Call for submission on indicators of adaptation and resilience at the national and/or local level or for specific sectors[1]

We thank you in advance for filling out this template with concise, evidence-based information and for referencing all relevant sources. As you will see on the last page of the document, more detailed information on case studies, tools/methods and other knowledge resources for dissemination through the Adaptation Knowledge Portal is welcome, but optional.

Name of the organization or entity:

Alliance for Global Water Adaptation (AGWA)

Type of organization/entity:

Please choose as appropriate:

- ☐ Local government/ municipal authority
- ☐ Intergovernmental organization (IGO)
- ☐ National/public entity
- ☒ Non-governmental organization (NGO)
- ☐ Private sector
- ☐ Regional center/network/initiative
- ☐ Research institution
- ☐ UN and affiliated organization
- ☐ University/education/training organization

Scale of operation:

- ☐ Local
- ☒ National

Specific sectors addressed:

- ☒ Adaptation finance
- ☐ Agriculture
- ☐ Biodiversity
- ☒ Community-based adaptation
- ☒ Disaster risk reduction
- ☒ Ecosystem-based adaptation
- ☒ Ecosystems
- ☐ Energy
- ☐ Food security
- ☒ Water resources
- ☐ Gender
- ☐ Health
- ☐ Heavy industry
- ☐ Human settlements
- ☐ Indigenous and traditional knowledge
- ☒ Infrastructure
- ☐ Services
- ☐ Tourism
- ☒ Urban resilience
- ☐ Other (Please specify below)

[1] FCCC/SBSTA/2016/2, paragraph 18.

City(ies)/Country(ies)/Region(s) of operation (if appropriate):

Description of relevant activities/processes or research:

Please describe the activities/processes that your entity has implemented in relation to indicators of adaptation and resilience. In case your organization carried out research, please describe it.

AGWA endorses a new generation of methodologies to assess and address climate risk in water resources management. These "bottom-up approaches" work with complex stakeholder needs, build confidence for policymakers, and integrate into existing decision-making processes to achieve quantitative solutions that are both robust and flexible. AGWA supports bottom-up approaches such as the World Bank's Decision Tree Framework (DTF), Collaborative Risk Informed Decision Analysis (CRIDA), and Eco-Engineering Decision Scaling (EEDS), among others. AGWA is creating a web-based Knowledge Platform launching in September 2017 to provide resources and increase capacity / uptake for each of the following methods.

1) AGWA has supported the WB's DTF development and implementation. The DTF is going through a diversification / development process as new applications and investment contexts are explored. In addition, the WB is investing in training and support globally. Training workshops on the DTF commenced in May 2017. They are designed to teach water managers, relevant stakeholders, and implementing organizations how to use the DTF.

2) AGWA has led the development of the new CRIDA methodology for water management planning and decision making. CRIDA builds on existing approaches to technical water management decision making processes, inserting direction for aspects relevant for resilient actions. CRIDA will initially launch as a publication in November 2017, and support a community of practice to rapidly scale up implementation. Some six years in development with a global team of more than 100 contributors from a wide variety of disciplines, CRIDA is designed for technical water decision makers who wish to assess and then reduce the influence of climate change on water resources management planning, design, and operations and combines state of the art approaches to develop robust solutions with stakeholders while assessing risk ("decision scaling") with flexible and governance-sensitive approaches operations and implementation ("adaptation pathways").

3) Building on work supported by the US National Science Foundation and SESYNC and published by *Nature Climate Change*, AGWA actively promotes efforts such as Eco-Engineering Decision Scaling (EEDS) with specific applications, institutions, and decision support systems. , EEDS establishes the water-climate criteria that can meet stakeholder or expert standards for success and failure and uses a stress-test approach to develop and compare green, hybrid and gray solutions for their impacts on ecosystems and water management needs.

Description of relevant tools/methods:

Please describe the tools and/or methods that have been developed and/or used.

1) The Decision Tree Framework is a robust decision scaling approach from the World Bank that provides resource-limited project planners and program managers with a cost-effective and effort-efficient, scientifically defensible, repeatable, and clear method for demonstrating the robustness of a project to climate change. The framework adopts a "bottom-up" approach to risk assessment that aims at a thorough understanding of a project's vulnerabilities to climate change in the context of other nonclimate

uncertainties (for example, economic, environmental, demographic, or political). It helps to identify projects that perform well across a wide range of potential future climate conditions, as opposed to seeking solutions that are optimal in expected conditions but fragile to conditions deviating from the expected.

2) CRIDA is an approach that implements decision scaling and bottom-up vulnerability approaches through collaborative stepwise planning procedures and Adaptation Pathways. CRIDA aims at easy assimilation in the diverse decision-making processes in water management found across the world. It addresses the urgent need to better tailor decision-making under uncertainty to the practice of water management and to improve the capacity of stakeholders, decision makers, and technical water staff together.

3) EEDS is an approach that explicitly and quantitatively explores trade-offs in stakeholder defined engineering and ecological performance metrics across a range of possible management actions under unknown future hydrological and climate states. The EEDS framework significantly contrasts with approaches typically used to assess the environmental impacts of water infrastructure projects, and it follows an iterative five-step process that includes defining system performance criteria, building a systems model, conducting a vulnerability analysis, evaluating options, and identifying a preferred decision (and, if necessary, reevaluating management options and/or criteria).

Key outcomes of the activities/processes undertaken:

Please provide information regarding the outcomes of the activities/processes described above, and do not hesitate to add qualitative assessment and/or quantitative data to substantiate the information.

1) The DTF has been and is actually being applied to real world projects such as the Upper Arun hydroelectric project in Nepal, the Mwache water supply and irrigation project in Kenya, the multi-reservoir Cutzamala water supply and irrigation system in Mexico, the Poko project and the pumped storage Matenggeng hydropower projects in Indonesia. As a result, the risks and potential benefits of investment in the Upper Arun project and robust adaptation options for the Mwache project were identified. Likewise, the vulnerabilities of the Cutzamala system and options for adaptation are being assessed. The Poko and Matenggeng projects are still under study. Discussion workshops have been held in Nepal and Kenya and DTF application training courses were held in Nepal, Mexico City, Massachusetts, and South Korea.

2) Although the CRIDA methodology has yet to be published, it is being applied and promoted in multiple contexts. In September 2017, AIT hosted a workshop to develop the capacities of interested experts in the knowledge and application of CRIDA, and facilitate the use of this expertise to advise governments and other stakeholders in Asia and the Pacific for projects related to climate change adaptation in the water sector. CRIDA has already been adopted and implemented by a variety of organizations, and interest in the methodology has been increasing. The Global Water Partnership, Millennium Challenge Corporation, US AID, DFID, the Mekong River Commission, the UNECE, UNESCO-IHP, WWF, TNC, IHE Delft, CONAGUA and IMTA, the Inter-American Development Bank, the Asian Development Bank, the European Investment Bank, a number of Chinese institutions, and others have all formally expressed strong interest in or have already tested implementation of CRIDA in part or as a whole, while several educational institutions have already used earlier drafts of CRIDA as a student resource or wish to in the future. A number of publications have already appeared in the media and peer-reviewed literature about CRIDA, and more are planned.

3) AGWA is part of a project to develop a national-scale application of eco-engineering decision scaling (EEDS) in Mexico with the Mexican Water Commission (CONAGUA) and WWF-Mexico. The AGWA team is supporting the application of EEDS via WWF-MX — support, modeling, guidance. As part of this project,

AGWA helped organize and run a workshop to train implementers and water managers in the EEDS process in May 2017 in Mexico City.

Description of lessons learned and good practices identified:

Please consider the following points when describing lessons learned and good practices: (a) effectiveness/impacts of the activities/processes (including measurability of the impacts), (b) efficiency in the use of resources, (c) replicability (e.g. in different locations, at different scales), (d) sustainability (i.e. meeting the current economic, social and environmental needs without compromising the ability to address future needs).

1) In each case of DTF application inception and validation workshops with representatives from key government organizations, academic institutions and other relevant stakeholders demonstrated the importance of local inputs to define performance metrics and selection of relevant adaptation options. At its best, the DTF approach is expected to provide a common framework that can be generally applied to infrastructure development. It will also be useful to assess other risks in addition to climate and thus position climate risks within a broader and realistic context. The articulation of a programmatic approach to assessing and managing climate risks in the context of other risks for water project investments is expected to lead to more robust and resilient projects that perform well over their lifetime.

2) CRIDA will address a number of critical water resources priority areas, including the assessment of existing and future water-related infrastructure (including natural infrastructure) to climate risks and the relative importance of climate risks to other challenges (e.g., demographic, economic, and urbanization shifts). It is a framework that helps water managers to address extreme weather events as well as shifts in mean climate characteristics, as well as associated socio-economic and environmental impacts. CRIDA provides a way of estimating climatic and eco-hydrological interactions with water availability, water quality, and water seasonality, including groundwater management and its interaction with shifting surface conditions. Throughout all CRIDA steps, there is an emphasis on wise use, adaptive management, and effective water conservation approaches.

3) The AGWA project of implementing EEDS in Mexico is still ongoing. The goal of the EEDS-Mexico project is to quantify the climate adaptation benefits of the CONAGUA-WWF water reserves program in Mexico so that the team can document how environmental flows contribute to ecological and social resilience. AGWA aims to make clear the volume and timing of the environmental flows necessary to ensure resilience for these systems, with particular attention paid to drought and flood risks.

Description of key challenges identified:

Please describe the key challenges associated with those activities/processes or the use of those tools/methods, that policy-makers, practitioners and other relevant stakeholders should know about.

1) The DTF aligns well with the status quo of general water resources practice enhanced by a practical way to account for the climate change uncertainty. It is more effective in the early stages of planning and design, where decisions can still be made about options for adaptation. In fact, brings out again the importance of decision making under uncertainty in the planning and design of water projects. The main challenges relate to the mainstreaming of this analysis not as a separate assessment but as an integral part of the regular planning and pre-feasibility studies. These challenges can be faced by wide diffusion and dissemination among practitioners, which in itself is also an important challenge.

2) Due to the general novelty of CRIDA, it will initially be challenging to translate the process into practice for the first cases as the capacity for implementation is evolving. Training, capacity building, and dissemination of results will help alleviate initial hurdles.

3) An integral part of the EEDS process is the identification of relevant performance indicators. These performance indicators represent critical features, services, or threats to the system. They are defined by stakeholders. One key challenge in implementing EEDS is identifying which system components are most critical to be tested against possible changes in management and/or climate. Multiple performance indicators can be stress tested, meaning that this challenge can be mitigated to an extent.

Planned next steps (as appropriate):

Based on this experience or research, have next steps been planned to address/study some of the identified challenges, scale up or scale out such activities/processes?

1) Several training workshops have taken place in 2017. Application of the DTF has been undertaken in Indonesia, Mexico, Kenya, and Nepal. Other applications are being explored. To help scale up efforts around the DTF and other bottom-up approaches, the World Bank has funded the development of a web-based Knowledge Platform to share information, promote dialogue, and expand implementation. This Platform will be hosted at http://agwaguide.org and is set to launch in September 2017.

2) The Baltic Development Forum has just funded a series of CRIDA workshops for SIWI, AGWA, and Deltares to train urban water managers in northeastern Europe (Sweden to Denmark) to reduce climate risks at a city scale. These events should serve as a mechanism to develop and refine existing training methodologies and workshop approaches, and that content should be circulated and become available to a broader audience. A number of universities are interested in CRIDA for teaching advanced students. IHE, Asian Institute of Technology, Oregon State, the University of East Angle, TU Delft, and (probably) Johns Hopkins are already using some core elements of CRIDA text. There is great interest in expanding and formalizing these resources, potentially even creating a set of guest speakers or other support teams to help instructors connect their students to practitioners.

3) Within the context of the Mexico project, the ultimate goal will be the development of a protocol that CONAGUA and other water managers can implement for other national management contexts. Next up for EEDS more generally will be scaling up implementation and increasing capacity. Its application can be diversified to include wildlife management for threatened species, implications for nature-based solutions, and more.

Relevant hyperlinks:

Please provide hyperlinks to sources of information.

DTF Publication: https://openknowledge.worldbank.org/handle/10986/22544
CRIDA Site: http://agwaguide.org/CRIDA/
Knowledge Platform (coming late September 2017): http://agwaguide.org
EEDS Publication: http://www.nature.com/nclimate/journal/v6/n1/full/nclimate2765.html

Further information:

Please do not hesitate to submit more detailed information on case study(ies), tool(s)/method(s) and/or other relevant knowledge resource(s) that are relevant to economic diversification. The latter will be shared through the Adaptation Knowledge Portal:

- Case study(ies)
- Tool(s)/method(s)

- Other knowledge resource(s) (online portals, policy briefs, training material, multimedia material, technical reports and scientific publications)