

**ABSTRACT VOLUME**

World Water Week  
in Stockholm

23-28 August, 2015

Water for Development

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Water for Development

Workshop 3:  
Managing change  
- strengthening resilience to climate and  
disaster risks

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## Workshop: Managing change – strengthening resilience to climate and disaster risks

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## Resilience to Climate and Disaster Risk: Bangladesh Context



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Keywords: resilience, adaptation, climate change, disaster risk, Bangladesh

### Introduction and objectives

Bangladesh with its geophysical position, very dense population, limited resources and dependence on nature, is one of the most disaster prone countries that are facing added challenges due to climate change. But with the vision of a nation ensuring safe lives and livelihood of its people, with past several decades of experience from disasters, the country is now able to shift from a culture of relief and response to more comprehensive disaster risk reduction. This paper is aimed to present case studies that will help to develop measures for strengthening resilience to climate and disaster risks for sustainable development.

### Methodology approach

Collections of relevant information for assessing the past experience of different disaster management approaches and also present practices, which were applied during and after disasters. The preferred options would assist the entire community to engage in comprehensive interventions that will not only ensure the protection of the settlement but also provide self-sustaining livelihood and service delivery options for its population. These include identification and validation of number of selected climate change adaptation options through field demonstration. The identification and validation processes involved series of workshops. Transforming this scientific information both to communities and the policy makers through social mobilization programs.

### Analysis, results, conclusions and recommendation

Bangladesh experiences the impacts of climate change through irregular rainfall pattern, water logging, floods, cyclone, saline intrusion, drought, sea level rise and tidal surge. The poor communities in the disaster prone areas of Bangladesh are the most vulnerable to the impacts of climate.

Perpetuating the spirit and vision for disaster risk reduction and climate change adaptation, Bangladesh has adopted a holistic process to integrate disaster and climate risks into development planning and processes. Many aspects of climate change and variability are already having a profound effect on the livelihoods of poor rural communities and enough is known about the future impacts of climate change for action to be taken. But the challenges for disaster risk reduction and climate change adaptation also remain alarming and also are increasing in intensity and complexity - some are persistent and recurring and the others are emerging. Overcoming these challenges will require scaling up our efforts through cooperation and collaboration among nations and communities – exchanging knowledge, information and technology for a common vision of a resilient future.

The field testing results from the comprehensive disaster management programs in Bainpara and Gazipara, two cyclone affected villages of Sutarkhali Union under Dacope Upazila in Khulna District reveal 60 climate change adaptation options out of 90 options that were identified and validated in the programs. Success and lessons from these pilot interventions will help build communities in south western part of Bangladesh that can with stand reoccurring disasters, fight back climate change impacts and achieve sustainable growth.

This study presents case studies that engage technology, physical and social infrastructure, local knowledge and social capital to complement the available resources to promote resilience through better living. These mostly include structural safety, adaptive interventions, social protection, sustainable development, early warning, natural resource management for sustainability, community – managed system.

## Building Climate Resilience: Adaptive responses to urban flooding across scales



Author: Dr. Marcus Moench, ISET-International, United States

Keywords: Resilience, Climate, Flood, Urban, Vulnerability

### Introduction and objectives

Many factors that influence vulnerability and resilience to flooding and climate change in urban areas emerge as a consequence of interactions that cross scales from the regional to the urban neighborhood and household. While, development actors focus on flood management possibilities at relatively large scales, responses within households, businesses and neighborhoods are widespread. These emergent responses influence and are influenced by actions at higher scales. This presentation provides evidence on the role of such responses and their relationship to higher-level interventions in responding to floods and protecting assets of vulnerable populations as urbanization and climate change proceed.

### Methodology approach

The presentation will draw on an extensive suite of studies of flood related disaster resilience conducted by ISET-International and our partners across urban areas in South and South East Asia and in the U.S. under programs supported by the Rockefeller Foundation, DFID, CDKN, the Red Cross and other organizations. These studies all utilized a common resilience/systems framework to guide data collection and analysis. As a result they provide a unified narrative for interpreting the factors and cross-scale linkages that contribute to climate and disaster resilience in different contexts.

### Analysis, results, conclusions and recommendation

Using an engaging and interactive multi-media-based approach, the presentation will share and interpret evidence on adaptive responses to floods occurring at the household and neighborhood level and their relationship to the higher-level factors that enable or constrain such behavior and the contribution it makes to resilience. Tangible examples involving shelter design, community-based drainage, the role of informal networks, early warning, urban disaster planning and other initiatives will be used to illustrate more general principles. These will document specific adaptive responses and their relationship to programs, institutions and policies at municipal and national levels. It will also explore how the benefits from adaptive responses are distributed across society with particular attention to poor and vulnerable groups.

Key conclusions include: (1) the central role of diverse behavioral responses at the household, business and neighborhood level in building resilience and supporting adaptation to climate change and flooding in urban areas; and (2) the importance of recognizing, enabling, and guiding such responses in higher level strategies and implementation activities. The presentation will also present key concluding insights on the degree to which flood and larger patterns of climate resilience are context-dependent and benefit the most vulnerable populations. Overall, the presentation will argue that far more attention needs to be devoted to the drivers of behavior, the diversity and context-dependence of responses, and the nature of relationships at very local levels along with their interactions with water, disaster risk and development interventions at higher urban or regional scales in order to meet the needs of poor and vulnerable populations. Processes that support sustained engagement and shared learning are essential for this to occur.

## Flood and drought risk: Differences, similarities and strategic management



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Keywords: drought, flood, ecosystem, risk, strategic

### Introduction and objectives

Floods and droughts are of increasing global concern. The inadequacy of current practice (as observed through the continued impacts of floods and droughts) underpins the consensus that both flood and drought management approaches must improve and that a transformational change in approach is required; away from a reactive, episodic, process based on emergency response towards a proactive, continuous, process of risk management.

This paper draws upon an international review of the common challenges floods and droughts pose and presents the shared principles and concepts needed to transition towards a more strategic management approach that is both risk and ecosystem based.

### Methodology approach

The findings presented here are based upon a research collaboration between WWF and GIWP (General Institute of Water and Hydropower, People's Republic of China) to develop a new strategic approach to flood and drought risk management. This highly productive collaboration has included (i) a review of international practice (from Australia, North Africa, Europe, North America and Latin America), (ii) analysis of lessons from historical floods and droughts, and (iii) face-to-face expert working sessions involving leading specialists in China and international experts from Australia, South Africa, US and Europe.

### Analysis, results, conclusions and recommendation

The analysis presented in this paper confirms that there is a significant opportunity to manage floods and droughts more strategically to deliver better social, economic and ecological outcomes. This does not imply the need for a single comprehensive and integrated approach but context-specific approaches based on a common strategic framework that deliver resilience (not simply resistance).

In particular this paper will outline a strategic framework which defines:

- (i) The purpose of modern drought and flood risk management; and
- (ii) Characteristics that underpin a strategic flood and drought risk management approach including (a) Understanding the whole system behaviour (including the relationships between human and ecosystems); (b) Using knowledge of risk and uncertainty to inform decisions; (c) Implementing a portfolio of measures and instruments (including capitalising on the benefits that good ecosystem management can bring to reducing flood and drought risks); (d) Embedding flexibility to enable evidence based adaptation.

The paper will expand upon how this framework supports building long term resilience through three inter-related phases: (a) Preparedness phase, that takes a long term view and taking actions to reduce the risks associated with future floods and droughts; (b) Response phase, where the focus becomes increasingly

centred on actions to minimise impacts; (c) Recovery phase, where the focus moves to promoting rapid recovery of the human and freshwater systems.

### Conclusions:

Through synthesising lessons and best practice from past drought experiences it is clear that significant opportunity exists to manage floods and droughts better. The paper will conclude with a series of golden rules that have been identified to guide the transition from traditional approaches to a more strategic risk based management.

## Lake Cyohoha catchment: Enhancing climate resilience of communities and ecosystems



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Co-Authors: Mr. Gerald Kairu, Uganda

Keywords: Climate resilience, trans-boundary, water security, stakeholders' participation

### Introduction and objectives

Lake Cyohoha transboundary catchment, located in the Bugesera region between Burundi and Rwanda, falls within the Kagera sub-basin of the Lake Victoria basin, which is part of the Nile Basin. Food insecurity is the major problem in the catchment, mainly due to: small sized farming plots, poor agricultural practices, population pressure and land degradation. Access to basic services is very low. Moreover, climate change trends pose a growing threat (floods, droughts) in the catchment. The main objective of the paper is to share experience from demonstrating local actions that will enhance climate resilience of communities and ecosystems.

### Methodology approach

In Lake Cyohoha catchment, communities were supported through demonstrating some climate change adaptation actions. A catchment/ecosystem approach is being used to promote integrated management of water and related resources in a transboundary catchment setting. Strengthening partnerships and developing capacities of stakeholders for water security and climate resilience are also included. The overall approach has been a participatory and community-owned process using water partnerships as platforms for participation at different levels. The Burundi and Rwanda country water partnerships (CWPs) are providing important platforms to facilitate coordination and dialogue among various stakeholders, and among different programs/initiatives.

### Analysis, results, conclusions and recommendation

The most suitable options for water security and building climate resilience were evaluated in a multi-stakeholders participatory approach. Actual implementation of appropriate measures for climate change adaptation and for water security is at an advanced level.

Main results so far include:

- Awareness raising about sustainable water resources management and climate change adaptation
- Participatory catchment-wide assessments
- Identification of priority interventions to enhance water security and climate resilience
- Catchment Plan preparation for integrated water resources management and climate change adaptation
- Catchment management structures (and broader stakeholder platforms)
- Support to communities in taking local adaptation actions comprising:
  1. demarcated and managed the buffer zone along the lake shorelines (60 ha), planting conservation and fruit trees (60ha),
  2. demonstrated biogas facilities as energy sources (12 units),
  3. extended water supply systems (for about 3000 people)

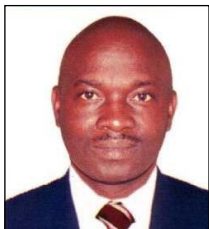
4. introducing improved cooking stoves (1000 households), rain water harvesting (12 households), and rehabilitated upper catchment areas (on-going).
5. strengthened partnerships between local government, local implementing actors and communities

The lessons being learnt from such interventions will be used to influence policies and practices in Burundi, Rwanda and the entire eastern Africa sub-region. Moreover, as Lake Cyohoha catchment is transboundary, the experiences from its management will inform management of bigger transboundary basins.

The following are recommended based on the lessons from the project:

- Water resources are shared resources within a hydrological boundary. Use catchment/basin as a unit of management/cooperation
- Communities need water for various uses. Demands are integrated and thus approaches
- Early participation and ownership by all stakeholders is useful for sustainability
- Community catchment management structures enhances empowerment and ownership
- Linking policies with practice useful in promoting water security and climate resilience

## Enhancing Drought Resilience in the Horn of Africa



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Keywords: Drought, Innovation, Partnership, Policy, Resilience

### Introduction and objectives

The Horn of Africa region comprising of Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda is prone to recurrent droughts making it one of the most vulnerable regions on the African continent to climate variability and change. Droughts affect nations with dramatic impacts on socio-economic and environmental stability. The Integrated Drought Management Program in the Horn of Africa (IDMP HOA) focus is to increase drought resilience. The objectives are:

- Influence policies and programs towards sustainable drought management
- Develop and support innovative demonstrations that address water security challenges
- Develop knowledge and build capacity for enhancing drought management
- Enhance partnership and collaboration in drought management

### Methodology approach

- Using participatory approaches to identify policy gaps, support and influence action of policy, plans and strategies at country and regional levels
- Demonstrating and document successful innovative initiatives that address water security and enhance stakeholders in uptake and up scaling drought related solutions
- Knowledge development and capacitating institutions and local actors in water security and drought resilience as well as documenting and sharing lessons and best practices
- Support partnership and collaboration at regional, national and community levels for sustainable water management in dry lands

### Analysis, results, conclusions and recommendation

The HOA region is highly vulnerable to drought. This is due to its dependence on primary production, unsustainable natural resource use, weak institutional capacity, limited and poor infrastructure, inadequate equipment for disaster management, limited financial resources and heavy reliance on rain-fed agriculture. Agriculture, Water, Energy and Biodiversity/ wildlife/Forestry/ tourism are the most vulnerable sectors.

Most countries in the HOA region have given priority to reducing vulnerabilities to drought, responding to drought incidences. They have developed policies, strategies, plans related to drought and putting in place institutions for drought management. Past actions by governments to respond to drought were focused mainly on relief and rehabilitation.

With regard to institutional mechanisms on drought management, all HOA countries have a responsible government institution to lead and coordinate the implementation of disaster risk management. However, the form and structure of coordination arrangements varies from country to country. Kenya has a dedicated National Drought Management Authority. South Sudan has a Ministry for Humanitarian Affairs and Disaster Management. While, Ethiopia has established Disaster Risk Management and Food Security Sector being led by a State Minister under the Ministry of Agriculture. Uganda and Somalia have higher levels of coordination being coordinated from the Offices of the Prime Ministers. In conclusion, the status of national frameworks for drought risk management in the HOA countries clearly showed that countries are at different stages in terms of establishing national frameworks for managing drought resilience. However, with regard to capacity for implementation and other soft components, the HOA countries share similar priority areas of intervention.

It's recommended that all countries in the HOA region engage in key priority areas to building drought resilience such as capacity & partnerships building, early warning systems, mainstreaming drought resilience in government plans and regional cooperation for drought management.



## Enhancing Community Resilience to Climate Change: Models, Approach and Practices.



Author: Mr. Md. Rafiqul Haque, Shushilan, Bangladesh

Keywords: Risk & Vulnerabilities, Community participation, Integration of indigenous & scientific knowledge, Adaptation models, Resilience

### Introduction and objectives

Coastal areas of Bay of Bengal are highly prone to disasters, which are mainly induced by the phenomenon of climate change impact in the region. Most of the studies show an increasing trend in temperature and rainfall variable and increase in the frequency & intensity of disasters. The issues has been also subjected due to heavy dependence on natural resources which are regularly dwindled and degraded by the impacts of both disasters & climate change as the major factors contributing to vulnerabilities of people living in poverty traps. This paper's objective is to present best practices and share learning.

### Methodology approach

This documentation has been done reviewing secondary information regarding the bio-physical and socio-economic context of coastal areas, collecting local knowledge found to practices by coastal communities as local level adaptation. Besides, more emphasis was given to keep out detail data on inputs and outputs from different pilot options, taking beneficiary and community perceptions, learning's, recommendation to make these more resilient, acceptable and profitable for the community. So, both qualitative data on inputs and outputs and qualitative data on learning and perceptions have been analyzed to prepare the document.

### Analysis, results, conclusions and recommendation

“Paribartan” is a multi-country climate change adaptation project has been aimed to increase resilience of the coastal community in the Bay of Bengal is being implemented by Shushilan and Jagrata Juba Sangha (JJS) over four coastal districts of Bangladesh. The project is a generous support of European Union through Concern Worldwide Bangladesh. Community Risk and Vulnerability Assessment (CRVA), a participatory vulnerability assessment tools was followed by Shushilan through engagement of communities and union disaster management committee (UDMC) to analyze risk associated with different hazards. Accordingly individual community level climate change adaptation and disaster risk reductions action plan was prepared from the identified options.

Upon taking support from the scientific bodies and different sectors of the government and by the guidance of Concern Worldwide Paribartan team, Shushilan team conducted feasibility studies, prepared guidelines on different adaptive options and are being implemented in the fields. These pilot models are- composite agriculture; resilient house-rain water harvesting system-vegetable gardening; energy saving stove-fuel wood plantation-nutrition gardening; homestead and char plantation for protection etc.

Besides, some innovative approaches adopted by the project that have helped reaching the communities more easily in building capacity and preparedness works. These are mobilization of Gram Paribartan Team (GPT), 100 HHs initiatives for preparedness campaign, Women Forum at different level and Paribartan Student Forum (PSF) for youth mobilization. The outputs, impacts and effectiveness of

these innovative pilot options and approaches have been recorded, analyzed and documented following longitudinal process. This paper will present that best practices in promoting community based adaptation to combat climate change.



## The Role of Infrastructure and Governance in Adaptation



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Keywords: infrastructure, storage, governance, climate, resilience

### Introduction and objectives

The World Water Council has undertaken with the Government of Mexico a study to understand the effect of storage reservoirs, and the criteria by which they are managed and operated, on the resilience capacity for climate change. The initial results are meant to promote improved policy and decision making among a variety of stakeholders.

The study will analyze systematically and objectively, through a series of case studies, the roles storage and water management systems can play in the future in order to mitigate and adapt to the potential adverse impacts of climate change, as well as policy implications and governance.

### Methodology approach

Ten case studies will serve the basis for a framework analysis demonstrating the roles of storage for adaptation to climate change and variability as well as their policy implications for water management, within the framework of sustainable development.

The case studies will evoke:

- Potential impacts (both positive and negative) of climatic and non-climatic factors on a variety of reservoirs;
- Policy frameworks, management, governance structures and implementation instruments;
- Challenges faced and lessons learned on construction and operation of reservoirs;
- Adaptation and mitigation mechanisms for socio-economic and environmental challenges;
- Drivers for water resources policy, management and development.

### Analysis, results, conclusions and recommendation

The project and its framework analysis, which is currently in progress, should aim to find new ways of approaching reservoir design and operation in a variety of circumstances in order to maximize the mitigation and adaptation effects on specific social, environmental and (green) economic targets. It should also study new long-term allocation mechanisms and short-term reallocation or temporary restrictions (during droughts or for ecological crises), as well as adaptive approaches to old and new reservoir operation in the context of unprecedented changes in the intensity and variability of extreme events.

The study is global in scope, with illustrative case studies from each continent, that will encourage the formulation of recommendations in different contexts.

## Smart Solutions for Climate ready Water Utilities



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Keywords: climate change, water, utilities, water and climate, Nigeria

### Introduction and objectives

The Africa Adaptation Programme (AAP), Nigeria office; with the support of Federal Ministry of Environment, the UNDP Nigeria, and Govt. of Japan recently commissioned the Bread of Life Development Foundation to conduct an assessment study on the 'Impacts of Climate change on Water Supply and Sanitation in Nigeria'.

The study investigated the correlates between climate change, and sustainable delivery of water supply and sanitation services in Nigeria, exploring the real and potential effects of climate variability on access to safe Water supply, as well as how it affects capacity of service providers to guarantee this access.

### Methodology approach

Review of secondary data surveys, participatory meetings and field visits. Existing literature relevant to the theme of the study were consulted and reviewed. Quantitative survey- Questionnaires were administered on 39 water supply and sanitation utilities, and water users in the four focal states for this study- Lagos, Anambra, Osun and the Federal Capital Territory; as well as online to other stakeholders in Nigeria.

Participatory meetings were held with key stakeholders in four states. Qualitative surveys- Study team undertook assessment visits - A total of 20 case studies are contained in this report arising from spot observations and analysis of secondary data.

### Analysis, results, conclusions and recommendation

#### Analysis

Climate is a threat more than an opportunity as it is negatively affecting water service delivery. Nigeria WSS sector lacks the appropriate policy, legal, and institutional framework to respond to climate change impacts. Nigeria's IWRM plan is yet to be finalised.

#### Results

Eighty four per cent (84%) of the 39 agencies surveyed have observed drastic changes in stream flows, seventy eight (78%) have observed contamination of groundwater due to weather changes, ninety per cent 90% are experiencing leakages in distribution system due to infrastructural damage caused by extreme flooding. 86% of WSS utilities have experienced increase cost of raw water treatment caused by increased contamination of water bodies.

Sixty seven (67%) per cent of the WSS sector agencies surveyed have not set up a desk office on climate change; and (73%) are yet to research into climate resilient water supply and sanitation technologies and systems. A high (76%) of WSS utilities said they have never conducted in house training for

relevant staff on climate change; (61%) said their staff have never attended seminars/workshops/conferences on climate change and (74%) said they have never conducted studies/researches on climate change as it affects their agency.

#### Recommendation

Water supply agencies should undertake vulnerability studies of existing water supply and sanitation system and ensure that new systems are built to reduce vulnerability; Incorporate climate change effects into the design considerations for major infrastructure; Maintain accurate record of water flow fluctuation in intakes including streams, rivers, and dams to enable them predict climate variability; and Modify existing infrastructure and operations to cope safely with and perform in more variable and extreme conditions.

#### Conclusion

National Governments should commission a study to assess the safety of dams and water schemes, and their vulnerability to weather extremes

## Strengthening resilience through collaborative research and open information systems



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Keywords: Niger River basin, Africa, floods, droughts, climate change

### Introduction and objectives

The population of the Niger River basin largely depends on climate-sensitive livelihoods, such as rain-fed agriculture and livestock rearing. Substantial rainfall fluctuations in the Sahel have led to major disasters such as the droughts and famines of the 1970s and 1980s, and the more recent flooding events in 2008, 2009 and 2012. In this research, we explore how collaborative research using open information systems can strengthen the resilience toward such disasters in a changing climate.

### Methodology approach

We established a collaborative partnership between Swedish and West African scientists. This involved regular interaction to build mutual capacity regarding (i) dominating hydrological processes in the Niger River basin and (ii) open-source computational tools to assess disaster risks. By combining our expertise, we adapted the process representations in the HYPE model to better match the hydrology of the basin, e.g. with a routine for simulating the floodplain dynamics of the Inland Niger Delta. Subsequently, we used climate model data to assess what effect climate change may have on floods and droughts in the region, and published the results online.

### Analysis, results, conclusions and recommendation

The collaborative research enabled us to substantially improve the HYPE model, particularly along the main branch where simulated river flows better matched observations in many locations. This made the model more appropriate for analyzing floods and droughts in a changing climate.

The climate projections indicate that temperature is likely to increase steadily in the basin in the future. Precipitation is also projected to increase, but perhaps more significantly to become more severe at the extremes. Floods are expected to increase in magnitude for most parts of the basin. Agricultural drought events are projected to become more intense and of longer duration in most locations, which may impact the livelihoods of many inhabitants. Substantial uncertainties and spatio-temporal variability remain in these conclusions.

The open nature of the HYPE model and the practical training enabled scientists at technical institutions with a disaster response mandate in the region to further adapt the model, and to start exploring the utility of the tool for additional purposes such as operational flood forecasting. Furthermore, the open publication of climate change impacts on floods and droughts at <http://hypeweb.smhi.se/nigerhype/climate-change/> enabled other institutions in the region with appropriate training to use the results in their adaptation and mitigation efforts. Hence, this collaborative learning approach contributed to strengthening the resilience of the society – through its technical institutions – to present and future disaster challenges.

The encouraging results from the Niger River basin and the generality of our approach suggests that our interactive feedback-driven process of incremental improvement could be valuable for building resilience and sustainable institutions also in other parts of Africa. Realizing this potential faces both opportunities and challenges, which we will further discuss in the presentation.

## Riparian Relations Over Time on Indus



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Keywords: Cross-scale, transboundary water governance, institutional adequacy

### Introduction and objectives

In adjusting for water resources management to better address challenges posed by climate change, the dynamics of cross-scales and their influence on institutions and decisions could provide important insights for managing complex systems. The case of Indus River is examined here to provide an example of the way institutional arrangements and legal and policy frameworks for transboundary water governance are shaped as a result of cross-scale interactions. The key question asked is whether there are specific indicators that could best judge adequacy of management practices in face of climate change.

### Methodology approach

Secondary data analysis to capture an overview of the institutions created for Indus to implement two key agreements – namely the 1960 Indus Waters Treaty and 1991 Water Apportionment Accord. Analysis is provided on key challenges that directly result from climate changes in the region and impact on the Indus basin. Description of riparian relationships on Indus over time through the use of Transboundary Water Interaction Nexus (TWINS) is provided to complement the analysis.

### Analysis, results, conclusions and recommendation

The research asks following questions:

1. Are the institutions created to manage Indus River remain adequate in face of evolving conditions as a result of challenges posed by climate change?
2. What changes, if any, have taken place in the institutional framework to directly respond to climate related variations?
3. What specific indicators can be identified to assess adequacy of institutional arrangements currently in place?

Using TWINS framework, the paper presents the interactions that are influenced by cross-scales interactions in shaping the institutions and their validity over time. The overarching questions being asked is whether a dramatic shift is still needed to incorporate new realities of climate change impacts in the region and by extension to the Indus River management practices.

The paper articulates some recommendations for the policy makers, researchers, civil society advocates, and user groups to consider. The paper differentiates these recommendations by degrees of influence that various stakeholders may have at international, national and sub-national scale.

## Is the Sankh-South Koel-Subarnarekha link resilient to projected climate change?



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Prof. John Wainwright, United Kingdom, Durham University

Keywords: Inter-basin water transfer, resilience, climate change, hydrological modelling, Sankh-South Koel-Subarnarekha  
**Introduction and objectives**

Sankh-South Koel-Subarnarekha link is part of ambitious Inter-linking of Rivers (ILR) project proposed by the Central Government of India. It is an Inter-basin water transfer (IBWT) project planned by the State Government of Jharkhand, India. IBWT projects are engineering oriented and propose to transfer excess water available in water-surplus basin to water-deficit basin. Proponents claim IBWT will resolve water scarcity issues; however critics raise several concerns regarding environmental impacts and practicality of these projects. Feasibility studies are being carried out by the National Water Development Agency and some early results are available on its website.

### Methodology approach

These studies are questioned by scholars on the basis of lacking transparency in the data, methodology and techniques used (Prabhu 2008). In particular the NWDA studies have overlooked resilience of IBWT projects to projected climate change in the region (Bharati et al. 2011). Gupta & Zaag (2008) advocated for independent research on IBWT projects by highlighting the ‘engineering, science and politics interlock’ (p.31). The present study is part of such independent research (an on-going PhD) and makes an effort to determine if the Sankh-South Koel-Subarnarekha link is resilient to projected climate change under a range of emission scenarios.

### Analysis, results, conclusions and recommendation

The research study area covers two basins of Sankh-South Koel-Subarnarekha link, the Brahmani basin (donor) and the Subarnarekha basin (receiver) in Jharkhand, India. The study makes effort to use publically available datasets and models (either free or with minimal cost). The analysis is based on rainfall, temperature and catchment data. The research examines, catchment hydrology at a range of scales using historical information and models water availability for the two basins without and with the proposed Sankh-South Koel-Subarnarekha link. This modelling work produces two base-lines- Catchments with and without IBWT link. The results facilitate the analysis and comparison of consumptive and non-consumptive water use in the basins under present climate conditions. It enables the analysis of the impact of IBWT link on catchments. Then model incorporates regional climate model (RCM) outputs to predict the performance of the Sankh-South Koel-Subarnarekha link on the water users within the catchments.

The percentage change in baseline scenarios both with and without the link in place is useful to assess the resilience of the proposed link. The research enables guidelines and recommendations for the Sankh-South Koel-Subarnarekha link to be developed. These guidelines and recommendations could also be considered for other such proposed IBWT schemes in similar regions. As the link is in planning stage, these recommendations could be accommodated to enable sustainable development rather than damaging water resources in the region.

## Global umbrella for local rains: Assessing Hyogo Framework implementation, Brazil



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Mr. Javier Miranda Arana, Mexico

Keywords: Disaster Risk Reduction, policy implementation, post-Hyogo Framework for Action, vulnerability, interdisciplinary research

### Introduction and objectives

Two significant agreements targeting international development and disaster risk reduction (DRR) – the Millennium Development Goals (MDGs) and Hyogo Framework for Action (HFA) – are due to end in 2015. Thus, the debate on “next steps forward” has been on the rise to jointly address different development goals. This research assessed to what extent was the implementation of HFA in Brazil successful. The case study in Rio de Janeiro showed that disaster infrastructure reconstruction projects, policy changes, information, network and investments were success indicators. This study contributes to the debate through identifying potential challenges to implement HFA in Brazil.

### Methodology approach

The information to assess implementation was obtained through a literature review of documents from the UN/ISDR, the Brazilian government and private institutions. In particular, the national progress report on the implementation of the Hyogo Framework provided important information. To compare and validate the information from the documents revised, semi-structured interviews were held with the main authorities working on the DRR sector of Rio de Janeiro: Inea, DRM, CPRM, SEDEC and CE-MADEN. A matrix was developed to compare all indicators of every priority of action of the HFA with actions observed in the case study.

### Analysis, results, conclusions and recommendation

This case study identified gaps in the implementation of the HFA; a point of concern for the present post-HFA debate. This study highlighted the importance of local level implementation and capacity building to both Brazil’s decision makers and the international community (e.g. UN/ISDR).

Brazil has been remarkable in establishing the legal environment, setting designated institutions for DRR actions, and bringing DRR at the national agenda. However, in the case of Rio de Janeiro, there weren’t enough financial resources, communications networks, and long-term goals for DRR to be rooted at the local community level. The current HFAPA fell short on guiding local governments to set appropriate administrative actions for DRR. These issues could have negative impacts on the livelihoods of vulnerable sectors of the population. Gaps were found in technological capacity and resources’ use issues across all HFA actions. More gaps were identified on implementation at the local level than at the state level regarding communication and education.

Policy design was found to be the fastest and least expensive step forward within the national policy process of DRR. The time investment and financial costs deemed to hold back the transition into policy implementation at the state and local levels. Strengthening disaster preparedness at all levels, and reducing underlying

factors (fourth and fifth HFApa), were harder to realize since it is difficult to reach local levels in Brazil. In addition to understanding of barriers and enablers of implementation, more research is needed to assess outcomes brought by the implementation of the global initiative such as the HFA. This will efficiently and effectively focus efforts to avoid vulnerable situations for both society and ecosystem. Further, it will offer some solutions to achieve a long-term vision of DRR from policy makers; thus securing a sustainable development that accounts for DRR.

## Disaster Resilient Water & Food Solutions by Bangladeshi Poor Communities



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### Introduction and objectives

Effects of climate change badly affect the drinking water sources and foods that lead in severe water and food crisis. Children and women become the main victims of adverse impacts of climate change. Numbers of poor people migrate to urban areas for livelihood purposes leaving their native lands. Despite millions of people still live in climate vulnerable disaster prone coastal zones, semi-arid and flood prone areas adapting themselves with the changing situations. This paper clearly describes how these people have overcome emerging problems; manage the changing situations and effects of changes in their social, economic, environment and health aspects.

### Methodology approach

SPACE, a local NGO conducted participatory situational analysis, organized people, strengthened their capacities and facilitated in developing disaster resilient mechanism based on emerging needs and changing situations. SPACE facilitated in community mobilization and imparting orientation and training to leading people, installing disaster resilient low-cost rainwater collection system, dry toilets, vermin-compost, water saving washing units and groundwater recharger at household level followed by Community Approach. SPACE ensured expected use, maintenance and management of the facilities through community-based monitoring mechanism, undertaking immediate and corrective measures on identified gaps involving community leaders, owners and children in monitoring process and documenting the findings.

### Analysis, results, conclusions, and recommendation

Bangladesh is a disaster prone country due to its vulnerable geographic location. Adverse impacts of climate change badly expose its safe water and sanitation situations into vulnerable and challenging. Droughts, groundwater declining, increasing flood, heavy rainfall, water-logging, river erosion, flash floods and saline intrusion led severe drinking water crisis. Over densely population, low lying and agriculture base, low economic strength, inadequate infrastructure, slow development, inadequate institutional capacity, higher dependency on natural resource make the country more vulnerable to climate stimuli. These unwanted situations have led poor people not only safe water scarcity; also food insecurity, unemployment, diseases, environmental degradation etc.

Realizing the needs of poor communities, SPACE facilitates the community in strengthening capacities for combating the emerging problems through innovating affordable and local solution of water and foods. Installation of dry toilets, groundwater recharger and water-saving washing units in semi-arid areas, rainwater harvesting system in coastal zones, flood prone and arsenic affected areas, the poor people have made a sustainable water solution. They also produce organic fertilizers through kitchen waste management, recycling human faces and urines for food facilities at their homestead. Conse-

quently, 80% households have safe water access from rainwater and wells round the year; adequate food facilities at home and clean environment. Field report further reveals diarrheal incidences and malnutrition among children and women decreased, medical cost significantly reduced. Major challenges include storage of year round rainwater and sustainability of achievements by the people as those are low-cost, no hi-tech and scientific systems are not involved.

However, the learning involves as people are capable to solve local problems and make them adaptive to the changing situations if they are properly facilitated. Key-Actors and development partners should extend cooperation to replicate the learning among climate threatened poor communities who suffer from water and foods crisis.



## STOCKHOLM INTERNATIONAL WATER INSTITUTE

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