



**Policy Brief Series, No.1**

**Climate Change Adaptation in the Water Sector: What does it mean for Thailand's water resources management?**

## Strengthening the resilience of Thailand's water sector: Integrating climate change adaptation into water resources management

### I. Why the Thai water sector needs to adapt to the impacts of climate change

**Climate change is a reality and already affecting people, the economy and the environment across Southeast Asia.** Thailand is highly vulnerable to the impacts of climate change and, according to the Global Climate Risk Index (CRI) is ranked the 9th most affected country by climate change and extreme weather events in the period 2000-2019.<sup>1</sup>

**The impacts of climate change strongly manifest in changes to the water cycle.** Climate change not only results in gradual, yet significant effects on water availability and quality but also increases the risks of water-related extreme events and disasters. For Thailand, more intensive rainfalls on the one hand, and more variable rainfall patterns on the other, have been observed and are also expected for the future. More flashfloods and severe inundations as well as prolonged hot and dry periods may be the result.

**Climate Change Adaptation (CCA)**  
can be defined as  
**“the process of adjustment to actual  
or expected climate and its effects”.**  
*(IPCC AR5)*

**The adverse impacts of climate change on water resources are becoming apparent in many ways and put Thailand's sustainable development at risk.** As seen in 2020, Thailand experienced the most severe drought the country has seen in over 40 years, it is becoming more and more obvious that **water-related climate change impacts adversely affect economic growth**, income generation, food security and human health as well as

the integrity of important ecosystems and biodiversity.

The failure to adapt water management strategies to the known impacts of climate change may result in significant human and financial losses, hamper livelihoods of the Thai people and even put their lives at risk. The consistent integration of climate change adaptation in Thailand's water resources management strategies and the systematic application of climate and disaster risk information for

<sup>1</sup> The Global Climate Risk Index (CRI) 2021. Germanwatch. Available at:  
[https://reliefweb.int/sites/reliefweb.int/files/resources/Global%20Climate%20Risk%20Index%202021\\_1\\_0.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/Global%20Climate%20Risk%20Index%202021_1_0.pdf)



planning and investment decisions therefore needs to be a top priority in Thailand's national response to climate change.

## II. Mainstreaming of climate change adaptation

### II.1 Integrating climate change adaptation at the national level

**Adaptation to the impacts of climate change is a core challenge for Thailand's water sector.** While water management is already complex, climate change will make the sustainable and equitable management and use of water even more challenging. Through timely and coordinated action however, Thailand can build a resilient water sector which will also help further sustainable development in other, water-related sectors.

Recommendations for climate change mainstreaming at the policy level:

- **The systematic integration of climate change adaptation into the 20-Years Water Resources Master Plan (2018-2037) as the guiding strategic framework of the water sector should be prioritized.** Regular assessments of the existing and desired level of integration of climate change adaptation into the Master Plan's six strategies [and the respective implementation plans] can help to track progress and identify gaps. Based on this, water related agencies will be able to identify suitable entry points to enhance climate-resilient approaches. In addition, these experiences can inform the next 5-year revision of the Master Plan which should reflect concrete objectives for climate change adaptation in a more explicit manner.
- **All water-related agencies should take climate change impacts into account in their formulation of policies and implementation of strategic plans.** Proposed measures to address this include building institutional capacity and technical know-how of agency staff, establishing budget lines for adaptation-related activities and developing adequate financing mechanisms to further climate change adaptation in water resources management. Setting-up **institutional exchange mechanisms for exchange and cooperation on climate change issues among water-related agencies** could also help to identify gaps and priorities and make use of the profound knowledge and experience in the sector.

***Thailand's National Climate Change Master Plan (2015-2050) aims to help the country achieve low-carbon growth and climate resilience by 2050. The key mission under adaptation is to "[build] climate resilience into national development policy by integrating directions and measures in all sectors at both national and sub-national levels to ensure country's adaptability to climate change". To achieve this goal, Thailand has developed the National Adaptation Plan (NAP) with the aim to build adaptive capacity and enhance climate resilience in six priority sectors, including the water sector. The water-related adaptation targets under the NAP are (1) to increase water security and (2) to reduce loss and damage from water-related disasters by developing mechanisms and approaches for integrated water resources management and building adaptive capacity and climate resilience to manage climate risks in water resources management.***



- **Water and climate change policy frameworks should be consistent from an early stage of their development.** By working hand in hand in the formulation of policies and plans that target water and climate change related goals, duplication and misalignments can be avoided and greater clarity in the role and mandates in the implementation of water and climate change related targets can be ensured.
- **Through intensified formal and informal cooperation structures among government agencies in charge of water and climate change, government agencies can achieve mutually beneficial outcomes and synergies** in achieving sectoral and national master plans and can drive progress in regards to national as well as international development targets, as stipulated in the 20-Year National Strategy and the Sustainable Development Goals.
- **Integrated policy implementation will not only render the water sector more resilient, but also contribute to the water-related goals of the National Adaptation Plan** (see box XY) as well as to related **Sustainable Development Goals**, like SDG 6 (Clean Water and Sanitation), SDG 13 (Climate Action) and others.

*ONWR as a regulating agency needs to work closely with ONEP to mobilise the integration of climate change into the water sector. I hope that Thailand's efforts will be recognised on the international stage when applying various [climate change adaptation] options and mechanisms in line with international standards" – Dr. Somkiat Prajumwong, Secretary General, ONWR.  
(Exemplary Quote, TBD with ONWR)*

## II.2 Integrating climate change adaptation into river basin management

Beyond cross-sectoral and inter-agency cooperation, mainstreaming of climate change adaptation can only be effective if it is anchored across all levels, from the national to the local level, and including the broad range of water-related stakeholders that operate in Thailand's 22 river basins.

**River basins constitute the key entry point to apply climate-resilient water management on the ground.** The impacts of climate change on the water cycle as well as the choices made to manage water under the conditions of climate change directly affect the local water users, communities, businesses and ecosystems. However, river basins constitute complex natural and socio-economic systems. Looking at the interconnectedness of water ways with the surrounding ecosystems and human settlements and economic activities in the area the need for water management approaches that integrate various needs and targets, and systematically integrate climate change adaptation, becomes apparent.

As set out by the Water Resources Act (2018), the responsibility to prepare plans for the use, development, management, maintenance, rehabilitation and conservation of water resources in Thailand's 22 river basins, the River Basin Master Plans (RBMPs), including the preparation of plans for prevention and rectification of drought and flood, lies with the Basin Committees (RBCs). The RBMPs encompass specific information on hydrological conditions, geographical conditions, ecosystems, settlements an urban planning, river schematic diagrams building on an area-based approach.

Although the impacts of climate change are described/highlighted in river basin master plans, the river basin planning processes are not based on climate information and analysis.

The **RBMPs therefore provide a key entry point for integrating climate change adaptation** as outlined in the Adaptation Mainstreaming Cycle (see Fig 1.) on a river basin scale. Based on a comprehensive Climate Risk and Vulnerability Assessments and Cause-Impact Chain Analysis, climate-sensitive and risk-informed RBMPs have the potential to harmonize water management with climate adaptation needs and priorities.



Based on a multi-stakeholder process climate-sensitive RBMPs bring together the perspectives, goals and interests of national, regional, provincial and local authorities, different water users, and local upstream, midstream and downstream communities and set the basis for reducing risks and vulnerabilities from water-related climate change impacts such as floods and droughts on a river basin scale.

### *The Adaptation Mainstreaming Cycle*

Mainstreaming refers to the integration of climate change adaptation into water related policy and planning to ensure the long-term sustainability as well as strengthening the resilience of Thailand’s water sector. The mainstreaming process can refer into the following steps:

*Step 1:* Gathering information and understanding the socio-ecological system in the river basin as well as its exposure to climate and disaster risks. Focus should furthermore lie on the engagement with stakeholders and on identifying entry points to support adaptation in the most effective way.

*Step 2:* In order to come up with suitable adaptation options, the risk that climate variability and hazards pose to the socio-ecological system need to be assessed. This also includes other natural and anthropogenic stressors and the interdependency between societies and ecosystems that affect this system.

*Step 3:* Based on the information generated through the risk assessment and cause-impact chain analysis in Step 2, adaptation options can now be identified. These should aim to reduce risks or increase the adaptive capacity of water sector stakeholders and local communities as well as maintain or enhance ecosystem services.

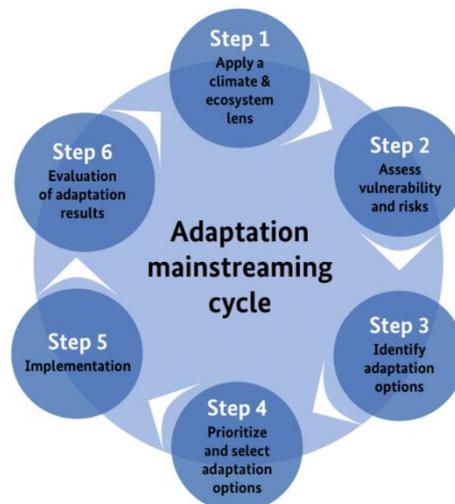


Figure1: Adapted from [adaptationcommunity.net](http://adaptationcommunity.net)

*Step 4:* Potential adaption options are compared and prioritized based on specific criteria, e.g. cost-benefit analyses, compatibility and potential for effective integration with other measures defined in relevant plans, such as the 20-Year WRMP or specific River Basin Master Plans.

*Step 5:* In this step, the adaptation measures selected in the previous step are put into action. Throughout the detailed design and implementation, it is important to ensure finance, stakeholder engagement, capacity-building and monitoring.

*Step 6:* Monitoring & Evaluation (M&E) helps to keep track of progress and provides the basis for learning, accountability and reporting. M&E of climate adaptation can be done to monitor specific adaptation projects as part of River Basin Master Plans as well as to track and report on the implementation of water-related targets stipulated in national and international policy frameworks, such as the National Adaptation Plan or the Sustainable Development Goals.

### **III. Adaptation options**

**Actions to integrate climate change adaptation in water resources management can be of political, institutional, or technical nature.** Political and institutional measures primarily refer to mainstreaming, integrated research, data and management approaches, institutional capacity-building and enhanced inter-agency cooperation. Technical measures range from conventional “grey” engineering approaches to “grey/green” hybrid options to “green”, ecosystem-based solutions of water management.

**Ideally, the diverse range of adaptation options is applied in a balanced mix.** Grey measures might be dams, canals, tunnels, pipelines, flood walls or wastewater plants, while so-called hybrid measures use ecosystem services in combination with hard infrastructure elements for climate-sensitive water resources management. Pure ecosystem-based solutions include the protection, rehabilitation and sustainable management of water and related ecosystems (e.g. wetlands, floodplains, forests).

**however only become truly effective on the ground, when the social dimension of climate change is taken into account** and measures are taken to enhance the adaptive capacity of people. This means to empower local stakeholders and communities to play an informed role in climate change adaptation, to listen to local wisdom and encourage strong ownership for climate-sensitive water resources management.

*Adaptation options from the upstream to downstream and sectoral perspective*  
 [note: graphic can be adjusted to the Thai water sector context in consultation with ONWR]

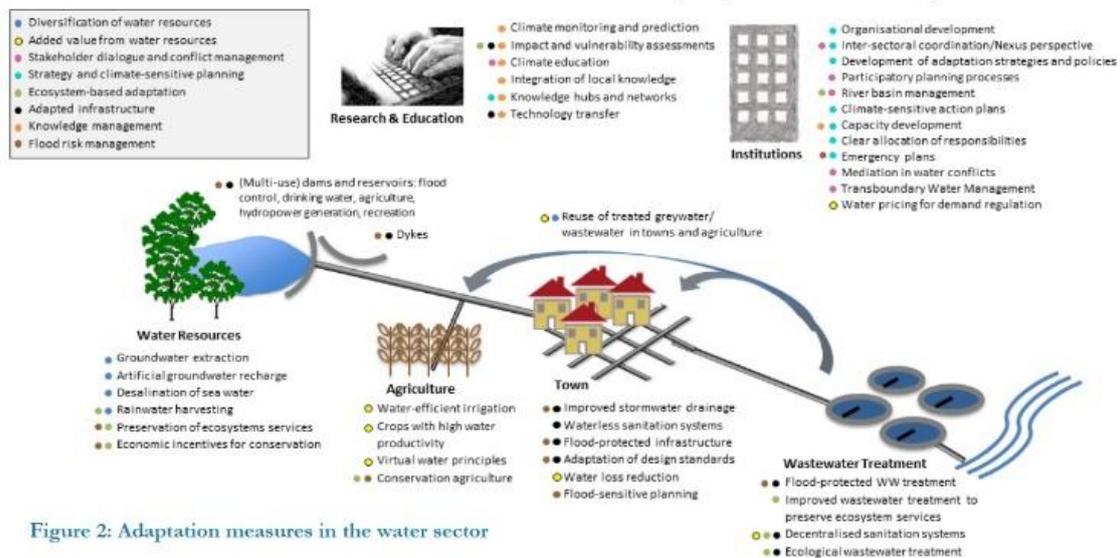


Figure 2: Adaptation measures in the water sector

#### IV. Conclusion

**Sustainable and climate-resilient water management is a critical building block for the overall climate-resilience** not only for the water sector itself but also of various economic sectors, and ecosystems and society at large. Efforts to enhance climate-resilient water management need to be further strengthened through **mainstreaming** and through **enhancing cooperation** and **multistakeholder approaches** across agencies and sectors. Policy, research and innovation,



knowledge generation and capacity development are important supporting elements to underpin this process.

For long-term climate resilience of Thailand's water resources, the fundamental role that climate-sensitive integrated water resources management and the sustainable management of water-related ecosystems play needs to be recognized and streamlined into all levels of policy, planning, and implementation processes. The 22 River Basin Master Plans and the respective River Basin Committee governance structures build the frontline for this critical change towards a climate-resilient river basin management.

**Climate-resilient water management can provide synergetic effects**, for example when looking at the water-energy-food nexus. Hence, the need to focus on climate-resilient water management refers not only to policies and strategies that deal directly with the sustainability and management of water resources, but includes those related to agriculture, energy, and urban and spatial planning, and those aiming to promote more sustainable economies and societies in general.

**In the face of increasing pressures on water resources in times of climate change, systemic and transformational change will be required in the way water is viewed and managed** by all relevant stakeholders in the water and connected sectors and the society at large. Integrating climate change adaptation in all aspects of water resources management will provide the pathway to foster long-term water security and climate resilience for sustainable development in Thailand.

...

## Term definitions:

**Climate Change Adaptation** is a response to global warming and the herewith connected effects on people, the economy and the environment. It is defined as 'the process of adjustment to actual or expected climate and its effects'.

**Adaptation action** can be defined as any measure that is undertaken to mitigate the consequences of actual or expected climate change impacts, to help natural and human systems to cope better or even take advantage of the effects.

**Adaptive capacity** relates to the capacity of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.

**Mainstreaming** is the systematic integration of climate change adaptation into sectoral and cross-sectoral policies, strategies, programmes and practice in order to achieve adaptive capacity and other development objectives. It is a complex process, involving changes and coordination at different political levels and groups of society.

**Resilience** is the capacity of social, economic and environmental systems to cope with hazardous event or trend or disturbance responding or reorganizing in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation. (IPCC, 2018: Annex I: Glossary [Matthews, J.B.R. (ed.)])

**Vulnerability** is the propensity of exposed elements such as human beings, their livelihoods, and assets to suffer adverse effects when impacted by hazard events (IPCC, 2018: Annex I: Glossary [Matthews, J.B.R. (ed.)])

**Risk** is the potential for adverse consequences where something of value is at stake and where the occurrence and degree of and outcome is uncertain. In the context of assessment of climate impacts, the term risk is often used to the potential for adverse consequences of a climate related hazard on lives, livelihoods, health and well-being, ecosystems and species, economic, social and cultural assets, services (including ecosystem services), and infrastructure. (IPCC,2014)

.....



## About TGCP-Water

The Thai-German Climate Program - Water (TGCP-Water)<sup>2</sup> works with ONWR and other water related stakeholders to enhance the national framework conditions for climate-sensitive IWRM and Ecosystem-based Adaptation (EbA) to prevent and reduce the impacts of climate change and water-related disasters at national and river-basin levels. TGCP-Water is financed by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The project works through five interrelated components, including national policy development, sub-national implementation, monitoring and evaluation, financing, and international cooperation.

For a step-by-step guidance for climate change mainstreaming at the river basin level, a Guideline for the development of climate-sensitive River Basin Master Plans (RBMP), developed jointly by GIZ and ONWR under TGCP-Water, will guide stakeholders in the Thai water sector in how to integrate climate change adaptation into the process of planning and management of water projects in Thailand's 22 river basins.

---

<sup>2</sup> For more information about TGCP-Water, please visit [https://www.thai-german-cooperation.info/en\\_US/thai-german-climate-programme-water/](https://www.thai-german-cooperation.info/en_US/thai-german-climate-programme-water/)