Metaguidelines for Water and Climate Change

For practitioners in Asia and the Pacific

Co-published by the Asia–Pacific Water Forum, Asian Development Bank and Global Water Partnership

Asia-Pacific Water Forum

ADB

Global Water Partnership

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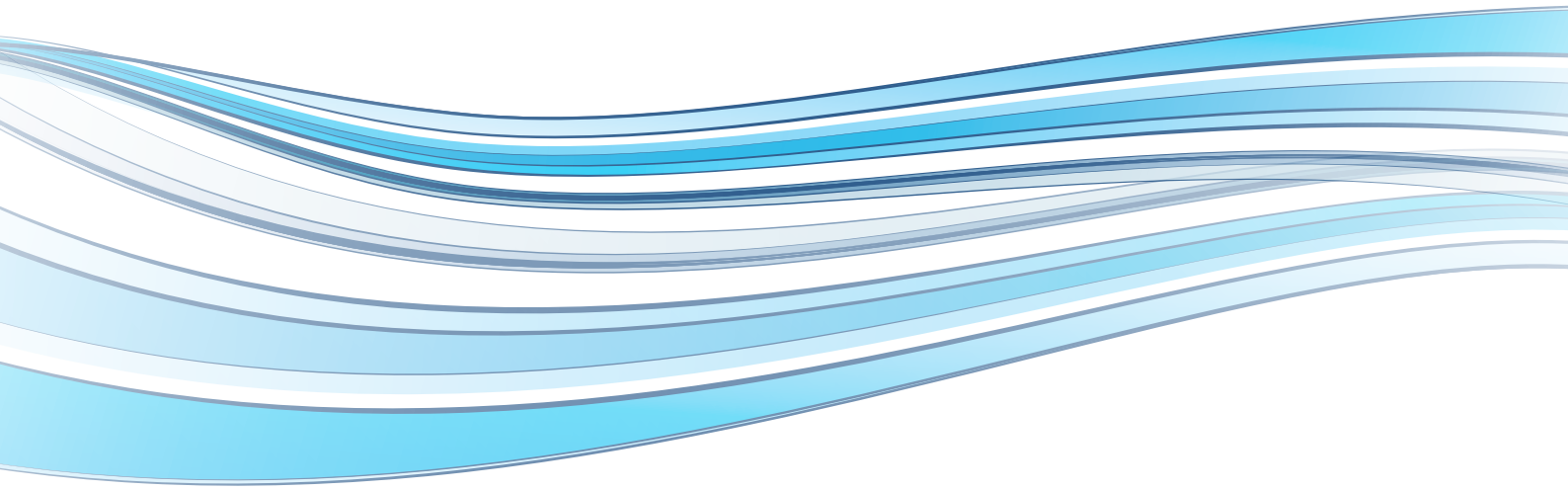

About the Asia–Pacific Water Forum

Created in 2006, the Asia–Pacific Water Forum (APWF) is an independent, not-for-profit, non-partisan and non-political network dedicated to improving sustainable water management by championing best practices, boosting investments, building capacity and enhancing cooperation throughout Asia and the Pacific. Through a commitment to cooperation and solidarity, APWF aims to capitalize on the diversity of Asian and Pacific experiences with water issues to accelerate the integration of water resource management into the socioeconomic development of the region. Since the inauguration of APWF, the network has put great emphasis on bringing water to the forefront of the political agenda. As such, APWF organizes the Asia–Pacific Water Summit, targeting top-level leaders in the region to generate the support and commitment required to meet the region's water challenges.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to the majority of the world's poor. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

About the Global Water Partnership

The Global Water Partnership (GWP) is an intergovernmental organization of 13 Regional Water Partnerships, 85 Country Water Partnerships and more than 3,000 Partner Organizations in 172 countries. Its vision is a water-secure world. Its mission is to advance the governance and management of water resources for sustainable and equitable development through integrated water resources management (IWRM). IWRM is a process that promotes the coordinated development and management of water, land and related resources in order to maximize economic and social welfare in an equitable manner, without compromising the sustainability of vital ecosystems and the environment.

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Contents

Foreword

The global water cycle is affected directly by climate change and Asia and the Pacific are known to be water-insecure. Together with other challenges, climate change poses a great risk to the social, economic and ecological development of this region. To address this increasing risk, there is a need to act in both the short and long term, focusing on mitigation and adaptation in response to current challenges and to reduce future risks.

Managing climate risk and uncertainty requires better governance and a more integrated and sustainable water resources management approach. Better information, policy, regulation, allocation and cooperation will pave the way for more proactive adaptation and enhanced resilience.

The *Metaguidelines for Water and Climate Change* were developed by the Asia–Pacific Water Forum (APWF) and Asian Development Bank (ADB) in collaboration with the Global Water Partnership (GWP). This publication is a continuation of the APWF Framework Document on Water and Climate Change Adaptation, developed for leaders and policy-makers in Asia and the Pacific in 2012. That framework document identified five key principles and corresponding actions to address climate change impacts on water and land resources in the region, focusing on what to do and why it should be done. The metaguidelines continue the messages of the framework document by addressing how the recommended actions can be implemented, with a focus on practical solutions illustrated by case studies from the region.

How can we enhance the adaptive capacity of countries to address the changes and uncertainties brought on by a changing climate in Asia and the Pacific? The answer is that we must ensure a strong knowledge base and co-benefits for mitigation and adaptation action, and identify finance for 'no regret' investments.

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Abbreviations

ADB	Asian Development Bank
APWF	Asia–Pacific Water Forum
BEAM	Basin Economic Allocation Model
CDKN	Climate and Development Knowledge Network
GCF	Green Climate Fund
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GWP	Global Water Partnership
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water Resources Management
REDD	Reducing Emissions from Deforestation and forest Degradation
REDD+	Goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

Introduction

Water is an integral part of livelihoods and economies, and one of the main media through which climate change is experienced. Asia and the Pacific have been declared water-insecure (ADB, 2013) and represent a landscape of evolving risk, where water managers need to manage the pressures from climate change and variation, but where historical meteorological and hydrological data may no longer provide reliable guidance. Within this challenging context, we need to know how practitioners can increase the resilience of societies to climate change and variation and how this can be achieved across different scales from community, city and river basin to national, regional and transboundary levels.

Climate change is a recognized global reality and the issue of 'non-stationarity' – in which past patterns may no longer indicate future trends – has come to the fore. Climate-related risks to environmental and societal systems are evolving in unprecedented ways, and the effective assessment and management of these risks requires a paradigm shift in our planning and problem-solving approaches.

There is a strong relationship between measures of national governance and water security (ADB, 2013). Most of Asia and the Pacific are comprised of developing countries with a common set of governance-related challenges. To enhance resilience to climate change there is need to strengthen knowledge about its impacts on water resources, to strengthen capacities to move into action with participatory and holistic approaches, and to ensure investments focusing on 'no regret' options and options with co-benefits for mitigation and adaptation. No regret investments deliver benefits regardless of ensuing climate and will help alleviate the cost and damage of water-related climate change impacts.

In addition to such adaptation action, local and bottom-up approaches are important for ensuring the inclusion of marginalized groups, especially women, children and the socially and economically disadvantaged.

The water sector needs to obtain the funding required to build capable institutions and resilient structures and systems that can withstand changes and variations in climate. 'Business as usual' (i.e. failing to consider the climate change risk) will result in loss of life as well as loss of cultural, ecological and economic assets, with economic returns decreasing as climate impacts increase.

While there has been considerable progress in addressing these complex challenges, there is still much to do. It is hoped that these metaguidelines will provide a knowledge base of best practice for Asia and the Pacific.

About the *Metaguidelines for Water and Climate Change*

In 2012, the Asia–Pacific Water Forum (APWF) Steering Group released the *Framework Document on Water and Climate Change Adaptation*, a publication aimed at leaders and policy-makers in Asia and the Pacific (APWF, 2012). This document identifies five key principles and corresponding actions focusing on what to do to address climate change impacts and why it should be done. The *Metaguidelines for Water and Climate Change* publication builds on the framework document by providing examples of how the recommended actions have been implemented, illustrated through case studies from Asia and the Pacific.

The metaguidelines are structured according to the five principles identified by the APWF framework document:

- Principle 1 – Usable knowledge
- Principle 2 – No regret investment
- Principle 3 – Resilience
- Principle 4 – Mitigation and adaptation
- Principle 5 – Financing

Under each principle, key messages are provided together with case studies demonstrating how the principles and recommended actions have been put into practice in the region to enhance climate resilience and water security. The numbered boxes illustrate various approaches and methods that have been adopted as a means to overcome constraints and promote greater integration and collaboration in the context of the five principles.

With a growing body of literature and guidelines on water resources and climate change adaptation, the aim of this publication is to provide some interpretation of this information by linking practical examples to the 'five principles' framework. In acknowledgement of the many guidance documents available, Annex 1 provides a non-exhaustive list of sources that we consider to be particularly relevant to the application of the key framework principles in an Asia–Pacific context.

The metaguidelines will be useful to a wide range of practitioners, including those in charge of financial allocation and national planning, project managers, the adaptation–mitigation community, educators, scientists, non-governmental organizations and the private sector. While the guidelines identify examples of good practice, which are shared by experts in the field of water and climate change, the intended audience goes beyond water resources specialists to include practitioners working in other water-dependent sectors such as energy and food.

Principle 1: Usable knowledge

How to bridge the gap between the knowledge generated by the scientific community and the specific needs of practitioners

The APWF framework document identified the generation of usable knowledge as a key principle in order to:

> *"...support scientists and practitioners to work together and develop knowledge that leads to effective actions and increased public awareness".*

The following actions were recommended as a means of achieving this aim:

Action 1.1 – Develop data infrastructure and networking for sharing data, information and knowledge to support decision-making and to raise public awareness.

Action 1.2 – Accelerate scientific efforts to improve the use of climate projections for countries, river basins and cities as well as to quantify and reduce the related uncertainty.

The 'gap' relating to usable knowledge lies between the contribution of science and its use by administrators, practitioners and communities. To deliver a better match, users' questions need to be answered by science, and solutions from both science and users need to be reviewed carefully. Science and users' knowledge should be improved by continuous, holistic and bottom-up approaches. We need to quantify uncertainty and translate and promote data- and information-sharing to ensure effective links between science and policy.

Key messages

- **Quantifying uncertainty**: Increase availability of historical observation data and improve data collection, archiving and analysis.
- **Translate data**: Interpret and translate observation data and prediction outputs into usable information for decision-making, planning and raising public awareness.
- **Sharing data and information**: Promote data- and information-sharing through exchanges to enhance knowledge and strengthen cooperative actions among stakeholders and science.

Quantifying uncertainty

The management of uncertainty is a feature of any planning exercise, regardless of whether climate is a significant factor. Within the water sector, uncertainties such as population growth, economic development and behavioural patterns are planned for regularly and, as such, the additional uncertainty relating to a changing climate should not become a barrier to action. It is important however that the latest and most accurate information is utilized fully within the planning and decision-making processes.

The impacts of climate change are often described generically, based on mean regional projections. However, quantifiable high spatial resolution data is needed to identify the right solutions at national and subnational levels. Achieving this requires active collaboration between planners and scientists to ensure that research is targeted at, and provides direct input to, actual planning processes and the selection of the most suitable investments. Use of historical projections is also important in planning for uncertainty as a measure to enhance the knowledge base on which to make projections and decisions.

The GWP South Asia and International Water Management Institute regional drought monitor for South Asia is a good example showing how scientific research is providing high spatial resolution of early warning on drought.

Further information at:
http://www.droughtmanagement.info/idmp-activities/south_asia/

Translate data

Before sharing information there is a need to interpret and translate observation data and prediction outputs into information that can be used for decision-making, planning and raising public awareness. In addition, research does not need to be conducted solely by scientists, but can be undertaken jointly by the scientific community and the stakeholders who will make use of the results. This increases the likelihood that outputs will be tailored specifically to needs..

The Space Applications for Environment initiative aims to encourage long-term monitoring of environmental change using space applications, especially satellite remote sensing technology. This will provide useful information on which to base risk reduction and adaptation programmes.

Further information at:
http://www.eorc.jaxa.jp/SAFE/index.html

The Climate and Development Knowledge Network (CDKN) has documented the development of a district disaster management plan in Gorakhpur, India. This is a good example of incorporating climate change data into district-level planning processes.

Further information at:
http://cdkn.org/wp-content/uploads/2014/05/CDKN_Gorakhpur_final_web-res.pdf

Sharing data and information

The sharing of data between institutions is a key aspect of adaptive planning. However, some researchers and institutions are reluctant to make their findings available to a wider (and potentially competitive) audience. Poor communication and coordination mechanisms among stakeholders also prevent broad data sharing.

The complexity and uncertainty associated with the impacts of climate change and the adaptation and mitigation responses required mean that stakeholders need the best possible information on historical and current conditions, as well as the most accurate long-term projections. Improving stakeholders' access to information is therefore essential to promote understanding, assess the benefits of enhanced climate resilience, and gain public trust and support for identified solutions. Box 1 describes community-led action to improve flood early warning in Thailand.

The CDKN 'inside story' on understanding the risk of flooding in Metro Manila, Philippines, provides a good example of collaboration between national and local institutions to make the best use of available information to predict and warn against flooding events.

Further information at:
http://cdkn.org/wp-content/uploads/2015/01/Inside-Story-Barangay-Potrero-Malabon1.pdf

Box 1: **Building capacity for early flood warning in Thailand**

The system for disaster early warning in Thailand comes under the responsibility of the Department of Disaster Prevention and Mitigation. However, this department operates only at the provincial level and its response in the past has been inadequate and slow. As a result, local communities have begun to take action by themselves to recognize the risk factors and minimize the effects of floods.

As part of the GWP Water, Climate and Development Programme, the Thai Water Partnership has been working since 2014 with key actors from local government and communities in Mae Sot Municipality, a town on the border between Thailand and Myanmar. With technical support from the Geo-Informatics and Space Technology Centre (based in northern Thailand) and the Faculty of Social Science at Chiang Mai University, the group has established community flood early warning systems to reduce the vulnerability of local communities to extreme weather events.

For example, the Water Partnership helped local groups to conduct surveys of their waterways to assess flood risk and aid risk reduction planning. In addition, they were introduced to a free android-based communication application (LINE), which enhances communication among local groups, agencies and municipality representatives; allows for presentation of the results of local community work; and helps local groups to access official information to aid early warning.

Source: GWP 2015. Capacity Building on Community-based Adaptation in the Risk and Vulnerable Areas to Extreme Weather in Mae Sot Sub-watershed, Thailand. GWP Southeast Asia. http://www.gwp.org/en/GWP-South-East-Asia/GWP-C-IN-ACTION/Water-Climate-and-Development-Programme-for-Southeast-Asia/ThaiWP/

Example from LINE information on water level and condition in the Moei River

Principle 2: No regret investment

How to plan for no regret investments, which yield benefits at minimal or low cost under any climate change scenario

The APWF framework document identified no regret investment as a key principle in order to:

> *"...identify and implement approaches that improve water security over a wide range of potential conditions, including current climate variability".*

Action 2.1 – Plan for incremental adaptation actions in tandem with improving climate projections.

Action 2.2 – Use an appropriate mix of structural and non-structural measures.

To respond to the uncertainty of climate change impacts in a country or region there is need to plan for no regret investments that will be of benefit in the majority of climate change scenarios.

Lessons learned from experience gained during recent large-scale, water-related disasters point to the importance of considering both structural and non-structural measures that can be of reference for future no regret investments.

Key messages

- **Risk literacy**: For national adaptation planning and disaster risk reduction investments there is need to understand short- and long-term risks under different climate change scenarios.
- **Coordinated approaches**: Investments should be structural, non-structural and multi-purpose to ensure benefits are spread across different sectors.
- **Continuous improvement**: Identifying lessons learned from existing adaptation strategies and actions at multiple levels will ensure incremental improvement of investments and investment planning.

Risk literacy

The uncertainty associated with climate change may be viewed as a reason to not invest in solutions that have been selected with adaptation and disaster risk reduction as a significant factor; i.e. why invest valuable resources to address scenarios that may not materialize, at least not in the near

future. Failing to convince politicians of the need for adaptive planning and investment can severely limit the opportunities to act. Legislative change, enforcement of regulation and policy development (including target setting) and mobilization of funding are often dependent on political mechanisms and commitment. Fostering an understanding of adaptive planning and its benefits among politicians is therefore essential to gain the necessary buy-in to prioritize an alternative, more resilient approach to water management.

The arguments most likely to gain such commitment centre on minimizing costs and reducing the risk of disaster. Highlighting the multiple, cross-sector benefits of climate-sensitive planning combined with the possible consequences of inaction will help politicians to view an alternative, flexible and possibly decentralized approach to water management as something that addresses the needs and priorities of their constituents. When presented together with a robust financial case, both in terms of comparative investment costs and savings from reduced vulnerability, the political mileage to be gained from not following a business as usual model can be substantial.

The Asian Development Bank (ADB) describes the relationship between climate resilience and infrastructure planning and investment in Khulna, Bangladesh.

Further information at:
http://adb.org/sites/default/files/pub/2011/adapting-climate-change-ban.pdf

***Vulnerability and Adaptation to Climate Change in the Semi-Arid Regions of India* provides an assessment of the multidimensional aspects of risk, impact and vulnerability.**

Further information at:
http://www.assar.uct.ac.za/sites/default/files/image_tool/images/138/RDS_reports/INDIA/South%20Asia%20RDS%20full%20report.pdf

Coordinated approaches

The conventional approach to water management is focused largely on addressing existing problems through large-scale, long-term investments in hard infrastructure. Such interventions have been designed typically based on a principle of 'stationarity', i.e. that natural systems remain within a known range of variability based on historical data. The inflexibility of such infrastructure as dams, centralized treatment plants and flood defence barriers means that in the event of non-stationarity, for example due to the impacts of climate change, water management is locked into a design that fails to function at its intended capacity and cost.

Planning flexible water management developments that are able to cope with a wide range of future climatic, economic and social scenarios reduces the vulnerability of the system to changing and uncertain conditions. No regret and low regret solutions, such as demand management, wetland conservation and wastewater reuse, have the potential to achieve water management goals irrespective

of climatic variation. In contrast with large-scale investments, decentralized solutions spread risk and typically retain an element of design flexibility once implemented. This means they can be adapted to future change more easily (see Box 2). Alternative solutions, such as the use of natural systems for storm water management, can also be designed to confer multiple benefits, including flood control, wastewater treatment and ecosystem conservation.

Flood preparedness and prevention was improved in Hanoi, Vietnam through a combination of structural and non-structural measures identified through an integrated approach.

Further information at:
http://siteresources.worldbank.org/INTEAPREGTOPURBDEV/Resources/573631-1233613121646/hanoi_extop.pdf

In India, an action planning process was used to 'future proof' Madurai city, working towards sustainable development of its water infrastructure.

Further information at:
http://www.bartlett.ucl.ac.uk/dpu/future-proofing-indian-cities/Madurai_Action_Planning_Report_-_Final-Feb2014.pdf

Continuous improvement

While long-term predictions can be useful for suggesting the scope of climate change that may be expected, there is also a need to track short-term changes and variability. Regular evaluation of changing conditions and the consequent risk is necessary. Since climate projections are being refined continuously as more data become available, the level of uncertainty is also reducing. On-going use of this data should inform the operation and modification of investments over time.

In addition, monitoring and evaluation can help identify lessons emerging from existing adaptation strategies and actions at multiple levels to ensure incremental improvement of investments and investment planning.

In Bangladesh, challenges and lessons have been identified from the first phase of the Comprehensive Disaster Management Programme. These have been used to inform a second phase and guide further work on managing disasters (CDKN 'inside story').

Further information at:
http://cdkn.org/wp-content/uploads/2011/12/Bangladesh-InsideStory_5pp_pr4F_LR1.pdf

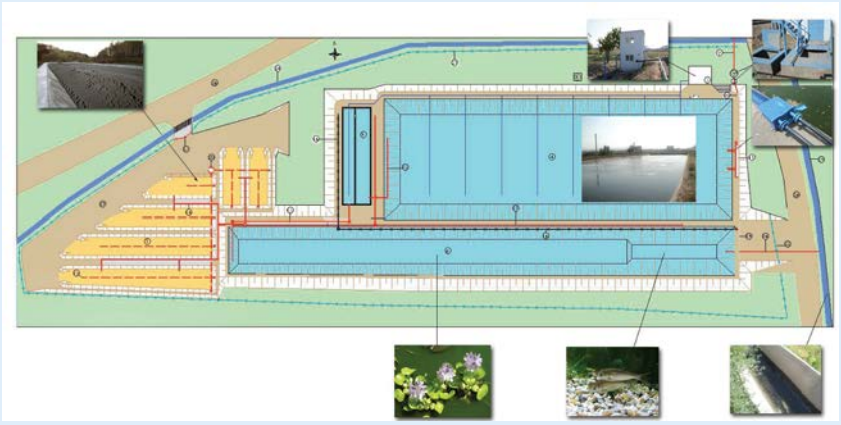
Box 2: **Decentralized wastewater treatment in Armenia**

With much of Armenia's wastewater infrastructure in need of rehabilitation, a decentralized approach to wastewater treatment and reuse has been adopted in the village of Parakar. This example illustrates one way in which more sustainable wastewater management could be adopted elsewhere in the country.

Responding to severe social, economic and environmental impacts caused by a lack of wastewater treatment, the Parakar community and GWP-Armenia obtained funding, initially from the Global Environment Facility Small Grants Programme, to design and construct a decentralized wastewater treatment plan. This consisted of biological treatment facilities with a capacity of 150m^3 per day and was the first of its kind in Armenia. The non-conventional technology was relatively cheap to build and operate compared with reconnecting the village sewer system with the Yerevan centralized wastewater infrastructure. It also ensured the wastewater was treated to the necessary standard to eliminate health risks for the local population and enable safe reuse for agriculture. Initial construction of the treatment facilities was completed during the first stage of the project between 2010 and 2012. The second stage was financed by local funds and the GWP Water, Climate and Development Programme in Central Asia and Caucasus. This added a naturally aerated biological treatment pond system enabling secondary treatment to occur through aquatic plants.

The Parakar wastewater treatment project has achieved significant multi-purpose benefits for the community. The decentralized wastewater treatment facility protects the health of the local population and can be operated and maintained by locally trained staff using community funds. It also allows the treated wastewater to be used as a resource, thereby boosting agricultural productivity and reducing reliance on rainfall.

The technology illustrates an integrated solution that addresses heath, economic and environmental needs. In the context of climate change, the treated wastewater can be used for irrigation to reduce farmers' reliance on regular rainfall. This makes it a low regret solution. In the context of the on-going nationwide initiative to rehabilitate the country's wastewater management, the Armenian government has shown considerable interest in using the technology elsewhere in the country. Armenia is likely to suffer increased water scarcity and drought as a consequence of climate change and this low-cost, flexible solution addresses problems that are common to many small- to medium-sized communities in Armenia.



Source: GWP 2010. Armenia: Local solutions for waste water management in Armenia village. Case study No 438. GWP IWRM Toolbox.
http://www.gwp.org/en/ToolBox/CASE-STUDIES/Asia/Armenia-Local-solutions-for-waste-water-management-in-Armenia-village-438/

Principle 3: Resilience

How to build a robust local governance system and local capacities that can enable effective decision-making in a participatory manner

The APWF framework document identified the development of capacity for resilience as a key principle in order to:

> *"...build societies' capacity to develop communities' resilience in the face of a changing climate".*

Action 3.1 – Strengthen the adaptation capacities of water managers, communities and society as a whole.

Action 3.2 – Improve community-based water risk management capacities.

Knowledge is a prerequisite to the development of resilience within differing and sometimes isolated communities, whether their setting is urban, rural, agricultural, riparian or mountainous. Such knowledge is normally accumulated through direct experience and exposure to local challenges. It can be improved through targeted capacity building and sharing of information from technical, social and community sources. Capacity development needs will be specific to different locations and training will be required at various levels of the community, especially for vulnerable groups including women, youth, children and the elderly and infirm. Water managers have a role to play in assisting and supporting local communities.

Key messages

- **Participatory approaches**: Strategies to foster and strengthen stakeholder engagement should be mainstreamed into national development planning and implementation.
- **Build ownership and leadership**: Community ownership and strengthened leadership will follow when all stakeholders are involved in community development activities.
- **Capacity development**: Support for capacity development is the key to enhancing people's ability to adapt and deal with climate change; it involves effective use of knowledge and data, and requires allocation of resources.

Participatory approaches

The responsibility for climate change adaptation does not rest with a single institution; it requires action at all scales, from households to the highest level of government. Adaptation planning is therefore a participatory process involving a broad range of stakeholders.

A multi-stakeholder process should complement rather than replace water governance structures and procedures. While the responsibility (and accountability) for formal decision-making rests with the mandated institution, a comprehensive stakeholder engagement process ensures that decisions are taken based on input from those who will be affected by the results. The inclusion of such input into national and local planning frameworks should be made prominent, since this in turn establishes community ownership of the adaptation plans and strategies upon which the success or failure of an investment may depend.

A watershed approach to coastal zone management in Balikpapan Bay, Indonesia, illustrates the importance of engaging institutions and local communities.

Further information at:
http://www.gwp.org/en/ToolBox/CASE-STUDIES/Asia/Indonesia-A-watershed-approach-to-coastal-zone-management-in-Balikpapan-Bay-85/

The Local Adaptation Plan of Action process in Nepal has been established to address the adverse effects of climate change at the local level within a national adaptation framework.

Further information at:
http://www.jvs-nwp.org.np/editor/preparation-local-adaptation-plan-action-and-investigation-investment-requirements-village

Build ownership and leadership

As mentioned above, community ownership is essential to strengthening resilience. However, comprehensive stakeholder engagement in governance processes and planning frameworks is just one part that society can play in mitigating the impacts of climate change. More sustainable agricultural practices, rainwater harvesting at the household level, wastewater reuse and reforestation are some examples of how society can increase resilience to climate change.

Community-led adaptation solutions are not necessarily costly and are likely to have multiple benefits. However, community members may not be aware of alternative technologies and the importance of managing climate risk. Increasing capacity to implement community-based adaptation solutions through local workshops and focus group discussions is a key requirement that can achieve significant gains in increasing local resilience.

The CDKN 'inside story' on local approaches to harmonizing climate adaptation and disaster risk reduction policies examines the role of local multi-stakeholder platforms as a means of increasing community resilience in northern India.

Further information at:
http://cdkn.org/wp-content/uploads/2014/05/Leh-Barmer-Inside-Story_WEB1.pdf

Capacity development

There is a need for better adaptive capacity to strengthen resilience to climate change and this can be achieved through effective use of knowledge and data, and allocation of resources. Just as the impacts of climate change affect all sectors, so the response must address the resilience of society as a whole. The learning element is crucial when it comes to investing in alternative solutions and the documentation of past experience provides the basis for large-scale uptake of innovation.

Demonstration projects provide a powerful way to showcase adaptation solutions that address different aspects of developing resilience and include flood protection, energy security and environmental preservation. Box 3 illustrates an example from Indonesia.

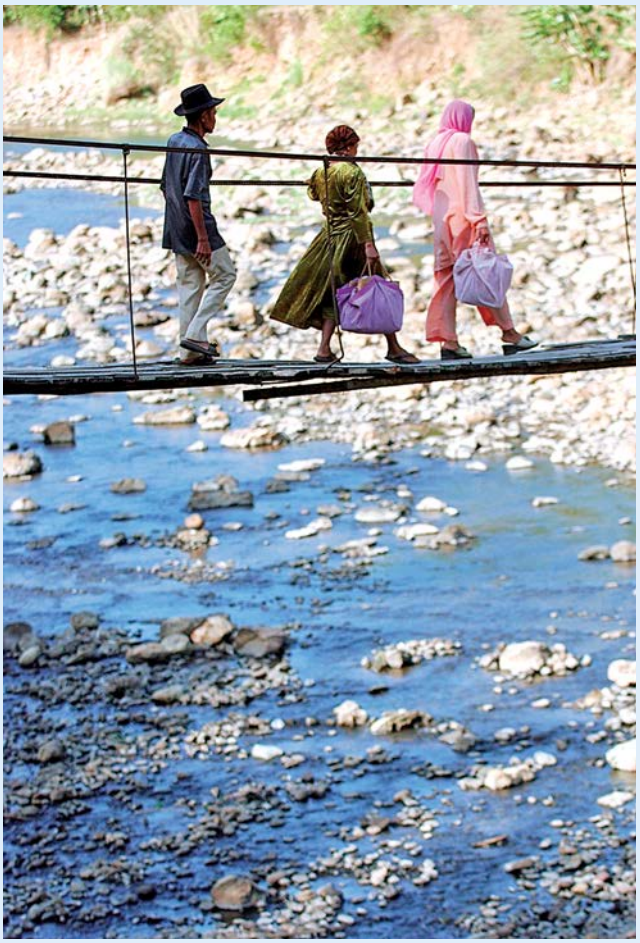
A capacity building project in Andhra Pradesh, India, helped to improve agricultural water productivity using canal and tank irrigation systems.

Further information at:
http://www.gwp.org/en/ToolBox/CASE-STUDIES/Asia/India-Actual-scope-for-improving-water-productivity-in-irrigated-agriculture-in-Andhra-Pradesh-359/

The CDKN 'inside story' on building resilience to climate change locally describes the case of Valenzuela City, Metro Manila, demonstrating the need for institutional collaboration and integrated planning when addressing climate resilience.

Further information at:
http://cdkn.org/wp-content/uploads/2015/03/Valenzuela-Inside-Story.pdf

Box 3: **Building resilient farming communities in Indonesia**



The Sereng River catchment is an area of high agricultural productivity with fertile soil, but it is surrounded by severely deforested and eroded hillsides. It therefore suffers from reservoir sedimentation as well as acute stream pollution from farmed animal waste. Furthermore, villages located on the riverbanks were devastated by unprecedented flooding during the 2010 rainy season.

Beginning in June 2010, Jasa Tirta I Public Corporation, the managing river basin organization, in cooperation with the Economic and Social Commission for Asia and the Pacific and other partner agencies, developed and implemented a programme with a combination of structural and non-structural aspects, as well as community capacity building involving women and youth. Under this programme, the communities learned to manage their rural watershed through a combination of terracing, reforestation, construction of gully plugs, riverbank protection and check dams, thus reducing erosion on the hill slopes. They also constructed a small hydropower facility for street lighting, and produced biogas for cooking from recycled animal waste, thereby securing alternative energy sources. These actions concurrently reduced river pollution and enabled energy self-sufficiency.

Source: UNESCAP 2012. Water and the Green Economy – Capacity Development Aspects, Chapter 10: Watershed management of Sereng River Basin: Part of the Brantas River Basin System, East Java, Indonesia
http://www.unwater.unu.edu/file/get/534%20

Principle 4: Mitigation and adaptation

How IWRM principles can be applied to attract co-benefits for climate adaptation and mitigation action when addressing climate change

The APWF framework document identified the importance of Integrated Water Resources Management (IWRM) principles as a suitable approach to mitigation and adaptation planning in order to:

> *"... adopt optimal combinations of measures that can improve coherence and coordination across levels and sectors to foster resilience and long-term sustainability".*

Action 4.1 – Promote IWRM in river basins as the appropriate process for planning and investments.

Action 4.2 – Promote synergies in the planning and implementation of adaptation and mitigation measures.

IWRM is defined as a process that promotes the coordinated development and management of water, land and related resources in order to maximize economic and social welfare in an equitable manner, without compromising the sustainability of vital ecosystems and the environment. With climate change increasing the risk of extreme rainfall, floods and droughts, and sea-level rise, the importance of the IWRM approach to adaptation has been recognized by the Intergovernmental Panel on Climate Change (IPCC), which states: "*it can be expected that the paradigm of IWRM will be increasingly followed around the world... This is likely to decrease the vulnerability of freshwater systems to climate change*" (IPCC, 2014).

Climate change affects all sectors of society, mainly through land and water systems. Adaptation and mitigation actions therefore call for horizontal and vertical integration of management approaches. The use of water by different sectors (agriculture, domestic, energy, health, industry etc.) and the ways in which these uses affect each other require cross-sector management approaches, not least to address the building of adaptation and resilience. The IWRM approach links the community and watershed levels with those of river basins and cities, and national and regional or transboundary levels.

Key messages

- **IWRM at basin scale**: Recognize the river basin as the logical framework within which hydrologic and environmental processes are quantified, and hence as the fundamental geographical setting for IWRM and adaptation planning.
- **Nexus approach**: Work in an integrated approach that includes all relevant sectors (e.g. water, food, energy and ecosystems) when applying IWRM for climate change adaptation.
- **Co-benefits for adaptation and mitigation:** The IWRM approach can be used to achieve both adaptation and mitigation benefits when addressing climate change.

IWRM at basin scale

Depending on the governance structures in place, water resources are managed to varying degrees across different planning scales, ranging from regional to community. While the basin scale is the natural hydrologic management unit, the reality of institutional mandates and responsibilities means that water is managed typically through a combination of regional, national, river basin, sub-national and community institutions.

Mainstreaming water and climate resilience into development planning within a basin will therefore require significant vertical collaboration. It is also essential to have a guiding climate change adaptation policy and/or action plan based on IWRM principles to provide the vision and priorities to which planning documents and frameworks at different levels can be anchored. This helps to ensure that planned actions contribute to, rather than contravene, a common good regardless of the level at which they are implemented.

The UK's Department for International Development cites an example from Nepal where improved catchment management helps build the climate resilience of watersheds in a mountainous region.

Further information at:
http://ppcr.moste.gov.np/?page_id=12

Nexus approach

While water resources are affected directly by climate change, indirect or 'knock-on' effects are invariably felt beyond the water sector, most notably in the agriculture, energy and environmental management sectors. Adaptation solutions therefore need to address impacts from the perspective of different stakeholders. The water–food–energy–ecosystems nexus provides a relevant entry point for adaptation planning, since the tangible links among sectors need to be appreciated when analysing the impacts of and exploring the solutions to address a changing climate.

The application of demand management measures also demonstrates the need for horizontal integration among the different institutions and sectors that influence or are influenced by water scarcity. Reducing water consumption at a significant scale depends on a range of stakeholders organizing their activities in a coordinated manner. An integrated approach provides a clear basis for linking adaptation planning with climate change mitigation through, for example, renewable energy sources that are highly dependent on water, such as hydropower and biofuels, and the carbon sequestration provided by water-dependent ecosystems.

The CDKN 'inside story' on integrating urban agriculture and forestry into climate change action plans in Sri Lanka offers good examples of interventions that address local water, food and energy needs while simultaneously increasing climate resilience.

Further information at:
http://cdkn.org/wp-content/uploads/2014/05/SriLanka_Inside_Story_final_web-res.pdf

Co-benefits for adaptation and mitigation

Adaptation and mitigation are equally important in development processes, ranging from short-term to long-term perspectives where adaptation action helps address impacts and uncertainties from climate change, and mitigation is needed to minimize the effects of a changing climate on our communities. There is a need to identify the co-benefits between adaptation and mitigation measures that contribute to minimizing the risk of duplication of efforts and ensure effective allocations for investments.

IWRM provides options for achieving adaptation and mitigation benefits when addressing climate change. With impacts on all sectors, the integration of management approaches is vital. See Box 4 for an example involving participatory forest management in Nepal.

CDKN cites an example illustrating adaptation and mitigation co-benefits achieved through a Reducing Emissions from Deforestation and forest Degradation (REDD+) programme in Fiji.

Further information at:
http://cdkn.org/wp-content/uploads/2012/11/Fiji-InsideStory.pdf

Box 4: **A mitigation intervention mechanism with adaptation co-benefits in Nepal**

Deforestation and forest degradation is continuing unabated, especially in least developed countries. To combat this, the United Nations is promoting Reducing Emissions from Deforestation and forest Degradation (REDD), in an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. 'REDD+' goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks. REDD+ recognizes: a) emissions reduction from deforestation; b) emissions reduction from forest degradation; c) conservation of forest carbon stocks; d) sustainable management of forests; and e) enhancement of forest carbon stocks.

Where REDD+ is dovetailed with participatory forest management, such activities have made the mitigation intervention more sustainable and serve as a basis for ecosystem-based adaptation measures. This is especially relevant in the Himalaya region, where landscape-level REDD+ is an ideal watershed management strategy to conserve vegetation, soil and water resources, thereby helping to maintain a healthy ecosystem on mountain slopes.

This recognition has led Nepal to focus on the co-benefits of REDD+, taking adaptation and mitigation aspects together. The Government of Nepal, in its March 2013 submission to the UN-REDD web portal, discussed how the term 'co-benefits' refers to non-carbon benefits associated with the implementation of REDD+ activities, and takes into account:

- enhancement of local livelihoods
- an increase in the value of biodiversity
- better ecosystem services for people and environment
- more resilient ecosystems for climate change adaptation
- improved governance, institutional setup and policies for natural resource management at local to national levels
- contributions to Multilateral Environmental Agreements (Aichi targets and other provisions of the Convention on Biological Diversity, the Ramsar Convention, the Convention on International Trade in Endangered Species and the United Nations Convention to Combat Desertification).

Source: Communication from the International Centre for Integrated Mountain Development
Further information at: http://www.un-redd.org

Principle 5: Financing

How to make best use of climate finance

The APWF framework document identified financing as a key principle in order to:

"...increase dedicated climate financing substantially".

Action 5.1: Conduct economic impact assessments for various adaptation options.

Action 5.2: Mobilize significant investments today (e.g. commit 1% of gross domestic product or GDP) to prevent greater damage later (e.g. 5%) as advised by the Stern Report.

Addressing and managing risk in the water sector due to climate change will require new and significantly expanded financial resources. ADB and the Asian Development Bank Institute estimate Asia's total infrastructure investment needs in the areas of water and sanitation for 2010–2020 to be over US$380 billion, with $155 billion needed for new capacity and $225 billion needed to replace and upgrade existing investments (ADB and ADBI, 2009 p.167).

It is clear that a post-2020 deal depends on the mobilization of finance to help developing countries respond to climate change. The current goal is for $100 billion per year by 2020. It is important that the water sector actively seeks to obtain its fair share of additional funding. There has been encouraging progress in securing the Green Climate Fund (GCF) as the central funding mechanism of the United Nations Framework Convention on Climate Change (UNFCCC) and over $10 billion was pledged by December 2014. Furthermore, funding for climate change has been increasing steadily from a range of sources, with the water sector receiving a significant share (ODI, 2014; CPI, 2014).

Climate change policy is a comparatively recent and growing field of policy and practice underpinned by new, additional and re-allocated resources. Policy transformation is taking place as the world strives to achieve low-carbon climate-resilient development. Initiatives are moving from project to programme framed at the international level, first through the development of National Adaptation Programmes of Action, National Adaptation Plans and Nationally Appropriate Mitigation Actions. More recently, commitments have been made to prepare Intended Nationally Determined Contributions (INDCs). INDCs will form a key part of a post-2020 climate agreement. It is vital that water resource managers and practitioners engage closely with these developments to bring an operational interface to their investment programmes at the national level.

Key messages

- **Identify priority investments:** Identify which investments have priorities for climate funding through the use of such tools as economic analysis.
- **Climate readiness**: Work to create climate readiness at national level in order to access global funds and to prepare a funding pipeline.
- **Coherence**: Seek to identify and improve coherence on domestic climate funding for water.

Identify priority investments

In planning and implementing public infrastructure investments, development finance agencies routinely evaluate and manage a wide range of risks, including those to credit, politics, exchange rates and operations. Each risk arises from uncertainty, and identifying an effective risk management strategy requires uncertainties to be quantified as much as possible. Often, uncertainty reflects a lack of information, but sometimes it is inherent, as is the case with climate change and its impacts. Climate change is recognized increasingly as a significant risk to many types of development investment, in particular to such long-term investments as water infrastructure.

There is a distinction between the economic impacts of climate change on a water project and the benefits of a proposed adaptation intervention. The costs imposed by climate change on a project conceptually represent the difference between the net benefits that the project would deliver in the absence of climate change, and the net benefits reflecting the impacts of climate change on both costs and benefits for the same project (i.e. without assuming any adaptation). A comprehensive benefit–cost assessment of climate change adaptation interventions for a given water project would include: a) net benefits of the project without climate change; b) net benefits assuming climate change impacts but without adaptation; and c) net benefits with adaptation. Such an analysis enables the cost of climate change and the net benefits of adaptation to be estimated in addition to the final net benefits of the project with adaptation.

The benefit–cost analysis of climate change adaptation (risk management) alternatives is one essential component of the comprehensive climate risk and vulnerability assessment for water projects. ADB has proposed a framework to guide project teams in determining the appropriate timescale for intervention.

Further information at:
http://www.adb.org/documents/guidelines-climate-proofing-investment-energy-sector

The Basin Economic Allocation Model (BEAM) has been developed as an economic model for water use in the Aral Sea basin. With a focus on five sectors (agriculture, energy, environmental flows, industry and sanitation), BEAM supports the assessment of water use and decision-making with regards to water allocation in the region.

Further information at:
http://www.gwp.org/en/ToolBox/CASE-STUDIES/Asia/Transboundary-BEAM---Aral-Sea-Basin-Economic-Allocation-Model-432/

Climate readiness

Analyses of the challenges faced by countries when addressing the impacts of climate change find capacity constraints to be a key issue. This is particularly the case when countries develop high-quality programmes to meet international standards and qualify for funding such as that provided by the Adaptation Fund and GCF (GCF, 2014). This gap in capacity often relates to institutional and policy requirements.

To help fill this gap, institutions such as the United Nations Development Programme (UNDP) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) have developed frameworks for initiating climate readiness. UNDP defines climate readiness as the capacity of a country to plan for, access, deliver, and monitor and report on climate finance, both international and domestic, in ways that are catalytic and fully integrated with national development priorities and achievement of the Millennium Development Goals (UNDP, 2012). Guidelines for establishing National Designated Authorities (to manage the interface between the international and national levels) are available from UNDP and GIZ (UNDP, 2012; GIZ, 2012).

In October 2014, the GCF Board approved a detailed readiness work programme intended to maximize the effectiveness of the Fund and to support and empower developing countries to drive the process of programming their resources. The country-driven programme is intended to maximize impact by supporting strategic stakeholder engagement and balancing adaptation and mitigation. It makes the best investments viable by supporting implementing entities to develop robust pipelines and programmes. It also extends the Fund's reach by helping developing countries meet accreditation requirements and work in partnership with multilateral partners. As of January 2015, over 20 countries from Asia and the Pacific had registered initial National Designated Authority nominations. Countries may request support to these (see Box 5).

GWP-Nepal has published a collection of examples of climate change adaptation projects and major activities on climate financing.

Further information at:
http://www.jvs-nwp.org.np/sites/default/files/Climate%20Financing.pdf

The Climate Finance Ready website provides a useful platform for knowledge exchange for climate finance readiness.

Further information at:
https://climatefinanceready.org/

Box 5: **Indonesia prepares to address climate change**

Indonesia's National Council on Climate Change has requested support from the Global Climate Fund (GCF) readiness programme to engage national stakeholders, including government, civil society, the private sector and potential implementing entities and intermediaries. The aim is to deepen understanding of the goals and requirements of the Fund, and agree on Indonesian priorities, building on the multiple strategies, plans and policies that Indonesia has developed in its response to climate change. The readiness programme will complement the wide range of efforts already being supported by national and international partners to strengthen Indonesia's capacity to use climate finance in its national response.

Source: Green Climate Fund, 2014. GCF Readiness Newsletter – October 2014.
http://www.gcfund.org/fileadmin/00_customer/documents/Readiness/2014-10-Readiness_Newsletter.pdf

Coherence

The UNFCCC sets clear obligations for developed countries to provide new and additional funds for climate change and has led to the current climate funding system. In 2012 there were more than 50 international public funds, 60 carbon markets and 6,000 private equity funds already providing 'green finance', although the ideal balance of public to private sources remains a contested issue (UNDP, 2012). There is, as yet, no agreement for delivery of the agreed $100 billion a year after 2020 and so the financing gap is likely to persist.

While the GCF and the special-purpose climate funds (e.g. the Pilot Program for Climate Resilience, Special Climate Change Fund, Least Developed Countries Fund and the Adaptation Fund) are the most widely identified and documented sources of finance for adaptation, including for the water sector, in fact they represent a relatively small part of the overall landscape (around 3% of total adaptation spend). National development banks, multilateral and regional development banks, national governments and bilateral development assistance organizations (in that order) all contribute significantly more to total adaptation finance, and should be considered when seeking adaptation co-finance for water sector projects.

The UNDP Asia and Pacific office has been supporting the development of innovative financial and policy frameworks to drive coherence in national climate change financial planning. These can help water sector practitioners become central to climate change policy and strategy implementation through engagement in Climate Public Expenditure and Institutional Reviews and Climate Fiscal Frameworks.

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