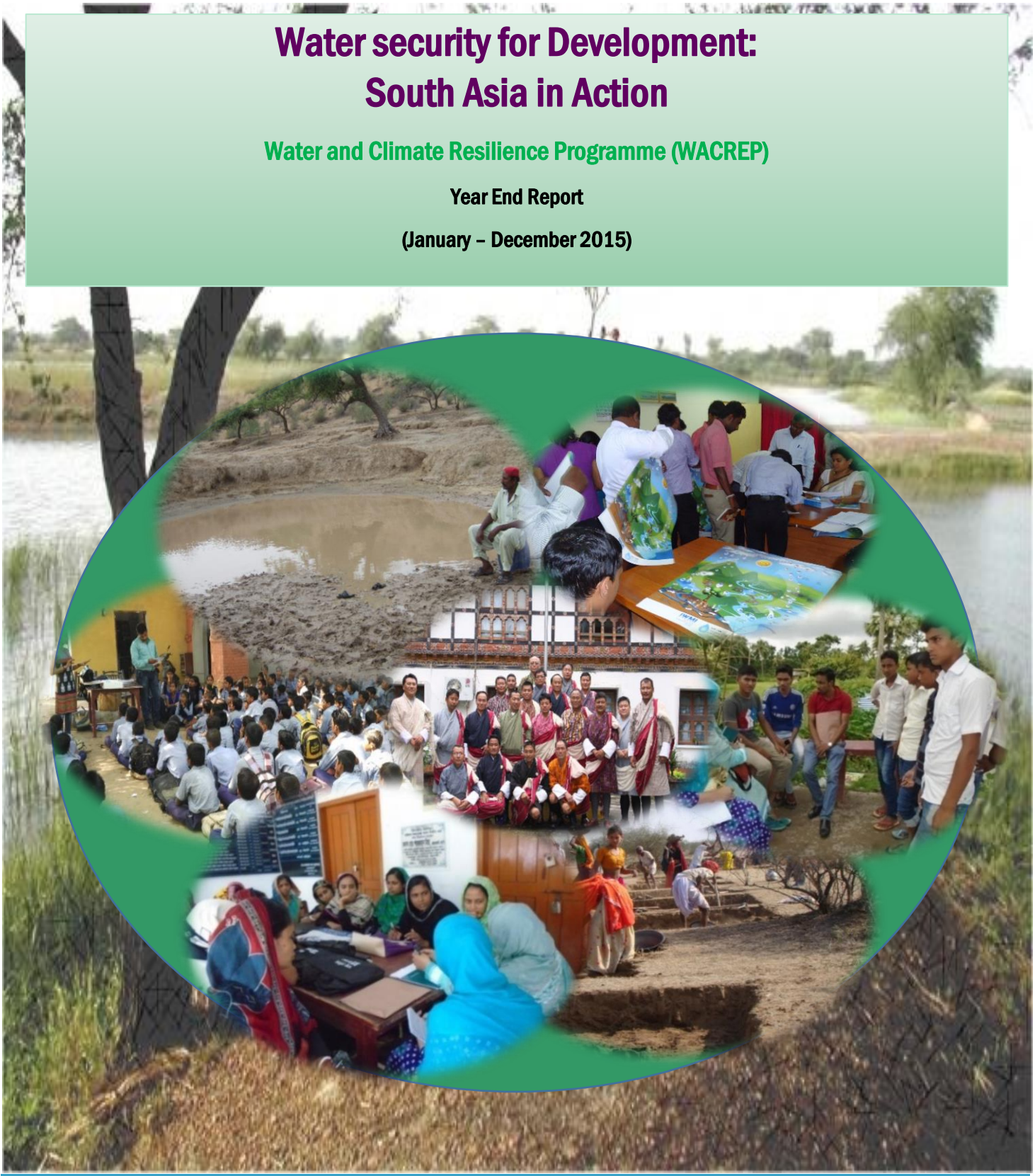
Water security for Development: South Asia in Action

Water and Climate Resilience Programme (WACREP)

Year End Report

(January – December 2015)



GLOBAL WATER PARTNERSHIP SOUTH ASIA (GWP SAS)
International Water Management Institute (IWMI),
127, Sunil Mawatha, Pelawatte, Battaramulla.
Sri Lanka
Tel: +94 11 2880000, Fax: +94 11 2786854, Email: P.Dissanayake@cgiar.org

Table of Contents

ACKNOWLEDGEMENT **3**

ACRONYMS AND ABBREVIATIONS **4**

EXECUTIVE SUMMARY **6**

WACREP IMPLEMENTATION IN 2015 ..... **8**

PHASE II (2015) ACHIEVEMENTS AT A GLANCE **9**

CHAPTER 1 -BANGLADESH WATER PARTNERSHIP **10**

Activity 5B (BWP): Workshop on 'Challenges of Drinking Water Security in Selected Coastal Areas with Special Emphasis on Polders and Participation of Youth and Women' 11

Activity 6A (BWP): Workshop on 'Water Security and Urban Water Management for Sustainable and Eco-friendly Cities/Towns with Special Emphasis on Impact of Climate Change' 17

CHAPTER 2 - BHUTAN WATER PARTNERSHIP **23**

Activity 3B (BhWP): Supports community based water source protection projects. 25

Activity 3C (BhWP): Supports community based projects for the efficient utilization of water resources through improved technologies. 27

Activity 6B: IWRM sensitisation workshop for communities 29

CHAPTER 3 - INDIA WATER PARTNERSHIP **34**

Activity 2C (IWP): Climate Resilient Development- A case study of Mashi sub-basin, Rajasthan (2015-2016) 36

Activity 3D (IWP): Promotion of Integrated Water Resource Management in Peri-Urban Settings (Action Research to develop innovative IWRM Investments) 43

Activity 6D (IWP): Water-Energy-Food Nexus: Developing a Framework for Resilience Development in Urban Areas with reference to Housing Societies. 50

Activity 7D (IWP): Promotion of IWRM in Peri-Urban Settings (preparation of community owned water investment and advocacy plan) – 2015-16 53

CHAPTER 4 - GWP NEPAL **56**

Activity 2B (GWP Nepal): Assessment of environmental flow in hydropower development and its implications in selected river basins (2015-2016) 57

Activity 3A (GWP Nepal): Assessment of water focused climate adaptation action/s in 101 LAPAs and its integration into local planning process in a selected districts (2015-2016). 60

Activity 5C (GWP Nepal): Lamatar LAPA implementation of a rain water harvesting system 62

CHAPTER 5 - PAKISTAN WATER PARTNERSHIP **64**

Activity 4: Drought mitigation and management in Potohar Area of Indus Basin (2015/2016 Activity) 65

Activity 5D: Establish two pilot sites demonstrating latest rainwater harvesting techniques and modern irrigation technologies in Potohar Region of Indus Basin 68

Activity 6C: Organizing capacity development workshops on climate change adaptation and proposals formulation for implementation in climate change impacted areas 73

CHAPTER 6 - SRI LANKA WATER PARTNERSHIP 75

Activity 2A: CCA Programme for Agency staff/FO Leaders/Farmers in Irrigated Agriculture (Continued in 2016) 76

Activity 5A: Expand new technological option, Rain Water Harvesting and Conjunctive use of surface/ground water, catchment and source area conservation and management 80

Activity 7A: Drinking water CBO programmes (6) linked to vulnerability profiling 84

Activity 7B: Schools' IWRM/Water Messenger Programme on CCA – “Sisu Jala Hamuwa” 86

Activity 7C: Film/Clips on CCA, Radio and Television Talk Shows, posters, Flyers, Street Drama for youth/schools and media events/tours 88

ACKNOWLEDGEMENT

The WACREP SAS Programme would like to extend its sincere thanks to GWP Chair, Dr Schaefer-Preuss, and Executive Secretary Mr. Rudolph Cleveringa for incorporating WACREP to GWPO project portfolio from 2013 onwards.

Jacques Rey, Head, Network Operations, Alex Simalabwi, Global WACDEP Coordinator were instrumental in guiding us to develop a fundable project under global WACDEP programme and we extend our earnest thanks to them.

This project was not possible without the support of Catharina Sahlin-Tegnander, Head of Finance and Administration and therefore, we extend sincere thanks to her and her team Peter Nyman, Senior Financial Officer; Sandra Lindholm, Financial Officer at GWP Secretariat.

We are thankful to Steven Downey, Head of Communications at GWP Secretariat who helped us in highlighting the WACREP interventions at global level.

We extend our sincere thanks to Angela Klauschen, Senior Network Officer for South Asia and China who provided us with for her contribution in project implementation.

Our earnest thanks go to Susanne Skyllerstedt, Programme Officer and Ralph Philip, Monitoring and Evaluation Officer at the GWP Secretariat who supported us in project implementation and monitoring.

Special thanks go to the GWP SAS former Regional Chair, Iswer Raj Onta for guiding us from the project development to implementation.

The CWPs and their partners were the pillars of this success, who implemented the activities at the ground level. We express our earnest thanks to the CWP Chairs and Country Coordinators.

Especial thanks go to Priyanka Dissanayake, Regional Coordinator, GWP SAS who provided the support in timely fund transferring in coordination with International Water Management Institute (IWMI), the host of GWP SAS Regional Office.

We are grateful to the IWMI Finance Team Gamini Halvitage, Financial Controller; Ranjith Samarakoon, Accountant and Nadeesha Rajapaksha, Project officer for the support extended in managing funds.

We would like to acknowledge the editorial support of Diluka Piyasena, Communication Coordinator, GWP SAS who tirelessly reviewed the draft several times to produce this report.

K L Induruwage
Programme Manager, Water & Climate Resilience Programme (WACREP),
Global Water Partnership, Regional Office, South Asia.

ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
APAN	Asia Pacific Climatic Change Adaptation Network
AWP	Area Water Partnership
BhWP	Bhutan Water Partnership
BOD	Board of Director
BWP	Bangladesh Water Partnership
BWIN	Bangladesh Water Integrity Network
BAWUN	Bangladesh Water Utility Network
BWWN	Bangladesh Women & Water Network
CDM	Clean Development Mechanism
CDKN	Climatic Development Knowledge Network
CEA	Central Environmental Authority
CEDS	Center for Environmental & Geographic Environmental Services
CEGIS	Centre for Environment & Geographic Services
DAC	District Agricultural Committee
DDC	District Development Committee
DNA	Designated National Authority
DMF	Design Monitoring Framework
EC	Executive Committee
ECI	Eco Conservation Institute
FCRI	Field Crop Research Institute
GWP	Global Water Partnership
GWP SAS	Global Water Partnership South Asia
GWPO	Global Water Partnership Stockholm
IFPRI	International Food Policy Research Institute
IMT	Irrigation Management Transfer
IPCC	Intergovernmental Panel on Climate Change
IMD	Irrigation Management Division
IWP	Indian Water Partnership
IWRM	Integrated Water Resources Management
IWM	Institute of Water Modelling
IUCN	International Union for Conservation of Nature

LGED	Local Government Engineering Department
LWP	Local Water Partnership
MDG	Millennium Development Goals.
MFIs	Microfinance Institutes
MoI	Ministry of Irrigation
MWWRA	Maharashtra Water Resources Regulatory Authority.
NARBO	Network of Asian River Basin Organizations
NWP	Nepal Water Partnership
NWSDB	National Water Supply & Drainage Board
PID	Provincial Irrigation Department.
PIM	Participatory Irrigation Management
PMC	Project Management Committee
PPMI	Peoples Participatory Management Institutions.
PRI	Panchayat Raj Institutions
RBO	River Basin Organization
RRDI	Rice Research & Development Institute
SACEP	South Asia Co-operative Environmental Programme
SAARC	South Asian Association for Regional Cooperation
SAARC DMC	SAARC Disaster Management Centre
SC	Steering Committee
SAWAF	South Asia Water Forum
SLWP	Sri Lanka Water Partnership
TERI	The Energy & Research Institute
US AID	United States Agency for International Development
WAPCOS	Water and Power Consultancy Services (India) Limited
WWN	Women and Water Network
ZWP	Zonal Water Partnership
SPRSS	Summary of Poverty Reduction and Social Strategy
NetWATER	Network of Women Water Professionals

EXECUTIVE SUMMARY

South Asia is home to well over one fifth of the world's population, making it both the most populous and the most densely populated geographical region in the world. Almost one in five people in South Asia still lack improved water source, despite significant progress made in recent years and the availability of many technical feasible and low-cost solutions. The crises deepened further due to climate change in this part of the world.

South Asia, together with sub-Saharan Africa, is among the areas expected to be hardest hit by climate change. It will likely to have profound effects on food and water security. Greater frequency of extreme events, warmer temperatures, increased incidence of temperature-influenced diseases and pests and increased risks and uncertainty are already evident. Severe flooding in 2007 along the Ganges and Brahmaputra rivers affected over 13 million people in Bangladesh; flooding in Pakistan in 2010 severely affected 20 million people. India has likewise suffered numerous events of extreme rainfall, flooding and droughts. In addition, the rise of sea level is a real threat to low lying areas in Bangladesh and Sri Lanka. The economic cost of the 2007 floods in Bangladesh was over $1 billion; in Pakistan it was nearly $10 billion. The human suffering has been immeasurable. Million tons of food production have been lost in the process, adding unknown numbers of food security-related deaths. Out of these, thousands of deaths directly related to the flooding and its aftermath, including the spread of diseases.

The history repeated again in 2015 and 2016 and Chennai floods and cyclone Roanu (affected countries are Chennai in india, Bangladesh and Sri Lanka) are the best examples.

The major water challenges in the South Asia has been prioritised and they are given below;

1. Climate change adaptation (CCA) in water and agricultural sectors,
2. Water related disaster coping and disaster preparedness,
3. Water management, agricultural productivity and food security,
4. Transboundary water issues,
5. Over exploitation of ground water, ground water depletion and ground water quality,
6. Rapid urbanisation, drinking water supply, sanitation and wastewater management,
7. Energy security and its impacts on water and food security, hydro power development and river degradation,
8. Inadequate capacity at the field/grass root level to address water challenges,
9. Rain water harvesting – inadequate storage and maintain the quality of the harvested water,
10. Inadequate use of information technology/media in the water sector.

There are large number of boundary partners active in this region, namely, South Asia Co-operative Environment Programme (SACEP), South Asian Association for Regional Cooperation (SAARC), Asia Pacific Adaptation Network (APAN), Network of Asian Rever Basin Organizations (NARBO), United Nations Development Programme (UNDP), United Nations Chirldrens Fund (UNICEF), Food and Agriculture Organisation (FAO), International Water Management Institute (IWMI), United Nations Economic and Social Commission for Asia and the Pacific UNESCAP, SAARC Disaster Management Centre (SAARC DMC) - now defunct and yet to name the successive organisation, Asia Foundation, United States Agency for International Development (USAID), Australia's Aid Programme (AusAID), Delta Alliance, World Bank and Asian Development Bank (ADB) are some of them.

One of the flagship initiatives of Global Water Partnership South Asia (GWP SAS) is the Water and Climate Resilience Programme (WACREP), was launched at the "India Water Week" in April 2013. This programme is another regional water and climate initiative under the global programme – Water and Climate Development Programme (WACDEP). WACREP was formulated to improve the climate resilience of South Asian countries to withstand the impact of climate change. Under this programme, Country Water Partnerships (CWPs) work with the respective government agencies and their partners and play a catalytic/facilitative role in implementing climate related activities.

WACREP is collaborating with SAARC DMC, SACEP, APAN and UNDP in implementing its activities to achieve its objective to support countries to;

- develop and integrate "no regret'" water security and climate resilience investments in to their development plans, budget and programmes,
- identify solutions addressing critical water security challenges to enhance the climate resilience of countries and communities,
- built knowledge and capacity to enhance water security and climate resilience,
- operationalise the GWP network with strategic allies and stakeholders to integrate water security and climate resilience in development process.

The aim of the global programme, WACDEP is to integrate water security and climate resilience in development planning processes, built climate resilience and support countries to adopt to a new climate regime through increased investment in the water sector.

Hence, WACREP is aligned with the global programme, WACREP built partnerships with regional players such as SAARC DMC, APAN and SACEP to enhance the resilience in the region. Further, the partnership has been strengthen with global climate players such as UNDP to support the countries in quantifying the economics of climate change adaption in Asia-Pacific Region.

Even though, WACREP is implemented under the theme of 'Climate Resilience and Water Security', its activities are also contributing to other themes such as, food, energy, ecosystems, urbanisation and Water Security and contributes to the GWP Vison: "A Water Secure World".

WACREP IMPLEMENTATION IN 2015

In 2015, 20 CWP based interventions have been identified to be implemented under WACREP and those were directed toward finding possible remedies to climate change related challenges faced by the South Asia Region. Due to reduced budget scenario, GWP SAS further focused on fund raising and a project proposal development. Most importantly it developed a proposal on "Programme on Water and Food Security Improvement in Dry Land in South Asia (WaFSIP-DL) SAS" and shared with the regional node of Climatic Development Knowledge Network (CDKN) and ADB.

The field level implementers of the WACREP are the Country Water Partnerships (CWPs). Out of which **Sri Lanka Water Partnership (SLWP) -**through their major minor irrigation training programmes and introduction of novel technical options to farmer community, **Bhutan Water Partnership (BhWP) -** through their farmer sensitisation programmes, **Pakistan Water Partnership (PWP) -** through alternating energy projects, using biogas and solar power for ground water extraction and irrigation tried to address the second major challenge in South Asia, **Water management in agriculture production and food security**.

The next major challenge of **Rapid urbanisation, water supply (drinking water), sanitation and wastewater management** was addressed by **India Water partnership (IWP) -** through their activities on promotion of Integrated Water Resources Management (IWRM) in peri-urban settings, by developing a frame work for resilience development in peri-urban setting and development of innovative IWRM investments, **Bangladesh Water Partnership (BWP)** - through their awareness/capacity building programmes on urban water management and water security in polders.

The third challenge in South Asia is **energy security and its impacts on water and food security, hydro power development and river degradation**, was addressed by **GWP Nepal** - through their programme on assessment of environmental flow study and policy development and **PWP** -through their demonstration projects on solar/bio gas water pumps.

The challenge, **Rain Water Harvesting (RWH) – inadequate storage and maintaining the quality of harvested water**, was addressed by **BhWP** - community based project in schools, **PWP-** RWH projects in desert area, **GWP Nepal** -through Lamartar LAPA implementation of RWH systems, **SLWP -**through its RWH and conjunctive use of surface/ground water initiative.

Inadequate use of information on technology/media in the water sector" is another challenge, which was addressed by all the CWPs through their interventions i.e. **SLWP** - through 'School *Sisu Jala* Programme and video on "*Linda Hdena Thru"* – (Until well gets dry) and **PWP -** through its capacity building programme for journalists.

The outcomes of most of the activities implemented in 2015 are yet to be seen. WACREP has made its headway to support the overall mission of Water Secure World and contributed to the SAS mission of enhance the climate resilience in the present socio/political environment.

PHASE II (2015) ACHIEVEMENTS AT A GLANCE

- National Organisations collaborated with CWPs in implementing activities – 12
- No of activities implemented under WACREP Phase II (2015) – 20
- No of people benefited from improved water resources planning & management – 10,325
- No of people benefited from demonstration projects – 2,000
- No of training programmes on IWRM/CCA - 20
- No. of field level people trained – 1,212
- No. of school level programmes – 2
- No of school children trained – 345
- No of workshops – 02
- No of people participated – 196
- No. of case studies – 01
- Reports - 08
  - Proceedings Report on "Challenges of Drinking Water Security in Selected Coastal Areas with Special Emphasis on Polders and Participation of Youth and Women (BWP web site),
  - Proceedings reports on Water Security and Urban Water Management for Sustainable and Eco-friendly Cities/Towns with Special Emphasis on Impact of Climate Change, (BWP website)
  - Interim Report on "Climate Resilience Development - A Case Study of Mashi Sub Basin in Rajasthan – (IWP website),
  - Report on the Promotion of Integrated Water Resources Management in Peri-Urban (IWP Website),
  - Interim report on "Water-Energy-Food Nexus (WEF): Developing a Framework for Resilience Development in Urban Areas with reference to Housing Societies", (IWP Website),
  - Interim report on "Promotion of IWRM in Peri-Urban Settings - preparation of community owned water investment and advocacy plan (IWP Website),
  - Interim Report (yet to be uploaded) on "Assessment of environmental flow in hydropower development and its implications in selected river basins",
  - Report on "Assessment of water focused climate adaptation action/s in 101 LAPAs and its integration into local planning Process in a selected district, (GWP Nepal website)

CHAPTER 1 -BANGLADESH WATER PARTNERSHIP

BWP was established on 30 September, 1998 to foster integrated water resource management (IWRM) by maximising economic and social benefits without compromising the sustainability of vital ecosystems through an experts group meeting under the initiative of Late Mr Quamrul Islam Siddique, Former Chief Engineer, *and Local Government Engineering Department* (LGED). Since its establishment, LGED is supporting BWP as the host institution and it also hosted the Regional Secretariat from 2003-2004 for two years. Mr Shahidul Hassan, President, BWP is the Head of the Executive Committee of the BWP and Dr K. Azharul Haq, Vice President leading the activities in BWP.

BWP plays a leading role on issues related to flood management, Climate Change and Adaptation (CCA) and trans-boundary water cooperation in the country and the region. Its initiative and leadership in developing the preparedness plans and framework for action has influenced policies, promoting of best practices, advocacy and knowledge sharing. Promoting IWRM related dialogues at all levels through provision of platforms within the country and using existing regional and global forums has made it an acknowledged and visible water sector proponent by the government and donors. Besides influencing IWRM policy and translating the concepts at ground level, issues of transboundary water sharing and CCA are the priority concerns of BWP.

BWP was the first to host the SAS Regional Secretariat and to organise the South Asia Water Forum (SAWAF) in 2004. It has participated actively in World Water Forums since 2002 and is responsible for texts on South Asia in the Asia Pacific Regional Document at WWF5 in Istanbul in 2009. At the 6th World Water Forum held in Marseille, France, BWP participated in the Women Leadership Preparatory Conference to debate Women's Leadership in Water and to forge concrete solutions. A key contribution to the region was development of a framework to manage flood disasters in the Ganges and Brahmaputra rivers, examining institutional requirements for basin wide flood management by Bangladesh, India and Nepal. It created Youth Forums in three river basins and has undertaken capacity building and awareness creation on IWRM for water professionals, youth and women.

It facilitated the establishment of the Bangladesh Water Utility Network (BAWUN) which is federated to SAWUN and the Bangladesh Water Integrity Network (BAWIN) working on water integrity. The Bangladesh Women and Water Network (BWWN) was also initiated and established by BWP.

Under WACREP Phase II (2015), BWP undertook two activities, namely;

1. Activity 5B: Workshop on 'Challenges of Drinking Water Security in Selected Coastal Areas with Special Emphasis on Polders and Participation of Youth and Women,
2. Activity 6A: Workshop on "Water Security and Urban Water Management for Sustainable and Eco-friendly Cities/Towns with Special Emphasis on Impact of Climate Change"

Contacts: **Dr K. Azharul Haq,** President, Bangladesh Water Partnership, House NO. 79 (1st floor), Road # 12/A, Dhanmondi R/A, Dhaka-1209, Contact No. 880 4477500213, 880 1819212996, Email: bwp@dhaka.net, Website: www.bwp-bd.org

Activity 5B (BWP): Workshop on 'Challenges of Drinking Water Security in Selected Coastal Areas with Special Emphasis on Polders and Participation of Youth and Women'

Output/Outcome: Local government officials and all other stakeholders are aware of the challenges and policy, institutional, technical and financing options, to address the issues of water security in coastal areas of southern Bangladesh.

Governance process influenced/governance outcome in place

The study focused on the current status of drinking water and the role and participation of youth, particularly women, in safe drinking water management and identified effective measures to improve water security in the coastal areas. It helped better understanding of water resource management, and constraints and challenges regarding access to safe drinking water in the selected study areas. It also helped to explore policy, institutional, technical and financing options, to address the issues of water security in coastal areas of southern Bangladesh, which still is a major concern.

The study reflects the challenges to safe drinking water, responsibilities of youth and women in the selected coastal polders[1] and data and information for water management. Vital statistics i.e. status of drinking water in the study area, constrain to access to water, challenges to safe drinking water in the localities, participation of youth and women in safe drinking water management, health risk related to water and steps taken by government and non-governmental organisations to resolve the problems were gathered.

Based on these field information, the expected solutions against challenges have been categorised, as Hardware and Software measures. *Hardware measures* are those involved in construction of various infrastructures or any other physical actions while the *software measures* are involving policy review and reforms, institutional arrangement, people's participation and awareness raising programmes etc.

Software Measures

- ✓ Establish linkage with Microfinance Institutions (MFIs) to receive finance for installing tube wells and rain water systems

[1] Bangladesh has 139 polders, of which 49 are sea-facing. These were constructed in the 1960s to protect the coast from tidal flooding and reduce salinity incursion. They reduce long-term flooding and waterlogging following storm surges from tropical cyclones. Selection criteria: i) Sea facing coastal districts, ii) Lower natural flow of upstream water, iii) Higher salinity in water, and iv) Scarcity of sweet water.

- ✓ Raise awareness and provide knowledge on negative impacts of salinity, iron and arsenic contamination and water borne diseases
- ✓ Arrange training for the polder areas community on information of good source of product and technology, desalination, water purification process, proper rain water harvesting process, water related health hazards, responsibility of the male members to collect water, impact of salinity, iron as well as arsenic.

Hardware Measures

- ✓ Introduce new technologies and products with low cost/interest to the polder area people.
- ✓ Excavate ponds with the share of beneficiaries for reserving much water
- ✓ Install deep tube well as much as with the technology of filter process of Iron and salinity.
- ✓ Introduce modern rain water harvesting system and provide this technology to some beneficiaries.
- ✓ Test contamination of arsenic, level of Iron and Salinity.
- ✓ Ensure medical treatment facility for affected people

A good number of research works has been conducted before, both by individuals and institutions, where most of the studies have emphasised upon salinity intrusion and overlooked other challenges to safe drinking water and the responsibilities of youth and women in that regards. It has also been stated that the women of all age groups are more vulnerable in any hazardous environment.

In this context, the study finding are very valuable tools for policy makers, water management community and sociologist to address the critical issues of polder community.

What GWP strategic goal(s) does this result relate to?
Catalyse Change in Policy and Practice

Description of change

Sensitisation of general public of the selected polder areas especially women and youth on the challenges of drinking water security in the areas were the immediate changes achieved through

the activity. The outcome would be the youth and women to play a more significant role in addressing the water security challenges not only in the coastal areas but also in all water stressed areas of the country.

Later the study findings needs to be mainstreamed to not only solve the critical water issues but also other socio-economic issues. This includes, (i) introducing new technologies and products for water purification; (ii) excavating ponds with the share of beneficiaries for reserving much water, and (iii) introducing modern rain water harvesting system to solve the constraints and challenges of drinking water scarcity.

The trainings can be extended to rest of the people of the polder areas in the future. It will also help to explore policy, institutional, technical and financing options, to address the issues of water security in coastal areas of southern Bangladesh, which is still a major concern.

Contributing factors, actors, and background

BWP collaborated with **Center for Environmental and Geographic Information Services (CEGIS)** in this activity. A polder is a low-lying tract of land enclosed by embankments that forms an artificial hydrological entity, meaning it has no connection with outside water other than through manually operated devices. Six coastal districts were selected as the study areas from Khulna and Barisal Districts. The study areas for Khulna region were Polder 35/3 of Bagherhat, Polder 22 and 30 of Khulna and Polder 2 and 3 of Satkhira districts; whereas for Barisal region Polder 48, 43/2A and 43/2F of Patuakhali, Polder 41/1 of Barguna and Polder 39/2C of Pirojpur. Subsequently, two Unions from each of the polders were also selected in same manner[2].

Source of Drinking Water in the Study Polder Areas

Drinking water sources	Sampled Barisal polders (%)	Sampled Khulna polders (%)
Tap	1	3
Tube well	89	74
Other (rain water, river water)	10	23
Total	100	100

Source: Population census 2011

Access to safe drinking water is one of the major problem in the South Asia region including Bangladesh with higher vulnerability in coastal areas. Inadequate upstream flow in existing surface water bodies increases salinity in both ground and surface water affecting water

[2] Selection criteria: i) Sea facing coastal districts, ii) Lower natural flow of upstream water, iii) Higher salinity in water, and iv) Scarcity of sweet water.

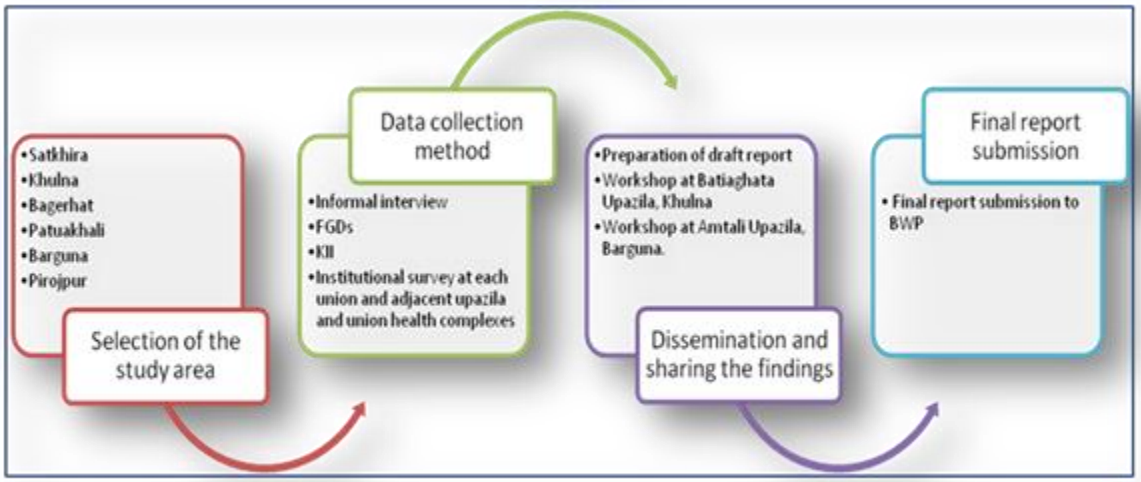
availability and threatening the water accessibility to the community. In the study area, though ground water is the most preferred source of drinking water, tube wells are found to be the source of saline and iron contaminated water which reduces the drinking water security as well as the socio-economic and health condition of the people of the study areas.

Furthermore, cyclone and sea level rise is a constant challenge and threat to drinking water security in the coastal polders. Simultaneously, inundation of tube wells and ponds due to flood and tidal water intrusion further aggravate the challenge for water security in the coastal areas developing scarcity of safe drinking water in the polder areas. As women provide labour to collect water for drinking and other household usage, the water scarcity directly affects the daily routine/workload of women. Villages from all age groups are suffering from various diseases, especially women and children who are more susceptible to such diseases.

Some challenges identified were; unavailability of water purification technology, frequency of natural risk and disasters, poverty, anthropogenic issues, socio-political and institutional issues.

Hand Tube Well (left) and Pond Sand Filter (PSF) in the Polder area (right)

Approach and Methodology adopted is given in the pictorial format.



BWP with CEGIS organised workshops on 13 and 15 October 2015 in Khulna and Barishal division to the south region of Bangladesh to disseminate the study findings to the people including local government officials, politicians and NGOs. More than 140 participants were present in the workshops where a sizable number of participants were youths and women. The main objective of the workshops was to identify challenges as well as recommendations to increase access to safe drinking water in the selected Coastal Polder areas.

The workshops were attended by Upazila Nirbahi Officer, Upazila Chairman, Upazila Vice Chairman, Upazila Members, local Government officials, NGOs, Schools and community stakeholders.
Both workshops were chaired by Engineer. Md. Waji Ullah, Executive Director of CEGIS. The Chief Guest of the workshop on 13 October 2015 was Upozela Chairman, Batiaghat, Khulna and the Chief Guest of the workshop on 15 October 2015 was Upazila Nirbahi Officer, Amtoli, Barguna.

The workshops were followed by technical sessions and open discussions. Both sessions were conducted by Dr Dilruba Ahmed, Director, Socio-economic and Institutional Division, CEGIS.

Two study reports were presented in the technical session of workshops where the reports were prepared based on the collected information on challenges of drinking water security of selected 10 coastal polders in the south region of Bangladesh. The technical session mainly focused on challenges and recommendations on drinking water security in the selected study areas.

Lessons learned

It was observed that local water security challenges and their probable solutions can be identified through interaction with the local population and practical and sustainable solutions can also be developed through joint consultation with them.

Other information—web links to reports, news items, etc.:

- Published in CEGIS Newsletter at www.cegisbd.com
- published quarterly at BWP website (www.bwp-bd.org)
- Summary report - http://www.bwp-bd.org/pdf/Workshop_on_Challenges_of_Drinking_Water_Security_in_Selected_Coastal_Areas_13_and_15_October_2015.pdf

Glimpse of the events:

Polder 43/2A

Barisal region

Workshop in Amtali Upazila of Barguna District

Polder 43/2F

Activity 6A (BWP): Workshop on 'Water Security and Urban Water Management for Sustainable and Eco-friendly Cities/Towns with Special Emphasis on Impact of Climate Change'

Output/Outcome: The stakeholders were thoroughly informed about current status and future challenges for water security in cities and towns under the projected climate change scenario.

Governance process influenced/governance outcome in place

The Coordinator of Technical Committee of Bangladesh for Intergovernmental Panel on Climate Change (IPCC), Dr Qazi Kholikuzzaman Ahmad participated as the Chief Guest at the workshop and out of eight presentations, five were presented by the senior government officials. This includes,

i. Managing Director, Khulna Water Supply and Sewerage Authority (KWASA),
ii. Deputy Managing Director (Research, Planning and Development), Dhaka Water Supply and Sewerage Authority (DWASA),
iii. Superintending Engineer, Chittagong Water Supply and Sewerage Authority (CWASA),
iv. Chief City Planner, Chittagong City Corporation,
v. Executive Director, Institute of Water Modelling (IWM),
vi. Director (NRM), Department of Environment (DoE),
vii. Executive Director, Centre for Environment and Geographic Information Services (CEGIS),
viii. Programme Manager, WaterAid Bangladesh

This shows the catalytic role played by BWP in setting up a platform for technical experts to share the water security challenges in urban cities and exchanged views with coordinator of technical committee of Bangladesh for IPCC to highlight the resources gap in achieving the Sustainable Development Goal (SDG) commitments in 2030. Around 56 participants including representatives from various city councils, Water Supply and Sewerage Authority, Local Government Institutes (LGIs), researchers, engineers, economist, environmentalists, university faculty members,

government officials, development workers, civil society actors, youth and media personnel were participated and exchanged views. The workshop held on 19 December 2015 at BRAC Center in Dhaka, Bangladesh.

What GWP strategic goal does this result relate to?
Catalyse Change in Policy and Practice

Description of Change
The workshop facilitated the participants to exchange knowledge on the subject issues. The participants provided valuable insights and comments on probable improvement strategies of drinking water security. It is expected that proper planning and implementation of technologies will improve the drinking water scenario of the country as well as aid in the evolving of eco-friendly cities.

Contributing factors, actors, and background

Despite of having a negligible contribution for global greenhouse gas emission, Bangladesh is one of the first and most severely affected countries due to climate change. Producing more waste than it can manage, wasting more natural resources than it can afford and being more lenient than the situation demands, the population is inherently subjected to modern environmental challenges, with water security issues demanding immediate attention. Water security ensures food security and energy security which is ultimately tied to human security.

In Bangladesh, water supply is heavily dependent on ground water sources. However, every year the ground water level in the capital Dhaka depletes by one to three metres. In response to high iron, arsenic and manganese concentrations of ground water, surface water treatment plants are also being installed in many rural areas. Moreover, global warming induced salt-water intrusion in the coastal regions of Bangladesh is causing decrement of the sources for safe drinking water.

Urban population will increase to 75 and 113 million by 2025 and 2050 respectively. Major migration of population will be towards Dhaka, Chittagong, Khulna and other large cities of the country. According to United Nations Children's Fund's (UNICEF's), 'Understanding Urban Inequalities in Bangladesh report-2010', around seven million people are estimated to be currently living in urban slums and is rising. The United Nations (UN) suggests that every person requires 20-50 liters of water a day just to ensure their basic needs for drinking, cooking and cleaning. According to the Asian Water Development Outlook 2013 only six percent of the population has access to piped water. This rapid rise in slum population will further exacerbate the existing water supply, sanitation and storm water drainage.

Total 56 participants were present in the workshops. This workshop was aimed to highlight SDG commitment of 100 percent water supply to city dwellers under the present context of only six percent has access to piped borne water and no big initiative for urban water management in terms of climate change. Therefore, this initiative was timely.

The main objective of the workshop was to sensitise the stakeholders about the water security and its management towards establishing sustainable and eco-friendly Cities/Towns. This workshop was a prelude to develop a programme of Integrated Urban Water Management (IUWM).

Lessons learned

Major contributing factors regarding the worst situation of drinking water were identified as

- indiscriminate disposal of solid and hazardous waste into water bodies,
- appropriation of wetlands and open spaces leading to stagnation of rainwater,
- pollution of rivers and water bodies,
- climate change-induced saline water intrusion in ground water,
- lack of awareness of water purification technology,
- natural disasters like flood and cyclone,
- poverty and ignorance.

Some of the government organisations and NGOs are working to solve these problems and local level representatives also trying to mitigate these problems marginally. Still these steps are not sufficient to mitigate the problems**.**

Some significant recommendations given during the workshops were;

i. **National allocation for water management activities:** Water is a fundamental need of the citizen of the country. Therefore the government should not wait for donor funding to initiate water management in the urban areas. There should be an allocation for such important agenda that deals with the basic needs of the people.

ii. **Surface water resources:** Groundwater of the country is depleting rapidly. Therefore water should be sourced from the surface water bodies in order to save our underground reservoir.

iii. **Water reuse:** Domestic grey water can be reused for various purposes, but not limit to toilet flush and floor cleaning etc.

iv. **Increase water efficiency:** Cities and towns of the country are water scarce areas with a rapid increase in water demand. An efficient water use can reduce present water demand. eg. a normal toilet flushing need about 12 liters of water while efficiency can be increased by introducing half flushing.

v. **Fight salinity intrusion:** Salinity is a great problem for many coastal cities, including (but not limited to) Chittagong, Khulna and Cox's Bazar cities. Therefore salinity should be considered in water supply planning in the coastal cities.

vi. **Water reservoirs in sub-urban areas:** Water reservoirs could be developed in suitable locations near big cities, especially in areas with hilly terrain, for storage of fresh water collected in the rainy season (e.g. Foy's Lake in Chittagong).

vii. **Recharging ground water of urban areas:** Groundwater of urban areas are depleting very fast. Groundwater can recharged by trapping rain water from roof tops and diverting them to aquifers.

viii. **Conservation of wetlands, open spaces and green areas:** Surface areas of cities and towns are mostly paved with cement preventing rain water to infiltrate. Wetland, open spaces, parks and gardens should be protected and keep open for rain water to get absorbed to the ground and infiltrate into aquifer.

ix. **Zero effluent discharge:** Industries are major source of water pollution along the rivers surrounding Dhaka city. Similarly, water bodies near other big cities are also polluted by industrial effluent. All industrial effluent should be treated before releasing into environment.

x. **Pro-poor and community based water management:** Pro-poor water management systems can be developed in small towns. Community can be involved in their water supply management systems.

Urban water adaptations will be needed for both highly developed supply and wastewater treatment infrastructure and for low tech and informal water supply and treatment. Rising populations, potentially rising and/or declining incomes and changes in technology should be considered in planning.

The suggested measures for urban water management are;

- Non-revenue water reduction
- System integration
- Institutional improvement
- Rainwater harvesting
- Demand reduction and conservation
- Reuse of water
- Water marketing
- Integrating climate change into planning.

The open discussions brought a few recommendations which are expected to assist the concern authorities and policy makers to develop sustainable and eco-friendly strategies and interventions for the vulnerable cities/towns.

Some identified knowledge gaps on hydrologic cycle of urban water, impacts of sea-level rise on coastal cities and mitigation in relation to urban water as barriers. It was confirmed that most of the initiatives have vested due to conflict of interest and poor governance and/or weak political will to commit the necessary financial and human resources to water supply development and water resource management and those are the common barriers.

Other information—web links to reports, news items, etc.:
Summary Report: **http://www.bwp-bd.org/pdf/workshop_on_water_security_and_urban_water_management.pdf**
Final Report: Diluka, please upload to WACREP Page. If you do not have it, please let me know.

Activities of the workshop have been highlighted in the following photographs.

<table>
<tr><td> 
</td><td><u>Inaugural Session</u>

Dr K. Azharul Haq, Vice President, BWP, Dr Qazi Kholikuzzaman Ahmad, Chairperson of Palli Karma Shahayak Foundation (PKSF) and Institute of Microfinance (InM); Mr. Md. Shahidul Hasan, President of BWP and chair of the Inaugural Session and Dr Fazle Rabbi Sadeque Ahmed (From Left)</td></tr>
<tr><td>The Chief Guest, Dr Qazi Kholikuzzaman Ahmad is delivering his speech</td><td> 
</td></tr>
<tr><td> 
</td><td>Speech by Dr K. Azharul Haq
Vice President, BWP</td></tr>
</table>

CHAPTER 2 - BHUTAN WATER PARTNERSHIP

RSPN was founded as a citizen based non-profit, non-governmental environment organisation in 1987 to support environment conservation in Bhutan. The Society was registered under the

Companies Act of Bhutan until last quarter of 2009, without proper authority which regulated the non-profit organisation, with a special clause on non-profit entity. With the establishment of Civil Society Organisation Authority (CSOA) of Bhutan, the Society is now registered under Civil Society Organisation Authority as one of the Public Benefit Organisations (PBO).

RSPN works on environmental education and advocacy, conservation and sustainable livelihoods, research and emerging issues like climate change, solid waste and water. RSPN programmes are based on its five year strategic plan and include species, ecosystem, and community based conservation programmes outside of the protected areas system. All of the RSPN's programmes continue to involve students/ individuals in schools, institutions, and communities throughout the country for various project activities. The Royal Society for Protection of Nature (RSPN) currently enjoys the Royal Patronage of Her Majesty the Gyaltsuen, Jetsun Pema Wangchuck. Her Majesty assumed the patronage of RSPN in 2012.

RSPN is governed by a seven-member Board of Directors, comprising representatives from varied sectors according to the requirement of the Civil Society Act of Bhutan. An Executive Director manages the day-to-day affairs of the organisation and reports to the Board of the Directors. Dr Lam Dorji, serves as an Executive Director/Member Secretary to the Board of RSPN.

Bhutan Water Partnership (BhWP) is a consortium of water professionals and concerned individuals from various sections of the society working towards achieving the goals of Integrated Water Resource Management (IWRM). It is a non-profit entity affiliated to GWP. BhWP office is currently hosted in the Royal Society for Protection of Nature (RSPN). In 2001, the Honourable Minister of Agriculture Official launched the BhWP by initiated by PPD of Ministry of Agriculture (MoA). Mr Dasho Sonam Tshering, then Director of Department of Power, and Lyonpo (Dr) Pema Gyamtsho, then Deputy Secretary, PPD, MoA were appointed as Chairman and Co-Chairman of BhWP respectively. Mr Kezang Jamtsho, PPD, MoA was nominated as the Secretary. In 2002, the National Environment Commission (NEC) was appointed by the CCM as the apex body on water resources. With this appointment, the coordination and regulatory functions of the BhWP was theoretically taken over by the commission. In a meeting between BhWP and NEC, it was agreed that BhWP would function as technical body to support

the NEC and the water sub sectors. BhWP Secretariat relocated to RSPN in February 2007 for two years. The NEC once again directed RSPN to host BhWP Programme form September 2011.

Under WACREP Phase II (2015), BhWP undertook three activities, namely;

i. Activity 3B (BhWP): Supports community based water source protection projects,
ii. Activity 3C (BhWP): Supports community based projects for the efficient utilization of water resources through improved technologies,
iii. Activity 6B: IWRM sensitive workshop for communities,

Contacts:

Mr Kinga Wangdi,
Country Coordinator Bhutan Water Partnership (BhWP),
Royal Society of Protection of Nature (RSPN),
Kawangjangsa,
P O Box 325,
Thimpu, Bhutan,
Tel: +975 2 326130/+975 2 322056
Fax: +975 2 323189
Kinga Wangdi (kwangdi@rspnbhutan.org)
Website: http://www.rspnbhutan.org/about-bhwp.html

Activity 3B (BhWP): Supports community based water source protection projects.

Output/Outcome:

Improved quality and quantity of water available hence improved health and sanitation.

Governance process influenced/governance outcome in place

BhWP financed implementing water resource management projects including access to water for two communities and one school in Bhutan during 2015. The grant was aimed at protecting sources of water and renovating water infrastructure which were constructed by government earlier with the labour contribution from the communities themselves. The programme covered two communities with more than 1,500 people including students in the selected school.

Although Bhutan is one of the countries having highest water per capita availability in the region, due to difficult terrain and topography, lack of appropriate technology and poor maintenance of water infrastructure, access to water has become a major challenge to the communities. Localised water shortages for both drinking and irrigation are common phenomena in many parts of the country. However, with the intervention, the communities started receiving higher quantity of water for both drinking as well as irrigation. Further the intervention lead the communities to take extra effort to maintain the system.

The third project implemented in the school was for restoring the school's drinking water facility and to improve the quality of water at school. Prior to the project, the water supply in the school was irregular and school run out of proper water mostly directly impacting on the hygiene and sanitation of the students. Earlier the pipelines were poorly maintained and large amount of water is being waited on the way before reaching the destination. However, the school authority has initiate proper maintenance of the infrastructure with the project and as a result school started receiving adequate water for its daily consumption, which is ultimately contributing to improving health and sanitation of over 500 students.

What GWP strategic goal(s) does this result relate to?

BhWP's initiatives in water resource protection and renovation of the water infrastructure will directly contribute towards the goal "Catalyse Change in Policy and Practice".

Description of Change

With proper maintenance and sensitisation of the community members, the available water was efficiently used in both the communities and the school. In the past, although they have constructed water infrastructure with the support from government, the maintenance was the serious issue that communities have faced mainly owing to the poor coordination and

cooperation within the community members. However, this programme has targeted towards proper maintenance of infrastructure and sensitisation of the communities and the local leaders for increase efficiency and promoting sense of ownership by involving communities themselves in the project.

Contributing factors, actors, and background

BhWP initiated the programme for protecting water resources and renovating water infrastructure including irrigation channels for two communities and restore drinking water facilities in one school which has ultimately improve both quality and quantity of water available in the school to improve health and sanitation of the students.

The protection of water resources and renovation of water infrastructure was initiate mainly to enhance the livelihood of the communities through providing adequate access to water.

The project was implemented in collaboration with the local communities mainly to promote sense of ownership amongst community members themselves and ensure proper maintenance of the infrastructure in the future

Lessons learned

- Lack of support from other officials to the programme managers who implement and monitoring the programmes make it hard for the manager to cope up with the workload together with the other mainstream responsibilities of the organisation.
- The available funding does not allow BhWP to implement projects having bigger impacts, therefore the per capita cost of the project is very high while the impact is low. To bring a bigger change in the community in the water sector in Bhutan we need to increase efficiency in implementing process, including release of fund and size of the fund. However, it does not mean that, small projects are not in a position to make impacts at the ground level. Since there is limited funding, hiring experts for project implementation is challenging which directly affect the ultimate success of the programme.

Community on water source protection

Cleaning of irrigation channel.

Activity 3C (BhWP): Supports community based projects for the efficient utilization of water resources through improved technologies.

Output/Outcome:

Communities applies technologies for management of water resources at local level.

Governance process influenced/governance outcome in place

The monks in the Tango Monastery and people in the Dopchula Community is aware of options available for them for better management of water and environmental concerns were raised.

What GWP strategic goal(s) does this result relate to?

Catalyse change in policy and practice.

Description of Change

There were two interventions namely, waste water management and improve water supply. Due to waste water management intervention, no grey water can be seen in the surrounding of the monastery and nearby water bodies are not polluted. The second intervention ensured the continuous water supply to the Dopchula community for their drinking and sanitation purposes.

Contributing factors, actors, and background

The waste water treatment and drinking water supply for Tango Monastery (Tango University of Buddhist Studies) was a one intervention.

Tango is located at the furthest north of Thimphu City. The monastery holds over 300 national and international students who study Buddhist philosophy. It is also one of the cultural heritages of the country and increasingly becoming a tourist destination for both national and international pilgrims.

The greywater that includes wastewater from washbasins, baths, laundry and kitchen discharged from the university compound which is being collected in the gullies, have negatively affected the surrounding environment. It emits unpleasant odour along the trail by spoiling the aesthetic value of the area.

With the support of BhWP, the university has constructed several soaking pits to collect these wastewater. As a result, there is no free flow of greywater can be seen in the surroundings. The idea is to allow the gravy water to be filtered through the soil to get quality water and the quality of the ground water are being monitored by BhWP.

BhWP also assisted in supplying drinking water facilities to one of the campuses of the University and over 25 monks were benefited from the project.

The Dopchula community is mostly comprises of families involved in security. The drinking water supply has been a serious issue for them. In high altitudes, most of the water sources get frozen especially during winter season and people hardly have access to running water in the area. With the assistance of BhWP, the community constructed an underground pipe system to connect the water source with the area. The new development provides continuous water supply to the Dopchula community for their drinking and sanitation purposes.

Lessons learned

Community intervention is a key for the successful of any project and intervention should be an urgently required solution.

Other information—web links to reports, news items, etc.:

Tango Monastery & Stream Nearby

Activity 6B: IWRM sensitisation workshop for communities.

Output/Outcome:

Communities practice IWRM Principles and applies these Principles for management of water resources at local level.

Governance process influenced/governance outcome in place

Until end 2015, nearly 180 local leaders of 18 districts were sensitised on the IWRM. The importance of water for drinking, sanitation, economy, eco-system services were discussed at length. How to address or at least minimise the problem of water scarcity was discussed in response to the concerned raised by the participants. All existing water related acts, rules and regulations and policies etc. were presented to participants mainly to make them aware on the policy matters relating to water resources and its management in an integrated approach.

The level of awareness of participants on water resource management and all relevant policies have been increased with the workshop. Therefore it is assumed that the workshop has been adequately addressed the issues relating to water at local levels - the participants are the local government leaders, who will discuss and prepare plans and ensure implementation of plans within their communities.

What GWP strategic goal(s) does this result relate to?

Generate and Communicate Knowledge

Description of Change (Why did the change happen?)

The IWRM sensitisation workshop was aimed at educating and providing information on water resources and its management to the Gups. Gups as the head of Gewog (block) has a very important role to play in planning and implementing local development planes and utilisation and management of the natural resources. The participants in the sensitisation workshops are the key persons engaged at the block level decision making for any development planning and executing. Therefore, it is expected to have positive changes in the process of planning their development needs.

Contributing factors, actors, and background

The sensitisation workshops were held at Gasa District on 22 to 23 May 2015. Four local leaders of the four blocks, the District Environment Officer, District Forestry Officer and District Agriculture Officer attended the programme. During the programme, presentations on importance of environment and water were made followed by very fruitful discussions on various environmental and water related issues.

The sensitisation workshops at Tashi Yangtse district was conducted on 12 to 13 October 2015 *and* at Samdrup Jongkhar district on 15 and 16 October 2015. The local leaders and the district environment officers actively participated for the programme. The workshops conducted with the aim of educating Gups (Local leaders) on water resources and its management. All 20 districts have now been covered with the IWRM sensitisation including these two districts, and BhWP is hopeful that the local leaders will make use of the knowledge gained from the programme to allow them to make informed decisions with regard to water resource management.

Lessons learned

An exercise was conducted in order to stress the importance of water, its issues and management, where the local leaders expressed their views in pictorial form. This exercise was found to be very effective way of explaining the use, issues and the management of water resources in an integrated manner. The participants expressed that the workshop has given a lot of knowledge about water and its management. The programme was found to be useful for the local leaders and they assured that the knowledge gained will be shared among the local people and most importantly they will use them in the management and planning of use of natural resources in their local areas.

Presentations were also made on the importance of environment and water followed by fruitful discussions on various environmental and water related issues. An exercise stressing more on importance on water, its issues and the need for proper management were conducted engaging participants. The local leaders expressed their thoughts in a pictorial form to make the issues clearer.

In general, the programme found to be useful for the local leaders. They assured that the knowledge gained would be shared among the locals, and most importantly use them in the management and planning of the use of natural resources in their areas.

Other information—web links to reports, news items, etc.:

Photo 2: Local leaders & Districts officers of Gasa District

Photo 3: Illustrating IWRM by local leaders

Photo 4: Synthesising IWRM

Photo 9: Local leaders and Environment Officer of Thimphu district

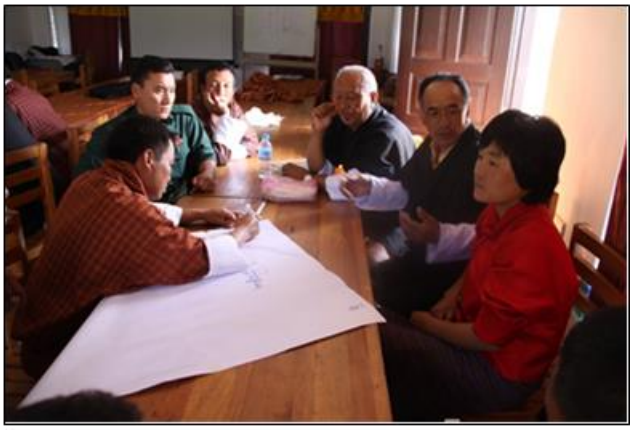


Photo 7: Discussions on their water sources

Photo 4: Mapping their watersheds

Photo 5: Participants of Dagana district

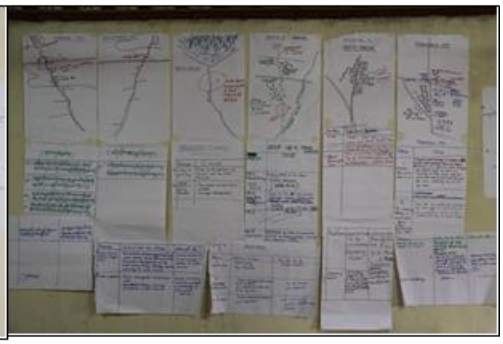


Photo 6: Listing down issues in the watershed

CHAPTER 3 - INDIA WATER PARTNERSHIP

India Water Partnership (IWP) is a non-profit organization with a goal of promoting Integrated Water Resources Management (IWRM) in India. It has been accredited by the GWP as one of the CWPs of GWP.

Core areas of IWP

IWP has been active in promotion of Integrated Water Resource Management (IWRM) principles and practices through its network partners to support national development priorities. Some of the core priority areas are; promoting IWRM approach effectively through workshops and consultations to address adaptation to climate change with the support of zonal water partners across the country; encouraging use of innovative low cost water saving technologies by the farming communities; sustainable natural resource management; integrated domestic water management; promoting Area Water Partnership (AWP) for river basin management; conflict resolution on water sharing; inter-state trans-boundary water sharing issues; gender mainstreaming, Involving youth in sustainable water management and to empower young people to become agents of change.

India Water Vision-2025 by India Water Partnership

IWP prepared "India Water Vision-2025" during 1999 based on the projections for country's water demand in 2025. As per India Water Partnership India Water Vision, the total estimated demand for water (gross) for 2025 is 1027 BCM. In order to meet this demand, water availability will have to be increased from around 520 BCM in 1997 to more than 1000 BCM in 2025. For meeting additional demands, investment requirements have been estimated to Indian Rs. 5000 billion during next twenty five years or about Rs. 200 billion per year. The India Water Vision-2025 is well cited in a number of national and international documents/reports/ scientific research papers.

Under WACREP Phase II (2015), IWP undertook four activities, namely;

i. Activity 2C (IWP): Climate Resilient Development- A case study of Mashi sub-basin, Rajasthan (2015-2016),
ii. Activity 3D (IWP): Promotion of IWRM in Peri-Urban Settings (Action Research to develop innovative IWRM Investments),
iii. Activity 6D (IWP): Water-Energy-Food Nexus (WEF): Developing a Framework for Resilience Development in Urban Areas with reference to Housing Societies,
iv. Activity 7D (IWP): Promotion of IWRM in Peri-Urban Settings (preparation of community owned water investment and advocacy plan) – (2015-17)

Contacts

Dr Veena Khanduri
Country Coordinator (IWP) and Programme Coordinator (WACREP-India)
India Water Partnership Secretariat - WAPCOS Ltd., 76-C, Sector-18, Institutional Area,
Gurgaon - 122015 (Haryana), India.
Tel: (+91-0124) 2399421 Ext: 1404, Fax: (+91-0124) 2397392
E-mail: iwpneer@gmail.com, Website: www.cwp-india.org

Activity 2C (IWP): Climate Resilient Development- A case study of Mashi sub-basin, Rajasthan (2015-2016)

Output/Outcome: Respective government agencies and NGOs/people of Rajasthan to understand basin level planning and IWRM approach which leads to build climate change perspective in water resources management.

Governance process influenced/governance outcome in place

This is a collaborative activity of IWP with one of its network partner **"Centre for Environment and Development Studies (CEDS)"** based at Jaipur, Rajasthan. The implementation duration is from January 2015 to December 2016. The major tasks identified in 2015 under this intervention were;

(i) GIS Survey; mapping of land resources, water resources and human resources of the area,
(ii) Conducting socio-economic survey: data collection on land, livestock, population, extraction of water and livelihood patterns etc.,
(iii) Adaptation/mitigation strategies: field survey on adaptation strategies for society, government agencies and policies etc.,
(iv) Climate change impact analysis: data collection on temperature, rainfall, humidity, groundwater aquifers and wind velocity etc.,

The main objective of the study was to list possible effects of climate change/variability on agriculture sector or livelihood of the people in the Mashi sub basin area. As climate change is manifested in variation in water availability, the second objective was to explore possibility of adoption of IWRM approach in water resource management in a river basin by developing a new approach of participatory community management of river basin water resources to ensure water and food security in Mashi River Basin. The study can be used as a pilot for River Basin management of water resources in Rajasthan.

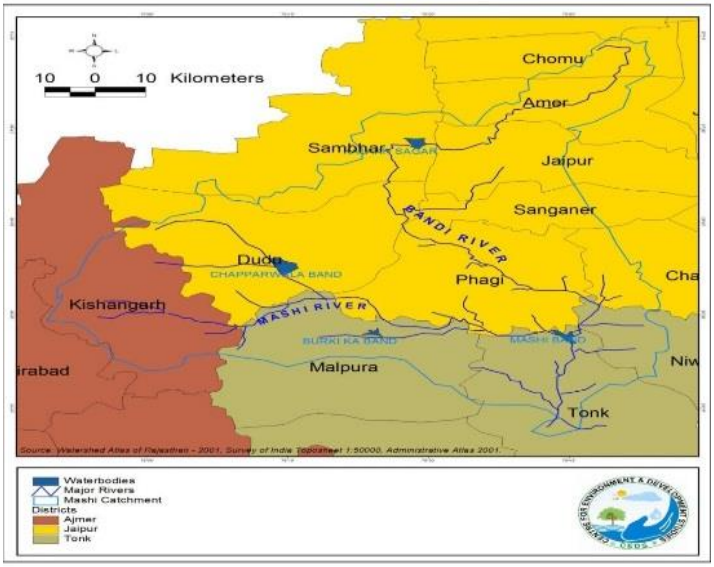
What GWP strategic goal(s) does this result relate to?
Catalyse Change in Policy and Practice

Description of Change
The state government came out with an act called "the Rajasthan River Basin and Water Resource Planning Act, 2015 for Basin wise Management of Water Resources". CEDS tried to understand the practical implication of this Act and identified that people and concerned line departments had no idea about its implication; therefore the CEDS initiated the concept of Participatory River Basin Management by forming a River Basin Parliament represented by all the stakeholders. In

the first year of the project (2015) this concept was developed and shared with few experts and NGO partners and sought their views for implementation in 2016.

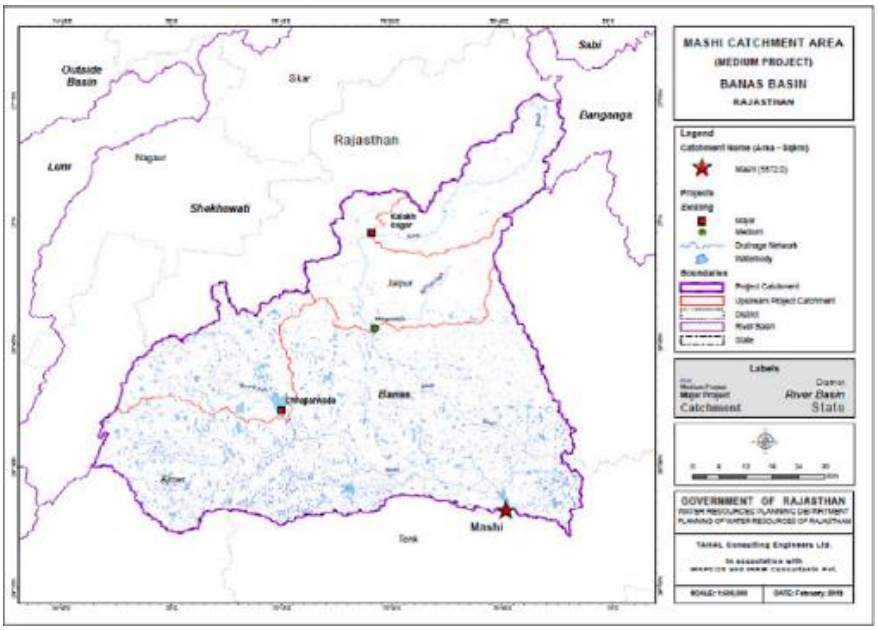
Contributing factors, actors, and background

Implementing this activity began with literature review of the project area, identification of specific sites, preparation of questionnaires, secondary data collection and procurement of satellite data from Indian Space Research Organization (ISRO) for the project area.



Boundary of Mashi sub Basin in the three Districts

The Mashi sub basin area of Banas basin has been delineated with the help of Ground Truth (GT) sheets and Watershed Atlas and Shuttle Radar Topography Mission (SRTM) datasets. Drainage system and physiography of the area mapped with the help of SRTM data. Relevant secondary datasets i.e. forest cover, geology, soils, habitations, infrastructure, human population, land use etc. were collected/procured and processed in GIS environment for developing various thematic output required for the study. The post monsoon datasets (IRS LISS IV images) were procured from National Remote Sensing Centre (NRSC). Images of both Kharif and Rabi crop seasons of the same year were selected and procured for particular year.



Aautomatically delineated catchment of Mashi Sub Basin

The digitization of thematic layers such as geological map, physiographic maps, slope map and soil maps were taken using secondary data collected from the study area, satellite image interpretation and limited field verifications helped to produce the thematic maps. Geological map were interpreted from satellite image (open Source) and were verified with the maps collected through open sources and later verified during the field checks. Physiographic map has been prepared using Topographic sheets and satellite images.

The range of tools were used for data collection including socio-economic survey, desk review, focused group discussion with key informants and other stakeholders, and direct observations. By using the two sets of questionnaire (one for Village Schedule and the other for Household Schedule), data on land, livestock, population, extraction of water, livelihood patterns, etc., were collected. In order to know the impact of interventions on the livelihoods of beneficiaries, few households were randomly selected from the sample villages for a detailed survey. Study was conducted by adopting participatory approach and also by holding consultations with Panchayat Raj Institution (PRI)[3] representatives. This survey helped the researchers to capture household strategies adopted by the farmers and the communities to mitigate the climate risk in their farms/areas. It was prominent that diversification of occupation, variation in cropping pattern and out migration are main strategies adopted by the people in the Mashi Basin.

[3] In India, the Panchayati Raj Institution (PRI) functions as a system of governance in which **gram panchayats** are the basic unit of local administration. The system has three levels: **gram panchayat** (village level), mandal parishad or block **samiti** or **panchayat samiti** (block level) and zila parishad (district level). PRI is a local Government for self-governance.

The huge set of baseline information collected was based on the learning's from the review of IWRM implementation in Rajasthan and this information would be used to prepare stakeholders capacity building modules so that in the second year of the project, the participatory river basin management approach can be adopted by formation of Mashi River Parliament similar to Tarun Bharat Sangh of Arvari River Parliament which is in operation from the last 20 years.

Activities planned for 2016 are based on the learning from 2015 implementation phase

The activities planned for 2016 are;

1) Developing a river basin concept,
2) Activity planning,
3) Preparing five capacity building modules for farmers and non-farm households, industrialists, unorganised sector entrepreneurs, Panchayati Raj Institution Members and on governance issues related to Mashi river basin parliament
4) Group formation at watershed level,
5) Consultation workshop with stakeholders for finalising Capacity Building Modules and Training.

Lessons learned

This survey helped the researchers to capture household strategies adopted by the farmers to mitigate the climate risk in their farms/areas. It was prominent that diversification of occupation, variation in cropping pattern and out migration are main strategies adopted by the people in the Mashi Basin. Financial management particularly public or private borrowing to bear the impact of climatic risk is also play an important part of the household strategies. Water resources availability also play major role in shaping household coping strategies as people are forced to migrate during drought years.

Lessons that emerges out of the review of international, national and Rajasthan State water resource management efforts will be used in developing new approach to manage water in the Mashi River basin.

The main learning from the pilot IWRM implementation in Rajasthan during last ten years are:

- Hydrological assessments must be the basis for local IWRM,
- Local people have to work alongside government departments to realise IWRM,
- Joint implementation by government agencies is a must for effective local IWRM,
- Existing government systems have to be used to support local IWRM,
- Considerable capacity building and awareness raising is necessary.

The one of the revelation during the field work that there is no groundwater in the Mashi River catchment area and wherever it is available is of bad quality, i.e. having high fluoride contents. Secondly, there are no tube wells and only shallow dug wells with very little recharging despite large number of surface water harnessing structures are there. On the other hand in Bandi River sub basin there are tube wells with good quality groundwater and better recharge capacity. These issues were discussed with the Geo-hydrologist and Geologist and it was decided to conduct geophysical assessment of both the rivers catchment areas, as the answer to above listed issues will be needed for basin level water resource planning.

Other information—web links to reports, news items, etc.:

http://www.gwp.org/Global/GWP-SAs_Files/WACREP/2015/REPORT%20ON%20CASE%20STUDY%20OF%20MASHI%20SUB%20BASIN%20-%20RAJASTHAN.pdf – Interim Report

Construction of Chaukas in community lands

Water Harvesting Structures

Talab

Personal Nada

Water Harvesting Structures in series

Water Harvesting Structures in series

Organic Farming

Worm Compost

Organic Farming

Agricultural Crops

Sesamum Crop

Rajaka (Alpha alpha) in Summer

Bajra Crop

Wheat in Rabi

Activity 3D (IWP): Promotion of Integrated Water Resource Management in Peri-Urban Settings (Action Research to develop innovative IWRM Investments)

Output/Outcome: Innovative indicative IWRM plan in place supported by advocacy strategy for policy and funding support

Governance process influenced/governance outcome in place

The activity conducted with the collaboration of **TARU Leading Edge**, New Delhi at Garhi Harsaru village located in Gurgaon District of Haryana which has a population of 8,000 people. The initiative was based on IWRM Action Research format, conducted in a peri-urban area of the National Capital Region of Delhi with objectives to develop innovative and indicative IWRM plan to be owned by local community. Under this study, there are number of tasks planned within the context of IWRM, namely, identification of key stakeholders, key informant and focus group discussions, selection of water stresses areas that need technical support in planning, organising and preparing indicative investment plan, understand the challenges through action research, conducting a workshop based on the findings, development of action research framework and implementation of developed action research framework.

Integrated solutions for issue related to water in village Garhi Harsaru were identified at the end of the first year of study. The challenges include; ground water, service delivery, water quality, solid waste and liquid waste management and institutional setup in consultation with the community. Identified solutions for ground water depletion were rain water harvesting, recharging of ground water and reusing waste water. Salinity and contamination are identified as key problems in relation to water quality, for which the IWP and Taru Leading Edge has proposed filtration and disinfection as one of the possible solutions. IWP and TARU distributed bio-sand filters to the local community as a demonstration. Inadequate and inefficient service levels were the issues identified under service delivery and it has been proposed to increase the coverage, efficiency, introduction of metered system to address the shortcomings of service delivery. Dependence on individual water sources and excessive water usage for agricultural are common which can be addressed through improved agriculture practices and awareness raising. Proper planning and implementation needed to address poor solid and waste water management.

The activity consisted of identification of the problem, extent and severity of the problem in the study area and possible remedies through evidence building and consultations. Significant problems identified based on the study were;

- Over-dependence on groundwater,
- Inadequate and inefficient service levels,
- Issues of salinity,
- No system of solid and liquid waste management,

These problems shall be addressed through a systematic Water Investment Plan, Institutional and Advocacy strategy and solid and liquid waste management plan.

What GWP strategic goal(s) does this result relate to?
Catalyse Change in Policy and Practice

Description of Change (Why did the change happen?)

TARU Leading Edge in consultation with IWP has developed the tools which were used to identify different water related issues by using qualitative and quantitative approaches.

- Availability and demand of water for drinking and irrigation purposes,
- Different storm water interventions that would augment the existing water sources,
- Testing of economic and institutional viability of leakage and introducing reduction measures,
- Identification of wastewater treatment system which is technically feasible and socially and economically viable,
- Socio-economic viability of metering and volumetric pricing of water,
- Identification of factors affecting urban hydrology and surface and groundwater interactions,
- Studying the key physical, chemical and biological parameters to be monitored for ascertaining water quality.

Considering the above identified problems, tools were developed and the survey team will develop a Water Investment Plan to provide a comprehensive framework for sustainable development and management of water resources, as well as to highlight the main areas that the investment will be directed, in which an effective legal and institutional framework for its implementation will be put in place. The Water Investment Plan shall aim for;

- securing water supply,
- identifying and developing new water resources that will enhance the water allowances per capita,
- providing access to improved water supply,
- expanding the wastewater services and coverage all over the area,
- promoting metered supply, enhancing the energy efficiency and expanding the coverage of the services,

The Water Investment Plan shall in specific look at developing a water security plan encompassing water safety for a holistic and participatory planning approach to address source sustainability, O&M issues, make provision for system replacement and expansion and water quality issues (Water Safety Plan).

Another critical plan component will also include the initiative to implement ‘Zero Waste Model’ based on integrated Solid and Liquid Resource Management (SLRM) approach that goes beyond

managing generated waste to preventing waste generation. Zero Waste means designing and managing products and processes to reduce the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them.

- Another important aspect is the Institutional and Advocacy strategy which will focus on setting up/strengthening the institutions for improved management of water resources and supply systems that will include strengthening village water committees, their training, and develop planning, monitoring and implementation systems. Along with this, holistic advocacy strategy for all relevant stakeholders will also be adopted to achieve comprehensive change. Advocacy has been alternatively seen as a mean of seeking changes in government policies, to changing attitudes, power relations, social relations and institutional functioning. Its goal can be to promote a cause, by promoting citizen participation. Access to water, sanitation and a hygienic environment implies the need to envision advocacy as part of a social change process and acknowledges that to do effective advocacy requires work and change across a variety of arenas or dimensions. The Drinking Water Advocacy and Communication Strategy Framework focuses on critical behaviours related to drinking water at household and community level. Including Families to ensure safe storage and handling of drinking water,
- Communities to demand establishment of representative and functional committees for drinking water supply from PRIs/PHED at GP level,

The plan shall help Garhi Hasaru village by:

- Adequate quantity of water to all at all times,
- Safe water free of any contamination,
- Equal access to the water supply systems for all residing in Garhi Hasaru and ensuring coverage through the Public Water Supply Systems,
- Water access regulated to ensure minimal wastage of water,
- Improved water supply,
- Improved water resources,
- Proper solid waste management through a zero waste model, where the output of one activity serves as the input for the other,

Contributing factors, actors, and background

Increasing population and rapid economic growth in India has created strong pressure to convert agriculture land to industrial and residential and these areas having land use change are described as ‘peri-urban’.

Peri-urban areas (also called urban space, outskirts or the hinterland) are defined by the structure resulting from the process of peri-urbanisation. It can be described as the landscape interface between town and country, or also as the rural—urban transition zone where urban and rural uses mix and often clash. Water, Sanitation and Solid and Liquid Water Management (SLWM) are the few of the basic amenities that need to be planned for these areas.

This highlights the need to not understand the process and dynamics of urbanisation but to identify and map the transformation to accommodate the growth. IWRM is one of the key tools to address the water issue which is interactive, community based and specific to local area requirements and promotes sustainable water use.

As indicated, with increasing water stress level especially in the National Capita Region (NCR) exposed to variance in rainfall, climate change, and population pressure, the need for IWRM is vital for sustainable water management.

IWRM is based on three principles: social equity, economic efficiency and environmental sustainability. It integrates all the resources to be together and incorporates both social and environmental considerations directly into policy and decision making in water policies. IWRM is a multi-sectoral approach in assessing and managing all the developmental issues that includes securing food production in irrigated agriculture, better management of water quality thus reducing health risks, assists disaster preparedness, water management of shared basins and assists appropriate planning of water use with better resilience. IWRM mainly focuses on more coordinated decision making across different sectors of water cycle and at different scales. The main three key objectives[4] of IWRM are;

- achieve efficiency in usage of water resources,
- equity, in the allocation of water across different social and economic groups,
- environmental sustainability to protect water resources and associated ecosystems,

TARU Leading Edge partnered with IWP for conducting an IWRM Action Research in peri-urban area of National Capital Region of Delhi with the objective of developing an innovative IWRM plan supported by advocacy strategy for policy and funding support in two year project format. The initiative is planned to be owned by local community and institutions for improved sustainability of the project inputs. For the effective implementation of the programme, TARU partnered with S.M Seghal Foundation which provided technical assistance in terms of supporting implementation, providing guidance and review the project outputs.

The action research used innovative methods of data collection by involving a local researcher, schools, knowledge practitioners and local leaders. During the action research phase, with the active participation of Panchayati Raj Institution members (discussion with Panchayat Representatives), several consultative meetings were held to identify the water related issues and planning for awareness raising campaign. 150 students from Government Senior Secondary School of village Garhi Harsuru were involved in the drawing competition, which was held as a part of the awareness raising process and students experienced the technique of water quality testing with a testing kit. They were educated on the quality of water they consume.

[4] http://www.sswm.info/category/concept/iwrm

Lessons learned

- Peri-urban areas have very unique challenges and conditions and are lacking historical data or information on past field studies in the region. Therefore it was difficult to develop a correlation.
- Community involvement is one of the most important aspect of IWRM in any development or conservation activity especially in rural set- up and peri-urban context. The success for any IWRM activity/water resource conservation/management intervention is dependent on the community involvement and mobilisation.
- The action research geared to showcase community engagement process and planning by involving community researchers, schools, local knowledge practitioners and local leaders.

Other information—web links to reports, news items, etc.:

The report can be accessed through following web link;
http://www.gwp.org/Global/GWP-SAs_Files/WACREP/2015/TARU%20FINAL%20REPORT%20-%20WACREP%20PHASE%20II%20_2015.pdf

Glimpse of events:

Bio-sand water filter distribution

Village open drain

Solid waste in the village.

Liquid waste on the village street

Awareness Generation Activities in Government School of Garhi Harshuru Village

Awareness Generation Activities in another Government School of Garhi Harshuru Village

Focus group discussion

Household survey

Water sample collection

Small pond in the village

Activity 6D (IWP): Water-Energy-Food Nexus: Developing a Framework for Resilience Development in Urban Areas with reference to Housing Societies.

Output/Outcome:
Water-Energy-Food (WEF) Nexus in Urban Areas were well defined and the other outputs included;

1) Identified the hot spots for WEF nexus,
2) identified Inter-linkages among the WEF at the level of food consumption in residential sector and a technical paper is prepared on WEF nexus which contribute to the concept of sustainable development of cities in the country and,
3) prepared a policy brief on WEF nexus in urban areas.

Governance process influenced/governance outcome in place

The issue of food security has to be seen in connection with water and energy security. Energy is required at all stages of food production and consumption whereas water is needed to extract energy for power generation. Thus, the interrelationship is so robust that improving the efficiency in one processes either through technological interventions or through regulatory approach will have impact on overall nexus elements. India needs to work on several areas to manage its developmental goal along with key challenges like urbanisation and rising population**.**

Results from the activity produced in the form of report and the technical paper, informed the policy makers about intricacies of water, energy and food in urban centres. This has sensitised them on the immediate measures required to harmonise the nexus and incorporate the resource efficiency measures in the planning and development stage.

The survey and its results also sensitised the local residents about the degree of consumption of water and energy for food, and its cost implications in their monthly consumption budget. It also informed them about the necessity of resource use efficiency, conservation of water and energy, and reduction in wastage of food.

What GWP strategic goal does this result relate to?
Generate and Communicate Knowledge

Description of Change

The key recommendations for optimising the WEF nexus are;

1. Shift from master plan to integrated development plans,
2. Sustainable food consumption,
3. Governance, Institutions and Integrated Policy Approach,
4. Green Economy Approach,
5. Ecosystem Approach,
6. Watershed as a unit of micro level planning,
7. Proper design for the residential building.

Incorporation of recommendations from the study in the planning and development of cities and its infrastructure will reduce the consumption of water and energy within the city, while reducing the waste being generated. This will further lead to reduction in pollution.
The change agent will be the Urban Development Ministry, Haryana Urban Development Authority and Gurgaon Municipal Corporation.

Contributing factors, actors, and background

IWP in collaboration with the Energy and Resources Institute (TERI) implemented this activity in four blocks of Gurgaon (Haryana) namely; Gurgaon, Pataudi, Sohna and Farrukhnagar. Gurgaon is a city in Haryana which forms the part of National Capital region. Indicators were identified to select the specific hot spots in the study area and after the selection of sites, hydrological and sub-hydrological units were delineated.

At the initial stage, an inception report was submitted by TERI and it was followed by a literature review on WEF nexus where different models and practices of WEF nexus are being reviewed. The different nexus approaches by various organisations such as Food and Agriculture Organization (FAO), World Economic Forum, GTZ, TERI, GWP, Organisation for Economic Co-operation and Development (OECD) and UN Population Fund were referred and collected secondary data on WEF nexus.

A questionnaire was developed to understand the linkages related of consumption of energy for water and consumption of water and energy for food, and to quantify it. The survey was conducted in identified hotspots using the questionnaire. The results were analysed to understand the degree of dependence of the three on each other at the level of food consumption in residential sector.

Multi-storied buildings/housing societies represent that micro-ecosystem of the urban landscape which has a two way relationship with the other micro-ecosystem present in the vicinity as well as the larger urban system. It gets influenced by the factors external to the system, and influences the outside world by exerting pressure on water and energy scenarios.

Gurgaon is fast developing city of Haryana, Gurgaon having more than 500 international and national companies. With rapid urbanisation, Gurgaon has become a leading financial and industrial hub with the third highest per capita income in India. This has led to very high rate of ground water extraction and energy consumption due to construction of new buildings and housing complex.

This led IWP with the support of TERI to conduct a study on WEF nexus to quantify the impacts exerted by these micro-ecosystems through their water-energy-food nexus footprints; and develop a resource optimisation matrix specific to multi-storied buildings/ housing societies in the Gurgaon city.

Lessons learned

- Besides the understanding developed on the theme of the project, the project also provided a lesson on technique and approach for a survey to be conducted in urban areas.
- Main challenge for conducting a primary survey is the attitude of the respondents in sharing the information and data which is considered by them as private. This is more severe in the case of commercial and business respondents, who take these surveys as audit of their business practices.

Other information—web links to reports, news items, etc.:

http://www.gwp.org/Global/GWP-SAs_Files/WACREP/2015/TERI%20REPORT%20-%20ACTIVITY%206D.pdf

Three pumps being used for extracting ground water in a single house resulting in wastage of ground water and over use of energy

Activity 7D (IWP): Promotion of IWRM in Peri-Urban Settings (preparation of community owned water investment and advocacy plan) – 2015-16

Output/Outcome: Innovative IWRM Plan (indicative) is in place supported by advocacy strategy for policy and funding support.

Governance process influenced/governance outcome in place

This is a follow-up activity of Activity 3D of above and this will continue till end 2016.

IWRM is the key to achieving effective and efficient management of water resources. The action research exercise recommends to address the water issues for the village as part of the integrated water management approach with focus on;

a) Planning of water resources; ground water, surface water, rain water and waste water management,
b) Improving water quality,
c) Promoting energy efficient systems in managing water supply,
d) Promoting decentralised systems
e) Promoting intuitional integration along with proper stakeholders' integration.

The next steps are to develop water investment plan that includes water security plan, water safety plan and a solid and liquid management plan and an institutional and advocacy strategy.

Water investment plan will provide a comprehensive framework for sustainable development and management of water resources as well as to highlight the main areas that investment will be directed, in which an effective institutional framework for its implementation will be put in place. Water investment plan shall include Water Security, Water Safety and Solid and Liquid Management Plan.

Developing a water security plan including water safety is a holistic and participatory planning approach to address source sustainability, O and M issues, make provision for system replacement, expansion and water quality issues (Water Safety Plan).

1. The surface and ground water resource is conserved, protected, enhanced and managed to ensure that the quantity of drinking water is sufficient to meet the demands of the population. This includes measuring water availability and metering its supply, constructing rainwater harvesting and groundwater recharge structures and instituting mechanisms
2. The water supply service is managed efficiently and sustainability with clear operational, maintenance and management procedures.
3. The quality of drinking water conforms to acceptable standards through the implementation of a series of preventive measures at the basin, source, system and household level (Water Safety Plan).

A Water Safety Plan (WSP) will be prepared to consistently ensure the safety and acceptability of a drinking-water. This is done by eliminating/minimising the potential risk of contamination in raw water sources, water treatment plants, catchment, distribution network, storage, collection and handling water safety plan which should be aimed at assuring the safety of drinking-water. The safety of drinking water can be assured through;

- preventing pollution of water source
- selective water harvesting
- controlled storage
- treatment prior to distribution
- protection during distribution
- safe storage of water within home and in some circumstances, treatment at the point of use.

What GWP strategic goal does this result relate to?
Generate and Communicate Knowledge

Description of Change

The action research geared to showcase community engagement process and planning by involving community researchers, schools, local knowledge practitioners and local leaders who are the driving force of change. The success for any IWRM activity/water resource conservation/management intervention is dependent on community involvement and mobilisation.

Contributing factors, actors, and background

Increasing population and rapid economic growth in India has created strong pressure to convert agriculture land to industrial and residential and these areas having land use change are described as 'peri-urban'.

Peri-urban areas (also called urban space, outskirts or the hinterland) are defined by the structure resulting from the process of peri-urbanisation. It can be described as the landscape interface between town and country, or also as the rural—urban transition zone where urban and rural uses mix and often clash. Water, Sanitation and SLWM are few of the basic amenities that need to be planned for these areas. This highlights the need to not understand the process and dynamics of urbanisation but identify and map the transformation to accommodate the growth. IWRM is one of the key tool to address the water issue which is interactive, community based and specific to local area requirements and promotes sustainable water use.

IWP tried to bring behavioural change in the communities of peri-urban area of village Garhi Harsuru, Gurgaon, Haryana through different initiatives and raise awareness on the water conservation, use and management (rainwater harvesting, maintaining water quality for

consumption, solid waste management, re-use of waste water and groundwater recharge etc.). A population of 8,000 villages benefitted under this intervention.

The activities planned for 2016 are as follows:

1. Extensive awareness/activities on water conservation, safety, and security aspects as per the recommendations from 2015 activities,
2. Preparing community owned integrated water investment plan with inputs from households, schools, community experts, technical experts and other stakeholders using community mobilising process,
3. Advocacy plan for policy and funding support to implement integrated water investment plan prepared and supported by the development of advocacy materials for sensitisation of stakeholders,
4. Implementation of advocacy plan through dialogue and consultation with relevant stakeholders,
5. Initiation of setting on/strengthening and sensitisation of community institutions in order to prepare them for the implementation of the integrated water investment plan through training support,
6. Monitoring the implementation of Integrated Water Investment Plan.

Based on the action research, the major issue in the study area - Garhi Harsaru village of Gurgaon, Haryana is over dependence on ground water. The other issues are inefficient service delivery, water quality and salinity, lack of solid and liquid waste management systems and lack of proper institutional setup.

It felt imperative to conduct awareness raising activities for the community to understand the importance of water (quantity and quality) to address the above issues.

Lessons learned

Peri-urban areas have very unique challenges and conditions. There was a severe lack of historical data or past field studies in the region. Developing a co-relation was difficult in this context.

The success for IWRM activity is highly dependent on community involvement and mobilisation at any implementation phase. Therefore community sensitisation and involvement/engagement is vital for IWRM project implementation. While sensitisation was achieved in 2015, 2016 is dedicated to implementation phase which would focus on preparing plans i.e. community owned integrated water investment plan and Advocacy Plan, etc.

Filed level monitoring of with the support of the community will also be also conducted in 2016.

Other information—web links to reports, news items, etc.:
Report is yet to be uploaded.

CHAPTER 4 - GWP NEPAL

Jalsrot Vikas Sanstha (JVS), Nepal, is a non-profit, non-government, non-political and professional organization and is incorporated under Association Registration Act 2034.
Global Water Partnership Nepal (GWP Nepal)

Global Water Partnership Nepal (GWP Nepal) was established in July 1999, as a partner of Stockholm based Global Water Partnership (GWP) and initiated to promote networking in water resources and promote IWRM. The members of GWP Nepal have consensually decided to designate JVS as the host institution for GWP Nepal. This decision was guided by the concerns of sustainability and the significant networking characteristic of the country water partnership.

The Executive Committee of JVS/GWP Nepal represents a multi-disciplinary team with backgrounds in planning, engineering, environmental science, resource economics, law, political science, sociology, Psychology, public administration and management. Dr Mrs Vijaya Shrestha is the President of JVS/GWP Nepal. The membership of GWP Nepal has grown from five in 1998 to a total of ninety nine (99) in 2002; Fifty six (56) are individual and forty three (43) are institutional, includes Government Water Agencies, Non-governmental organizations, International Organizations, University/colleges/educational institutions and Private organizations.

Under WACREP Phase 11(2015), GWP Nepal has undertaken 3 activities, namely;

i. Activity 2B (GWP Nepal): Assessment of environmental flow in hydropower development and its implications in selected river basins (2015-2016),
ii. Activity 3A (GWP Nepal): Assessment of water focused climate adaptation action/s in 101 LAPAs & its integration into local planning process in a selected districts (2015-2016),
iii. Activity 5C (GWP Nepal): Lamatar LAPA implementation of a rain water harvesting system

Contacts:

JALSROT VIKAS SANSTHA (JVS), Nepal/GWP Nepal
Baluwatar, Ullas Marg, House No. 102, Ward No. 4,
General Post Box No. 20694, Kathmandu, Nepal. Phone: 977-1-4434424, Fax: 977-1-4434431, E-mail: mail@jvs.org.np, Website: http://jvs-nwp.org.np

Activity 2B (GWP Nepal): Assessment of environmental flow in hydropower development and its implications in selected river basins (2015-2016)

Output/Outcome: Increased environment concern in hydro power development,

The major outputs are, 1) To identify the implications status of environmental flow, 2) Assessment of impact (on ecosystem, microclimate, livelihood etc.) with and without environmental flow.

Governance process influenced/governance outcome in place

In 2015, GWP Nepal/JVS initiated the activity 'Assessment of environmental flow in hydropower development and its implications in selected river basins' to identify the status of implementation of environmental flow in Modi River of Gandaki River Basin. The activity will continue till the end of 2016.

By the end of 2015, pre monsoon and post monsoon discharge data has been collected along with the preliminary information of the study area. Similarly, a report has also been prepared compiling all the information from four aspects i.e. Socio-economic, environmental, hydrological and fisheries. Finally the status of environmental flow implementation will be identified in the river and information and knowledge on practice and policy compliance of releasing minimum-flow in the river during hydro-electricity generation will be disseminated. This would facilitate in attracting of the Government of Nepal and policy makers towards conservation of water resources and associated biodiversity.

What GWP strategic goal does this result relate to?
Catalyse Change in Policy and Practice

Description of Change
Nepal possess huge potential of hydropower generation and there are rules and regulations enacted in the country to maintain the ecological condition without hampering natural ecosystem and aquatic animals. Environmental Protection Act (1997) and Regulation (1997) are some of them which have made mandatory to conduct environmental impact assessment to reduce possible environmental impact. Similarly, there is also a provision of maintaining environmental flow of 10 per cent to conserve aquatic biodiversity according to the Hydropower Development Policy 2001.

GWP Nepal/JVS thus selected Modi River, tributary of Gandaki River for studying status of implication of environmental flow. At present two hydropower projects are under operation in the river. Pre-monsoon and post-monsoon discharge data and preliminary information about the study area have been collected in 2015 and the actual status of environmental flow will be identified after collecting and analysing complete information from one more field visits in 2016.

This study is expected to enhance understanding on required minimum water flow in river/rivulets used for hydro-electricity generation, taking into consideration the acute power shortage and increasing number of dams to divert water for hydroelectricity generation.

Contributing factors, actors, and background

The total catchment area of the river is 675km^2 and the mean annual precipitation in the basin is approximately 2,700mm.Almost 80 per cent of total annual rainfall and 84 per cent of the flow occurs during May to October. Thus, Modi-Khola is rich in water resources in terms of average annual flow, but most of the flow volume occurs during this five months period. At present, two hydropower projects are operating in the basin. The Modi Khola owned by Nepal Electricity Authority has installed a power plant with the capacity of 14.08 MW which operating since 2000. In addition at the lower Modi-1, there is a 10 MW hydro-electricity project, owned by United Modi Hydropower Private Limited, operating since 2012. The study focuses on five Village Development Committees (VDCs) of Kaski district (Ghandruk, Lwang-Ghale, Lumle, Dangsing and Salyan) and 11 VDCs in Parbat district (Bhuktangle, Deupurkot, Tilahar, Bajung, Durlung, Chuwa, Pakuwa, Bitalawa Pipaltari, KatuwaChautari, Shivalaya and Mudikuwa), adjoining the main stream of the Modi Khola).

A team comprising of a socio-economist, environmentalist, hydrologist and an expert on fisheries were hired by GWP Nepal/JVS for the study, which analysed the implications on environmental flow of Modi River Basin. Mr Batu Krishna Uprety, Regional Council Member GWP SAS is the team leader for the study.

During 2015, the team carried out two field visits, first was in May 2015, to collect the baseline information, responses of local people and Nepal Electricity Authority (NEA) officials and pre-monsoon discharge data in the Modi River. The next was on December 2015 to collect the post monsoon data in the river. Expert from each aspects have prepared a preliminary report which was compiled and reviewed. Stakeholders' consultation/meetings will be organised at local level to solicit their inputs on the sectoral draft report and the report shall be improved. GWP Nepal/JVS will organise a consultation meeting/s at central level with all relevant stakeholders and experts to solicit their inputs.

- **Lessons learned** In absence of any environmental conservation efforts, the Modi Khola remains vulnerable to exploitation
- Conducting the EIA is not sufficient but effectiveness of implementing the recommended mitigation measures and regular monitoring from centre level is important,
- Developers are very cautious and reluctant to provide the information which was one of the major challenges.

Other information—web links to reports, news items, etc.:
The preliminary report is under review by the sector experts and will be uploaded to WACREP website.

Consultation local people

Post-monsoon data collection of Modi Khola

Activity 3A (GWP Nepal): Assessment of water focused climate adaptation action/s in 101 LAPAs and its integration into local planning process in a selected districts (2015-2016).

Output/Outcome: Identification of water focused climate change adaptation actions which leads to enhanced climate resilience,

Governance process influenced/governance outcome in place

The main focus of the study was to document how water focused climate adaptation actions are included in Local Adaptation Plan for Action (LAPA) and how they are budgeted. It shall help decision makers to revisit it for other LAPAs. A draft report has been prepared by the Government of Nepal compiling water focused adaptation practices in 101 LAPAs. . The information can be used for enhancing the climate resilience in the districts/area where water resources are seriously affected due to climate change with easy identification as well as implementation of local adaptation practices. The report is in the process of finalising.

The expected outcome of the activity is that the findings will be shared with the concerned parties and other relevant stakeholders, especially with decision makers so that the adequate budgetary allocation should be made for water related adaptation options.

What GWP strategic goal does this result relate to?
Catalyse Change in Policy and Practice

Description of Change

Government of Nepal has prepared and implemented 101 LAPAs in several districts of mid and far-western Nepal to cope with the climate change Thus, the report has been prepared by compiling water focused adaptation activities in those LAPAs so that it will help in their integration into the local planning process in the vulnerable district. The report has documented the impacts of climate change in water resources of several districts, including Bajura, Dailekh, Rolpa, Rukum, Dang, Kalikot, Dolpa, Jajarkot etc. along with the prioritised adaptation plans related to water resources and associated budget.

This study shall bring the real scenario to the attention of decision makers and the recommendations shall help to realise the need of allocation properly for the water focussed actions.

Contributing factors, actors, and background

GWP Nepal/ JVS hired a consultant to document the water focused adaptation actions on the existing LAPA document. The report and findings is being shared with decision makers and recommendations to be made accordingly.

Consultant has reviewed LAPAs and balance 10 LAPAs cannot be found in the Ministry. The total budget for the water related activities are Nepalese Rupee 4,639 million which is a 61 per cent of the total budget where it should be used for both water and energy and all thematic areas which related to water resources.

Lessons learned

- All LAPAs are not easily assessable,
- Political instability and continuous protests in Terai in Nepal challenged the field visits in searching a case study of local planning process,
- The budgetary forecast for each category of adaptation measures in the water sector in 91 LAPAs reviewed so far is given below;

	PERCENTAGE
INFRASTRUCTURE	44
CAPACITY BUILDING	.267
AGRICULTURAL PRODUCTION	.46
WATER RESOURCE CONSERVATION AND RAIN WATER HARVESTING	5.32
INDIGENOUS KNOWLEDGE	.86
COMMUNITY PROTECTION	.75
LANDSLIDE AND FLOOD CONTROL	9.21

- This analysis provides a very good overview of LAPA priorities identified at the local level.

Other information—web links to reports, news items, etc.:

http://jvs-nwp.org.np/assessment-water-focused-climate-change-adaptation-actions-101-lapas-and-its-integration-local

Activity 5C (GWP Nepal): Lamatar LAPA implementation of a rain water harvesting system

Output/Outcome: Increased climate change resilience,

Governance process influenced/governance outcome in place

Nepal experienced the devastating earthquake on 12 and 29 May 2015 and the school building where the rainwater harvesting plant was installed was damaged completely.

What GWP strategic goal(s) does this result relate to?
Catalyse change in policy and practice

Description of Change

GWP Nepal/JVS prepared a LAPA for Lamatar VDC of Lalitpur district in 2014. Among several adaptation plans, rain water harvesting system was one of the prioritised adaptation actions of the local community so GWP Nepal/JVS in 2015 decided to install a rainwater harvesting plant in the area. After a preliminary visit a site was selected, a tentative budget was prepared and finalised a design for the harvesting plant.

The devastating earthquake occurred in May 2015 destroyed rainwater harvesting unit installed in the school by GWP Nepal/JVS.

Contributing factors, actors, and background
At the initial stage of implementation, a group of experts from GWP Nepal/ JVS and SMART PANI visited the area for site selection for implementation of rain water harvesting plant. Local people and teachers of the school were also consulted during the process. Similarly, SMART PANI had prepared the design and tentative budget for the activity.

Lessons learned

- Natural disasters are beyond the control of human beings

Other information—web links to reports, news items, etc.:

Few photos after earthquake struck the area are given below;

Damaged buildings were declared by government as unsafe. Mr. Batu, ECM of GWP Nepal observing the sites with a Technician from Smart Pani. Temporary structure built by school is visible.

CHAPTER 5 - PAKISTAN WATER PARTNERSHIP

The Pakistan Water Partnership (PWP) was established in February 1999 as the country partner of Global Water Partnership (GWP). PWP is a Public Limited Company registered under the Pakistan Companies Act 1984, with a large number of key stakeholders from Government Organizations, Public and Private Sector, NGOs, Women and Youth Groups, and Civil Society having impact on, or impacted by, water and its uses in the country.

PWP is mandated to provide a neutral platform to all water stakeholder institutions, organization, departments and individuals for discussing national, sub-national and local water issues to build consensus at different levels. It has to promote the concepts and principles of IWRM in the country in order to meet the growing scarcity of water resources, increasing deterioration in water quality and the looming threat to environmental sustainability. In order to carry out its mandate, Pakistan Water Partnership PWP maintains close relationship with official agencies like the Planning Commission; Pakistan Water and Power Development Authority (WAPDA); Ministries of Water & Power; Environment; Agriculture and Provincial Agriculture and Irrigation Departments, Provincial Irrigation and Drainage Authorities (PIDAs), United Nations agencies and Non-Government Organizations (NGOs) in the water sector for sensitizing on judicious use of water resources to gain maximum benefit through the integrated water resources management in the country.

Pakistan Water Partnership PWP is governed by Board of Directors which is headed by a Chairman. Mr Naseer Ahmad Gillani is the current Chairman of PWP and PWP Secretariat is based in Islamabad. Mr. Sardar Muhammad Tariq, Executive Director/CEO of PWP is the head of the Secretariat.

Under WACREP Phase 11(2015), PWP has undertaken 3 activities, namely;

i. Activity 4: Drought mitigation and management in Potohar Area of Indus Basin (2015/16),
ii. Activity 5D: Establish two pilot sites demonstrating latest rainwater harvesting techniques and modern irrigation technologies in Potohar Region of Indus Basin,
iii. Activity 6C: Organizing capacity development workshops on climate change adaptation and proposals formulation for implementation in climate change impacted areas,

Contacts:

Pakistan Water Partnership (PWP),
710, Street 22, I-8/2, Islamabad, Pakistan.
Tel: +92 51 486 0895 Fax: +92 51 486 0896
Email: pwp@pwp.org.pk

Activity 4: Drought mitigation and management in Potohar Area of Indus Basin (2015/2016 Activity)

Output/Outcome:

Workable proposal for drought mitigation and management in Potohar Area of Indus Basin was prepared and got funded by potential donors.

Governance process influenced/governance outcome in place

Desert dwellers have been suffering greatly under the climate changes that they face. To meet these challenges, PWP drafted a project proposal addressing the core issues of water in relation to desert development and presented at the Regional Council meeting[5] in Pakistan. This proposal includes six distinct packages that cater water conservation, agro forestry, rangeland rehabilitation, capacity building, agribusiness and policy networking to meet the different challenges.

It has also proposed to improve the knowledge base through thesis supported research grants and reportedly the grant has been announced for Cholistan and Baluchistan. PWP received the names of possible candidates.

The five year regional proposal on drought developed by PWP which covers India, Pakistan and Afghanistan. The proposed budget is Euro two million. .

What GWP strategic goal does this result relate to?
Catalyse Change in Policy and Practice

Description of Change

Available water is used inefficiently in agricultural, domestic and industrial activities leading to poor social and economic status, migration and environmental degradation. The available knowledge on sound water management does not reach the grass root level. Some other problems that led to this mission were;

- Lack of exchange/access to knowledge and expertise
- Deficient capacity of human resources and institutes
- Inadequate stakeholder involvement
- Lack of coordination among different stakeholders
- Non-favourable framework conditions which encourage water wasting
- No/low (economic) value of water
- Lack of/not adopted regulation and legislation

[5] GWP SAS has formulated a proposal on "Water and Food Security Improvement in Dry lands in South Asia (WaFSIP-DL) SAS" and presented to RC.

- Not guaranteed enforcement of regulation and legislation
- Low awareness of the impact of inefficient water use
- Problems related to water management
- Deficient monitoring of water resources and uses
- Inadequate storage and distribution
- Lack of or poor prediction for planning (use and availability)
- Lack of investment and attention of local authorities

The debate on policy has benefited from this research and policy interaction has been at highest level of government.

A. High level presentation was given at the recent GWP supported Area Water Partnership (AWP) known as Hisar Water Partnership held in Karachi in November 2015 where the session was chaired by Dr Sulman Shah, the former Minister of Finance, Government of Pakistan. The essential ingredients of the water policy were outlined and debated by the participants and feedback prepared for the government.
B. Following this, the Water and Power Authority WAPDA organised a seminar in December 2015 where further refinement draft water policy has been conducted

Contributing factors, actors, and background

Main stakeholders: CWPs, Government Institutes, Non-Governmental Organisations (NGOs), INGOs (International Union for Conservation of Nature (IUCN), Oxfam novib, World Water Fund (WWF))

The main partners: Sarwan AWP Baluchistan, Tharparkar AWP, Bahawalpur AWP

In broad terms, the proposed project will address all goals of the GWP strategy, directly contributing to two goals of PWP Strategy

1. Address critical development challenges.
2. Reinforce knowledge sharing and communication. Engagement of mass media including print, electronic and radio in spreading message regarding IWRM and better water management for enhanced livelihood creation amongst the most marginalised communities

Lessons learned

The proposed project will impact on villages and its community with the especial attention given to promoting livelihood opportunities of youth. Once funding is negotiated the full scale project implementation will take place in all the three countries –Afghanistan, India and Pakistan.

The government acknowledged the proposal by highlighting the potential benefits of integrating the proposal with the ongoing vision document prepared by the Federal Government of Pakistan

In the Potohar region, two pilot bio-gas water pump demonstration sites were installed with small scale kitchen garden irrigation pumping facility. The pumps were introduced to more than 300 farmers and stakeholders.

Other information—web links to reports, news items, etc.:
Reports: Project proposal on "Desert Development"

Hisar Water Conference and participation of PWP Team

Activity 5D: Establish two pilot sites demonstrating latest rainwater harvesting techniques and modern irrigation technologies in Potohar Region of Indus Basin

Output/Outcome:

PWP in collaboration with Eco-Conservative Initiatives (ECI) has installed two biogas water pumps in Rehan Colony and Dhok Lal Shah. Stakeholders (local community, Academia and the tourists) are aware of latest Rain Water Harvesting and modern irrigation technologies.

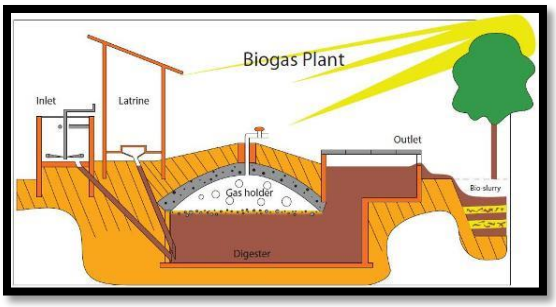
In term of latest rain water harvesting techniques, the lined and unlined ponds have been established through community participation to recharged wells and the concept of IWRM was popularised among communities and water quality testing was undertaken through instrumentation.

Governance process influenced/governance outcome in place

PWP has initiated concept of rain water harvesting among local community by excavating ponds on already depressed land and steps have been taken to collect drinkable rain water for livestock and agriculture. All projects are livelihood focused and are based on social mobilisation. Some ponds have been excavated on different locations.

Three Karezes[6] have been implemented in Mastung and surrounding area of Quetta.

[6] **KAREZ SYSTEM**



Karez is an indigenous method of irrigation in which groundwater is tapped by a tunnel. After running for some distance the tunnel comes out in the open and the water is conducted to the command area. In Pakistan it is confined to the province of Balochistan which has a tribal society. Karez is an old and stable irrigation system of Pakistan. It is a community enterprise managed by tribal tradition and run by social control. Spacing of the karez, their types, life, length, discharge, land development and allocation, water distribution and management are important aspects of karez irrigation which have been discussed in this paper. Differences in karez maintenance and management produced by differences in tradition and customs of various tribes inhabiting Balochistan are brought out.

Cleaning and rehabilitation of these Karezes will benefit more than 2,000 households for agriculture and drinking water. Furthermore, crops will be grown and sustainable water use will be assured for all the seasons.

The local Agricultural Officer and Department of Extension were invited to observe the operation and they have expressed their desire to prepare a proposal for local funding.

What GWP strategic goal does this result relate to?

Generate and communicate knowledge.

Description of Change

Rainwater harvesting through pond construction and recharge of dug wells have secured the extra runoff water from catchment areas. In many occasions the collected water was redirected to a deep pit with percolation controlled through plastic sheets and ground compaction. The water is being used for gardening, livestock, and irrigation and for domestic use with treatment. It also helps in recharging the ground water. Village inhabitants are now utilising the collected water in their pitcher dependant small scale vegetable gardening. In several cases the monthly benefit from the home grown is 2,500 – 3,000 rupees.

Moreover, knowing the advantages of Biogas Water pump[7] and the conditions of the farmers in Khewra, PWP with ECI visited Khewra to identify a convenient solution with economic benefits to the villages. The introduced Biogas Water Pump is relatively a simple and reliable technology which is also an alternative energy resource. The system also consists of a large tank/digester where livestock waste is being fed through the inlets.

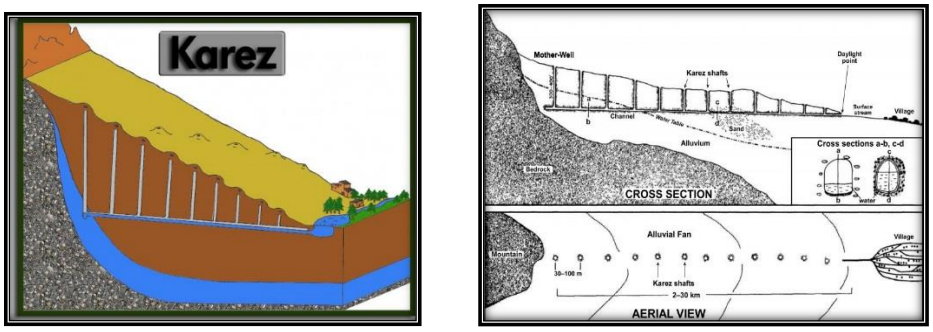


Fig: Karez System explained in the picture above

[7] Biogas typically refers to a mixture of different gases produced by the breakdown of organic matter in the absence of oxygen. Biogas can be produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste or food waste. It is a renewable energy source and in many cases exerts a very small carbon footprint. Biogas can be produced by anaerobic digestion with anaerobic bacteria, which digest material inside a closed system, or fermentation of biodegradable materials.

PWP Supervising the Biogas Water Pump

Destroyed and renewed Karezes

Contributing factors, actors, and background

ECI Field Unit team visited the old Khewra and briefed the community the benefits of installing the proposed Biogas Water Pump. Hence two suitable sites at Dhok Lal Shah and Rehan Colony were chosen for installing the Biogas Water Pump.

The farmers in the area, especially in the rain-fed area such as khewra and its suburbs are highly dependent on ground water. The available irrigation systems consumes high level of energy and farmers are facing the problem of high electricity and diesel prices for operating the water pumps. With this background, considering the favourability towards climate and the scale of livestock farming in the rural area of Pakistan, biogas was considered very useful.

In our initiative undertaken in Potohar, eco conservation provided the required field support and also participated in joint monitoring and technical advice.

Lessons learned

Major issues identified included lack of clean drinking water, absence of rainwater harvesting practices and health problems in human and livestock. Excavation of rain water harvesting ponds, roof top rain water harvesting are some of the interventions undertaken under this activity.

The bio gas water pumps are successfully operating at both the sites such as Dhok Lal Shah and Rehan Colony near Khewra Town in the Salt Range Area. These systems not only tend to reduce the waste and meet energy requirements to irrigate the vegetable gardens but will also translate

into substantial financial savings for the local community. The partners are convinced that introduction of biogas water pump technology in rural areas will bring numerous benefits to local community in addition to efficient irrigation, improved sanitation, public health and conservation of forests with prevention of soil erosion and production of bio-fertilisers.

Small financial incentives are provided and the benefits of technology were demonstrated to the communities. Adoption rate can vary from village to village depending on the local circumstances and economic base.

Other information—web links to reports, news items, etc.:

- http://pwp.org.pk/wp-content/uploads/2015/publications/Report-on-Scooping-visit-to-Pishin-Balochistan-27-April-2015.pdf

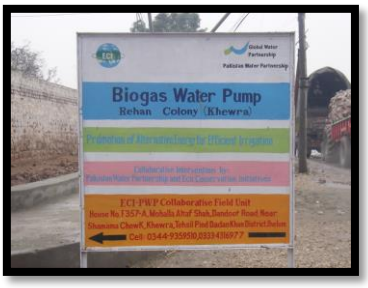
Destroyed Karez of Mastung

Rehabilitated Karez of Mastung

Local working for the rehabilitation of Mastung Karez.

Locals working for the rehabilitation of Game Karaz

Potohar Salt Range



Showing PWP board of Bio Gas Water Pump

PWP Team supervising the Bio Gas Water Pump Project under way and sucessfully completed biogass plant.

Activity 6C: Organizing capacity development workshops on climate change adaptation and proposals formulation for implementation in climate change impacted areas

Output/Outcome: Partners are aware of writing a good proposal on CCA for donor funding,

Governance process influenced/governance outcome in place

Most of the AWPs were not resourceful in writing project proposals and PWP implemented this activity to support AWPs to write good proposals which in turn can be a source document if, PWP decides to elaborate it for national level.

Four training Workshop were held under this activity. Sardar Muhammad Tariq (CEO) and Dr Pervaiz Amir (Director PWP) in collaboration with the members of International Union for Conservation of Nature (IUCN) members introduced the method and importance of proposal and report writing in awareness campaigns and other important domains where such plan is needed.

What GWP strategic goal(s) does this result relate to?
Generate and communicate knowledge.

Description of Change

PWP conducted four capacity building workshops in Tharparkar and Quetta. Proposal writing skills were imparted and three proposals were submitted by AWPs to PWP.

Contributing factors, actors, and background

The first workshop was held on 5 March 2015 with the participation of 40 journalists. The second two day workshop was held on 25 and26 April 2015 and trained Sarawan AWP in Mastung. Loralai AWP in Loralai and Bolan AWP in Quetta training 20 people. The third was held on 14 and 15 May 2015 in Khanewal in Southern Punjab and trained 40 people. Fourth workshop was held on 4 April 2015 for 45 journalists on the theme of “changing development perspective under climate threats”.

Lessons learned

These proposals need to channel to funding agencies.

GWP led capacity building workshop was able to develop skills on proposal writing. .

Other information—web links to reports, news items, etc.:

PWP Team on Training workshop at Quetta in collaboration Sarawan Water Partnership.

Dr Pervaiz Amir and Sardar Muhammad Tariq briefing the participants.

CHAPTER 6 - SRI LANKA WATER PARTNERSHIP

Sri Lanka Water Partnership (*Lanka Jalani*) is an independent non-profit association of institutions with the goal of promoting Integrated Water Resources Management (IWRM) in line with the concepts and principles articulated at international fora such as Rio, Dublin and 1st and 2nd World Water Forums. It is an initiative supported by the Global Water Partnership (GWP) and a constituent of the South Asia Regional Water Partnership. Membership is open and inclusive and currently represents a wide range of stakeholder interests. It took the initiative in developing a Water Vision 2025 for Sri Lanka in the year 2000 and a program for Action (PFA) to translate the vision to action. It has set up Area Water Partnerships (AWPs), Youth and Gender networks and other basin level institutions to support River Basin Management (RBM) and IWRM in Sri Lanka. AWPs provide the local institutional base for representation and action at local level while the Country Water Partnership (CWP) and associated CEO panel provides the forum for policy level dialogue of these issues for consideration at national level. Both levels encourage close interaction among groups of stakeholders for purposes of harmonizing approaches and integrating issues.

Ms Badra Kamaladasa, former Director General, Department of Irrigation is the current Chair of SLWP and eminent researchers, academics and water resources specialists serve on its Steering and Programme Committees.

5 Activities undertaken under WACREP Phase II (2015) are given below;

i. 2A: CCA Programme for Agency staff/FO Leaders/Farmers in Irrigated Agriculture
ii. 5A: Expand new technological option, RWH and Conjunctive use of surface/ground water, catchment and source area conservation and management,
iii. 7A: Drinking water CBO programmes (6) linked to vulnerability profiling,
iv. 7B: Schools' IWRM/Water Messenger Programme on CCA – "Sisu Jala Hamuwa",
v. 7C: Film/Clips on CCA, Radio & TV Talk Shows, posters, Flyers, Street Drama for youth/schools and media events/tours

Contacts:

Sri Lanka Water Partnership,
C/o International Water Management Institute
No. 127, Sunil Mawatha, Pelawatta,
Battaramulla.
Tel: 0112880188
Fax: 0112786854
E mail: slwp@cgiar.org

Activity 2A: CCA Programme for Agency staff/FO Leaders/Farmers in Irrigated Agriculture (Continued in 2016)

Output/Outcome: Developed Training of Trainers (TOT) materials, Staff in District/Province, Agency trained on Climate Change Adaptation (CCA) and Farmer Organisation (FO) leaders sensitised on CCA.

Governance process influenced/governance outcome in place

CCA has been mainstreamed into the planning and response systems of agencies with regard to irrigated agriculture. Special units have been established to coordinate actions with other relevant units. The process of integrated approach to management of agricultural programmes have up streamed to planning processes.

What GWP strategic goal does this result relate to?
Catalyse Change in Policy and Practice

Description of Change
CCA programmes were implemented with all stakeholders on one platform including the research arms and universities. This brought credibility to recommendations being presented for adoption by farmers, going beyond the usual agency based decision making.

Contributing factors, actors, and background

SLWP in collaboration with respective government agencies conducted three training programmes;

Programme 1:

This programme was held in collaboration with Irrigation Management Division (IMD) of Ministry of Irrigation (MoI). The CCA programme was conducted for the Project Staff of Giritale, Minneriya and Kaudulla Major Irrigation Schemes. It was held at the Hingurakgoda Divisional Secretariat Conference Hall on 27 February 2015. There were 71 participants from Irrigation and Agriculture Departments, Agrarian Development, Coconut Development Board, Project Managers and Development Officers of Irrigation Management Division attended the one day programme.

Consultant Irrigation Agronomist, Chief Engineer of Irrigation Office in Polonnaruwa, Deputy Director Agriculture and Senior Lecturer from University of Rajarata participated as resource Persons.

The Country Coordinator and one of the Consultants represented SLWP while IMD by the Acting Director who is also presently the Additional Director General Irrigation Department and the Monitoring Officer of IMD. Topics addressed included CC impacts on Water Resources and Rural Livelihoods, CC impacts on Irrigation Water Management, Cropping Practices to cope with CC and Adoption of New Technology as a CCA option.

Programme 2:

This CCA programme was held on 16 March 2015 at the Conference Hall of the Department of Agrarian Development in Anuradhapura with the collaboration of IMD of Ministry of Irrigation (MoI) for Project Committee Members of Nachaduwa, Nuwara Wewa, Thissa Wewa, Mahakanadarawa, Mahawilachchiya, Hurulu Wewa, Padaviya and Wahalkada Major Irrigation Schemes**.** Nearly 95 participants from Irrigation and, Agriculture Departments, Agrarian Development Department, Coconut Development Board, Project Managers and Development Officers of Irrigation Management Division attended the programme.

Programme was organized jointly by SLWP and IMD of the MoI and Agriculture. Resource persons were from Irrigation Department, Irrigation Management Division and University of Rajarata.

Programme 3:

This programme was held on 5 October 2015 at Kantale and total participation was 130 including 95 FO leaders and 25 PMC Staff, even more than expected (only 80 participants were expected). Larger percentage of participants were Tamil language speaking officers and therefore, a translator was provided. It has been planned to translate CCA FO Booklet and CBO Booklet to Tamil Language and more programmes have been planned in North and Eastern part of the country in 2016.

The good indication of changes influenced by this trainings were, i) the level of participation far exceeds targets indicating commitments and interest at local level, ii) demand for publications and knowledge products far outstrip our cupidity to meet requirements, as a result of that proxy mechanisms' such as developing video on CCA and tutorials are being pushed through, so that outreach is not limited to SLWP capacity and budget to intervene.

Lessons learned

- Higher progress has been achieved at field level in promoting an integrated approach by the agencies. They are used to work together at the field and district level as mechanisms and forums such as DDC, DAC and PMC exist.

- At policy level, the multiplicity of ministries having various political perspectives have been more difficult to bring all the sectors together.

Other information—web links to reports, news items, etc.:
Evaluation Report:
(The evaluation done by SLWP on the feedback of participants. It is available with SLWP)

Awareness Programme on CCA for Farmer Leaders of Medium and Minor Irrigation Schemes in Kurunegala District. 24 May 2016

SLWP held a majority of CCA programmes for agency staff and Farmer Leaders of major and some medium schemes under the Irrigation Department (ID) since 2013. The programme held on 24 May 2016 at the Wayamba Training Institute, Wariyapola was significant as Farmer Leaders of Minor Irrigation Systems under the Department of Agrarian Development (DAD) were included

for the first time.

Minor schemes are significantly more vulnerable to climate change impacts and SLWP hopes to shift emphasis to medium and minor schemes in implementing its CCA programmes in 2016 and 2017 as it is clear that greater capacity building efforts and support are needed for these systems. This programme was a sequel to the agency staff CCA programmes for ID and DAD that were held at the Bathalagoda Rice Research and Development Institute on 9 May 2016 and 31 August 2015.

.

Notwithstanding the disaster situation with respect to flooding and landslides in Sri Lanka including in the Kurunegala District and heavy floods especially in the lower reaches of the Deduru Oya over 60 FO Leaders and a further eight Development Officers (4 from ID and 4 from DAD) in charge of the FO development activities in these systems attended the programme. Total participation was 75 including the resource persons. The Director of Irrigation served as Resource Person and Irrigation Engineer Wariyapola participated in the programme. Other Resource persons included a Consultant Irrigation Agronomist, Senior Lecturer of Rajarata University and a Deputy Director of Agriculture.

The interest and demand was so intense that SLWP agreed to hold a follow up programme for FO leaders in other systems in NWP in 2016. SLWP Knowledge products including a booklet on CCA for Farmers and a recent publication on Paddy Cultivation under CC conditions developed in collaboration with the Bathalagoda Rice Research Institute was distributed among the FO Leaders.
http://lankajalani.org/wacrep-activities/wacrep-2015/

Activity 5A: Expand new technological option, Rain Water Harvesting and Conjunctive use of surface/ground water, catchment and source area conservation and management

Output/Outcome: Stakeholders are aware of coping options available to minimise the CCA impacts.

Governance process influenced/governance outcome in place

Agencies working with farmers such as Irrigation and Agrarian Development Departments have realised the need to have agency staff exposed to new technology options for coping CCA. Programmes arranged to meet the demand.

What GWP strategic goal does this result relate to?
Generate and communicate knowledge.

Description of Change

The training programmes provided knowledge on climate change and possible adaption options to the field level officers.

Contributing factors, actors, and background

Held three programmes in collaboration with government agencies.

Programme 1:

The first programme was held on 26 March 2015 at Filed Crop Research Development Institute (FCRID), Department of Agriculture, Maha Illuppallama. Some 37 officers participated the programme including Project Managers, Development Officers and Development Assistants of the projects in Puttlam, Kurunegala and Anuradhapura, implemented by the Irrigation Management Division.

Dr S. Weerakoon, Director, FRCDI and Dr Ajantha De Silva, Additional Director, conducted the programme.

This is a follow up of the programme conducted for farmer leaders in Phase 1. At present farmers are receiving advices and instructions on Sprinkler/drip equipment only from vendors and are thus tied to brand names and products. It was observed that over 50 per cent of cost saving is possible with local purchase and Project staff will promote these equipment very often at the Project Management Committee.

Programme 2:

The second programme was held on 31 August 2015 at Bathalagoda Rice Research and Development Institute. Some 40 participants including, Project Managers of IMD, Divisional Staff of Department of Agrarian Development and Irrigation Department of North Western Province attended the programme.

This programme focused on Agronomic Practices in paddy cultivation to cope with climate change. This is a follow up programme held at Maha Illukpallama and Angunakolapelessa Field Crop Research Institute (FCRI).

.

Programme 3:

A workshop on 'Agronomic Practices in Paddy Cultivation to Cope with Climate Change' was held on 30 November 2015 at Rice Research and Development Institute, Batalagoda. Some 35 Engineering Assistants from Irrigation Department offices in Ampara, Puthlam, Anuradhapura, Kandy and Kurunegala attended the programme. The Director Water Management and Director Flood Management of Irrigation and Chair SLWP attended the workshop.

Lessons learned

The knowledge available has not been filtered down to the grass root level as most of the training confined to the central level. Therefore, this programme has a big impact on reducing knowledge gap on CCA.

Other information—web links to reports, news items, etc.:

Evaluation Report:

(Evaluation done by SLWP on the feedback of participants and available with SLWP)

As part of the SLWP continuing programme on Climate Change Adaptation (CCA) in the irrigation sector, a workshop on the above was held on the 24 March 2016 for Irrigation Department (ID) staff of the Monaragala District at the In-Service Training Institute of the Department of Agriculture at Angunakolapellessa. The 35 participants (27 male and 8 female) included Engineers, Engineering Assistants, Development Officers and Field Assistants of the ID. This programme was part of SLWP World Water Day Programme and was implemented as a SLWP and Cap Net Lanka joint activity.

Main objectives of this programme were to make the participants aware on

1. value of water and water management in agricultural practices specially under water crisis situations,
2. improve the knowledge on the impacts of climate change in productivity and rural livelihoods,
3. upgrade the knowledge and skills to manage and
4. Conserve water to mitigate the climate change impacts and technological options which could be adopted to face the climate change challenges.
5. Ground water recharge and importance rainwater harvesting for agriculture.
6. Demand Irrigation as an option

The SLWP Chair in her speech highlighted the importance of the Technological options to cope with climate change for the members of the Irrigation Department, especially those who work with farmers on irrigation water supply and management. The SLWP Country Coordinator presented on the roles, functions and structure of SLWP.

Mr Ananda Jayasinghe, Irrigation Agronomist and former Director Irrigation Management of the Ministry of Irrigation and Water Resources made a presentation on Climate Change impacts on Farming and Rural Livelihoods. Whereas Mr W.A.K. Karunathilaka, Additional Director, Field Crop Research Development Centre Angunakolapellessa presented on Cropping options/practices for Dry Zone Agriculture to cope with Climate Change.

The participants visited the School of Agriculture, Angunakolapellessa and were introduced to the extensive rain water harvesting techniques including ground water recharging being practiced both for perennial and annual crops and drip irrigation systems operating on solar power. Mrs Chandrangani Gunawardena, Deputy Director (Principal), School Of Agriculture, Angunakolapellessa has arranged this successful field programme.

They have also visited the Uda Walawe Project of the Mahaweli Authority where a newly developed "On Demand" Irrigation System had been installed and was one of five such systems presently in operation in Uda Walawe. In this particular irrigation system, the distribution canals from the reservoir have been designed to issue water as required based on the crop and growth stage. The participants were introduced to the technical and institutional issues that had arisen in system operations.

Most of the participants have commented that the programme is important for them because they had an opportunity to learn more on agriculture related subjects which are useful in irrigation. This programme has become an eye opener to think about climate change more seriously and special attention needed to be paid to irrigation management.

Next workshop:
A programme on the above for technical officers of the Irrigation Department (ID) and Department of Agrarian Development (DAD) working with farmers in medium and minor irrigation systems was held at the Rice Research and Development Institute (RRDI) Bathalagoda on 9 May 2016. 32 officers of the ID from NWP and NCP with four engineers from the ID head office attended the above programme along with eight officers including a District Engineer of DAD from Kurunegala and Puthlam District. Regional Director Irrigation based in Kurunegala also attended the sessions. Total participation was 40.

This programme is a follow up activity to the general CCA Programme of SLWP and aims at capacity building of such staff to cope with climate change issues impacting on irrigated agriculture especially with Paddy and Other Field Crops. The session at RRDI focused on paddy cultivation and especially on farm water management as these officers were already familiar with system management. Issues of water supply, demand and management during land preparation, growth and reproductions phases of paddy cultivation. Issues of crop and soil management including salinity and iron toxicity were discussed and options recommended. Information on use of newer short age paddy varieties to better cope with floods, droughts, salinity and iron toxicity was provided. A guideline prepared by SLWP with assistance of RRDI on paddy cultivation in the context of climate change was also provided to the participants. A field demonstration was part of the overall programme.

http://lankajalani.org/wacrep-activities/wacrep-2015/

Activity 7A: Drinking water CBO programmes (6) linked to vulnerability profiling

Output/Outcome: The rural drinking water CBO community are aware of CCA impacts on their water supply project.

Governance process influenced/governance outcome in place

Rural water community take adaptation measures to mitigate possible climate change effects on their community water supply schemes.

What GWP strategic goal does this result relate to?

Generate and communicate knowledge

Description of Change

The description of the change is yet to be seen.

Contributing factors, actors, and background

Two programmes were held in Passara and Welimada on 12 and 13 March 2015 a collaborative effort of SLWP, National Water Supply and Drainage Board (NWSDB) and the National Community Trust.

The programmes were focused on;

- Climate change and its effects on water supply and rural community.
- The health issues related to climate change
- Issues faced by the community in adapting to climate change.

The Drinking Water CBOs were the target groups of the programmes.

The resource persons included an Engineer, Senior Chemist and Sociologist from NWSDB, Regional Epidemiologist from Regional Health Department and a Forest Officer. There were 56 participated for the Passara Programme held on 12 March while 46 for Welimada Programme held on 13 March.

Lessons learned

The focused group discussions provided a good opportunity to the participants to discuss the health issues related to climate change and the practical issues faced by the communities when adapting to climate change.

Assume these discussions have given an opportunity to fill the knowledge gap among the CBO members.

Other information—web links to reports, news items, etc.:

http://lankajalani.org/wacrep-activities/wacrep-2015/

Activity 7B: Schools' IWRM/Water Messenger Programme on CCA – "Sisu Jala Hamuwa"

Output/Outcome: Sensitise the youth on IWRM and CCA concepts.

Governance process influenced/governance outcome in place

This is a good awareness programme which influence young generation to pay more attention and take extra care on the environment and get the sense of responsibility towards protecting the planet.

What GWP strategic goal does this result relate to?
Generate and communicate knowledge.

Description of Change

The School curricular covered an integrated approach to CCA. Some schools integrated the Water Messenger Programme as part of the Environment Cells presently functioning in schools.

Contributing factors, actors, and background

Two programmes held in Anuradhapura District on 11 and 12 May 2015 in collaboration with NWSDB, Provincial Health Department and Provincial Education Department.

The first programme was held on 11 May 2015 at Kebethigollawa Maha Vidyalaya with the participation of 183 students followed by the second programme which was held on 12 May 2015 at Kahatagasdigiliya Middle School with participation of 162 students**.**

Resources persons from NWSDB and Provincial Health Department conducted the programme. Topics discussed included climate change, proper use of drinking water, water quality and water bone diseases.

Lessons learned

Engaging with schools in trainings is a difficult and a lengthy process - should undergo a clearance process and match timelines to plan programmes with school examinations and holidays.

Other information—web links to reports, news items, etc.:

http://lankajalani.org/wacrep-activities/wacrep-2015/

Activity 7C: Film/Clips on CCA, Radio and Television Talk Shows, posters, Flyers, Street Drama for youth/schools and media events/tours

Output/Outcome: The IWRM and CCA concepts are known.

What GWP strategic goal(s) does this result relate to?
Generate & communicate knowledge.

Contributing factors, actors, and background

A Road Show, walk of farmer organisations and students were organised by Residential Project Manager of Nuwara Wewa, Anuradhapura in North Central Province and Bathalagoda in North Western Province on 22 March to celebrate the World Water Day 2016. Nearly 1,000 participated for both events, while SLWP sponsored posters and flyers were displayed and distributed among the participants. Nearly 125 posters depicting Water Cycle were handed over to the schools.

Prof Champa Navaratne, Regional Council Member, SLWP interviewed by BBC Sandeshaya (Sinhala) on climate change and women.

Film on CCA for Irrigated Agriculture has been developed and three tutorials for training of agency staff and farmers is planned to be developed from available materials.

Lessons learned

Knowledge products including publications, documentaries and videos play a vital role in communicating information and gives a broader impact.

Other information—web links to reports, news items, etc.:
"Linda Hindena Turu – Until The Well Gets Dry" has been uploaded
https://www.youtube.com/watch?v=_VAD7F2XCbY&feature=youtu.be