

NAP-GSP Regional Training Workshop for Asia

Mainstreaming Climate Change Adaptation into Water Resources

Workshop Report

Seoul, Korea, 13th to 16th September 2017



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1. Introduction

The National Adaptation Plan (NAP) Regional Training Workshop for Asia on “Mainstreaming Climate Change Adaptation into Water Resources” took place from the 13th to 16th of September 2017 in Seoul, Korea, back to back with the NAP Regional Expo. The training targeted governments in the Asian region. Participants who attended this workshop were representatives from the Ministries of Environment, Ministries of Water, Ministries of Agriculture, Ministries of Local Government, Ministries of Foreign Affairs, Ministries of Energy and Ministries of Planning Development and Finance of Asian developing countries¹ (LDCs and non-LDCs), as well as key resource people from partner organizations.

The workshop was co-organized by the National Adaptation Plan Global Support Programme (NAP-GSP), a joint United Nations Environment Programme (UN Environment) and United Nations Development Programme (UNDP) led initiative, financed by the Special Climate Change Fund (SCCF) and the Least Developed Countries Fund (LDCF), the United Nations Office for Sustainable Development (UNOSD), and the Korean Environment Institute (KEI)-Korea Adaptation Center for Climate Change (KACCC). The workshop was facilitated by the United Nations Institute for Training and Research (UNITAR), in collaboration with the Global Water Partnership (GWP).

In brief, the NAP-GSP supports more than 50 countries, in Asia, Africa, the Pacific, Middle East and North Africa, Eastern Europe, Caucasus and Central Asia (EECCA), Caribbean, Central America, South America. Activities include facilitating trainings on the NAP process, technical assistance, and providing opportunities for knowledge sharing on NAPs. The NAP-GSP has provided support to developing countries since 2013, through financing from the GEF-LDCF. The first phase of the NAP-GSP for LDCs was operational from 2013-2015. During this phase, the NAP-GSP held Regional Training Workshops in which decision-makers from Environment, Planning and Finance Ministries from LDCs were oriented on the steps for National Adaptation Planning as well as on leveraging finance. The programme received funding for a second phase of expanded support to LDCs from 2016-2019. The NAP-GSP for developing countries is a parallel programme from 2017-2019, funded by the SCCF – currently supporting 24 countries with their NAP processes.

The NAP-GSP activities are the following:

- **Country Support:** Tailored one-on-one support is provided to countries to initiate or advance their NAP process, including stocktaking, customized training, and support to develop NAP roadmaps.
- **Technical assistance:** Training packages – including tools, methods and guidelines – are developed for countries to advance their NAP process. National technicians from key sectors are supported to assess long-term vulnerability to climate change and relevant adaptation options through targeted training workshops.
- **Knowledge brokering:** Exchanging experiences (South-South/North-South), is essential to ensure the perpetuation of good practices relevant to medium to long-term national, sectoral and local planning and budgeting processes. The NAP-GSP captures NAP learning, produces NAP training materials and develops country reports and case studies to demonstrate medium to long-term adaptation planning.

¹ Bangladesh, Bhutan, Brunei – Darussalam, Cambodia, China, India, Iran, Lao, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam, Yemen

1.1 Objectives

The overall objective of the regional training was to increase the capacity of policy makers and technical people for effective decision-making by tackling climate change adaptation for sustainable water resources management and development. As a key natural resource, water is a multi-sectorial issue and provides an entry-point for mainstreaming climate risks management through the NAP process. This included a focus on extreme events and other slow onset aspects related to water (such as droughts, floods, sea level rise, landslide, changes in salinity, etc.).

The workshop aimed to:

- Enhance the understanding of participants of the importance of water resources and the cross sectoral linkages with other priority sectors (agriculture, fisheries, energy, ecosystems, industry and infrastructure, health, etc.), ensuring the successful alignment with the implementation of international development and climate agenda, including the 2030 Agenda for the Sustainable Development with the Sustainable Development Goals (SDGs) and the Paris Agreement;
- Take stock of existing guidance, tools and methods of tracking climate change risks related to water and improving understanding of climate information linkages with other sectors;
- Take stock of approaches for decision making including incorporating uncertainty in planning and examining policies and laws conducive to CCA mainstreaming; and
- Exchange lessons learnt based on country experiences on mainstreaming Climate Change Adaptation (CCA) into development planning.

The workshop also highlighted support available through NAP-GSP and partners to accompany countries in advancing their NAP processes.

1.2 Methodology

Training methods used were highly interactive with a minimum in lecture style teaching. Trainers used the Harvard Case Method in promote more effective learning and retention of ideas. The training also successfully stimulated engagement across all concerned countries, sectors and departments, providing opportunities for high level discussion, sharing of information and knowledge and team building. During the workshop, participants were regularly taking part in various activities designed to help them develop their understanding of the different topics that were covered. These activities were based on well-established adult learning principles, which include:

- Seeing how to apply the topic under consideration to your one's situation;
- Focusing on aspects which are of particular relevance to participants; and
- Discussing the subject with a small number of other professionals so that participants develop a shared understanding.

The 4-day regional training was structured around seven sessions presented as below:

- Session 1: Understanding climate change and the international context;
- Session 2: Climate and hydrological Information and Services;
- Session 3: Scenario-building and vulnerability assessments for decision making;
- Session 4: Stakeholder participation, institutional arrangements and partnerships;
- Session 5: Cross-sectoral linkages;
- Session 6: CCA in water resource management; and
- Session 7: Interactive workshop.

The sessions were structured as a presentation first followed by an interactive exercise, most of which were in break-out groups with a plenary, wrap-up discussion to end.

1.3 Workshop communication

A website dedicated to this workshop has been created: <http://globalsupportprogramme.org/node/4158>. It recaps the workshop progress, compiles all presentations and documents given and provides a link to the workshop photo album.

Most of the exercise outputs were captured on displays created by the participants and the displays were photographed. Some of these photographs are reproduced in the Report annexes.

1.4 Overall results

A total of 57 participants (Picture 1) from 19 different countries in Asia attended the training workshop representing a range of ministries mentioned above. There was a homogeneous level of understanding among participants on climate change adaptation mainstreaming. There was active participation from many of those present, and there was positive feedback about the plenary and working group sessions.

Through the exercise sessions of the workshop, ideas and suggestions were provided that formed the basis of an indicative roadmap development for climate change adaptation mainstreaming into water resources management for each country represented. This is presented in Annex V of this report, and this constitutes the main output of this workshop. The following reports sets out the substance of each of the seven sessions.



Picture1: The regional training's participants officials and partners

2. Results of workshop sessions

This section describes each of the workshop's seven sessions regarding the main points made in the presentation followed by the purposes and outputs of the working groups.

The workshop was officially launched with opening remarks made by **Mr. Young-hoon Kim**, Director General of climate and Future Policy Bureau of Korean Ministry of Environment. He reminded the audience that Asia was the world's most vulnerable region for water insecurity, impacting approximately 75% of the population. According to him, there is no doubt that climate change adaptation is crucial to water management as the available water resources are decreasing and fresh water systems are under stress. **Dr. Jongsoo Yoon**, Head of UNOSD, highlighted that water is the first victim of climate change as around 90% of disasters were related to water. **Mr. Mozaharul Alam**, Regional Coordinator for Climate Change at the UNEP Asia and the Pacific Office, indicated that, as a key natural resource, water was a multi-sectoral issue and provided an entry-point for mainstreaming climate risk management through the NAP process. Referring to the audience as technical and sector specialists, he invited the audience to work together to deepen its understanding of climate change adaptation, with the water sector as a main focus and entry point. Finally, **Mrs. Sarwat Chowdhury**, UNDP Seoul Policy Center, stressed that, as countries progress towards implementation of NAPs, there must be scale up of financial and technical assistance.

2.1 Session 1 – Understanding climate change and the international context

This session laid the fundamental principles behind climate change and specifically look at climate change impacts. It linked the impacts to various socio-economic sectors and linked up with the international policies that are driving actions to climate change on the international arena e.g. the 2030 Agenda for Sustainable Development with water and climate related SDGs, the Paris Agreement with NDCs and NAPs, etc. This session helped the participants to understand the importance of climate change adaptation, with a focus on the medium and the long-term planning; as well as the international context.

Ms. Sonam Khandu (Vice Chair of Least Developed Countries Expert Group – LEG) presented an overview of the process to formulate and implement NAPs. She highlighted to participants that the NAP was the main output of the process, and was designed to be iterative, country-driven, and provided the substance of the adaptation ambition expressed in the NDCs and Adaptation Communications under the Paris Agreement.

Mr. Motsomi Maletjane (Team leader at UNFCCC Secretariat) presented the concept of Adaptation under the UNFCCC. He reminded the participants that NAPs are the primary instrument that help countries manage their work on adaptation, at all scales and levels into a coherent national approach.

Mrs. Eunhae Jeong (Senior development management expert at UNOSD) presented the water-related SDGs and policy support system. She reminded the participants that SDG 6 is dedicated to water: “ensure availability and sustainable management of water and sanitation for all” and that UNOSD-UNU had developed a project to assist countries to implement national SDG processes.

The group work aimed at understanding the country context of each participants in terms of how climate variability/change is affecting their water sector and key water related sectors. The participants shared their national priorities as well as relevant ongoing/ upcoming initiative that can be considered as entry points to mainstreaming climate change adaptation in those water sector and key water related sectors. Countries outputs for the session 1 are transcribed in the Annex III.

2.2 Session 2 – Climate and hydrological information and services

This session highlighted key concepts and practical examples to increase awareness of decision-makers about climate information & services which are key resources to prepare for climate change and when well-integrated into policy (e.g. through NAP) and practice, can help reverse this trend and enhance cross-sectoral climate resilient development.

Mr. Amir Delju (WMO) presented the concept and functions of climate information and services, defined as the collection of weather and climate data that is credible, relevant and usable. He detailed the Global observing system, the different components of the climate services information system, the different types of climate information and their use for decision-makers at all levels working on short medium and long-term planning.

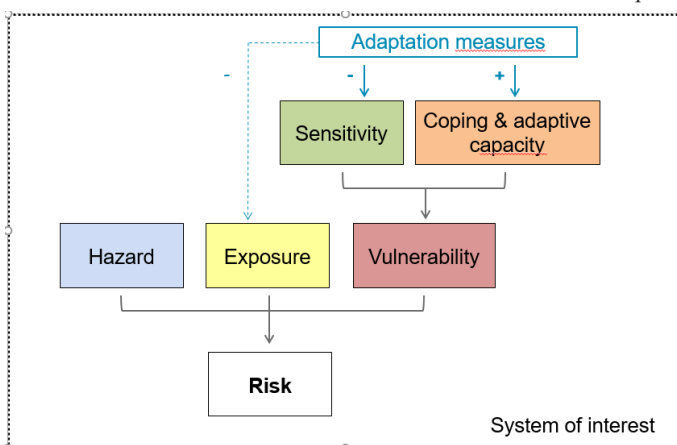
Mrs. Hwirin Kim (Korean Ministry of Land, Infrastructure and Transport) presented the concept of hydrological information and services through the detailed review of integrated water management, flood forecast and control, hydrological services and WMO Associated Program Flood Management (APFM) and Integrated Drought Management Program (IDMP).

The first part of the group work, led by Mr. Amir Delju, aimed at developing a risk mapping and hazard identification. Participants were invited to reflect the impacts of specific hazards to key sectors and geographical areas. This allowed them to think about the type of information they would need as to plan and mainstream climate risks into NAPs. The second part of the group work, led by Mrs. Ju Youn Kang (Korea Adaptation Center for Climate Change) aimed at assessing climate change impacts on various sectors.

2.3 Session 3 – Scenario-building and vulnerability assessments for decision-making

This session focused on how to make adaptation decisions given uncertainties. Participants were able to use knowledge gained in previous sessions 1 and 2 (impacts of climate change and climate information to conduct vulnerability assessments and build scenarios) to, in turn, make adaptation decisions.

Mrs. Agnes Balota, GIZ Philippines office, examined the concepts of vulnerability and risk and their components and explained how identifying factors contributing to risk and vulnerability in a system is a first step to a systematic approach to climate change adaptation. In order to facilitate conceptual understanding and operationalize the different components of risk and vulnerability, the concept of impact chains has been proven very useful. The figure below visualizes the different components of risk by adapting the impact chain and was shown to participants at the beginning of the exercise session in order to familiarize them with the different components of the term 'risk'.



The Vulnerability Assessment exercise was divided into two parts. Due to limited time, each group focused only on specific system of interest related to the water sector. In part 1, participants gathered information to understand the recent situation of the systems of interest. It dealt with the recent situation in the system of interest: stocktaking of actors and assets in the relevant system of interest and an analysis of their recent sensitivity and adaptive capacity.

Part 2 dealt with the future under climate change. It worked through potential impacts on the biophysical and socio-economic components of the system of

interest and finally defined the vulnerability / need for action. Group outputs are transcribed in Annex IV.

2.4 Session 4 – Stakeholder participation, institutional arrangements and partnership

This session addressed the issues relating to governance in the context of water security and climate resilience and explained the linkages between governance and climate change adaptation planning. This session also focused on defining why an improved/enhanced level of engagement of stakeholders is vital in the context of water security, adaptation planning and climate resilient development.

Mrs. Rohini Kohli (Lead Technical Specialist, UNDP) carried out a presentation on institutions for National Adaptation Planning. She reminded the participants that clear institutional arrangements for NAPs are essential from the outset and that institutions have a role in delivering specific NAP outcomes, such as coordination and prioritization.

Mr. Seung Hee Kim (Environmental advisor, UNDP BRH) delivered a presentation on institutional arrangements and water governance. He defined water governance as the establishment of coordination mechanisms across institutional structures with different mandates; and reviewed the framework for water resources and service in order to ensure fair, efficient and sustainable allocation of water resources across various sectors.

The group exercise invited participants to identify a typical adaptation project to analyze, to complete a stakeholder identification table and draw a stakeholder influence diagram.

2.5 Session 5 – Cross-sectoral linkages

This session looked at the various cross-sectoral linkages with the water sector and explained how cross sector linkages for water relate to achieving Agenda 2030 and the implementation of the Paris Agreement focusing on Nationally Determined Contributions (NDCs) and NAPs.

Mr. Beau Damen (Senior Water Expert, FAO-RAP) carried out a presentation on understanding the food-water-energy nexus in the concept of NAPs. He defined the water-energy-food nexus in Asia and how NAPs could be used as a framework to tackle the nexus issue.

The group work focused on appraising options and addressing trade-offs. The exercise consisted on following a series of tasks designed to prepare an initial appraisal of participants' chosen adaptation measures from a nexus perspective. Then, participants created a simple chart to evaluate the potential benefits and risks of their chosen measures, the trade-offs involved and the stakeholders needed to be involved. At the end, each group presented in plenary their measures. Footage of this sequence can be found on the NAP-GSP youtube channel: <https://www.youtube.com/watch?v=-WRv1-E6MtM>

2.6 Session 6 – Mainstreaming climate change adaptation in water resources

This session looked at some of the approaches and entry points to mainstreaming climate change adaptation in water resource management and development. It identified and defined the approaches to climate change adaptation in water resource management and how to use each of these tools in one's own/different contexts. This session gave the opportunity to four countries to present their national mechanisms for mainstreaming climate change adaptation in water resources managements,

Mr. Armand Houanye (Global Water Partnership, GWP) made a presentation on mainstreaming water security and climate resilience into development planning and decision-making process. He highlighted that there were many entry points for mainstreaming climate change adaptation at all stages of the policy cycle and that it was a means to increase the effectiveness of adaptation and development. Participants were also exposed to key institutional requirements for effective mainstreaming that include:

- Cross-sectoral and cross-level coordination, cooperation;
- The need to powerful champions at national level;
- Integration of new thinking, new research in planning and monitoring systems and processes;
- Strengthening of capacities of stakeholders at various scales;

- Timely stakeholder participation at various scales;
- Experience sharing, dissemination of good practices;
- Availability and quality of climate related information and evidence including socio-economic analyses of key linkages between climate change and development.

Mr. Phuntsho Wangdi and **Mr. Norbu Wangdi** from the National Environment Commission of Bhutan presented the **Bhutan case study** on mainstreaming integrated water resource management. According to climate change projections, temperatures will increase up to 1% by 2039 and annual rainfall will increase up to 6% by 2039. The Bhutan water partnership set up by the country in 2001 facilitated the coordination and the preparation of policy documents, a strategic vision and action plans related for integrated water resources management. This resulted in the adoption of the Bhutan water act in 2011 which mainstreamed IWRM framework in Bhutan. They highlighted that involvement of all stakeholders had been key for planning and policy implementation as well as a strong political will and support for enabling a strong environment.

Ms. Daw Khon Ra (Irrigation and Water utilization management department) presented the country case study of **Myanmar**. According to climate change projections by 2050, there will be an increase of 1.4 °C in temperatures, an increase in rainfall, more extreme rains, storms and flood events, shorter monsoon season and droughts. Myanmar designed a National Adaptation Program of Action in 2012 which attempts at addressing immediate needs for building climate change resilience of vulnerable communities. One of its priorities is to assess the status of dams for providing sustainable water supplies and withstanding flood risks under future climate change.

Ms. Duangjai Srithawatchai (Department of water resources, Ministry of natural resources and environment) presented the **Thailand** case study. She outlined that Thailand has encountered severe flood and landslide events during the last decade which caused great socio and economic damages. She presented Thailand's 20 years Strategy as well as the Water Resources Management Strategic Plan (2017-2036) which objectives are to solve the water resource problems that cause severe socio-economic impacts and to integrate water management in an appropriate way. Its main goals are water accessibility, water sufficiency and water quality as well as disaster management of flood and land slide.

Mrs. Yun Ra Choi (Korea Productivity Center) presented the **Korea** case study. She reminded the audience that the cost of adapting to climate change in developing countries is ranging from \$280 to \$500 billion in 2015 and could increase by 5 times by 2050. She then presented the Korean climate change adaptation scheme which concerns 243 cities and the National Adaptation Plan which started in 2016.

Mr. Armand Houanye (GWP) dedicated his second presentation to the Integrated Water Resource Management (IWRM). He shared with participants GWP's definition of the IWRM as a "process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems". He reminded the audience that IWRM planning and implementation process emphasizes on the assessment of water resources as well as all the different uses of water resources to come up with goals and actions for ensuring the sustainable use and development of the water and related resources. He insisted on the fact that IWRM offers the opportunity to build resilience to current climate variability while building capacity to adapt to future climate. It concluded that IWRM provides mechanism and approaches for managing changes to the quantity and quality of water, for capacitating organizations and communities to cope with climate variability and change, and for managing trade-offs and conflicts.

Mr. Mozaharul Alam (Regional coordinator, Climate Change UNEP) delivered a presentation on Ecosystem Based Adaptation (EbA) which he defined as an emerging approach that helps people and the environment to adapt to the adverse impacts of climate change. He reminded the audience the multiple benefits of EbA and how EbA measures could contribute to food security, sustainable water management, disaster risk reduction and biodiversity conservation.

During the exercise session, participants were invited to divide themselves in groups in order to identify key interventions for mainstreaming climate change adaptation into IWRM planning and implementation. Participants defined the methods for mainstreaming CCA, the resources and key stakeholders to be involved into each of the IWRM

cycle stages which are: initiation, strategic vision development, situation analysis, water management strategy choices, IWRM plan with budget prepared and approved, implementation and evaluation.

2.7 Session 7 - Drafting an indicative roadmap on follow up actions

This session was an opportunity for participants to see how they could make use of the knowledge gained during the training to mainstream CCA into specific water related sectors according to the national priorities in their home countries.

The main purpose of this session was for participants to develop draft roadmaps based on their national priorities set in session 1, through:

- Identifying actions to mainstream CCA into specific water related sectors in their country;
- Categorizing actions that can be undertaken with countries' own resources (technical and financial) and those that need external resources; and,
- Developing a timeframe that would serve as a guiding tool to mainstream CCA into specific water related sectors in their country by the end of 2018.

The roadmap template is transcribed in Annex V.

3. Assessments

3.1 Retrospective self-assessment

A set of 9 assessment questions were formulated by UNITAR to test understanding at a conceptual level by comparing results pre-and-post training. These questions summarise and are derived from individual learning objectives for each of the NAP training sessions. The selected questions, formulated as an 'I am able to ...' statement, were inserted into a pre-and-post questionnaire excel sheet and issued to all participants.

Participants were asked to self-assess their knowledge against each statement using the following scale: 1 = weak; 2 = some; 3 = average; 4 = moderate; 5 = high. This self-assessment was completed at the beginning of the training, after the introduction to the course, and then again at the end. All learners were requested to complete both a pre-and-post assessment.

Through the use of an excel spreadsheet, the assessment questions generated specific data-sets, particularly:

1. A 2-D line/mark graph showing modules and LO-related questions tested in Korea;
2. A bar chart presenting PRE and POST level of perceived knowledge per learning objective based on an aggregated score for all training participants;
3. A summary of the comments collected through questionnaires.

A. Learning objectives and self-assessment questions

Objective 1 – I am able to explain the causes and impacts of climate change and describe climate change impacts to key socio-economic sectors.

Objective 2 – I am able to distinguish key international climate policies and drivers of climate change action such as SDGs, NDCs and NAPs.

Objective 3 – I am able to define and explain how to use climate information and services in policy and development planning.

Objective 4 – I am able to understand the importance of a vulnerability assessment in the context of water resources management.

Objective 5 – I am able to find and use available data and tools to conduct vulnerability assessment.

Objective 6 – I am able to understand the importance of stakeholder engagement and governance in the context of water security and a climate resilient development.

Objective 7 – I am able to define climate change cross-sectoral linkages and understand how they connect to achieving SDGs.

Objective 8 – I am able to explain the importance of cross-sectoral planning.

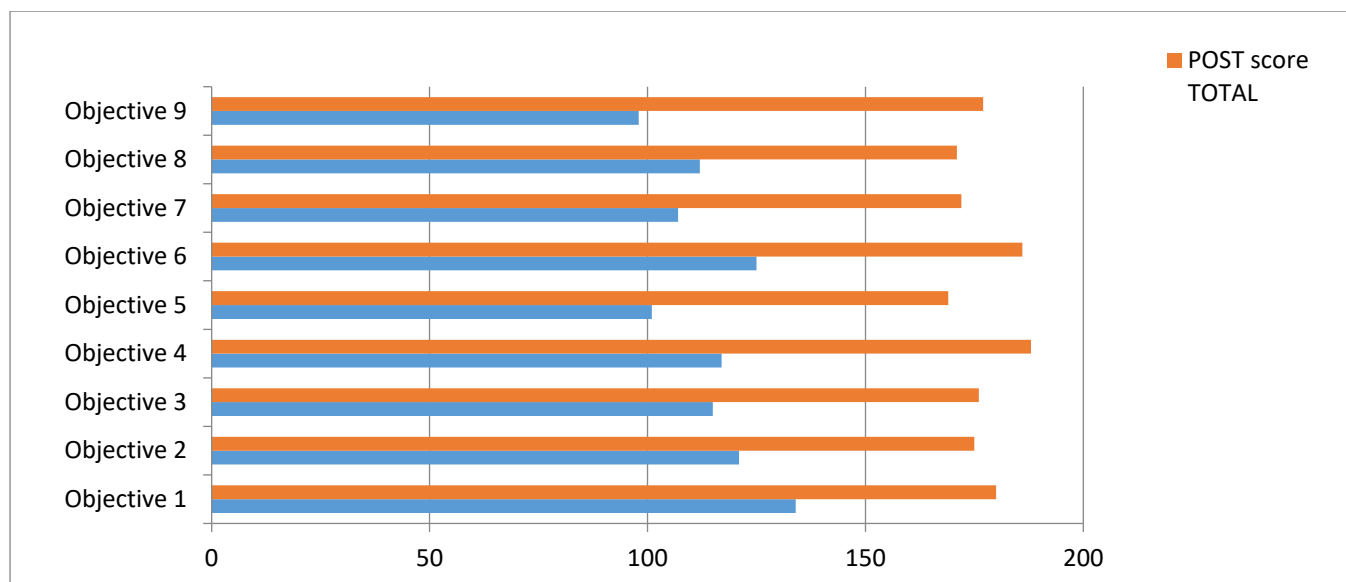
Objective 9 – I am able to identify several approaches used in mainstreaming climate change adaptation in water resource management.

B. PRE and POST level of perceived knowledge per training objective

The pre-and post assessment evaluation was undertaken by: 1) adding up the score of all training participants per session, and 2) calculating the percentage value of the aggregated score. Conversion to a percentage allows comparison across countries. The evaluation shows the following results.

Objectives	PRE score TOTAL	POST score TOTAL	DELTA
Objective 1	134	180	46
Objective 2	121	175	54
Objective 3	115	176	61
Objective 4	117	188	71
Objective 5	101	169	68
Objective 6	125	186	61
Objective 7	107	172	65
Objective 8	112	171	59
Objective 9	98	177	79

The analysis of the retrospective self-assessment discrepancy shows that the greatest learning improvement was noted in the areas shaded in green (Objectives 4,5 and 9). Medium to lower progression was perceived for objectives corresponding to orange shaded areas (objectives 1 and 2).



3.2 Workshop questionnaire

A. Main participants' feedbacks

General comments:

- Agenda very neatly prepared and participants can participate actively,
- Highly satisfied with the workshop. I hope a similar kind of workshop takes place but focuses more on technical aspect on vulnerability assessment through scenario building or tools for cost-benefit analysis in order to equip government institution with technical staff who are capable of running their own projection and take appropriate adaptation measures.
- It is an excellent learning opportunity, it has enhanced my knowledge, skills and attitude on CCA. It would be better to have a group/network of participants for sharing country experiences/best practices/key issues. It would be good to organize similar training workshop on other sectors.
- This workshop was useful to enhance my knowledge on CCA. I gained knowledge which will be useful to carry out my official work in a more effective manner.
- The workshop is supporting our knowledge to enhance formulation of NAP. Sharing experiences with other countries and agencies were useful. The presentation on "climate and hydrological information and services" was most interesting.

Suggestions:

- Workshop should cover other sectors (ex: agriculture, health) and socio-economic impacts,
- Inclusion of a field visit/learning expedition would be good for a better understanding of CCA in actual situation,
- Workshop should include real case related to NAP process and other sectors.
- It would be good to provide assistance in developing showcase (flagship) programs and support for implementation.
- The setup of the room could be friendlier if arranged in U-shape especially during the presentation sessions.
- Some materials could have been e-mailed along with logistical note.
- More games and icebreaking activities and cultural presentations/shows/dance/sing.

B. Survey quantitative results

- Please rate the degree to which information circulated prior to the workshop was...

	Completely 5	Mostly 4	More or less 3	Partially 2	Not at all 1	Not applicable
Useful (in terms of making an informed decision to take this workshop)	33%	44%	17%	4%		
Accurate (in terms of matching what took place)	26%	52%	16%			

- Please rate the following statements using the numerical scale from strongly agree (5) to strongly disagree (1)

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
The information presented in this workshop was new to me.	11%	30%	51%	6%		2%
The content of the workshop was relevant to my job.	53%	43%	2%	2%		
It is likely that I will use the information acquired.	43%	50%	7%			

- Resource persons. Please rate the following statements using the numerical scale from strongly agree (5) to strongly disagree (1). The trainers/facilitators were effective at ...

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
Presenting information	28%	57%	13%			2%
Responding to questions of participants	37%	48%	7%	2%		6%
Stimulating participant involvement	37%	48%	7%			8%

- Overall satisfaction. Please rate the following statements using the numerical scale from strongly agree (5) to strongly disagree (1).

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
My awareness of the topic has increased	53%	43%	2%			2%
Overall, the workshop was very useful	55%	41%	2%			2%
I will recommend this workshop to a colleague.	63%	35%	2%			

- Workshop materials. Please rate the following statements using the numerical scale from strongly agree (5) to strongly disagree (1).

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
The PowerPoint presentations were useful	50%	48%	2%			
The Participant manual was useful	46%	33%				21%
The exercises were relevant	46%	46%	4%		2%	2%
The workshop provided useful opportunities to reflect on one's own skills, knowledge and capacities	46%	46%	6%		2%	
The workshop provided useful opportunities to learn from others (colleagues)	44%	47%	7%			2%

4. Next steps

Indicative roadmaps will be progressively collected by UNEP once finalized by countries' participants.

Annex I – List of participants

1.	Bangladesh (UNOSD)	Dr. Nurul Quadir Additional Secretary Ministry of Environment and Forests
2.	Bangladesh (UNOSD)	Dr. Uttam Kumar Das Deputy Secretary Planning Division, Ministry of Planning
3.	Bangladesh (UNOSD)	Mr. Md Jan-E-Alam Deputy Chief Ministry of Water Resources
4.	Bhutan (LDCs)	Mr. Chencho Norbo Secretary and UNFCCC focal point National Environment Commission
5.	Bhutan (LDCs)	Mr. Norbu Wangdi Division Chief Forestry Officer, Ministry of Agriculture and Forests, Ugyen Wangchuck Institute for Conservation and Environment Research (UWICE) Lamai Goempa, Bumthang, Bhutan
6.	Bhutan (LDCs)	Phuntsho Wangdi Environment Officer, Ministry of Agriculture and Forests,
7.	Brunei Darussalam-Non (LDCs)	Hj Rusli MD. Abid Engineer Ministry of Development
8.	Brunei Darussalam-Non (LDCs)	Abdul Hafiz Hati Abdul Latif Engineer Ministry of Development Department of Drainage and Sewage
9.	Cambodia (LDCs)	Mr. Chanthoeun Heng Deputy Director of Department of Climate Change, GSSD Sustainable Development, Ministry of Environment (MoE)
10.	Cambodia (LDCs)	Mr. Piseth Keo Vice Chief of Climate Change Adaptation Ministry of Environment (MoE)
11.	Cambodia (UNOSD)	Mr. Thy Sum Director Department of Climate Change General Secretariat of National Council for Sustainable Development Ministry of Environment, Cambodia
12.	China (UNOSD)	Ms. Shuo Liu Assistant Professor The Chinese Academy of Agriculture Sciences Institute of Environment and Sustainable Development in Agriculture
13.	China (UNOSD)	Mr. Ouchen Cai Assistant Professor China Waterborne Transport Research Institute Ministry of Transport

14.	China (UNOSD)	Ms. Muge Liu Programme Officer National Center for Climate Change Strategy and International Cooperation
15.	India (Non LDCs)	Mr. Sanjay Kumar Singh Deputy Director Ministry of Environment, Forest and Climate Change
16.	India (Non LDCs)	Mr. Uday Kumar Singh District Magistrate cum Collector, Munger (Bihar) Department of Personnel, Government of Bihar Dm Residence
17.	India (Non LDCs)	Mr. Shard Scientist Ministry of Environment, Forest and Climate Change
18.	Indonesia (Non LDCs)	Mr. Fajar Baskoro Wicaksono Staff of Subdirector Hydrology & Water Resources Environment Ministry of Public Works and Housing
19.	Indonesia (Non LDCs)	Mr. Sigid Santoso Deputy Director for Hydrology Water Resources Environment Ministry of Public Works and Housing
20.	Indonesia (Non LDCs)	Mr. Pradah Dwiatmanta Head Section for Water Resources Environment Ministry of Public Works and Housing
21.	Iran (UNOSD)	Mr. Hamidreza Baghersad Director of Water and Soil and Engineering Affairs Jihad Agriculture Organization of Isfahan Province, Ministry of Jihad Agriculture, Iran
22.	Iran (UNOSD)	Mr. Bahram Taheri HSE Advisor to the Minister and Director General of the Environment, Safety and Social Affairs Departments Ministry of Energy
23.	Iran (UNOSD)	Ms. Azade Khaman Climate Change Expert Department of Environment
24.	Lao PDR (LDCs)	Mr. Vanxay Bouttanavong Head of Climate Change Adaptation Division Natural Resources and Environment (MONRE)
25.	Lao PDR (LDCs)	Mr. Bouathong Theothavong Technical Official Natural Resources and Environment
26.	Lao PDR (UNOSD)	Mr. Sangkhane Thiangthammavong Director General Ministry of Natural Resources and Environment, Vientiane, Lao PDR.
27.	Malaysia (Non LDCs)	Yusmazy MD Yusup Senior Principle Assistant Secretary Ministry of Natural Resources & Environment Malaysia, Wisma Sumber
28.	Malaysia (Non LDCs)	Nurul Huda Md Adnan Research Officer Ministry of Natural Resources and Environment National Hydraulic Research Institute of Malaysia
29.	Maldives (Non LDCs)	Mr. Ahmed Waheed Director Ministry of Environment and Energy Handhuvari Hingun, Male, Maafannu,
30.	Maldives	Mr. Mohamed Shujuan Ibrahim

	(Non LDCs)	Assistant Oceanographic Observer Environmental Protection Agency Ministry of Environment and Energy
31.	Maldives (UNOSD)	Mr. Mohamed Musthafa Director Water and Sanitation Department Ministry of Environment and Energy
32.	Mongolia (Non LDCs)	Mr. Odmunkh Enkhbold Deputy Director of Protocol Ministry of Foreign Affairs
33.	Mongolia (UNOSD)	Mr. Ankhbayar Tsog-Ochir Second Secretary Department of Multilateral Cooperation, Ministry of Foreign Affairs
34.	Mongolia (UNOSD)	Mr. Gerelt-od Tsogtbaatar Officer of the Department of Climate Change and International Cooperation Ministry of Environment and Tourism
35.	Myanmar (LDCs)	Mr. Min Maw Director Environmental Conservation Department Ministry of Natural Resources and Environmental Conservation
36.	Myanmar (LDCs)	Ms. Khon Ra Director Irrigation and Water Utilization Management Department Ministry of Agriculture, Livestock and Irrigation
37	Myanmar (LDCs)	Ms. Kyi Kyi Khaing Deputy Director Planning Department Ministry of Planning and Finance
38	Nepal (UNOSD)	Mr. Raju Pudasaini Under Secretary Ministry of Population and Environment
39	Nepal (UNOSD)	Mr. Palhad Prasad Sapkota Under Secretary Ministry of Energy
40	Nepal (UNOSD)	Mr. Milan Karki Planning Officer National Planning Commission
41	Pakistan (UNOSD)	Syed Rizwan Mehboob Prime Minister's Focal Person on Climate Change Ministry of Climate Change, Pakistan
42	Philippines (Non LDCs)	Ms. Maria Victoria Evangelista Senior Coordinator Climate Change Commission
43	Philippines (Non LDCs)	Mr. Allan Goleng Senior Economic Development Specialist National Economic and Development Authority 3 rd , Agriculture, Natural Resources and Environment Staff (ANDRES)
44	Philippines (Non LDCs)	Mr. Sevillo Jr David Executive Director National Water Resources Board Department of Environment and Natural Resources

45	Philippines (FAO)	Ms. Reichelle Celorica Department of Agriculture
46	Sri Lanka (Non LDCs)	Ms. Shyamali Priyanthie Korale Kankanamge Environment Management Officer Climate Change Secretariat of the Ministry of Mahaweli Development and Environment
47	Sri Lanka (Non LDCs)	Mr. Jayantha Priyal Bamunusinghe Arachchig Research Officer Mahaweli Development and Environment
48	Sri Lanka (Non LDCs)	Rajapakshe Arachchige Ranjith Premakumara Assistant Director Ministry of Mahaweli development and Environment
49	Thailand (Non LDCs)	Ms. Chompunut Songkhao Environmental Officer Climate Change Management and Coordination Division Office of Natural Resources and Environmental Policy and Planning Ministry of Natural Resources and Environmental
50	Thailand (Non LDCs)	Ms. Duangjai Srithawatchai Senior Professional Plan and Policy Analyst Ministry of Natural Resources and Environment/Department of Water Resources
51	Thailand (Non LDCs)	Mr. Phirun Saiyasitpanich Director of Climate Change Management and Coordination Division Ministry of Natural Resources and Environment Office of Natural Resources and Environmental Policy and Planning/ Climate Change Management and Coordination Division
52	Thailand (FAO)	Dr. Akarapon Ministry of Agriculture
53	Thailand (FAO)	Mr. Napat Ministry of Agriculture
54	Vietnam (Non LDCs)	Ms. Pham Thi Minh Hoa Senior official, The Standing Office of National Committee on Climate Change Ministry of Natural Resources and Environment
55	Vietnam (Non LDCs)	Mr. Nguyen Duc Cuong Water Resource Specialist, Head of Natural Disaster Prediction and Early Warning Division, Department of Climate Change Ministry of Natural Resources and Environment
56	Vietnam (UNOSD)	Mr. Nguyen Van Huy Head Division of Science-Technology and International Cooperation Department of Climate Change Ministry of Natural Resources and Environment
57	Yemen (LDCs)	Mr. Fahmi Abdulhadi Omer Binshbrak Coordinator, Climate Change Unit Environment Protection Authority (EPA)
58	Yemen (LDCs)	Mr. Nashwan Abdulrahman Mohammed Al-Mahdi Specialist, Planning Department Ministry of Water and Environment MWE
59	Yemen (LDCs)	Mr. Naef Musaed Specialist Ministry of Planning
60	GIZ	Agnes Balota (PHI office)
61	WMO	Amir Delju



64	UN ENVIRONMENT NAPGSP	Mozaharul Alam
65	UN ENVIRONMENT NAPGSP	Grzegorz Wesolinski
66	UN ENVIRONMENT NAPGSP	Esther Lake
67	UNDP NAPGSP	Ms. Rohini Kohli Lead Technical Specialist
68	UNDP NAPGSP	Seung Hee Kim
69	UNFCCC	Motsomi Maletjane
70	LEG	Sonam L. Khandu
71	UNOSD	Dr. Jongsoo Yon
72	UNOSD	Eunhae Jeong
73	KEI	Young-hoon Kim
74	KEI	Ju Youn Kang
75	KEI	Hana Shin
76	KEI	Yun Ra Choi
77	KEI	Heesun Choi
78	FAO	Beau Damen
79	UNITAR	Bryan Hopkins
80	UNITAR	Armand Houanye
81	UNITAR	Delphine Clement





Annex II - Workshop agenda

Day 1	Day 2	Day 3	Day 4
Setting the scene: what is mainstreaming CCA and what information do we need for decision making?	What do we need to know and do to support mainstreaming adaptation into water resources?	Approaches for integrating CCA into Water Resources	Designing an indicative roadmap for mainstreaming CCA
Morning Session			
08:30 – 09:00 Registration	09:00 – 09:15 Reflections on Day 1 and objectives of Day2	09:00 – 09:15 Reflections on Day 2 and objectives of Day 3	09:00 – 09:15 Reflections on Day 3 and objectives of Day 4
09:00 – 10:00	09:15 – 09:45	09:15 – 10:00	09:15 – 11:00
Welcome Young-hoon Kim, (Director General of Climate and Future Policy Bureau, Ministry of Environment, Korea) Dr. Jongsoo Yoon, (Head of UNOSD) Mozaharul Alam, (UNEP & NAPGSP) Sarwat Chowdhury, (UNDP Seoul Policy Center) Introduction Armand Houanye (GWP/UNITAR) <ul style="list-style-type: none"> Introduction to the workshop objectives, methodology and outcomes Tour de Table Pre-training self-assessment Overview of the regional programme GROUP Picture	Session 3: Scenario-building and vulnerability assessments for decision making <ul style="list-style-type: none"> Presentation 3.1 Definition of vulnerability (in context of water resources management), the two-level and detailed vulnerability assessments <i>Speaker: Agnes Balota (GIZ PHI office)</i> 	Session 6a: CCA in water resource management <ul style="list-style-type: none"> Presentation 6.1 Mainstreaming water security and climate resilience into policy processes, Scenario-based approaches to planning, Adaptive Management <i>Speaker: Armand Houanye (GWP)</i> 	Session 7: Interactive workshop Application of informed decision making in priority sectors. Participants will draft an indicative roadmap on climate change adaptation mainstreaming into a specific water related sector according to national priorities (defined in exercise session 1). <i>Lead facilitator: Armand Houanye</i> <i>Co-facilitators: Delphine Clement (UNITAR)</i>
	09:45 – 11:00	10:00 – 10:45	
	Session 3 - Exercise: Do a vulnerability assessment for country <i>Lead Facilitator: Agnes Balota (GIZ)</i>	Session 6a – Panel discussion: Presentation of country case studies <ul style="list-style-type: none"> Yun Ra Choi (Korea Productivity Center) - <i>A step forward on climate change adaptation</i> Country case study 2 - Bhutan Country case study 3 - Myanmar Country case study 4 - Thailand 	
	11:00 – 11:15 – Coffee break	10:45 – 11:00 – Coffee break	11:00 – 11:15 – Coffee break
	11:15 – 12:15		11:15 – 12:30
	Session 3 – Exercise: continuation		Session 7 – continuation
10:00 – 11:00	12:15 – 13:00	11:00-12:30	12:30 – 13:00
Session 1: Understanding climate change and the international context <ul style="list-style-type: none"> Presentation 1.1 Overview of the process to formulate and implement NAPs: objectives, building blocks, sample process and outputs <i>Speaker: Sonam L. Khandu (LEG vice chair)</i> Presentation 1.2 Adaptation under the UNFCCC <i>Speaker: Motsomi Maletjane, (UNFCCC)</i> Presentation 1.3 Water-related Sustainable Development Goals and Policy Support System <i>Speaker: Eunhae Jeong (UNOSD)</i> 	Session 4: Stakeholder participation, institutional arrangements and partnerships <ul style="list-style-type: none"> Presentation 4.1 Stakeholder engagement <i>Speaker: Rohini Kohli (UNDP)</i> Presentation 4.2 Institutional arrangements and water governance <i>Speaker: Seung Hee Kim (UNDP)</i> 	Session 6a –Open discussion in plenary on "mainstreaming climate resilience into water related development planning processes"	<ul style="list-style-type: none"> Wrap-up, Reflection on key messages from Day 4 Quizz
11:00 – 11:15 – Coffee break			
11:15 – 13:00			
Session 1 - Exercise: National priorities and mentor matching <i>Lead Facilitator: Armand Houanye (GWP)</i>			
LUNCH			

Day 1	Day 2	Day 3	Day 4
Afternoon session			
14:00 – 14:45	14:00 – 15:00	14:00 – 14:45	14:00 – 15:30
<p>Session 2: Climate and hydrological Information and Services</p> <ul style="list-style-type: none"> Presentation 2.1 Climate Information & Services, Climate info in adaptation planning, use of climate info in flood/drought-risk evaluations <i>Speaker: Amir Delju (WMO)</i> Presentation 2.2 Hydrological information and services <i>Speaker: Hwirin Kim (Ministry Land, Korea)</i> 	<p>Session 4 – Exercise: Tools for stakeholder analysis <i>Lead facilitator: UNITAR</i></p> <p style="text-align: center;">15:00 – 15:45</p> <p>Session 5: Cross-sectoral linkages</p> <ul style="list-style-type: none"> Presentation 5.1 Understanding the food-water-energy nexus in the context of NAPs: processes, success stories and challenges <i>Speaker: Beau Damen (FAO)</i> <p style="text-align: center;">15:45 – 16:00 – Coffee break</p> <p style="text-align: center;">16:00 – 17:15</p> <p>Session 5 - Exercise: Analytical tool exercise on how climate change impacts sectors <i>Lead facilitator: Beau Damen (FAO)</i></p> <p style="text-align: center;">17:15 – 17:45</p> <ul style="list-style-type: none"> Wrap-up, Reflection on key messages from Day 2, Quiz 	<p>Session 6b: Mainstreaming CCA in water resource management</p> <ul style="list-style-type: none"> Presentation 6.2 Integrated Water Resource Management (IWRM), Ecosystem-based Adaptation (EbA) <i>Speakers: Armand Houanye (GWP) and Mozaharul Alam (UNEP)</i> <p style="text-align: center;">14:45 – 16:00</p> <p>Session 6b – Exercise: Water security and IWRM <i>Lead facilitator: UNITAR</i></p> <p style="text-align: center;">16:00 – 16:15 – Coffee break</p> <p style="text-align: center;">16:15 – 17:15</p> <p>Session 6b – Exercise - Continuation</p> <p style="text-align: center;">17:15 – 17:45</p> <ul style="list-style-type: none"> Wrap-up, Reflection on key messages from Day 3, Quiz 	<p>Workshop wrap-up Lessons and recommendations from the workshop</p> <ul style="list-style-type: none"> Discussion of next steps Participants feedback (plenary statements and questionnaire) Post-training self-assessment or knowledge test Certificate ceremony <p style="text-align: center;">Closure</p>
14:45 – 16:00			
<p>Session 2- Exercise: Risk Mapping and Impact Assessment <i>Lead Facilitators: Amir Delju (WMO) and Ju Youn Kang (KACC)</i></p> <p style="text-align: center;">16:00 – 16:15 – Coffee break</p>			
16:15 – 17:15			
<p>Session 2 - Exercise – continuation</p>			
17:15 – 17:45			
<ul style="list-style-type: none"> Wrap-up, Reflection on key messages from Day 1, Quiz 			
End of the Day			

Annex III – National priorities

Water sector and selected key water related sectors	Impacts of climate variability and change	Challenges that institutions and country face to overcome identified impacts	Policy and legal framework in place	National priorities as well as on-going/ upcoming initiatives and processes that can be considered as entry point to advancing adaptation planning in the water sector and selected key water related sectors
 BANGLADESH				
Water resources	<ul style="list-style-type: none"> - Irregular rainfall - Droughts - Saline water 	<ul style="list-style-type: none"> - High rainfall disrupting events - Unavailability of drinking water - Drainage congestion 	<ul style="list-style-type: none"> - Bangladesh water policy 1999 - National water management plan of - Bangladesh Water Act 2013 	<ul style="list-style-type: none"> - Provide safe drinking water
WASH services	<ul style="list-style-type: none"> - Polluted water - Unhygienic sanitation 	<ul style="list-style-type: none"> - Health hazard - Safe drinking water 	<ul style="list-style-type: none"> - National drinking water policy 1999 - National water supply and drainage policy 1998 	<ul style="list-style-type: none"> - Provide safe drinking water - Provide drainage facility
Agriculture	<ul style="list-style-type: none"> - Crop loss 	<ul style="list-style-type: none"> - Food security 	<ul style="list-style-type: none"> - Agriculture policy 1999 	<ul style="list-style-type: none"> - Surface water - Alternate method of cultivation
 BHUTAN				
Water resources	<ul style="list-style-type: none"> - Local streams drying - Too much and too little Freshwater biodiversity impact - Pollution 	<ul style="list-style-type: none"> - Baseline information inadequate - Weak local capacity - Poor coordination mechanisms among sectors/global 	<ul style="list-style-type: none"> - Bhutan water policy/Act regulations - NIWRM 	Water resources assessment
WASH services	<ul style="list-style-type: none"> Water quality and quantity Water borne disease 	<ul style="list-style-type: none"> - Inadequate baseline information - Poor coordination among sectors - Poor implementation of regulations 		Sanitation and drinking water
Agriculture	<ul style="list-style-type: none"> - Soil erosion - Land degradation - Erratic rainfall Windstorms 			Efficient water system

	- Increase in Pest and disease			
Industries	- Increase in sediment load - Disruption of water distribution systems			Efficient water allocation
 BRUNEI				
Water resources	Drought	- Financial constraints - Lack of centralized coordinated body on disaster management - To reduce public water consumption. We are the highest in the ASEAN region due to cheap water tariffs.	- 2035 Nation vision Water security control unit (WSCU) - WHO water quality	RkN Nation projects N.O.M.C established WMG 99% pipal connection 100% centralized sewers reduced flooding
WASH services	Floods Pollution	- Financial constraints - Lack of centralized coordinated body on disaster management		
 CAMBODIA				
Water resources	- Increase in temperatures - Increase in precipitation Water quality (floods) - Water access scarcity - Water regime change	- Finance - Capacity - Coordination	Water law X CCCSP CCAP	- Building capacity on climate data collection and recording - Building climate resilient infrastructure - Strengthening information and early warning system - Improving institutional structure
 CHINA				
Water resources	Imbalance Shortage Drought Flood	Finance Capacity	5 years plan Specific laws	Projects for south to north transfer
Agriculture	Yield Quality	Disaster management Capacity Infrastructure Water saving techniques	Law in water pollution and prevention	Technology Water saving agriculture
WASH services	Pollution	Public awareness knowledge Local ability	Law in land and water maintenance	Action plan on water pollution prevention New plant and network
 INDONESIA				

Water resources	<ul style="list-style-type: none"> - Floods - Drought - Landslides - Water Scarcity 	<ul style="list-style-type: none"> - Indonesia is an archipelago country that vulnerable to climate change and has special characteristic for every regions/island - Data and information are spread and not integrated - Flood, Drought and Landslide Early Warning System is still developing - Socialization and participation of local communities is not optimal - The implementation of technology is still not optimal - Limited budgeting in water related climate change adaptation 	<ul style="list-style-type: none"> - Law 11/1974 on Water Resources - Presidential Decree No. 61/2011 on National Action Plan on GHG Emission Reduction - Presidential Decree No. 71/2011 on National Inventory of GHG Emission - MPW Regulation No. 11/2012 on National Action Plan 2012-2020 in Climate Change Mitigation and Adaptation in Ministry of Public Works - First Nationally Determined Contribution Republic of Indonesia - Water Resources Management Strategic and Implementation Plan in Every River Basins 	<ul style="list-style-type: none"> - National Strategic Priorities (2014-2019): - Developing of dams and other water storage facilities - Implementation of water-efficient concept in water management - Construction, O&M and rehabilitation of irrigation canals & pipes, coastal protection infrastructures, sediment control infrastructures, polder systems, telemetry hydrological stations, early warning systems and water allocation systems - Empowering local communities in water resources communities
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IRAN


Water resources	<ul style="list-style-type: none"> - Increasing temperature - Decreasing precipitation - Adverse effect on water quality and quantity 	<ul style="list-style-type: none"> - Water scarcity - Agriculture-water shortage - Socio security risk 	<ul style="list-style-type: none"> - Storage water - Reducing eva 	<ul style="list-style-type: none"> - Reducing agriculture area - More efficiency
WASH services	<ul style="list-style-type: none"> - Increasing consumption 	<ul style="list-style-type: none"> - Domestic and industry water shortage 	<ul style="list-style-type: none"> - Recycling and reuse treatment 	<ul style="list-style-type: none"> - Increasing cost - Completing waste and water network system
Agriculture	<ul style="list-style-type: none"> - Soil erosion - Adverse effect on products - Reducing farmland 	<ul style="list-style-type: none"> - Food security risk - Immigration - Unemployment 	<ul style="list-style-type: none"> - Crop pattern - Resilient crop 	<ul style="list-style-type: none"> - Irrigation system - Low irrigation notilage



KOREA

Water supply (domestic supply)	Drought in spring to winter according to regions	Reservoir size	Now the legal basis is divided into 2 ministries (MOE, MOLT)	Convergence into one legal basis
Sewage treatment in wet weather	Floods and heavy rainfall	Sewage treatment plant size	Sewage act (insufficient for wet weather sewage control)	To build sewage treatment plant larger under wet weather

Agricultural supply	Drought in spring season	Reservoir size	3 Ministries involved (MOE, MOLT, MOAFF)	Comprehensive counter measure to maintain water supply reservoir
Urban flood	Urban flooding under heavy rainfall	Sewerage system size	Limited sewer pipeline's size	Continuing to invest in enlarging
 MALDIVES				
Water resources	- Salt water intrusion - Depletion of fresh water lens - Deterioration of water quality Flooding	- Capacity constraints - Financial constraints Infrastructure	- Constitution - Water policy - Climate change policy - Draft water act in Parliament	- Promotion of IWRM - Institutional capacity - Increasing water security in islands - NDC and SDG
 MYANMAR				
Water resources	- Drought - Heavy rain – flood	- Shortage of water - Decrease in yield and production		
Agriculture	- Drought - Heavy rain	- Land degradation - Outbreak of pest - Damage in crop		
 NEPAL				
Water resources	- Temperature rise - Variation in precipitation and rainfall - Water induced disasters (flood, snow melting, GLOF, drought)	- Capacity gap - Resources gap - Data gap - Technology	- Constitution - Water resources Act and policy - Climate change policy - NAPA, LAPA - NAP in progress - Environment Act/Regulation IEE/EIA	- Drinking water - Irrigation - HP - Health - Tourism - NCCSP - EBA - PPCR - NAP
WASH	- Loss of water source - Water borne disease - Waste management (post disaster)	- Inter sector coordination		
Agriculture	- Land degradation - Drought - Change in crop pattern	- Effective Implementation of existing policy programs		
Others (Infrastructure, HP, Urban development)	- Damage and loss of infrastructure (roads, HP) - Increasing costs			
 SRI LANKA				

Water resources	<ul style="list-style-type: none"> - Floods and droughts (seasonal variation of availability of water) 	<ul style="list-style-type: none"> - Human displacement - Food security - Land slides - Power generation (hydro) 	<ul style="list-style-type: none"> - Disaster management policy - Climate change policy - Environment policy - drinking water policy 	<ul style="list-style-type: none"> - NAP in place - NDCs - SDGs
Agriculture		<ul style="list-style-type: none"> - Food security - Poverty - Poor coordination between agencies - Poor implementation of APs 	<ul style="list-style-type: none"> - Agriculture policy - Land policy - Land act - Forestry policy 	<ul style="list-style-type: none"> - Green Lanka program
 VIETNAM				
Water resources	<ul style="list-style-type: none"> - Quantity, quality - Degradation in some areas - Change in rain regime, leads to serious floods in raining season, - Droughts in dry season - Change in water flow in regions - Water salinity 	<ul style="list-style-type: none"> - Lack of integrated water management - Lack of data on water resources - Lack of comprehensive risk management in water sector - Capacity of state management 	<ul style="list-style-type: none"> - National strategy on CC - National strategy on water resources - Law on water resource 	<ul style="list-style-type: none"> - Development of integrated water resource management - Capacity building programs for water sector - Early warning system development - Investment in water system infrastructure - Water pricing system
Agriculture	<ul style="list-style-type: none"> - Change in water supply - Reduced productivity - Reduced agricultural land - Sea-level rising - Agricultural land flooded with salt water - Food security 	<ul style="list-style-type: none"> - Lack of proactive adaptation methods in agricultural sector - Lack of policy/legislations coping with CC impacts on agricultural sector 	<ul style="list-style-type: none"> - National strategy in CC - Action plan on adaptation in agricultural sector - Other agricultural sector: fisheries, plantation 	<ul style="list-style-type: none"> - Implementation of sectoral action plan - Strategy/research on new variety, approaches in plantation - Institutional arrangement - Impact assessment - Change approaches to opportunity of CC for agricultural development

Annex IV – Vulnerability and Risks Assessments

BANGLADESH				
System of interest	Current climate variability		Current Sensitivity	Coping and adaptive capacity
Agriculture Farmer	Variation in rain fall (excessive – low) Drought		Crop damage Fisheries losses Economic losses to farmers	Development of crop variety that can stand with flood condition Drought resistant variety Support provided by department of agriculture (seeding, fertilizer, micro-credit)
	Hazard	Exposure	Vulnerability	Risk and need for action
	Excessive rainfall turn into flooding Less rainfall turn into drought	Irrigation system deteriorate in south east part of Bangladesh are exposed to flooding Cultivable land deteriorates due to rain in northern part of Bangladesh Farmers and livelihoods are affected during flood	Irrigation system destroyed in southern and southeast – northern part of Bangladesh	Support provision for the farmer (seeding, fertilizer)

CAMBODIA				
System of interest	Current climate variability		Current Sensitivity	Coping and adaptive capacity
Urban water supply	Drought Long period- prolonged		Insufficient water storage Decrease water quality Improper urban development plan	Household rainwater collection Transport water from other areas Low adaptive capacity
	Hazard	Exposure	Vulnerability	Risk and need for action
	Prolonged Drought	Insufficient water storage Geographical locations are prone to drought Salt intrusion caused by sea level rise	Urban water supply system is highly vulnerable	Risk: 4 Need of action: 4

CHINA

System of interest	Current climate variability		Current Sensitivity	Coping and adaptive capacity
City drainage system	Rainfall		High drainage system deterioration Inadequate capacity Transport jam Risk to lives and assets	Improved infrastructure forecasting and early warning Public transport network (metro) City management
	Hazard	Exposure	Vulnerability	Risk and need for action
	Increasing intense rainfall	Water logging Traffic jam	High, ill and outdated design of drainage system Lack of infrastructure in some areas	High sponge city (city wet land, permeable pavement) Smart transport dispatching New system and sewerage Public awareness

INDIA

System of interest	Current climate variability		Current Sensitivity	Coping and adaptive capacity
Water resource management for agriculture, fishery, sanitation, energy, lives	Increased rainfall Drought Diseases Damages lives, stocks and animals		Embankment of rivers, sedimentation Erosion of productive soil Damaged to crop Loss of fishing in coastal area	Disaster management through early warning system Protection of river bank Crop management by insurance Insurance and compensation payment to farmers for loss of cattle
	Hazard	Exposure	Vulnerability	Risk and need for action
	Heavy rainfall followed by drought in some region	Loss of crop Loss of animals Loss of live stock Flood and drought by 60% and 40% respectively	Loss of property – high Loss of human life and animals	Crop insurance Animal insurance Reservoirs Hard and green infrastructure like conservation of wet lands

INDONESIA

System of interest	Current climate variability		Current Sensitivity	Coping and adaptive capacity
Irrigation system Farmer	Drought		Damaged irrigation infrastructure because of water conflict	Utilization farmers organization to determine the water allocation at farmer level Law enforcement

		Water allocation	Utilization farmers organization to determine the water allocation at farmer level Socialization of intermittent irrigation New construction of water storage infrastructure (small dams, etc)
Water supply system Rural communities	Drought	Water scarcity Settlements far from water sources Decreasing of water supply Water supply network is not available	Construction of public hydrants Socialization of efficient water use Construction of water storage Construction of water supply network
		Low income because their time used by taking and transporting the water to their house	Water supply by using water tank trucks Rainwater harvesting

IRAN

System of interest	Current climate variability		Current Sensitivity	Coping and adaptative capacity
Irrigation system	Drought Water pollution		Reduce of agricultural land Adverse effect on crop production	Increased efficiency irrigation Resilience crop
Farmers	Reduce of water resources withdrawal		Land subsidence Immigration Unemployment	Management of water resources No-tillage Change of cultivating time Adaptation plans Public awareness
	Hazard	Exposure	Vulnerability	Risk and need for action
Irrigation system	Soil erosion Dust storms More drought salinization	Increasing deeps and semi-deep wells Increased diseases Changing the permanent rivers to seasonal	High cost of water transportation Destroy of infrastructures, roads, farmland, cities... Increased social and economic cost	5

Farmers		Reduce of quantity crop production Livelihood risk Reduce of livestock	Social threats Transboundary problems Marginalization increased	3
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LAOS

System of interest	Current climate variability	Current Sensitivity	Coping and adaptative capacity
Rural infrastructure (irrigation system)	Heavy rain High temperature	Flooding Damage to pipes Insufficient water flow to rice fields Limited volume storage and delivery capacity	Upgrade irrigation system by using concrete lining Replace with steel pipes Upgrade water reservoir Capacity building for local authorities on how to maintain irrigation Place and protect water transmitting pipe underground (Planning on going) Implementing project using community based approach with technical assistance (on going) Provide addition of storage intake and storage (on going)

MALAYSIA

System of interest	Current climate variability		Current Sensitivity	Coping and adaptative capacity
Drainage system (rivers)	Variation in rainfall intensity and distribution More extreme events Increase in flood prone area especially in low lying areas Decrease in water availability Temperature rise		Siltation causing shallow river Water pollution Inadequate infrastructure	Flood mitigation programme (Department of irrigation) Early warning system at major rivers National water balance management system (few selected river basins)
Irrigation for agriculture			Increase/decrease of water supply	Extensive water management system (flow measurement on site and reporting system and comp-based dss)
	Hazard	Exposure	Vulnerability	Risk and need for action
Drainage system (rivers)	Flood Drought Soil/bank erosion	Damage to infrastructure, human settlement Water food borne disease Sioco-economic activities (aquaculture)	Medium – high (depending on river basins)	Medium - High

MALDIVES

System of interest	Current climate variability		Current Sensitivity	Coping and adaptative capacity
Water infrastructure – Household water tanks + community water tanks Community household	Prolonged dry periods		Inadequate storage capacity Space limitation Experience water shortage during dry periods	Water transportation on boats Upgrading community water tanks Increase storage capacity (design and construction) Introduce RO technology to water stressed islands (on-going)
	Hazard	Exposure	Vulnerability	Risk and need for action
	Seasonal fluctuations	Unavailability of rainwater for harvesting	Limited storage capacity due to design and space constraints High cost of water transportation on boats Capacity constraints to adapt to the RO technology	

MYANMAR

System of interest	Current climate variability		Current Sensitivity	Coping and adaptative capacity
Irrigation infrastructure DAM	Heavy rainfall Inflow to dam No real time information Manual water level		Dams were built over period of time (20 years) Damaged in structure	Review the old hydrological design parameter PNLF adopted Applied the old parameter for Idf
	Hazard	Exposure	Vulnerability	Risk and need for action
Irrigation infrastructure	Huge inflow rising water level	Damaged spillway structure	medium	4 Retrofitted auxiliary spillway Repair the old spillway
Dams structure	Dig spillage flows from spillway			Need to install rainfall station in catchment area Need to upgrade auto rainfall station Need to receive spatial and temporal data Data and information sharing Capacity building Technical assistance Modified operation system

PHILIPPINES				
System of interest	Current climate variability	Current Sensitivity	Coping and adaptive capacity	
Water support system	Increased temperature Increased/decreased in rainfall Increased variability between seasons Increased in frequency of tropical cyclones Sea level rise	Water infrastructure and management systems not designed for less variable climate conditions Inefficient infrastructures Degraded watersheds, reduce water quality and quantity Fragmented and weak institutional and governance environment Lack of comprehensive water-related data Significant number of municipalities still waterless	Retrofitting and construction of climate-smart and disaster-resilient water infrastructures and facilities Establishment of climate-resilient water system in waterless municipalities Promotion of rainwater harvesting (green building code) Establishment of water quality management area Provision of innovative and agricultural insurance schemes Development of national water policy to address governance, optimization of water use and integrated water management issues	
	Hazard	Exposure	Vulnerability	Risk and need for action
	Increased temperature and frequency of hot days and nights (more intense) Increased and decreased in rainfall More extreme weather events	Angat Dam is exposed to prolonged drought	Prolonged drought would decrease availability of water for irrigation energy, generation and domestic supply use Farmers rely mainly on Angat dam as their resource of irrigation water for production resulting in decrease in production (and income)	5 Creation of an APEX body Conduct vulnerability and risk assessment Climate proof water supply infrastructure Development of national water policy and water security roadmap Construct climate proofed and retrofit water supply for waterless municipalities Increased financing Rehabilitation and protection of watersheds and river basin areas

SRI LANKA			
System of interest	Current climate variability	Current Sensitivity	Coping and adaptive capacity
Water management for agriculture (crops)	More or less precipitation Flood Drought	Damaged agriculture land and crops Water quality issues	Wetland – lowland Flood control through existing irrigation system Existing sources

and rice, Irrigation system, Farmers)				Farmers insurance scheme
	Hazard	Exposure	Vulnerability	Risk and need for action
	Extreme weather events Crops damage Dry areas getting dryer Wet areas getting wetter	60% of land areas situated in flood prone area	Crops damage	5

THAILAND

System of interest	Current climate variability		Current Sensitivity	Coping and adaptative capacity
Assets : Infrastructure (dam, water reservoir, wier) Agriculture production Industry Actors : Operators (national board) Households People Farmers	Flood Rainfall patterns frequency		Insufficient drainers capacity Landuse pattern/management Water management coverage area Slow expand irrigation area pipeline Institutions: National Board Watershed committee Many agencies concern	Early warning system Mitigation and prevention plan from disaster Adaptive capacity building Awareness raising Preparedness Water management Networking
	Hazard	Exposure	Vulnerability	Risk and need for action
	Extreme rainfall events	Lowland area of the river basin High GDP area	high	Participatory water management: National board Watershed committee Local authority Water usage group

YEMEN

System of interest	Current climate variability	Current Sensitivity	Coping and adaptative capacity
Floods control system for local communities	Changing patterns of rainfall More frequent extreme events More frequent heavy rain	No early warning system in place to give local communities information Heavy rainfall not expected	Climate information network in place Local knowledge and perspectives Diastser risk reduction plan

Annex V – Draft roadmaps

