

# Water and Climate Resilience Programme (WACREP)

Year End Report  
(January – December 2016)



**GLOBAL WATER PARTNERSHIP SOUTH ASIA (GWP SAS)**

Tel: +94 11 2880000, Fax: +94 11 2786854,

Email: [secretariat@gwpsas.org](mailto:secretariat@gwpsas.org)

[www.gwp.org/en/gwp-SAS/](http://www.gwp.org/en/gwp-SAS/)

## Table of Contents

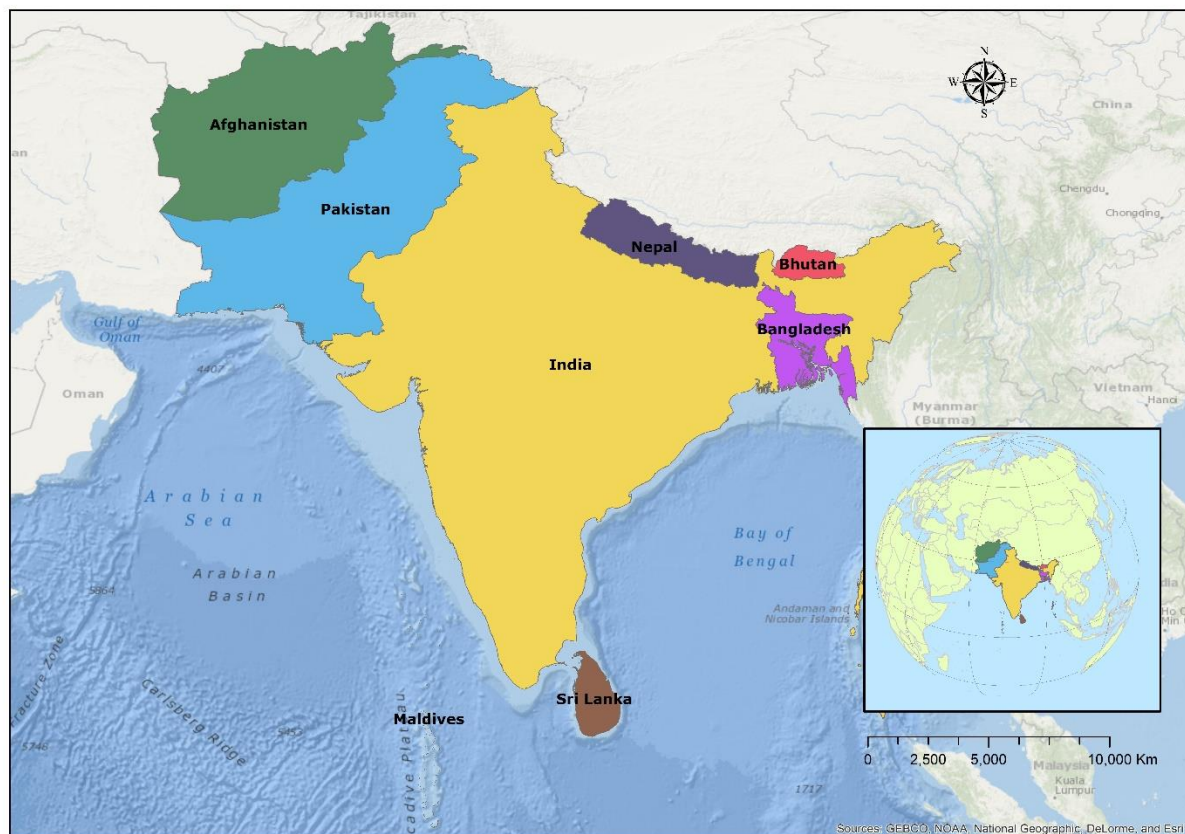
<b>ACRONYMS AND ABBREVIATIONS</b> .....	<b>2</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>4</b>
<b>WACREP IMPLEMENTATION IN 2016</b> .....	<b>6</b>
<b>CHAPTER 1 - BANGLADESH WATER PARTNERSHIP</b> .....	<b>7</b>
Activity (2E): Conduct a case study on the feasibility of Rainwater Harvesting in urban areas to reduce water logging in Dhaka city .....	8
Activity (2F): Conduct a study on ‘Effects of Climate Change on Water and Food Security in Selected Coastal Deltas and its Possible Economic Impact’ .....	10
<b>CHAPTER 2 - BHUTAN WATER PARTNERSHIP</b> .....	<b>14</b>
<b>CHAPTER 3 - INDIA WATER PARTNERSHIP</b> .....	<b>16</b>
Activity 2C (IWP): To prepare a capacity building module for training stakeholders of Mashi Basin based on the inputs received from GIS survey mapping, water resource mapping and water balance modelling conducted in 2015 .....	17
Activity 7D (IWP): Promotion of Integrated Water Resource Management in Peri-Urban Settings based on 2015 Research Findings .....	21
<b>CHAPTER 4 - GWP NEPAL</b> .....	<b>26</b>
Activity 2B: Assessment of Environmental Flow in Gandaki River Basin: A Case of Modi Khola .....	27
Activity 3A: Assessment of water focused climate adaptation actions in 101 LAPA and its integration into local planning process in selected district .....	29
Activity 3B: Study of earthquake impact on the water resources status in selected earthquake hit areas .....	33
<b>CHAPTER 5 - PAKISTAN WATER PARTNERSHIP</b> .....	<b>36</b>
<b>CHAPTER 6 - SRI LANKA WATER PARTNERSHIP</b> .....	<b>38</b>
Activity 5A (SLWP): Technology Options for CCA Including Conservation Activities – Continued from 2015 .....	39
Activity (7A): Drinking Water CBO Programmes .....	43
Activity 7B: Schools' IWRM/Water Messenger Programme on CCA – “Sisu Jala Hamuwa” .....	44
Activity (7C): Community Based Knowledge Products .....	47

## ACRONYMS AND ABBREVIATIONS

<b>ADB</b>	Asian Development Bank
<b>APAN</b>	Asia Pacific Climatic Change Adaptation Network
<b>AWP</b>	Area Water Partnership
<b>BhWP</b>	Bhutan Water Partnership
<b>BWP</b>	Bangladesh Water Partnership
<b>BAWUN</b>	Bangladesh Water Utility Network
<b>BWWN</b>	Bangladesh Women and Water Network
<b>CEDS</b>	Center for Environmental and Geographic Environmental Services
<b>GWP</b>	Global Water Partnership
<b>GWP SAS</b>	Global Water Partnership South Asia
<b>IMD</b>	Irrigation Management Division
<b>IWP</b>	Indian Water Partnership
<b>IWRM</b>	Integrated Water Resources Management
<b>IWM</b>	Institute of Water Modelling
<b>IWMI</b>	International Water Management Institute
<b>LGED</b>	Local Government Engineering Department
<b>NARBO</b>	Network of Asian River Basin Organizations
<b>NWSDB</b>	National Water Supply and Drainage Board
<b>PMC</b>	Project Management Committee
<b>PRI</b>	Panchayat Raj Institutions
<b>RRDI</b>	Rice Research and Development Institute
<b>SACEP</b>	South Asia Co-operative Environmental Programme
<b>SAARC</b>	South Asian Association for Regional Cooperation
<b>SAARC DMC</b>	SAARC Disaster Management Centre
<b>SAWAF</b>	South Asia Water Forum
<b>SDGs</b>	Sustainable Development Goals.
<b>SLWP</b>	Sri Lanka Water Partnership

<b>USAID</b>	United States Agency for International Development
<b>WAPCOS</b>	Water and Power Consultancy Services (India) Limited
<b>NetWATER</b>	Network of Women Water Professionals

## EXECUTIVE SUMMARY



South Asia region is surrounded by three water bodies; Bay of Bengal, Indian Ocean and Arabian Sea while the climate of the region varies considerably from area to area i.e. from tropical monsoon in the south to temperate in the north. It is home to an astounding variety of geographical features, such as glaciers, rainforests, valleys, deserts, and coastal area that are typical of much larger continents. The variety is influenced by not only the altitude, but also by the factors such as proximity to the coast and the seasonal impact of the monsoons.

This region is one of the most disaster-prone regions of the world while nearly 91 percent of these disasters are related to hydro-meteorological origin. Afghanistan, Bangladesh, India and Pakistan recorded significantly higher frequencies of natural disasters. Although no region of the world is completely spared by natural disaster, the poorest countries in South Asia are hit the most, due to poor coping capacity. The vagaries of nature leave behind death and destruction with huge impact on the developing economy.

The region faces some of the greatest population pressure on the land in the world. This has resulted in unprecedented stress on natural resources and ecosystems, causing sustained degradation of forest, soils, wetlands, rivers and aquifers. With a three-fold increase in human population since 1950, South Asia's per capita water availability is down to one fifth of what it was 60 years ago.

The human suffering has been immeasurable. Millions of tons of food production have been lost in the process, adding unknown numbers of food security-related deaths to the thousands of deaths directly related to the flooding and its aftermath, including the spread of disease.

Although South Asian countries contribute to very little global warming, yet they are generally made to acknowledge as the most vulnerable countries to climate change and climate variability. The region is host to one of the most threatened eco-systems from the effects of the climate change.

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 River Basin Organizations (NARBO), United Nations Development Programme (UNDP), United Nations Children's 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.

Global Water Partnership South Asia (GWP SAS) started a flagship initiative Water and Climate Resilience Programme (WACREP), launched on 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 collaborate with partners to implement the 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.

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 Vision: “A Water Secure World”.

## WACREP IMPLEMENTATION IN 2016

In 2016, Global Water partnership South Asia focused on 11 Country Water Partnership (CWP) based activities and interventions. Overall, WACREP in South Asia is targeted towards developing resilience among communities to withstand the hazards that can be generated due to the effects of climate change in South Asia. The projects will engage stakeholders for providing knowledge and developing skills on climate change mitigation and adaptation. Limited grant allocations in 2016 have lowered the number of activities conducted by each CWP while the Regional Office as well as the CWPs mainly targeted the efforts towards resource mobilisation. The activities conducted by the region were designated in order to achieve GWP's three Strategic Goals; catalyse change in policy and practice, generate and communicate knowledge and strengthen partnerships.

Nowadays reaching safe water sources in urban cities in South Asia has become a mirage as the water sources in the urban cities either have been polluted or dried off. The ground water table in Bangladesh, India and Pakistan is been highly contaminated with Arsenic and/or other contaminants by aggravating the situation. Rain Water Harvesting is one of the significant remedies to achieve water security and Bangladesh Water Partnership (BWP) conducted a study on measuring the feasibility of Rain Water Harvesting in urban areas.

GWP is one of the pioneers of Integrated Water Resources Management (IWRM). Bhutan Water Partnership (BhWP) continued their efforts on sensitising both government officials and educational institutions in 2016.

Climate Change (CC) is still a new concept for some of the communities in the world and even some of the government counterparts and officials working in the water/agriculture sector are not aware about the concept. India Water Partnership (IWP) identified the necessity of developing a Capacity Building Module for imparting training to the stakeholders Climate Resilience Development. Simultaneously, IWP focused on preparing a community owned water investment plan – which was one of the highlights under WACREP 2016, implemented by IWP. Under this project, IWP developed three Detailed Project Reports (DPRs); a Solid Liquid Waste Management (SLWM) plan, IWRM Plan and a Detailed Investment Plan.

Nepal has a very high potential to produce hydropower and as a result, quite a number of small holders have started constructing the hydropower plans without considering the ecological conditions of the waterways and the surroundings. GWP Nepal/JVS started assessing environmental flow in hydropower development and its implications in selected river basins in Nepal.

Sri Lanka Water Partnership (SLWP) continued its training programmes on Climate Change Adaptation (CCA) for Agency Staff, Farmer Organisation (FO) leaders and the Farmers who depends on irrigated agriculture in 2016. In addition, SLWP developed several knowledge products on climate smart agriculture in the country. The materials includes both print and videos and have been highly acknowledged by the government institutions and are being used for the trainings and workshops conducted by the institutions.

## 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 has been supporting BWP as the host institution and Mr Shahidul Hassan, President, BWP is the Head of the Executive Committee of the BWP and Dr K. Azharul Haq, Vice President is leading activities in BWP.

BWP plays an important role on issues related to flood management, Climate Change and Adaptation (CCA) and transboundary water co-operation in the country and the region. Its initiative and leadership in developing preparedness plans and frameworks for action have influenced policies and promoted 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.

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 6<sup>th</sup> 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) and the Bangladesh Water Integrity Network (BAWIN) working on water integrity and the Bangladesh Women and Water Network (BWWN).

Under WACREP Phase II (2016), BWP undertook two activities -

1. Activity (2E): Conduct a case study on the feasibility of Rain Water Harvesting (RWH) in urban areas to reduce water logging in Dhaka city;
2. Activity (2F): Conduct a study on ‘Effects of Climate Change on Water and Food Security in Selected Coastal Deltas and their Possible Economic Impact’.

Contact: Dr K. Azharul Haq, President, Bangladesh Water Partnership, House No. 50 (3<sup>rd</sup> floor), Road No. 08, Block No. D, Niketon, Gulshan-1, Dhaka-1212, Bangladesh  
Contact No. +880 1953939924 +880 1819212996 +880 1760606121  
Email: [bwp@dhaka.net](mailto:bwp@dhaka.net), Website: [www.bwp-bd.org](http://www.bwp-bd.org)



## Activity (2E): Conduct a case study on the feasibility of Rainwater Harvesting in urban areas to reduce water logging in Dhaka city

### Output/Outcome

BWP in association with its partner, Institute of Water Modelling (IWM) conducted a case study on 'the feasibility of rainwater harvesting in urban areas to reduce water logging'. A technical feasibility study was conducted and IWM finalised the report on 28 December 2016.

### Background of the study

Over the last few decades, the city of Dhaka – Bangladesh's capital has undergone a drastic increase in its population, currently housing around 15 million. A rapid increase in population has resulted in extensive urban development, which has been mostly unregulated and unplanned in its scope. As a result, city utility services like water supply, sewerage and storm water drainage are under tremendous pressure. The city experiences significant drainage congestion and water logging even when a normal storm event occurs. It is envisaged that the drainage problem will be more pronounced as climatic conditions change in the future. Higher intensity rainfall with shorter duration is expected to occur, coupled with uncertainties, which necessitate preventive climate change action.

In the study, a rainwater harvesting system was constructed by IWM/ Dhaka Water Supply and Sewerage Authority (DWASA) at Segunbagicha area of Dhaka. Rainwater was collected from the rooftop of DWASA office building having an area of 380m<sup>2</sup>. Rainwater from the rooftop was collected and injected at a depth of 80-110m below ground surface through two injection wells. The experiment recorded the injection rates over time against different hydrostatic pressure. It was observed that for a given dimension of recharge pit and open area in the injection wells, the injection rate at equilibrium state is approximately 31.93mm/hour under a hydrostatic pressure of 560 Kilopascal (kPa).

A rainfall runoff model was also constructed during the study to simulate three scenarios:

- (1) Runoff generated from the Segunbagicha catchment without rainwater injection;
- (2) Runoff generated from the same catchment excluding the runoff volume from rooftop of areas => 300m<sup>2</sup>
- (3) Mitigation of the impact of climate change on the storm water drainage system in 2025 and 2050.

It is pertinent to mention that RAJUK<sup>1</sup> has issued a Statutory Regulatory Order (2011) which gave direction to construct such rainwater harvesting system for rooftops => 300m<sup>2</sup>.

---

<sup>1</sup> Rajdhani Unnayan Kartripakkha, or RAJUK – literally the Capital Development Authority of the Government of Bangladesh

### Related GWP strategic goal:

Catalyse change in policy and practice

### Description of Change

The final report presented a technical feasibility study for reducing storm water runoff by injecting a part of the runoff to the groundwater aquifer system. The analysis was based on an experiment conducted by DWASA in 2010 with technical support from IWM.

### Contributing factors, actors, and background

The experiment was conducted under DWASA funded project “Study on Artificial Recharge to Aquifer by Rain Water Harvesting from Building Roof-tops in Dhaka City (Pilot Project)”



DWASA logo

### Lessons learned

The key learnings are as follows:

- The experiment successfully demonstrated that rainwater from rooftops could be harvested to recharge groundwater in the saturated aquifer and thus reduce run-off resulting in significant reduction in water logging.
- Given certain conditions of injection well design, recharge pit dimension and generated water column pressure significant rainwater injection is possible. The rate of injection was calculated only at *Segunbagicha* recharge pit in Central Dhaka. Similar experiments in other parts of Dhaka city are yet to be performed, though it is envisaged that due to different aquifer properties in different areas, the rate of injection might vary. This is yet to be ascertained.
- Quality of rainwater being injected was recorded for a particular period in 2010. No significant threat to the contamination of aquifer was observed if rainwater in the first 10 minutes was flashed outside the recharge pit.
- Rainwater harvesting from rooftops could be a good adaptation measure to offset the impact of climate change on urban drainage.
- Model simulation and field monitoring shows that nearly 11.5 percent runoff can be reduced by injection to the saturated aquifer in normal conditions in *Segunbagicha* catchment. The reduced runoff by injection offsets the impact of climate change considerably. Therefore, rainwater harvesting can be an effective adaptation measure against climate change and improving urban storm water drainage.

The key recommendations from the study were:

- The experiment with rainwater harvesting needs to be performed in other parts of the city with different design of injection wells and recharge pits.
- The SRO (2011) of RAJUK is timely and should be strictly enforced.
- Groundwater quality change needs to be monitored over an extended period, covering pre-monsoon, monsoon and post monsoon periods.
- The findings can be used in other tropical cities in other deltas of the world to reduce drainage congestion.

#### **Other information:**

- Published quarterly at BWP website ([www.bwp-bd.org](http://www.bwp-bd.org)) ; BWP News Letter 2016
- Summary report - <http://bwp-bd.org/pdf/wacrep/WACREP II 2016 Report on Feasibility Study of Rain Water Harvesting in Urban Areas to Reduce Water Logging December 2016.pdf>

**Activity (2F): Conduct a study on ‘Effects of Climate Change on Water and Food Security in Selected Coastal Deltas and its Possible Economic Impact’.**

#### **Output/Outcome**

The stakeholders were thoroughly informed about the status and future challenges for water security in cities and towns in the coastal areas under the projected climate change scenario in Bangladesh.

#### **Background of the Study**

Bangladesh has been identified as one amongst 27 countries, which are most vulnerable to impacts of climate change. The food security of Bangladesh is affected by climate change directly and indirectly as one of the direct impacts is loss of crop production. Additionally, the salinity intrusion and sea level rise affect the Rabi crop production in coastal zone of Bangladesh. Scarcity of irrigation water is common in those areas during the dry period. Frequent, untimed and prolonged flood and storm surges hamper the productivity of Kharif II (Aman), reducing the food availability. Climate change impacts changes the agro-ecological conditions in the country, affecting the growth and distribution of incomes and reducing the demand for agriculture due to adverse climatic events.

Farmers tend to switch to other income generation activities because of less net return and higher possibility of production loss in agriculture. This creates obstacles in food accessibility and affordability. Furthermore, the impacts of climate change affect both inland and cultural fisheries as climate change alters the water temperature and salinity status. The irregular and erratic precipitation, hydrological changes in fish habitat and extreme natural events take place because

of climate change. Soil-water salinity and sea level rise have both positive and negative effects on coastal areas as these changes expected to increase favourable areas for shrimp, other brackish water fish and shellfish culture (important export items of Bangladesh).

Climate changes also affect the Sundarbans, resulting in loss of nursery grounds for many marine fish species. The economic impact of climate change has been identified in terms of impact on water and soil salinity in agriculture, fisheries and domestic sectors (salinity in drinking water). Increased levels of salinity in surface water and soil over the years has affected irrigation facilities in the study area. In 2050, it is forecasted that irrigation area of Khulna (nearly 475,000ha) and Noakhali (nearly 250,000 ha) will be affected by salinity. As a result, 2.97mt of food production will be lost by the year 2050 in the study areas. Increased salinity in surface water has also contributed to the deterioration of the quality of ground water. Currently, 195,061 households in Chittagong, Cox's Bazaar and Khulna Districts have to purchase drinking water to meet their demand.

The study area has a total population of 18.04 million (BBS 2011; which is increasing by about 1.4 percent per annum). About 54 percent of this population is engaged in agricultural activities, 11 percent in industry and 35 percent in the service sector. Agricultural activities broadly include crop farming, fisheries, livestock and poultry farming. It has been estimated that in 2030, the population will increase to about 23.36 million.

**Related GWP strategic goal:**

Catalyse change in policy and practice

**Description of Change**

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

The main objective of the consultations was to sensitise stakeholders about water security and its management towards establishing sustainable and eco-friendly cities/towns. Total 56 participants were present at the community level workshops, which was a prelude to develop a programme of Integrated Urban Water Management (IUWM). These workshops aimed to highlight SDG commitment of 100 percent water supply to city dwellers by the year 2030.



Image 1: Community Consultations

### Contributing factors, actors, and background

Despite having a negligible contribution to global greenhouse gas emission, Bangladesh stands to be the first and one of the 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 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 meters. In response to high iron, arsenic and manganese concentrations in ground water, surface water treatment plants are being installed in many urban and peri-urban areas. Moreover, global warming induced salt-water intrusion in the coastal regions of Bangladesh is causing a decrement in the sources of safe drinking water.

Urban population will increase to 75 and 113 million by 2025 and 2050 respectively. Major population migration 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', nearly 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 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.

### **Lessons learned**

The study showed that Khulna has a maximum of 1ppt (parts per trillion) salinity intrusion for about 62 percent area and 25 percent area with 5ppt salinity. Patuakhali has a lower level of salinity, such as 0.8 percent area of less than 1ppt and 3.4 percent area of less 5ppt. Noakhali has 8.3 percent area of less than 5ppt salinity. The salinity in the area is gradually degrading the water security at a higher rate. The projection of salinity in 2050 showed a clear threatening situation for the water security at the studied regions. Khulna has the maximum possibility to hold saline surface water - 47 percent of water is less than 15ppt salinity. People from Noakhali will suffer from water availability and quality associated with this problem in the long-term. There is a possibility of having 37 percent water with less than 15ppt of salinity in 2050. Other areas are also having the possibility of more salinity intrusion in the coming years.

Therefore, it was concluded that without the impact of climate change the people of study area could be more economically benefited than that they had in base situation in 2009.

## CHAPTER 2 - BHUTAN WATER PARTNERSHIP



The Royal Society for Protection of Nature (RSPN) was founded as a citizen based non-profit, non-governmental environment organization 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 organization, with a special clause on non-profit entity. With the establishment of Civil Society Organization Authority (CSOA) of Bhutan, the Society is now registered under Civil Society Organization 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 the protected areas system. All RSPN programmes continue to involve students/ individuals in schools, institutions, and communities throughout the country for various project activities RSPN currently enjoys the Royal Patronage of Her Majesty the Gyaltsuen, Jetsun Pema Wangchuck since 2012.

RSPN is governed by a seven-member Board of Directors, comprising representatives from varied sectors according to the requirement of Civil Society Act of Bhutan. An Executive Director manages the day-to-day affairs of the organization 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 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 by RSPN. In 2001, the Honorable Minister of Agriculture launched the BhWP 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 from September 2011.

Contact: Mr Kinga Wangdi,  
Country Coordinator Bhutan Water Partnership (BhWP)/Royal Society of  
Protection of Nature (RSPN)  
Kawangjansa, PO Box 325, Thimpu, Bhutan  
Tel: +975 2 326130/+975 2 322056 Fax: +975 2 323189  
Website: <http://www.rspnbhutan.org/about-bhwp.html>,  
Email: [kwangdi@rspnbhutan.org](mailto:kwangdi@rspnbhutan.org)



## CHAPTER 3 - INDIA WATER PARTNERSHIP



India Water Partnership (IWP) is a non-profit organisation with a goal of promoting IWRM in India. IWP is hosted by WAPCOS, a public sector undertaking under the Ministry of Water Resources, River Development and Ganga Rejuvenation.

### Core areas of IWP

IWP works towards water security in India by utilising the concept of IWRM. IWP carries out dispassionate analysis of various water related issues and steers the policy discourse on social, economic, ecological and scientific basis. IWP serves as an independent voice on water management issues, outside the government, forecasting and identifying potential challenges. IWP works towards these goals through research, advocacy and implementation on the ground with the help of its 120 network partners in India.

IWP also addresses integrated domestic water management, promoting Area Water Partnerships (AWPs) for river basin management, conflict resolution on water sharing, inter-state transboundary water sharing issues, gender mainstreaming, and involving youth in sustainable water management.

Under WACREP Phase II (2016), IWP undertook two activities, namely:

- 1) Activity 2C (IWP) : Climate Resilience Development - To prepare Capacity Building Module for imparting training to the stakeholders of Mashi Basin based on activities undertaken during 2015
- 2) Activity 7D (IWP) : To prepare community owned water investment plan based on the action research findings emerged from 2015 activity

Contact: Dr Veena Khanduri, Country Coordinator, India Water Partnership  
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](mailto:iwpneer@gmail.com), [veena@cwip-india.org](mailto:veena@cwip-india.org)  
Website: [www.cwip-india.org](http://www.cwip-india.org)

## Activity 2C (IWP): To prepare a capacity building module for training stakeholders of Mashi Basin based on the inputs received from GIS survey mapping, water resource mapping and water balance modelling conducted in 2015

### Background:

The primary aim of this activity is to form a Mashi River Basin Parliament with 83 members comprising of different stakeholders to support IWRM and suggest adaptive climate change measures to be taken by communities living in and around Mashi river basin for their socio-economic development.

In 2015, a need assessment was undertaken through GIS Survey; mapping of land resources, water resources and human resources and a socio-economic survey was conducted in the villages located in and around Mashi River basin. In addition, a Water Evaluation and Planning (WEAP) for the Mashi River basin based on the model developed by Stockholm Environment Institute (SEI, USA) was also conducted. Further adaptation and mitigation measures based on the regional topography with regard to current climate change was done through various capacity development modules.

**Output/Outcome:** The major outputs of the activity are,

- Preparation of the River Basin Concept and planning of intervention activities
- Developed capacity building modules (for domestic water users, farmers and Panchayati Raj Institutions (PRI) members
- Prepared a Draft Constitution for Mashi River Water Parliament (in Hindi language)
- Formation of groups at watershed level and training stakeholders

### Governance process influenced/governance outcome in place



This was a collaborative effort of IWP with one of its network partner “**Centre for Environment and Development Studies, Jaipur (CEDSJ)**” in Rajasthan since January 2015 to December 2016.

### Objectives of the study:

- 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 manifests in variations in water availability.
- To explore the 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 would be used as a pilot for River Basin management of water resources in Rajasthan.

The major tasks identified in 2016 under this intervention were:

- Selected two NGOs for facilitating formation of stakeholder groups and identification of key persons in each watershed. They further assisted in community mobilisation and worked along a donor – Wells for India.
- Identification of Panchayats and key people in the six watersheds was conducted to form a stakeholders group to represent the Mashi River Basin Parliament with the support of Panchayati Raj Institution (PRI) representatives. A watershed-wise map was used in the process.
- Consultations were held with identified Sarpanchs (Head of Village) who were incentivised to generate awareness about river basin management. The purpose of these meetings was to identify the following:
  - Are people willing to join this movement to save the Mashi River and better plan water resources in the basin?
  - Is the river important for them? If yes why?
  - What they expect from the proposed Mashi River Basin Parliament?
  - Which Sarpanch/Pradhan/person is more committed and will be willing to join the parliament?
  - What are the views of PRIs regarding governances and other issues related to the proposed model?
  - Identification of members for watershed groups.
  - Areas/issues of present and future water related conflicts.
  - Views about present water related programmes and projects, gaps and achievements and scope for convergence with our approach.
- Held a consultation with the Technical Advisory (TA) team, consisted of Union Minister of Information and Communication, Government of India to understand the Participatory River Basin Management concept. TA team also supported in mobilising PRI representatives to form micro watershed committees and to organise group meetings. The team will also help Members of Legislative Assembly (MLAs) to participate the River Basin Parliament meetings representing Mashi Basin Area. This multi-stakeholder platform is broadly represented by Stakeholder groups (Farmers, Industrialists, etc.), Technical support group (Local NGOs, CEDSJ, Line Department, etc.) and Public representatives (MLAs, Pradhan, Sarpanch).
- As funding partner NGOs were necessary to conduct community mobilisation activities in the basin, and a meeting with the officials of Indian Oil Cooperation Ltd. (IOC), Jaipur was organised. Further, a proposal developed by CEDSJ was used for fundraising through CSR funding. The efforts were made to gather funding from national/international donor agencies for further development of this activity.

- The WEAP model predicted the following uncertainty using the following climate change scenarios-CGCM3 A1B\_Wet and ECHAM5 A1B\_Dry. In the dry scenario, there is increase in groundwater storage while in wet scenario there is decrease in ground water storage with respect to reference scenario. The decrease in water storage in the wet scenario is a consequence of an increase in agriculture production in the region.
- A field visit of the study team along with the geologist and geo-hydrologist expert from Advanced Center for Water Resources Development and Management (ACWADAM) was conducted in the basin and meeting with farmers were held to assess the requirement for capacity building activity. The insights were used to prepare the Capacity Building Modules.
- IWP in association with the CEDS, Jaipur documented the views of participants. The participants of the meeting included Sarpanch, Pradhan, farmers, government officials, contractors (riverbed sand mining) and lawyers.

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

Catalyse change in policy and practice

### **Description of Change**

Mashi River is a tributary of River Banas that originates in the Khamnor hills of the Aravali range (about 5 km from Kumbhalgarh) and flows along its entire length through Rajasthan. Banas is a major tributary of the River Chambal, the two rivers meet near village Rameshwar in Khandar Block in Sawai Madhopur District of Rajasthan. The total length of the river is about 512 km.

Mashi basin falls in three districts - Jaipur, Ajmer and Tonk Districts of the state of Rajasthan. The two main tributaries of Mashi River are Bandi and Mashi, which originate from the hills of Samod and Ajmer district respectively. Any adverse impact on water availability due to climate change/variability is manifested through occurrence of drought or flood, which consequently threatens food security and livelihood of rural households in the river basin. Further, it also affects the development and achievements of vital national sectoral development goals, such as, energy, health, industry, infrastructure investments, etc. Hence, building knowledge on climate change among stakeholders and incorporating climate change in planning and making policies i.e., climate change adaptation is a major objective to attain water and food security.

Recognising the above, IWP in collaboration CEDSJ involved in watershed development of Mashi River on the principles of IWRM. To establish the baseline of water availability and storage capacity of the basin, following activities were undertaken with the technical guidance of ACWADAM:

- Groundwater mapping of Bandi and Mashi tributaries
- Micro-watershed wise geophysical survey
- Measurement of groundwater draft using sensors
- Use of micro irrigation and its impact on groundwater draft in shallow water system

- Log data from farmers, testing yields of tube wells at different locations in the basin
- Identification of groundwater recharge possibilities in the basin
- Polly house and water use-interview with farmers.

Several consultation meetings were held in November 2016 with respect to water governance in the Basin. The first meeting was in Kalakh Dam Village in Bandi River, second was in Bandi Bachao Sangrah Samiti on issues related to community mobilisation for formation of River Parliament. The third meeting was with Kashtkar Committee of Jobner Village to discuss farmer issues that should be taken care while formulating River Parliament.

### Procuring and developing materials to display in meetings

Five stakeholders meetings were held and posters and display materials were prepared to impress and attract participants. This would boost community and stakeholder participation.

#### • Consultations organised with identified Sarpanchs<sup>2</sup>

Date	Village	Issues discussed/emerged
05.10.2016	Jhag Panchayat, Dudu, Jaipur District.	<ol style="list-style-type: none"> <li>1. Encroachment of river area</li> <li>2. Identification norms for members and formation of River basin Parliament</li> <li>3. Legal status of River Parliament</li> </ol>
10.10.2016	Kalwar, Jaipur District	Meeting with Mr Jagdish Sani an Advocate who is fighting for saving the river Bandi <sup>3</sup> from encroachment
12.10.2016	Agriculture University, Jobner, Jaipur district	Discussion with agriculture experts on their availability for training stakeholder groups
22.10.2016	Kalwar, Jaipur District	Meeting with group of advocates to discuss three issues; <ol style="list-style-type: none"> <li>1. The state government encroachment in Bandi River</li> <li>2. Issue of environmental flow in the river</li> <li>3. Groundwater contamination due to dumping sewage water in the Bandi River</li> </ol>

Participants of the consultations represented different sectors including advocates, panchayats and farmers. From these consultations, it was realised that the stakeholders needed further details on organisational structure of the River Basin Parliament such as the legal standing and roles and responsibilities, etc. Based on these observations, required material was prepared in consultation with lawyers and other experts.

<sup>2</sup> Heads of Village

<sup>3</sup> Mashi Sub Basin and Bandi Sub Basin together forms the Mashi River basin

**Activities undertaken in 2016 based on the learning from 2015 implementation phase were:**

- 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, PRI Members
- 4) Group formation at watershed level
- 5) Consultation workshop with stakeholders for finalising Capacity Building Modules and Training.

The activity continues in 2017.

**Lessons learned**

Suggestions for water management in Mashhi Basin:

- The results of WEAP modelling should be shared and used to catalyse informed multi-stakeholder dialogue for water resources management in Mashhi Basin.
- Lay foundations and took concerted efforts for value-chain work for mustard and other field crops (vegetables).
- Given the uncertainty of climate change projections, a Steering Committee for Mashhi Basin should be setup that guides and monitors overall implementation of the action plan and how climate change unfolds/manifests.
- The assumptions in WEAP will need to be revisited on periodic basis (at least once in two years) to decide on allocations and use efficiencies across sectors.

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

[https://www.gwp.org/globalassets/global/gwp-sas\\_files/wacrep/2015/report-on-case-study-of-mashi-sub-basin---rajasthan.pdf](https://www.gwp.org/globalassets/global/gwp-sas_files/wacrep/2015/report-on-case-study-of-mashi-sub-basin---rajasthan.pdf)

**Activity 7D (IWP): Promotion of Integrated Water Resource Management in Peri-Urban Settings based on 2015 Research Findings**

**Output/Outcome:** IWP in association with its partner Taru Leading Edge implemented the project 'Promotion of Integrated Water Resource Management' in Garhi Harsuru village of Gurgaon, Haryana falling in the National Capital Territory of Delhi. The first phase of the project was completed in 2015 and the second phase was carried out in 2016.

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

Generate and communicate knowledge

**Contributing factors, actors, and background**



The activity conducted with the collaboration of TARU Leading Edge, New Delhi at Garhi Harsaru village located in Gurgaon District of Haryana that 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.

In 2015, a base-line survey of the village was undertaken on water and sanitation status and a number of awareness generation programmes were conducted for the village community and the schoolchildren. In 2016, an attempt was made by IWP and Taru Leading Edge to find a solution to the issues identified during base-line survey in 2015. Based on the findings of base-line survey, objective of the activity in 2016, an innovative IWRM plan, supported by advocacy strategy for policy and funding support was developed.

Awareness raising programmes and regular meetings with village heads, office bearers, local community and school staff was carried out in 2016. Three Detailed Project Reports (DPRs) were created on:

- Solid Liquid Waste Management (SLWM)
- IWRM Plan
- Detailed Investment Plan

The collaboration would continue in 2017 and together implement the activities/sub-activities as suggested in the DPRs. Developments include obtaining permission from Dy Commissioner, Gurgaon for construction of Rooftop Rainwater Harvesting structure in a Senior Secondary School in Village Garhi Harsaru. The special Gram Sabha (village level meeting) was called for discussion and endorsement for construction of a Rain Water Harvesting structure at government school of the village was obtained. The meeting also discussed planning of SWLM with active participation of village communities.

#### **Activities carried out:**

##### **Process**

1. Sharing of DPRs on IWRM and SLWM with the village community for their acceptance.
2. Upon village communities' acceptance, the DPRs were presented to possible donors to secure funding.

##### **I. Solid Liquid Waste Management (SLWM)**

Based on the baseline survey in 2015, it was decided to formulate a detailed project report for SLWM, as there is no collection and disposal mechanism for solid waste nor any means to collect and transport the waste. In addition, there was no specified location for waste disposal in the village. Therefore, based on the baseline survey in 2015, field visits and interaction with the

communities, a draft SLWM DPR was prepared and reviewed by IWP Secretariat and Taru Leading Edge.

## II. IWRM

### **Rooftop Rainwater Harvesting Structure**

Permissions were sought and granted by the Deputy Commissioner, Gurgaon (Haryana) in October 2016 to construct rooftop rainwater harvesting structure in a Senior Secondary Government School of the project village. The approval was given after number of meetings and discussions held on construction parameters and regular follow-ups.

### **Role of Village Panchayat**

- Project initiatives developments were discussed with the key persons of Panchayat of the project village Garhi Harsuru until mid-May 2016. The team explained the need for constructing Community Rainwater Harvesting Structures (CRWH) in the village and discussed the technical and administrative issues that can emerge in site selection.
- The newly elected Panchayat effective from February 2016 shared other activities being carried out by them in terms of community development that included construction of storm water drains in colonies and repair works in village area including road construction.
- Panchayat members voiced their concerns regarding various issues in their village, such as high level of groundwater withdrawal and improper disposal of solid and liquid waste. Later Panchayat members were briefed about the components of DPRs to be implemented in their village and the Panchayat offered to provide their help and support in the implementation of different components of the DPRs.

## III. Preparation of Water Investment Plan:

Preparation of Water Investment Plan was conducted. The Water Investment Plan includes:

- Lake (Johad) Restoration
- Addressing problems of existing water supply issues like quality, leakages, discharge levels, intermittent water supply
- Provisions for un-served areas with respect to drinking water
- Groundwater recharging in habitat areas
- Sensitisation and awareness building activities
- Institution building
- Rooftop Rainwater Harvesting Demonstrations
- Community Based Water Filtration System





**Image 1:** Discussion on Detailed Investment Plan with village community on 27 November 2016

### **Student Engagement**

Students are the best ambassadors to bring about change in any community. Students were asked to list out usage of water at homes and identify measures of water conservation. They were also asked to practice water conservation measures introduced at the workshop at home for a one-month period and to report their achievements during the next awareness activity. The purpose of this exercise was to motivate the students, as they are change agents, to convey the information on water conservation to their families.

Awareness raising activities on water conservation, water usage and a drawing competition were organised on 22 April 2016 at the Government School, Garhi Harsaru on Earth Day. The sub-activities conducted were:

- Conducted a presentation on water conservation in a school to raise awareness of the students on importance of water and conservation measures. The presentation consisted of a brief description on usage of water at home, water conservation measures, water cycle and rainwater harvesting.
- A drawing competition for students of grade 6 to 8 in the Government School with the participation of nearly 56 students. The theme of competition was 'Water Conservation, Water Cycle, Rainwater Harvesting and Environment Protection'.
- Four winning drawings were awarded prizes by one of the senior teachers of the school.



**Image 2:** Students at the drawing competition

### Lessons learned

#### Suggestions for IWRM in the villages of Peri-urban Areas:

- Awareness campaigns should be conducted regularly to highlight the importance of water conservation and reducing water wastage.
- Building partnerships with different stakeholders is essential for sustainable development. One of the key stakeholders of the partnership should be the community.

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

[https://www.gwp.org/globalassets/global/gwp-sas\\_files/wacrep/2015/taru-final-report---wacrep-phase-ii-2015.pdf](https://www.gwp.org/globalassets/global/gwp-sas_files/wacrep/2015/taru-final-report---wacrep-phase-ii-2015.pdf)

[https://www.gwp.org/globalassets/global/gwp-sas\\_files/wacrep/2016/new-dpr\\_slwm\\_final.pdf](https://www.gwp.org/globalassets/global/gwp-sas_files/wacrep/2016/new-dpr_slwm_final.pdf)

## CHAPTER 4 - GWP NEPAL



Jalsrot Vikas Sanstha (JVS), Nepal, is a non-profit, non-government, non-political and professional organisation established in 1999 and is incorporated under Association Registration Act 2034 B.S.

### **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. Members of GWP Nepal have consensually decided to designate JVS as the host institution for GWP Nepal. This decision was guided by concerns of sustainability and the significant networking characteristic of the Country Water Partnership.

The Executive Committee of GWP Nepal/JVS represents a multi-disciplinary team with backgrounds in planning, engineering, environmental science, resource economics, law, political science, sociology, psychology, public administration and management. Dr Vijaya Shrestha is the President of GWP Nepal/JVS. GWP Nepal has more than 88 individual institutional memberships, including government water agencies, non-governmental organisations, international organisations, universities/colleges/educational institutions and private organisations.

In 2016, under WACREP, GWP Nepal undertook three activities:

- 1) Activity 2B: Assessment of environmental flow in hydropower development and its implications in selected river basins (Continued from 2015-2016),
- 2) Activity 3A: Assessment of water focused climate adaptation action/s in 101 LAPAs and its integration into local planning process in a selected districts (Continued from 2015-2016),
- 3) Activity 3B: Study of earthquake impact on the water resources status in selected earthquake hit areas

Contact: GWP Nepal/Jalsrot Vikas Sanstha (JVS)  
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](mailto:mail@jvs.org.np) , Website: <http://jvs-nwp.org.np>

## Activity 2B: Assessment of Environmental Flow in Gandaki River Basin: A Case of Modi Khola

### Output/Outcomes:

This case study recommends that there is a need of cumulative impact assessment, mainly in those basins, which have higher potential for hydropower and where there are plans for cascades of projects. This study also provides information to rethink on mitigation measures proposed in EA studies to conserve downstream ecosystems and/or life forms in hydropower projects. More importantly, this study underscores the importance of proper basin plans and assessment of hydropower potential that can be harnessed sustainably from economic and environmental perspectives.

### Background:

The primary focus of water development projects in Nepal has been hydropower and irrigation. Initially, there has been no consideration of environmental flow requirements downstream of these developments. The Hydropower Development Policy, 2001 has stipulated the need for maintaining a minimum flow in rivers and downstream of hydropower plants. However, such recommendations remain arbitrary and minimal. In the case of Hydro-Electric Power Stations (HEPs) of Modi Khola no minimum water releases observed despite it was proposed in Environmental Impact Assessment (EIA) and Initial Environmental Examination (IEE) report.

In 2015, GWP Nepal/JVS initiated the activity, assessment of environmental flow in hydropower development and its implications in Modi River of Gandaki River Basin. 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). By the end of 2015, pre monsoon and post monsoon discharge data has been collected with the preliminary information of the study area. Similarly, a report was prepared compiling the information from four aspects i.e. Socio-economic, environmental, hydrological and fisheries. The main objective of the activity is to ensure policy compliance of releasing minimum flow in the river during hydro-electricity generation.

### Activities:

The preliminary report prepared by incorporating sector reports including environmental, socioeconomic, fisheries and hydrological sectors was reviewed. The report included the pre- and post-monsoonal discharge data, socio-economic information of the study area and anticipated impacts on socio-economic, aquatic and hydrological environment due to the hydropower project along with the relevant legal frameworks of environmental flow.

By the end of the project, status of the environmental flow implementation was identified in the river and information and knowledge on the practice and policy compliance of releasing

minimum-flow in the river during hydro-electricity generation will be disseminated. This information will facilitate in getting the attention of the Government of Nepal and policy makers towards conserving water resources and associated biodiversity.

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

Catalyse change in policy and practice

### **Lessons Learnt:**

Some important outcomes of the report are:

- To date, there has been no consideration of environmental flow requirements for downstream of hydropower and irrigation projects.
- Nepal's environmental policy and legislation are in their infancy at present - neither specify or mentions about ecologically acceptable limits of water withdrawals (MoWR 1992).
- Hydropower Development Policy (MoWR 2001) has stipulated the need for maintaining a minimum flow in rivers, downstream of hydropower plants.

In case of Modi Khola HEP and Lower Modi Khola-I HEP minimum water release was not observed despite being proposed at Environment Impact Assessment (EIA) and Initial Environmental Examination (IEE) reports.

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



**Pre- and Post-Monsoon Surveys**

Web link: [https://jvs-nwp.org.np/sites/default/files/Final%20Report\\_E-flow.pdf](https://jvs-nwp.org.np/sites/default/files/Final%20Report_E-flow.pdf)

## Activity 3A: Assessment of water focused climate adaptation actions in 101 LAPA and its integration into local planning process in selected district

### Outcome/Output:

Beginning in late 2015, GWP Nepal/JVS began to design a study to further Nepal's understanding of the relationship between its climate change adaptation priorities and water resource management. Therefore, 101 of the Local Adaptation Plans for Action (LAPAs) were reviewed to identify adaptation actions and associated budgets related to water resources. The report preparation also required extensive consultation with community members and government agencies. This is one of the first attempts to thoroughly examine the progress of LAPAs under a water lens.

GWP Nepal organised a workshop on 'Assessment of water focused climate adaptation actions in 101 LAPAs and its integration into local planning process' on 17 June 2016 in Union House, Anamnagar, Kathmandu. The programme aimed at highlighting the water focused climate adaptation actions in LAPAs implemented by Government of Nepal in fourteen districts of Mid- and Far-Western Development Region of Nepal. There were 30 personnel representing governmental agencies, international non-governmental organisations (NGOs) and NGOs.

### Background:

The team conducted a field visit to the LAPA implementing sites and consulted with government line agencies and Community Based Organisations (CBOs) at district level. The consultation with District Development Committee helped in identifying entry points for adaptation action/s. The integration of adaptation actions to be made is based on the recommendations for the local level.

Climate Change (CC) is a global discourse while its impacts are local. Nepal realised the urgency of supporting climate vulnerable communities to adapt to impacts of CC and National Adaptation Programme of Action (NAPA) was established in 2010. Currently, the Government of Nepal is implementing LAPAs in 93 Village Development Committees (VDCs) and seven municipalities in the most climate vulnerable 14 districts of mid- and far west Nepal with the collaboration of Department of International Development, Government of UK (DFID) and European Union (EU).

Each LAPA included detailed descriptions of the largest threats faced by their locality due to climate change. The first approach of the study was to examine these identified threats. GWP Nepal/JVS grouped these into eight of the most commonly identified potential impacts:

- drying-up of water sources;
- effects of landslides on irrigation and drinking water supply;
- decrease in agriculture production from floods, landslides and drought;
- increase in drought-induced barren land;
- damage to agricultural land due to river and stream floods and bank cutting;
- infestation of disease and pest (domestic plants and animals);
- damage to infrastructure from natural disasters such as landslides and floods, including from fire and ice melting; and

- lowering down of groundwater table

The next step of the study was to review all of the funding allocated in each of the 101 LAPAs for climate change adaptation actions. This revealed that 53 percent of the funding for the Climate Change Adaptation (CCA) actions identified across those LAPAs reviewed is allocated for water-related projects.

Next GWP Nepal categorised all the water-related adaptation actions proposed in the reviewed LAPAs into seven categories: infrastructure; community protection; water resource conservation and rainwater harvesting; agriculture; landslide and flood control; indigenous knowledge and water mill; and capacity building. These seven water-related adaptation action categories were used to further observe the budget allocated for each one.

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

Catalyse change in policy and practice

### **Lessons Learnt:**

- Expand and implement LAPA activities with people's participation
- Plan water conservation practices
- Enhance and improve indigenous practices of water collection and storage technologies
- Promote forest conservation and plant species with high water holding capacity
- Promote inter-agency coordination at the district and village levels
- Establish core technical unit in district, municipality and VDC levels for timely support in planning, budget releasing and implementing LAPAs
- Provide maintenance funds
- Initiate documentation to replicate good practices and learn from mistakes or failure practices.

One of the most important study findings was that more than half of the CCA action funding within those LAPAs reviewed has been allocated for water-related projects and activities. Recalling that LAPAs are principally produced by local community members, this large percentage of allocated budget to water actions demonstrates the perceived vulnerability of water resources in the face of climate change in Nepal. In other words, this finding ascertains that local community members and government authorities have already begun to recognise the importance of prioritising water resource management alongside CCA.

Another principal finding of the study was that most of the water-related budget allocated across the LAPAs is infrastructure-related (82.6%). This grouping of adaptation actions calls for the development of various water infrastructure such as irrigation canals, groundwater wells, drinking water supply, micro-hydroelectricity, and bridges. Water-related adaptation actions, which received considerably less priority, include those related to capacity building and agriculture. However, capacity building has been identified as a crucial component of successful climate change adaptation. This is widely referred to as adaptive capacity or “the ability of different socio-ecological systems and agents to respond and recover from climate impact”

(Lemos et al., 2013). Without this capacity to adapt and build resilience, other adaptation efforts may be futile (Eisenack et al., 2014).

More practically, GWP Nepal wanted to ensure that the study's findings were disseminated and used appropriately. Though all of the LAPA actions are critical –water-related or not –to increase Nepal's resilience to CC, GWP Nepal has been utilising the reports' findings to advocate for the prioritisation of water-focused adaptation actions. As discussed, the impacts of CC on water resources in Nepal include everything from flooding to drought; in combination with the socioeconomic and political context faced by its citizens, primarily agriculture-based livelihoods and general quality of life are threatened. Thus, prioritisation of water is purposeful since it influences many aspects of Nepal's adaptive capacity in the face of climate change. Put in another way, the water lens utilised to examine the LAPAs was purposeful because managing Nepal's waters in an integrated and holistic approach will have multiple benefits on its citizens and other natural resources.

Since its completion, the report has been communicated to all water-related government institutions and the Nepal Climate Change Support Programme, who is responsible for implementing LAPAs. The purpose of this communication was to ensure that these entities are aware of the importance of water resources when discussing climate change adaptation in Nepal locally and nationally. A workshop was also organised in mid-2016 in Kathmandu to highlight the water-focused climate adaptation actions in LAPAs.

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

**Web link: [jvs-nwp.org.np/publications](http://jvs-nwp.org.np/publications)**



Discussion with LAPA facilitator Mrs. Krishna Jaishi  
Community consultation in Shankarpur, Bhimpur





Discussion with the Executive Director of Rajapur municipality  
Consultation with local indigenous Tharu community



Consultation with local people at Shankarapur (Bardiya)



Workshop on 'Assessment of Water Focused Climate Adaptation'  
Participants of the workshop

## Activity 3B: Study of earthquake impact on the water resources status in selected earthquake hit areas

### Output/Outcome:

GWP Nepal/JVS conducted this study to identify the impacts of Gorkha earthquake hit on the 25 April 2015 on water resources. The study conducted using Focus Group Discussions (FGDs), Key Informants Interviews (KII), visual observation, published and unpublished report and articles. The study report has been finalised in December 2016.

### Background:

The study team conducted field visits on 8 September and 8 November respectively to Kavrepalanchowk and Kathmandu districts which severely affected by the earthquake, to gather information on impact of earthquake on the status of water resource. The information gathered through a FGD.

The participants of the field visit consisted of representatives from Water User Association, Daraune Pokhari Conservation Committee and women representing Mother's Group. Participants revealed the problems faced in daily activities due to lack of water resources. The study team also observed the current status of water resources.

Further visits and discussions organised are as follows:

1. Visit to Dakshinkali and Chandragiri Municipalities
2. Pharping hydropower, Saatmule, Naumule and Sheshnarayan areas were observed
3. Key Informants Interview (KII) were conducted in Dakshinkali Municipality
4. A FGD was held in Dapcha-Kashikhanda Municipality
5. Matatirtha was observed in Chandragiri Municipality

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

Catalyse change in policy and practice

### Lessons Learnt:

The study revealed that most ponds, stone spouts and springs in the selected areas were affected – in addition to other factors. The earthquake was responsible for drying up of water resources in the selected areas. The quantity and quality of water was mainly affected by the earthquake while the flow of water was found to vary sporadically. Pseudo-changes in the quantity of water in all the study sites was noted and turbidity in water resources was high just after the earthquake.

Locals have had to face adverse impacts due to the scarcity of water such as loss of agricultural production, problems in animal husbandry, hurdles in daily activities, perturbation of social harmony and impact on aquatic ecosystem. Unfortunately, locals are not practicing any protective measures to enhance water security except in Dapcha-Kashikhanda Municipality and

Bagmati River Basin (BRB). The efforts of locals in conservation of Daraune-Pokhari Pond (in Dapcha-Kashikhanda Municipality) as recharge pond is praiseworthy. Likewise, BRB in Kathmandu Valley is being managed by High Powered Committee for the Integrated Development of the Bagmati Civilization (HPCIDBC) to ensure water security in Kathmandu.

The study recommends that the water security in the areas can be achieved through rainwater harvesting, restoration of traditional spouts and identifying and conserving recharge ponds. Furthermore, identification of water stress and water availability shall solve the water scarcity to a certain extent. Improvement of water supply services are important to meet the water demands while public awareness is important to secure existing resources.

**Other information—web links to reports, news items, etc.: [jvs-nwp.org.np/publications](http://jvs-nwp.org.np/publications)**



Dried well in Dapcha-Kashikhanda Municipality  
Dried tap in the study area



Participants of Focus Group Discussion  
Decreased water flow from stone spouts at Matatirtha, Chandragiri Municipality, Kathmandu



Mr Somnath Poudel, Vice President of JVS/GWP Nepal observing dried stone spouts at Matsyanarayan pond, Kirtipur Municipality, Kathmandu Reservoir of Pharping Hydropower Project, Dakshinkali Municipality, Kathmandu

## CHAPTER 5 - PAKISTAN WATER PARTNERSHIP



on or impacted by water and its uses in the country.

The Pakistan Water Partnership (PWP) was established in February 1999 as a country partner of GWP. PWP is a Public Limited Company registered under the Pakistan Companies Act 1984, with a large number of key stakeholders from government organisations, public and private sector, NGOs, women and youth groups, and civil society having an impact

PWP is mandated to provide a neutral platform to all water stakeholder institutions, organisations, 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, PWP maintains a close relationship with official agencies like the Planning Commission, Pakistan Water and Power Development Authority (WAPDA), Ministries of Water and Power; Environment, Agriculture. The Provincial Agriculture and Irrigation Departments, Provincial Irrigation and Drainage Authorities (PIDAs), United Nations agencies and NGOs in the water sector are also collaborating with PWP for sensitising on judicious use of water resources to gain maximum benefit through the IWRM.

Board of Directors headed by a Chairman governs PWP. Mr Ragib Abbas Shah 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.

Contact: 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](mailto:pwp@pwp.org.pk)

### 1. Compilation of Quetta report

Dr Pervaiz Amir compiled the Quetta report that documents the fieldwork and related activities conducted in Baluchistan from 5 to 13 December 2015. The team visited water stress sites which close to Quetta, engaged with national media to highlight the existing and emerging water crisis and launched Quetta and Karan Water Partnerships. The preliminary feasibility study was also conducted during the visit to Kharan and Nushki desert Areas.



Field visits by PWP

## 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 IWRM. SLWP took the initiative in developing Water Vision 2025 for Sri Lanka in the year 2000 and a Programme for Action (PFA) to translate the vision to action. It sets 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 harmonising approaches and integrating issues.

Ms Badra Kamaladasa, former Director General, Department of Irrigation was the Chair of SLWP during 2016 and eminent researchers, academics and water resources specialists serve on its Steering and Programme Committees. Mr Jayatissa Bandaragoda currently chairs SLWP since the starting of 2017.

Four activities were carried out under WACREP in 2016, mentioned below:

- 1) Activity 5A (SLWP): Technology Options for CCA Including Conservation Activities
- 2) Activity (7A): Drinking Water CBO Programmes,
- 3) Activity (7B): Schools IWRM/ Water Messenger Programme-CCA area
- 4) Activity (7C): Community Based Knowledge Products

Contact: 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](mailto:slwp@cgiar.org)

## Activity 5A (SLWP): Technology Options for CCA Including Conservation Activities – Continued from 2015

**Output/Outcome:** Developed Training of Trainers (TOT) materials, trained staff in District/Provincial levels on CCA and sensitised Farmer Organisation (FO) leaders 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 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 various training programmes and workshops.

### **Programme 1: Agronomic practices in other food crops cultivation to cope with Climate Change**

In continuation to SLWP irrigation sector programme, a workshop on 'Agronomic practices for other food crops cultivation to cope with climate change' was held on 24 March for the staff of Department of Irrigation (Dol) of the Monaragala District at the In-Service Training Institute of Department of Agriculture, Angunakolapellessa. Altogether 35 (27 male and eight female) attended the workshop including engineers, development officers and field assistants of the Dol. The programme was organised in line with World Water Day (WWD) with the collaboration of CapNet Lanka.

The programme consisted of two specialist presentations on 'Climate change impacts on farming and rural livelihoods' and on 'Cropping options/ practices for dry zone agriculture to cope with climate change'. Later participants visited the School of Agriculture, Angunakolapellessa where they were introduced to the extensive rainwater harvesting techniques being practiced for perennial and annual crops and drip irrigation systems operating on solar power. Further, a visit to the Mahaweli Authority - Uda Walawe Project was conducted to observe the newly installed "On Demand Irrigation System", which is one of five such systems currently operating in Uda Walawe.





Field visit – On demand Irrigation  
Participants at the session

### **Programme 2: CCA for Irrigation Sector staff in Puttalam**

In continuation of CCA trainings for staff of the irrigation sector, farmers, the Project Management Committee (PMC), members of the two major irrigation projects at Inginimitiya and Tabbowa in Puttalam district participated the programme organised with collaboration of Irrigation Management Division (IMD) of the Ministry of Irrigation. The programme was held on 4 March 2016 at the District Secretariat, Puttalam. The District Secretary, Puttalam attended programme as the Chief Guest while 56 participants representing two PMCs of DoI, IMD, Agriculture, Agrarian Services and the Coconut Cultivation Board attended the programme. A Consultant - Irrigation Agronomist, Deputy Director Department of Agriculture and Senior Lecturer from the University of Rajarata gave presentations at the programme.

### **Programme 3: Workshop on ‘Agronomic practices in paddy cultivation to cope with climate change’**

The programme was convened for technical officers of the DoI and Department of Agrarian Development (DAD) working with farmers in medium and minor irrigation systems at the Rice Research and Development Institute (RRDI) at Bathalagoda on 9 May 2016. In total 40 participants, including 32 officers of the DoI from North Western Province (NWP) and North Central Province with four Engineers from the Head Office, DoI along with another eight officers including a District Engineer of DAD, Kurunegala and Puttalama Districts attended the workshop.



Workshop on 'Agronomic Practices in Paddy Cultivation to cope with Climate Change'

**Programme 4: Awareness raising programme on CCA for Farmer Leaders of Medium and Minor Irrigation Schemes in Kurunegala District**

SLWP initiated CCA programmes for agency staff and farmer leaders of major and some medium schemes under the DoI since 2013. An event was organised on 24 May 2016 at the Wayamba Training Institute, Wariapola where farmer leaders of minor irrigation systems under the DAD were included for the first time. The Director of Irrigation, Consultant Irrigation Agronomist, Senior Lecturer of Rajarata University and Deputy Director of Agriculture attended the programme as resource persons.

Minor schemes are significantly vulnerable to climate change impacts and SLWP shifted its focus on 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 DoI and DAD that were held at the Bathalagoda RRD I on 31 August 2015 and 9 May 2016.

The interest and demand was so intense that SLWP agreed to hold a follow up programme for FO leaders in other systems of NWP within the year 2016. SLWP knowledge products including a booklet on CCA for farmers and a recent publication on paddy cultivation under Climate Change conditions developed in collaboration with the Bathalagoda RRD I was distributed among the FO Leaders.



Awareness raising programme on Climate Change Adaptation in Kurunegala District

**Programme 5: CCA programme for Agency Staff/FO Leaders/Farmers in irrigated agriculture - for Field Staff in Ratnapura District.**

The first programme in the wet zone on CCA for staff in the agriculture sector in Ratnapura was held at the Samudu Cooperative Hotel on 28 July 2016. Altogether 39 participants from the DoI, Agrarian Development and Agriculture participated the programme. Issues related to specific agro-ecological zones of Ratnapura and special agronomic practices of the wet zone were discussed at the programme. Presentations were conducted by the University of Sabaragamuwa and the Director of Department of Meteorology.

Towards the end of the programme an evaluation was carried out which indicated over 84 percent of the participants ranked the programme as important. Another important factor was more than 80 percent of participants were women.

**Programme 6: Awareness raising on CCA for Field Staff in Kalutara District**

CCA programme for staff in the agriculture sector was held in Ratnapura, at the Cooperative Training Centre, Kalutara-North on 5 August 2016. This was the second programme held in the wet zone. Around 38 participants from the DoI, Agrarian Development and Agriculture participated the programme. Issues related to specific agro-ecological zones of Kalutara and agronomic practices conducted specifically in the wet zone were discussed in this programme. There were four presentations conducted by the Director of Department of Meteorology and the

University of Sabaragamuwa. More than 84 percent of the participants (out of which 65 percent were women) ranked the programme as important.

### **Programme 7: New Technology Options Programme (Demonstration Projects) – Mahalluppallama**

A follow up programme to the programme held in RRDI in Bathalagoda for staff of DoI and Department of Agriculture (DA) was held on 2 September at Field Crop Research and Development Institute (FCRDI) Mahalluppallama. Altogether 41 participants from North Central Province and North Western Province attended the programme, which focused on technical options and practices for Other Field Crop (OFC) cultivation to cope with climate change.

#### **Lessons learned:**

The reality of climate change and its impacts are fully realised by all sections of the community. Awareness outreach on CCA for the water sector conducted at ground level was identified as a major need for agency staff, farmer leaders, farmers and CBO since 2013 and has resulted in well-informed agency staff and local populace including schoolchildren. SLWP moved on from awareness on climate change to capacity building and use of demonstration projects in 2015 and 2016, especially in the irrigated agriculture sector to help strengthen both agency staff knowledge on technical options for CCA and improve farmer resilience to cope with Climate Change.

The dearth of knowledge products in national languages was a major obstacle and SLWP working with the three major crop research and development institutes in developing joint technical material is in high demand by agency staff and farmers. SLWP has now developed such material in Tamil and will be embarking on similar programmes in the North and East shortly. Need for intervention in the non-irrigated plantation sector has been requested and SLWP is now active in both coconut, tea and export agriculture sectors.

#### **Activity (7A): Drinking Water CBO Programmes**

**Output/Outcome** An attempt to raise awareness on drinking water and climate change was made with collaboration of community-based organisations in Sri Lanka. This led to the rural drinking water CBO community becoming aware of the impacts of CCA 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(s) does this result relate to?**

Generate and communicate knowledge

## Description of activities

### CBO awareness Programme at Katugastota

A one-day CBO awareness programme was held on 30 March at National Water Supply and Drainage Board (NWSDB) Auditorium, Gohadoda, Kandy with the collaboration of SLWP, NWSDB and the National Community Water Trust. Office bearers of CBOs, officials of NWSDB and resource persons from the Department of Health, Central Province participated the programme with total participation of 80 (including 70 CBO representatives).

At the inaugural session Mr T. D. L. S. Jayasena, Senior Engineer-Rural Water Supply explained the significance of conducting a workshop on CCA and recalled disasters related to climate change that the area has been experiencing. He emphasised the merits of being proactive in identifying suitable adaptation methods. The region is currently experiencing negative impacts of CC; therefore, unless action is taken CC impacts will also be felt in the lower riparian areas. By appreciating the support given by WACREP programme he mentioned, the particular programme is being funded by WACREP due to lack of community mobilisation programmes for CBOs. This programme facilitates in strengthening the awareness on CCA among CBOs.

Presentations and discussions at the workshop were centered on impacts of climate change on rural livelihoods, water quality, catchment and source area conservation, impact of agro-chemicals and institutional issues related to conservation of catchments.

### Lessons learned:

There is a knowledge gap and the awareness raising programmes gave a good opportunity for the focused group (rural drinking water community) to discuss health issues related to CC and practical issues when adapting to CC.

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

#### Output/Outcome:

Students are key stakeholders in the future of a country and engaging them in meaningful and educational activities is essential to prepare for CCA. SLWP focused on generating awareness amongst schoolchildren about IWRM through programmes on CC and water in different schools in Sri Lanka.

#### Governance process influenced/governance outcome in place

This was a good awareness programme, which influenced the young generation to pay more attention to the environment and get a sense of responsibility towards the planet.

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

Generate and communicate knowledge.

#### Description of change

### **1. Sisu Jala Hamuwa Programme at Bingiriya**

A school water programme on CCA was held on 30 June 2016 at Vijaya Central College, Weerapokuna, Bingiriya. This activity was organised by Mr Laksitha Sudasinghe, Secretary of Deduru Oya Area Water Partnership (AWP) with the Environment Coordinator, Bingiriya Educational Zone. Nearly 160 students attended the programme. Mr Sarath Premalal from Department of Meteorology and Ms Geethanie Ahangama, Hector Kobbakaduwa Agrarian Research Institute (HARTI) conducted sessions on CC and climate related impacts on agriculture. Ms Kusum Athukorala, Regional Council Member SLWP conducted a session based on the newly developed SLWP video on climate change. She further led a focus group discussion on CC and future involvement of youth in agriculture.

Mr Sudasinghe organised an essay competition on the day based on the materials presented in the programme. The best three essays were awarded cash prizes of LKR 3000, 2000 and 1000 for 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> places from SLWP. These three essays were uploaded on the SLWP website.

### **2. School Programme on Climate Change at Walala Ratnayake Central College**

An awareness programme about CC was held at the Walala Ratnayake Central College on 26 September. The Principal welcomed the guests and the participants and Mr Niyangoda, Regional Council Member of SLWP described the roll of SLWP in water security and in raising awareness among the school children on CC. A senior sociologist from the NWSDB and an epidemiologist from the health department described various aspects of water, sanitation, water borne diseases, school sanitation and other health tips. 175 students and three teachers participated the programme.

### **3. School Awareness Programme – Gonadika Maha Vidyalaya**

An awareness-raising programme on CC was held at Gonadika Sinhala and Tamil Maha Vidyalaya at Bambaragaha in the Denuwara Education Zone, Central Province with the collaboration of Lions Club-Pilimatalawa, Network of Women Water Professionals (NetWwater) and NWSDB. These stakeholders attended the programme and explained the importance of sensitising communities on CCA.

Gonadika Maha Vidyalaya was experiencing lack of proper water supply and clean toilets. Additionally parents were unable to support the improvement of the school conditions due to high poverty levels of the community.

An art competition was held and students were asked to express their views based on the presentations through drawing. Further, with the assistance of the Zonal Education Office and Career Guidance Office of Denuwara Educational Zone, a campaign targeting students on conserving water resources and CCA was organised with the participation of 260 students.



Students at the art competition  
Ms. Kusum with the schoolchildren

#### **4. Balana Sisu Jala Hamuwa Programme on Climate Change**

Balana is in water short central mountain range where the NWSDB is unable to provide piped water due to steep terrain. The only available water sources are dug wells and springs, which are being depleted due to rampant deforestation. Consequently, Rain Water Harvesting (RWH) is the only alternative water source in the village Dekinda -Motana that has only a few RWH tanks.

NetWwater and Lions Club - Pilimatalawe have been working in the village on RWH and have identified Ozo Kandy Hotels as a potential partner, who would raise funds to build a RWH tank for Balana Kanishta Vidyalaya (Balana Junior School). The Balana Junior School does not have drinking water facilities and water for toilets is being secured from a well that runs dry in the dry season. In this period, water for sanitation purposes is taken from the neighboring houses.

A *Sisu Jala Hamuwa* on CC and Water Security was held on 6 September 2016 at Balana Junior School. An introduction to ongoing school water security programme in Denuwara Educational Zone was given by Mr L. Jayawickerema, a representative of Provincial Education Ministry of the Central Province. Ms Kusum Athukorala, Regional Council Member, SLWP discussed the need of practicing IWRM at community level in order to meet the challenges of CC. She said that mini-catchments bordering springs and wells should be conserved to improve groundwater recharge. school communities can work together with parents to improve community water security. Ms Nayana Samarakoon, NWSDB presented on enhancing water security through RWH in a changing climate. A representative from MOH Yatinuwara made a speech on health and water issues in Balana. He listed out the health problems in the area. He further said that he noted there were several malnourished children in this school.

The younger students who attended the programme were given drawing materials to draw the usage of water in their community. A large number of parents and past pupils attended the meeting indicating the sustainability of the project. Four resource persons and 65 students participated the seminar. Parents agreed to check the status of the wells and springs in the area as none of the wells had been tested for water quality.

## 5. School Programme at Katugastota Maha Vidyalaya

An awareness programme on CC was held at Katugastota Maha Vidyalaya on 10 October 2016. The participants were welcomed by the Principal while Mr Niyangoda, Regional Council Member, SLWP described the role of SLWP in water security and raising awareness on climate change among schoolchildren. He also mentioned the importance of schoolchildren knowing about CC and school sanitation as future citizens and decision makers of the country. A senior sociologist from the NWSDB and an epidemiologist from the Department of Health spoke about water, sanitation, water borne diseases, school sanitation and other health tips. Nearly 100 students and five teachers participated in the programme.

### Lessons learned:

Timely interventions in underserved sections of society have far-fetched long-term impacts. By focusing on sanitation at the ground level and educating students about these issues, SLWP can enable change in their communities by targeting the students as catalysts of the movement.

### Activity (7C): Community Based Knowledge Products

**Media activities, Posters, Flyers, Road Shows, Street Drama for youth/school or media events/tours**

### Output/Outcome:

SLWP created and disseminated community-based knowledge products developed under WACREP on CC and CCA to farmers, officers and other stakeholders in the irrigated agriculture sector. Knowledge products included guidelines on paddy cultivation, videos about WACREP activities and other publications dealing with climate change related issues that impact irrigated agriculture, especially paddy and other field crops.

SLWP is planning to move from awareness raising and advocacy to technical support for CCA in the future.

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

Generate and communicate knowledge.

### Description of change

#### I. Publications

- A publication on 'Successful paddy cultivation in the context of climate change' in Sinhala was prepared and printed under the guidance of Batalagoda RRDI. This will be used for training of the agency staff.
- A technical booklet on 'New technology options for other field crop cultivation under climate change' was developed with the technical assistance of the Field Crop Research



and Development Institute of Mahailuppallama. This was the second such technical publication for field staff/FO leaders.

- A booklet on 'Rain water harvesting for agriculture' was developed with the collaboration of Field Crop Research and Development Institute, Angunakolapelessa.

## II. Community Based Knowledge Products

- As part of Phase II, an activity called 'Communicating Climate Change' was initiated with one of SLWP partners - HARTI. A meeting was held with the Director General and the communication team of HARTI on 21 September 2016 to identify possibilities of using the film in the *National Govi Sathiya* (Farmer's Week) as a training tool in Agrarian Services Centers, which will be carried out by HARTI at the request of the Minister of Agriculture. Through this programme, a large number of training sessions will be conducted simultaneously covering almost all the farmer organisations in the country.
- The session of RRDI was focused on paddy cultivation especially on farm water management as these officials are familiar with system management. This includes 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.
- SLWP developed a video documentary on climate change named 'Thinking of water before the well runs dry?' was distributed through agency partners and among the communities. The objective was to highlight water issues, promote IWRM at a multi-stakeholder platform and support awareness raising among SLWP partners on CC using the video as a tool. The first planning meeting was held at International Water Management Institute (IWMI) on 6 May 2016. The initial exploration of the substance, format and communicative strategies were discussed on the day. Though the focus of the video is on irrigated agriculture, other sector specialists - agriculture, forestry and media were also invited for the initial discussions to maintain SLWP's IWRM principles. Based on these inputs the final meeting was held at HARTI in June 2016. Further discussions were held with the Director General, HARTI and the Communications Team on 7 October 2016 to explore the possibilities of using the film in the trainings conducted during the National Farmers' Week by HARTI where farmers representing all the Agrarian Services Centers participated. Ultimately, HARTI agreed to use the video during these special farmer-training sessions.

### Lessons learned:

Creating knowledge materials in local languages is beneficial to local communities as an educational tool and feedback to the content and style of publications has been increasingly positive. Further, videos and films bypass the communication barrier and are able to reach out to a larger audience, and something SLWP will continue to invest resources in in the future.

This report contains WACREP activities conducted by the GWP SAS Network, which comprises of the GWP SAS Regional Office and the Country Water Partnerships of Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka.