



**GREEN
CLIMATE
FUND**

Meeting of the Board
17 – 20 October 2018
Manama, Bahrain
Provisional agenda item 17

GCF/B.21/10/Add.35

26 September 2018

Consideration of funding proposals - Addendum XXXV

Funding proposal package for SAP003

Summary

This addendum contains the following seven parts:

- a) A funding proposal titled “Enhancing climate resilience of the water sector in Bahrain”;
- b) No-objection letter issued by the national designated authority(ies) or focal point(s);
- c) Environmental and social report(s) disclosure;
- d) Secretariat’s assessment of the funding proposal;
- e) Independent Technical Advisory Panel’s assessment of the funding proposal;
- f) Response of the accredited entity to the independent Technical Advisory Panel’s assessment of the funding proposal; and
- g) Gender documentation of the funding proposal.

The funding proposal package for SAP003 is being submitted for the first time for the Board's consideration at its twenty-first meeting.

Simplified Approval Process Funding Proposal

Project/Programme title: Enhancing climate resilience of the water sector in Bahrain

Country(ies): Kingdom of Bahrain

National Designated Authority(ies): Supreme Council of Environment

Accredited Entity: UN Environment

Date of first submission: [2018/08/21]

Date of current submission/
version number: [2018/08/24] [V.002]

If available, indicate GCF code:

This code is assigned to each project upon first submission of a Concept Note or Funding Proposal and remains the same throughout the proposal review process. If you have submitted this project/programme previously please indicate the GCF code here.



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Contents

Section A **PROJECT / PROGRAMME SUMMARY**

This section highlights some of the project's or programme's information for ease of access and concise explanation of the funding proposal.

Section B **PROJECT / PROGRAMME DETAILS**

This section focuses on describing the context of the project/programme, providing details of the project/programme including components, outputs and activities, and implementation arrangements.

Section C **FINANCING INFORMATION**

This section explains the financial instrument(s) and amount of funding requested from the GCF as well as co-financing leveraged for the project/programme. It also includes justification for requesting GCF funding and exit strategy.

Section D **LOGIC FRAMEWORK, AND MONITORING, REPORTING AND EVALUATION**

This section includes the logic framework for the project/programme in accordance with the GCF Results Management Framework and Performance Measurement Framework, and gives an overview of the monitoring, reporting and evaluation arrangements for the proposed project/programme.

Section E **EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA**

This section provides an overview of the expected alignment of the projects/programme with the GCF investment criteria: impact potential, paradigm shift, sustainable development, needs of recipients, country ownership, and efficiency and effectiveness.

Section F **ANNEXES**

This section provides a list of mandatory documents that should be submitted with the funding proposal as well as optional documents and references as deemed necessary to supplement the information provided in the funding proposal.

Note to accredited entities on the use of the SAP funding proposal template

- The Simplified Approval Process Pilot Scheme (SAP) supports projects and programmes with a GCF contribution of up to USD 10 million with minimal to no environmental and social risks. Projects and programmes are eligible for SAP if they are ready for scaling up and have the potential for transformation, promoting a paradigm shift to low-emission and climate-resilient development.
- This template is for the SAP funding proposals and is different from the funding proposal template under the standard project and programme cycle. Distinctive features of the SAP funding proposal template are:
 - *Simpler documents*: key documents have been simplified, and presented in a single, up-front list;
 - *Fewer pages*: A shorter form with significantly fewer pages. The total length of funding proposals should **not exceed 20 pages**;
 - *Easier form-filling*: fewer questions and clearer guidance allows more concise and succinct responses for each sub-section, avoiding duplication of information.
- Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other funding proposal documents such as project appraisal document, pre-feasibility studies, term sheet, legal due diligence report, etc.
- Submitted SAP Pilot Scheme funding proposals will be disclosed simultaneously with submission to the Board, subject to the redaction of any information which may not be disclosed pursuant to the [GCF Information Disclosure Policy](#).

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:

“SAP-FP-[Accredited Entity Short Name]-[yyymmdd]”

A. PROJECT/PROGRAMME SUMMARY			
A.1. Has this FP been submitted as a SAP CN before?		Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
A.2. Is the Environmental and Social Safeguards Category C or I-3?		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
A.3. Project or programme	<i>Indicate whether this FP refers to a combination of several projects (programme) or one project.</i> <input checked="" type="checkbox"/> Project <input type="checkbox"/> Programme	A.4. Public or private sector	<input checked="" type="checkbox"/> Public sector <input type="checkbox"/> Private sector
A.5. Result area(s)	<i>Indicate the result areas for the project/programme.</i> Mitigation: Reduced emissions from: <input type="checkbox"/> Energy access and power generation <input type="checkbox"/> Low emission transport <input type="checkbox"/> Buildings, cities and industries and appliances <input type="checkbox"/> Forestry and land use Adaptation: Increased resilience of: <input type="checkbox"/> Most vulnerable people and communities, including women and girls <input checked="" type="checkbox"/> Health and well-being, and food and water security <input type="checkbox"/> Infrastructure and built environment <input type="checkbox"/> Ecosystem and ecosystem services		
A.6. Total investment (GCF + co-finance)	<u>11.8</u> (million USD)	A.7. Total GCF funding requested	<u>9.8</u> (million USD)
A.8. Type of financial instrument requested for the GCF funding	<i>Mark all that apply.</i> <input checked="" type="checkbox"/> Grant <input type="checkbox"/> Loan ¹ <input type="checkbox"/> Equity <input type="checkbox"/> Guarantees <input type="checkbox"/> Others:		
A.9. Division of GCF funding by thematic funding window (if applicable)	_____ USD or _____ % Mitigation _____ USD or _____ % Adaptation <i>In case of cross-cutting project/programme, indicate the allocation of funding according to mitigation or adaptation activities. The sum of mitigation and adaptation should add to the amount indicated in field A.7.</i>		
A.10. Implementation period	5 years. The expected last date of drawdown/disbursement of funds from GCF is four years from inception i.e. early 2023.		
A.11. Total project/programme lifespan	15 years of lifespan for project outcomes	A.12. Expected date of internal approval	8/21/2018
A.13. Executing Entity information	The Kingdom of Bahrain through the department of the National Oil and Gas Authority (NOGA)		
A.14. Scalability and potential for transformation (Eligibility for SAP, max. 50 words)			
<p>The Kingdom of Bahrain has several current initiatives underway to improve how the country manages its water resources under climate change conditions. These include: i) research on the dynamics of the national aquifers; ii) the development of a national water strategy; and iii) demand management campaigns. The proposed project will – in Phase 1 of a two-phased approach – effect a paradigm shift by scaling up these initiatives through a combination of technical and institutional capacity building, knowledge management and learning, revision of policies and legislation, increased public awareness on climate change threats, and promotion of water saving and reuse. The effect of this upscaling will be to manage the national demand for water and create an enabling environment for the use of innovative technologies to mitigate the effects of climate change on Bahrain’s water sector. The project will also support the development and implementation of a Phase 2, which will focus on direct investments to increase water supplies through improved treatment and transmission of wastewater. These investments in Phase 2 will build on the framework for climate-resilient integrated water resource management established within Phase 1.</p>			

¹ Senior loans and subordinated loans.

A.15. Project/Programme rationale, objectives and approach (max. 250 words)

The Kingdom of Bahrain, a Small Island Developing State, is severely threatened by climate change. The country's water sector is in particular facing threats from: i) rising temperatures causing increases in water demand across all sectors; ii) sea level rise causing saline intrusion into aquifers; and iii) rising temperatures and greater intensity of rainfall causing reduced rates of aquifer recharge. In combination, these threats are likely to reduce Bahrain's freshwater resources by at least 50 to 100 million m³ of water per year in the short-term². Innovative solutions need to be adopted by the Bahraini public, the private sector and government to manage the expected reduction in water resources from climate change in a manner that is not only climate-resilient, but also socially, environmentally and financially sustainable. To develop, promote and implement such solutions, the project will facilitate transformational change within Bahrain's water sector by building technical and institutional capacity to monitor and model climate change impacts on water resources, mainstreaming climate resilience into sectoral water management planning, developing new policy and legislative frameworks (including water tariff reforms), and designing new financial instruments. It will also raise public awareness of the need for managing water resources under climate change conditions through demand management and re-use of greywater. The project interventions will directly benefit 130,500 people, including small scale farmers and low-income groups who are the most vulnerable to the climate change impact of reduced availability of water. The Government of Bahrain (GoB) is seeking US\$9.8 million of grant funding to implement these critical interventions.

² Section B.1. provides a breakdown of this range of 50 to 100 million m³.

B. PROJECT/PROGRAMME DETAILS

B.1. Context and baseline (max. 500 words)

Adaptation interventions required in Bahrain's water sector

Climate change will affect national demand for water as well as the size of Bahrain's freshwater reserves. In terms of demand: increasing temperatures (Figure 1)^{3,4} in Bahrain are expected to increase requirements for municipal water use – currently averaging ~248 million m³ per year – by ~5 million m³ per year by 2030⁵. Given that municipal use accounts for approximately half of Bahrain's water use, an additional demand of ~5 million m³ per year (Figure 5) can conservatively be expected from other industrial and agricultural users of water (industry and agriculture account for ~5% and ~45% of total water use, respectively)⁶. This total extra demand caused by climate change of ~10 million m³ per year is likely to increase beyond 2030 as temperatures increase further.

In terms of the size of its freshwater reserves, saline intrusion into aquifers as a result of sea level rise (Figure 3)⁷ is expected to be considerable given that approximately one tenth of Bahrain's land area would be affected by a 0.3 m increase in sea level. The water deficit that will arise from saline intrusion (Figure 4)⁸ and reduced aquifer recharge (in Saudi Arabia as well as Bahrain) on Bahrain's groundwater reserves has not yet been modelled. However, rising temperatures, more intense rainfall and reduced annual rainfall amounts (Figure 2)⁹ are expected to reduce aquifer recharge by 30–70% across the Arab Region¹⁰, which equates to a reduction of 34 to 78 million m³ per year for Bahrain¹¹.

Based on the currently available data (described above), it can be reasonably concluded that the combined climate change threats – including increasing demand, saline intrusion and reduced aquifer recharge – are likely to reduce Bahrain's freshwater reserves by at least 50 to 100 million m³ of water per year in the short-term¹² (see Figure 6 below). Demand management, combined with groundwater management, will be required to address the increasing gap between demand and sustainable supply. In this regard, the Government of Bahrain is currently developing a national water strategy¹³, which will promote demand-side management and the use and re-use of wastewater from several sources, including greywater, municipal wastewater, produced water from the oil and gas sector, and harvested rainwater. Although the water strategy presents an opportunity for developing the climate resilience of the water sector, there is minimal capacity within Bahraini institutions to monitor changes to freshwater reserves, process and analyse large amounts of data, model the impacts of climate change impacts on the water sector, and collate an evidence base

³ Over the last six decades, Bahrain has experienced an upward trend in mean, maximum and minimum temperatures, with a rate of warming of more than 0.4 °C per decade. These trends are expected to continue over the next 70 years, with temperatures increasing by ~1.2 °C and 1.0–1.5 °C by 2050 under RCP 4.5 and RCP 8.5, respectively. By 2090, this increase is expected to reach ~2.4 °C under RCP 4.5 and 3.6–4.2 °C under RCP 8.5.

⁴ Historical temperature records come from one meteorological station at the international airport that has been in operation as far as 1940s. Only recently, four additional meteorological stations are in operation. All these stations are situated away from urban centres (see <http://www.bahrainweather.gov.bh/>) and will therefore experience minimal impacts from the urban heat island effect.

⁵ This calculation took population growth into account. The increase of 5 million m³ is solely a function of climate change impacts of increasing temperatures.

⁶ Agricultural water use efficiency declined from 26,790 m³/ha in 1992 to 31,015 m³/ha in 2013, partly as a result of increased evapotranspiration caused by climate change. As temperatures increase further, this trend in agricultural water demand will continue. Ansari, M.S.A., 2013. The water demand management in the Kingdom of Bahrain. *International Journal of Engineering and Advanced Technology*, 2(5), pp.544-554.

⁷ Direct impacts of sea level rise (SLR) on groundwater in Bahrain have not been modelled for Bahrain. Inundation models show, however, that ~11% of Bahrain's total land area would be lost by 2050, from a ~0.3 m increase in sea level – Annex 15: Bahrain's Second National Communication to the United Nations Framework Convention on Climate Change. 2012.

⁸ A conservative estimate of 12 million m³ of freshwater lost per year because of saline intrusion has been used in calculations of the impact of climate change on freshwater in Bahrain.

⁹ Bahrain's rainfall is extremely erratic and exhibits both spatial and temporal variability. Annual average rainfall is predicted to decrease by up to ~20% over the period 2031–2050 and by up to a further ~5% by 2090. In addition to the predicted decreases in annual average rainfall, General Circulation Models (GCMs) predict that rainfall variability will increase over time, with an increase in the frequency and severity of extreme events. It is also predicted that dry events will be longer and more severe – United Nations Economic and Social Commission for Western Asia (ESCWA) et al. 2017. *Arab Climate Change Assessment Report – Main Report*. Beirut, E/ESCWA/SDPD/2017/RICCAR/Report.

¹⁰ UNDP. 2013. *Water Governance in the Arab Region: Managing Scarcity and Securing the Future*. The figures on reduced aquifer recharge presented in this UNDP report were backed up by the following sources: Khater, A.R. 2010. "Regional Technical Report on the Impacts of Climate Change on Groundwater in the Arab Region." Technical Document. UNESCO Cairo Office, Cairo; and Doumani, F.M. 2008. "Climate Change Adaptation in the Water Sector in the Middle East and North Africa Region: A Review of Main Issues." PAP/RAC Workshop, 19–21 May, Sardinia, Italy.

¹¹ Zubari, W. 2018. *Water sector assessment report (Modules I and II). Development of the National Water Strategy and Implementation Plan for the Kingdom of Bahrain (2017-2030)*.

¹² A conservative estimate of 12 million m³ of freshwater lost per year because of saline intrusion has been used in calculations of the impact of climate change on freshwater in Bahrain.

¹³ The strategy has been informed by consultations with a wide range of national water experts. Climate change impacts were considered in the consultations.

of best practices for water management. These constraints are preventing climate change risks from being integrated into the national water strategy in a comprehensive and systematic manner.

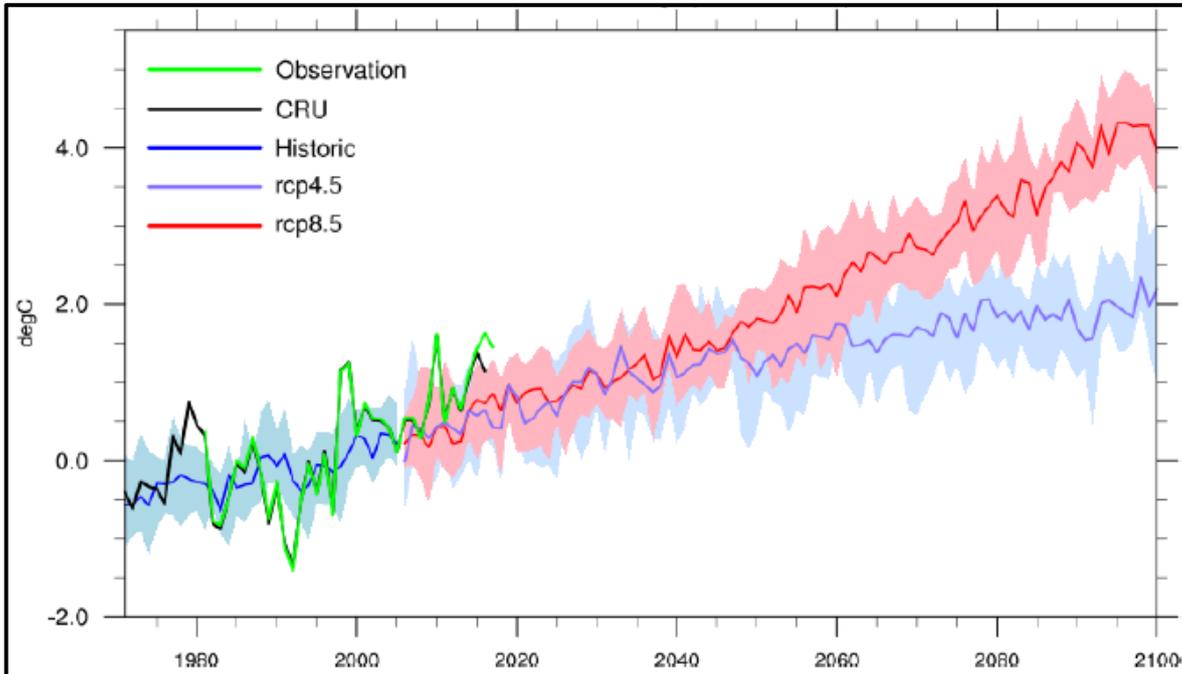


Figure 1. Downscaled temperature projections for Bahrain based on RCP 4.5 and RCP 8.5 projections, indicating temperature increases from ~1.2 °C and 1.0–1.5 °C by 2050. By 2090, this increase is expected to reach ~2.4 °C under RCP 4.5 and 3.6–4.2 °C under RCP 8.5.

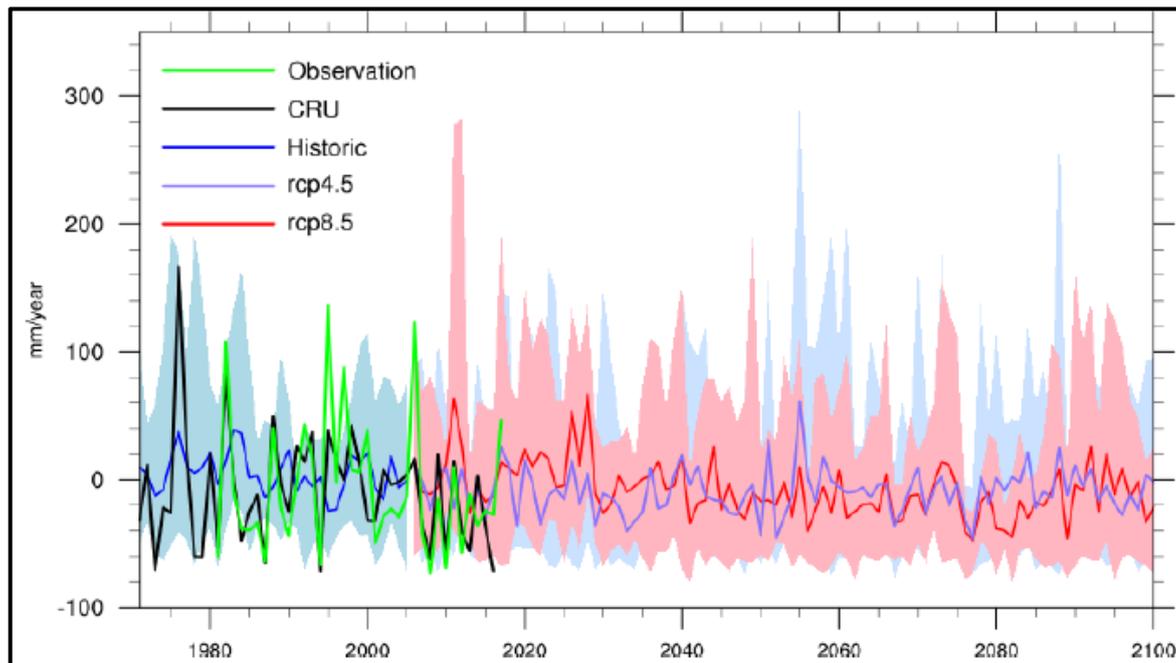


Figure 2. Downscaled rainfall projections for Bahrain based on RCP 4.5 and RCP 8.5. Under RCP 4.5, for the period 2031–2050, annual average rainfall is predicted to decrease by ~10–15% in the south and by ~20% in the central and northern areas of the country. By 2090, the annual average rainfall is predicted to decrease by a further 1–5% across the whole country. Under RCP 8.5 for the period 2031–2050, annual average rainfall is predicted to decrease by 12–15% in the north and 5–8% in the south. By 2090, the annual average rainfall is predicted to decrease by ~25%, particularly in the north.

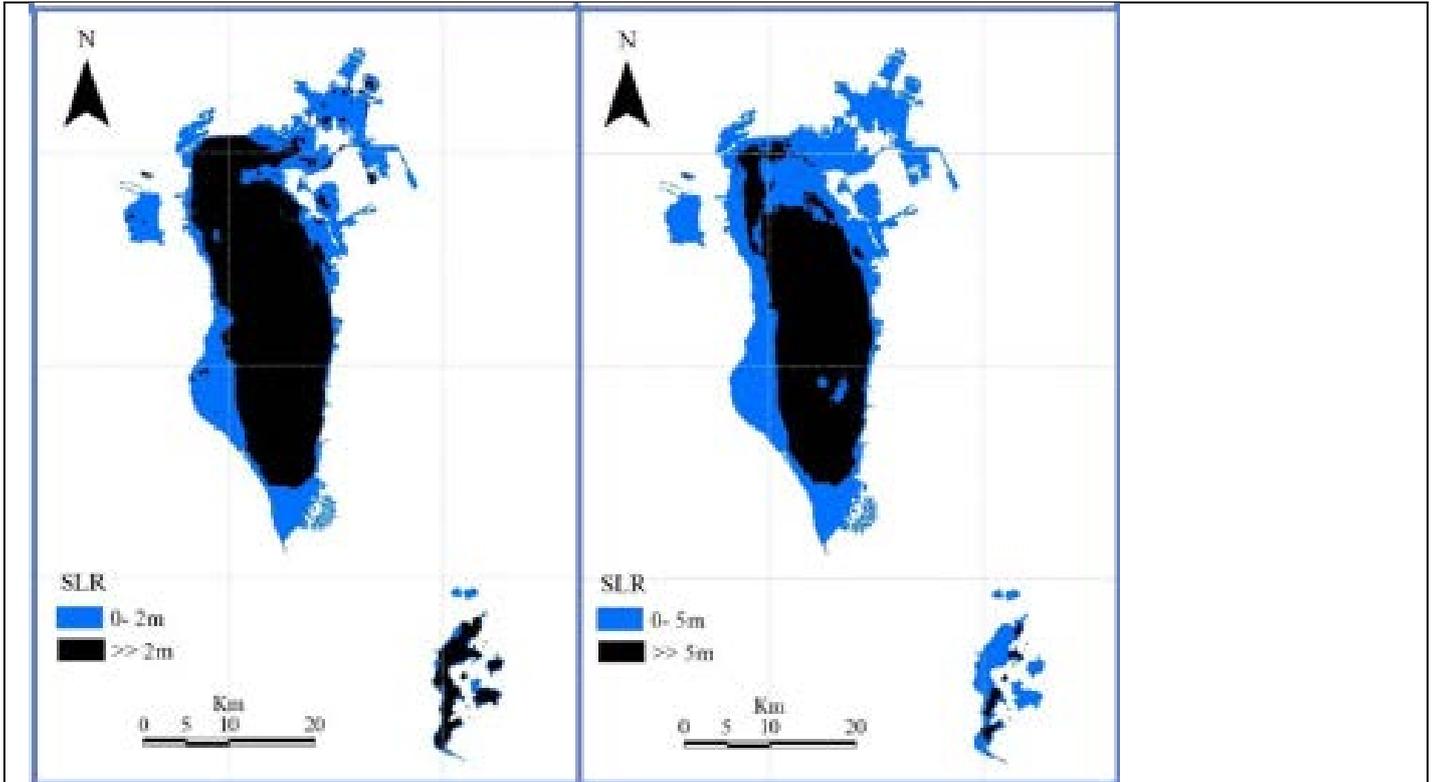


Figure 3. Predicted sea-level rise in Bahrain under the “Extreme deglaciation rate” for both 2050 and 2100¹⁴. Inundation models show, however, that ~11% of Bahrain’s total land area would be lost by 2050 to SLR, from a ~0.3 m increase in sea level¹⁵.

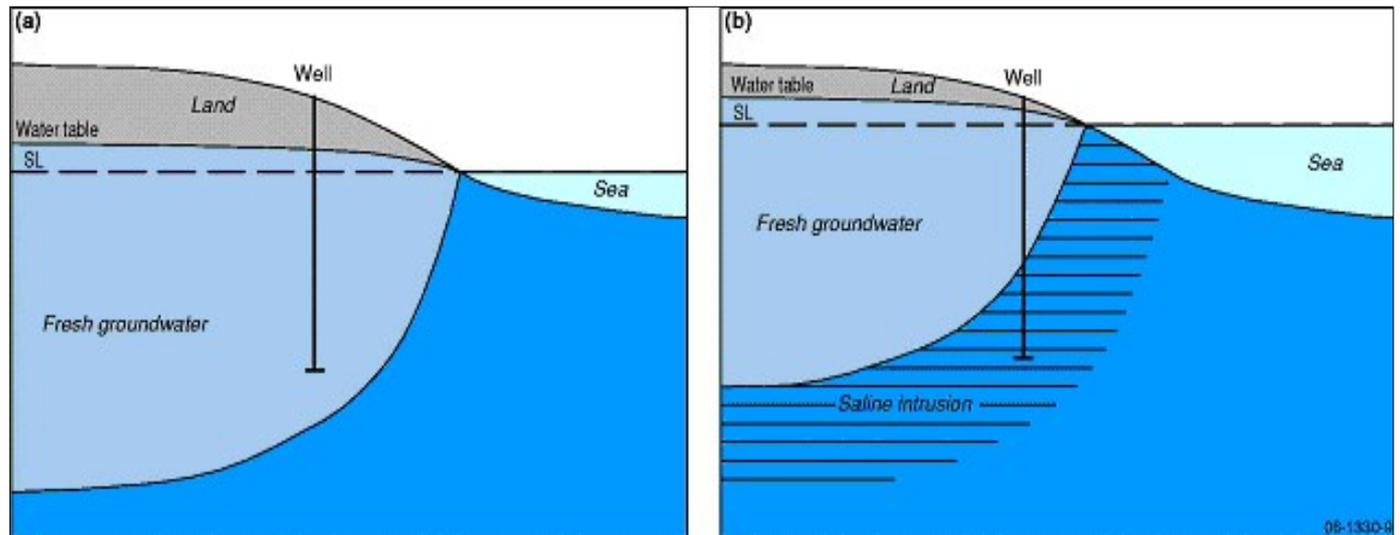


Figure 4. The effect of sea level rise on freshwater aquifers¹⁶. (a) The baseline situation, where the bottom of a well is in fresh groundwater. (b) The impact of sea level rise, resulting in the bottom of the well-being in saline water. Simulation models show that a SLR of ~0.3 m will result in the inundation of one tenth of the country’s land area (~80 km²) by 2050¹⁷. This inundation is expected to cause extensive saltwater intrusion through coastal aquifers, salinizing large portions of the country’s limited groundwater resources.

¹⁴ Annex 15: Bahrain’s Second National Communication to the United Nations Framework Convention on Climate Change. 2012.

¹⁵ Ibid.

¹⁶ Source: www.OzCoast.gov.au

¹⁷ Please refer to Annex 15: Bahrain’s Second National Communication on page 23 to 26.

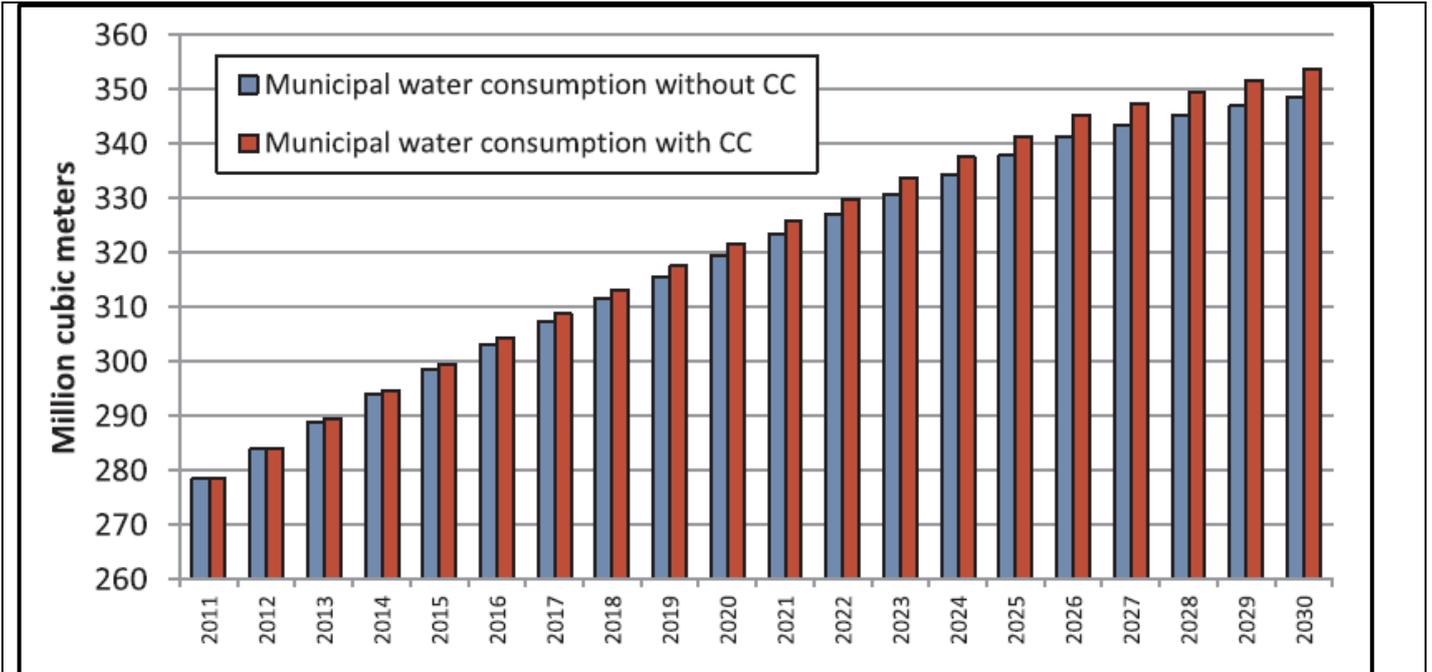


Figure 5. The modelled effects of a rise in temperature on annual municipal water consumption in Bahrain¹⁸. Predicted baseline increase in water demand of ~39 million m³ per year by 2030, with an additional 5 million m³ per year increase attributed to climate change.

¹⁸ Al-Zubari, W.K., El-Sadek, A.A., Al-Arabi, M.J. and Al-Mahal, H.A., 2018. Impacts of climate change on the municipal water management system in the Kingdom of Bahrain: Vulnerability assessment and adaptation options. *Climate Risk Management*. 20: pp. 95–110.

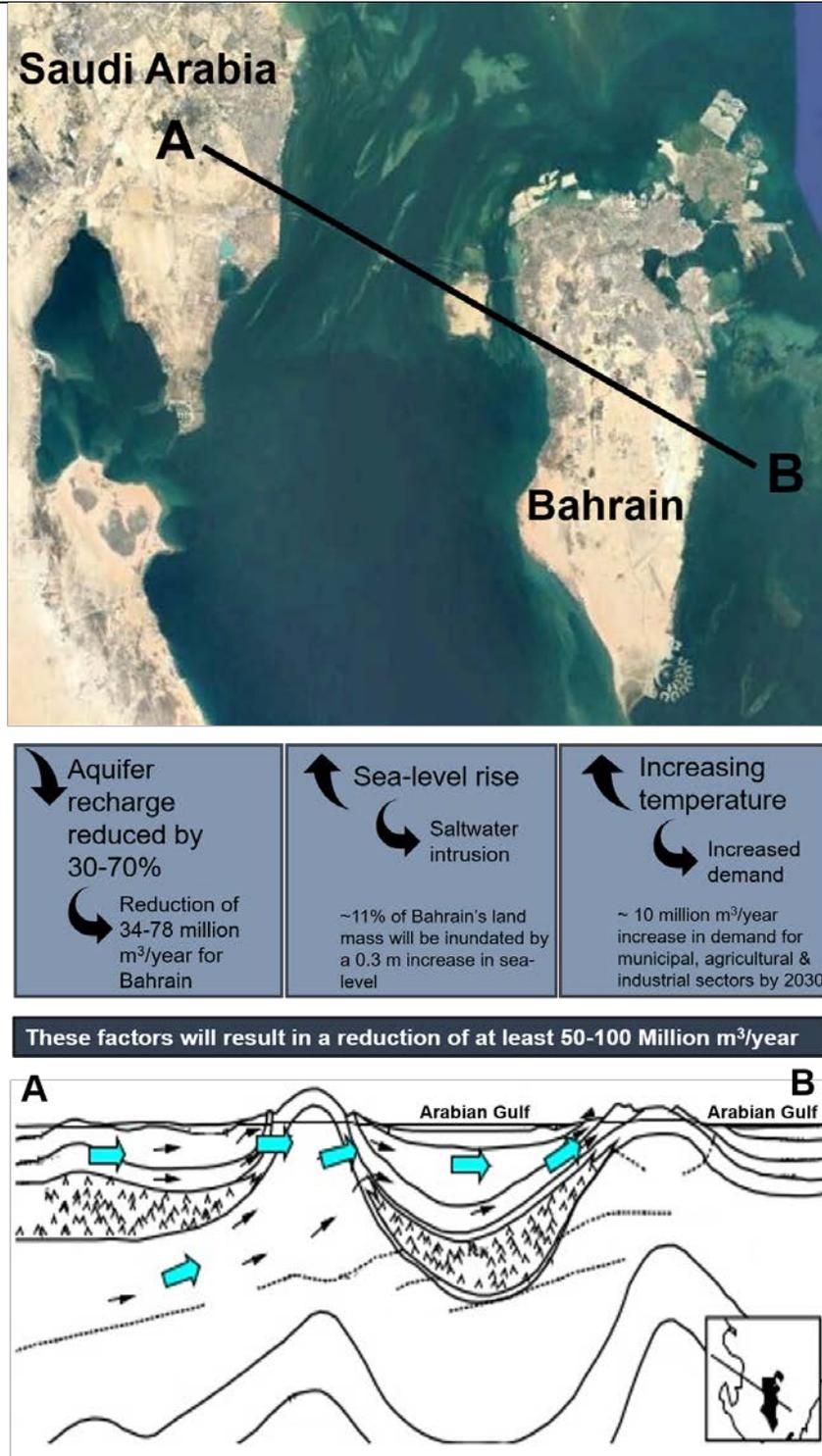


Figure 6: Expected climate change impacts on Bahrain's availability of freshwater¹⁹ through: i) reduced aquifer recharge in Saudi Arabia; ii) saline intrusion from sea level rise; and iii) increasing air temperatures causing an increase in water demand in domestic households, businesses, agriculture and industry. A cross section of the aquifer systems connecting Saudi Arabia and Bahrain is shown at the bottom of the figure²⁰. The letters A and B show the geographic location of the cross section on the map at the top of the figure.

¹⁹ Detailed descriptions of the climate change impacts on freshwater availability are described in Annex 2a: Feasibility Study

²⁰ Cross-section credit: Alshabaani 2015. Status of the agricultural land, soil and ground water in Bahrain. FAO presentation available through Slideshare.net

Problem to be addressed by the proposed GCF project

As noted above, climate change impacts are expected to reduce Bahrain's freshwater reserves by at least 50 to 100 million m³ per year in the short-term. Currently, Bahrain does not have the appropriate technical, institutional and financial capacity to develop a detailed understanding of this threat and approach to build the climate resilience of its water sector.

The Government of Bahrain will address this problem by reducing demand for water and augmenting supplies of water through a two-phased approach. The proposed project forms part of a Phase 1 which will promote a transformational change in Bahrain's water demand management and build the knowledge base and capacity for informed decision making for climate-resilient water management. Building the institutional capacity of the Water Resources Council (WRC)²¹ will be the central instrument to achieving the objectives of Phase 1. A second GCF proposal is currently under development which will contribute to Phase 2 and will focus on direct investments to increase water supplies through improved treatment and transmission of wastewater. The National Oil and Gas Authority (NOGA) will play a central role in Phase 2 through the adoption of innovative technologies for the treatment of produced water from the oil industry to augment aquifer recharge. The proposed interventions for Phase 2 will build on the framework for climate-resilient integrated water resource management developed during Phase 1.

Barriers to building climate resilience of the water sector

Limited technical capacity, financial resources and availability of data for modelling the impacts of climate change on Bahrain's water sector.

To build the climate resilience of the water sector through informed policy and decision-making, the government will require accurate quantification of the effects of increasing demand, saline intrusion and reduced aquifer recharge as a result of rising temperatures. These effects are intrinsically linked and need to be modelled.

Currently, there is limited communication between the academic institutions undertaking water resource modelling and the government institutions responsible for managing water within the country. As a result, research conducted by academics is not focussing on meeting all the information requirements of the water managers. This problem is compounded by a lack of financial capacity within academic institutions to comprehensively model the long-term climatic effects on the country's water sector at a sufficiently granular scale.

The need for greater granularity can be observed in the current use of the WEAP21 (Water Evaluation and Planning) dynamic modelling software. Although WEAP21 has been used to estimate the impacts of climate change on Bahrain's municipal water management system, there is a need to expand simulation models and develop future scenarios beyond the municipal sector to gain a full understanding of the inter-connectivity of increasing demand, saline intrusion and reduced aquifer recharge. Specific limitations for developing these scenarios, and proposing solutions to climate change impacts on the water sector, include: i) limited institutional capacity and financial resources to coordinate a comprehensive groundwater monitoring programme to model the hydraulic effects of changes in rainfall and temperature on groundwater availability (from the perspective of increased demand and the consequent need for augmenting supply); ii) limited data on groundwater dynamics (including current and predicted extraction rates, and groundwater recharge rates); and iii) a lack of information on the best solutions for managing groundwater resources.

Limited institutional capacity to integrate climate-resilient water resource management into national planning and policies.

Bahrain's governmental institutions have limited capacity to integrate climate risks into management of the country's freshwater resources. Entities responsible for the management of water (such as the WRC) and agencies responsible for the management of water-intensive industries (such as NOGA) face several constraints.

Firstly, there is limited knowledge and awareness within these institutions of the potential impacts of climate change on groundwater and the interactions between the availability, demand and supply of water across economic sectors. This is partly because much of the focus of water management in the country is currently on municipal supply and meeting the demands of an increasing population, with limited communication and coordination between economic sectors. As a result, the impacts of sectors such as agriculture and industry have been largely overlooked in terms of water demand management.

²¹ Annex 2a: Feasibility Study provides additional details on the Water Resource Council on page 55.

Secondly, there is insufficient coordination among national institutions involved in water management. The WRC, for example, is the highest water authority in Bahrain and part of its mandate is to coordinate water management across the different agencies. However, despite recent restructuring, the WRC only functions as a committee, without an institutional foundation – such as a permanent secretariat or authority – to support its mandate²². It also lacks sufficient technical capacity to fulfil its functions effectively. The WRC is headed by the Deputy Prime Minister, Sheikh Khalid Bin Abdulla Al Khalifa, with members including the Minister of Electricity and Water Affairs, Minister of Works, Municipalities Affairs and Urban Planning, Minister of Housing, Minister of Transportation, Minister of Finance, Minister of Industry, and Minister of Cabinet Affairs. It is technically supported by a permanent Technical Advisory Committee (TAC) and includes members from all the water-related ministers and agencies. The establishment of the WRC has consolidated the water resources management agencies and in 2017 it initiated the formulation of a comprehensive, integrated, national water policy and strategy based on IWRM. This is considered to be the first step forward in the long, intricate path to sustainable water management in the country. Its formulation is being guided by the Arabian Gulf University with support from a temporary technical committee.

Inadequate legal and regulatory frameworks to support climate-resilient water demand management.

The regulations governing water use in Bahrain are fragmented and limited. There is, for example, no overarching framework that governs the protection of water resources or use of wastewater, particularly in the context of climate change. The laws and regulations that are in place are often misaligned and not adequately enforced (see Annex 2a: Feasibility Study for more information).

Further to these legislative constraints, groundwater extraction is largely unmonitored, with limited regulation, ostensibly resulting in excessive use by some individuals and businesses. This excessive use is in all likelihood a result of tariff structures not penalising heavy users of groundwater, and because it is unclear which government institutions are responsible for managing this national resource. Tariffs are also outdated, with limited coherence in the pricing structure for water from different sources. Previous attempts to revise water tariffs – including the introduction of tariffs for treated wastewater and sanitation services – have not come into fruition because of a lack of understanding from policy makers regarding the willingness-to-pay of water users. Although the government has made substantial progress in shifting public perceptions of treated wastewater over the past four decades, there is a need for more extensive community engagement to raise awareness of the need for stronger regulation and tariffs to manage freshwater resources under climate change conditions in the long-term.

Limited knowledge and awareness of water-saving strategies.

It is estimated that inappropriate household water-use and losses, which arise from negligence, internal leakages and garden use represent on average 48% of the metered water supply – equating to ~120 million m³ per year²³. This unnecessary loss of water is partly because Bahrainis are not fully aware of the importance of water conservation given expected climate change impacts on their already scarce freshwater resources. They are also largely unaware of how to conserve water most effectively, including through the use and recycling of alternative water supplies (such as rainwater and greywater). Similarly, many businesses and farmers have limited awareness and knowledge of practices and technologies for reducing their water demand. Although the Electricity and Water Authority (EWA) does have a water conservation unit, the dissemination of information is limited. As a result, innovative technologies for water recycling and conservation are underutilised across Bahrain.

A constraint cutting across all of the above-described barriers is insufficient financial resources. This limitation is restricting direct investment into climate-resilient planning and development of the water sector.

B.2. Project/programme description (max. 1,000 words)

The proposed project will address the impacts of climate change on Bahrain's water sector through two inter-linked components, focusing on: i) creating an enabling environment for climate-resilient water demand management, using international best practices and a scientific evidence base; and ii) investments in climate-resilient water demand management. The conceptual framework of the project is depicted in Figure 7, with a detailed description of all project components, outputs and activities below it.

²² The responsibilities of the Water Resources Council include: i) formulating the water resources policies and strategies for the country, including setting up of appropriate institutional and legislative frameworks; ii) coordinating and integrating government water policies and strategies; iii) identifying priorities for the implementation; and iv) ensuring the implementation of water policies and strategies.

²³ Ministry of Works, 1998. National Sanitation Master Plan Review (NMPR). Sanitary Engineering Ministry of Works, Kingdom of Bahrain.

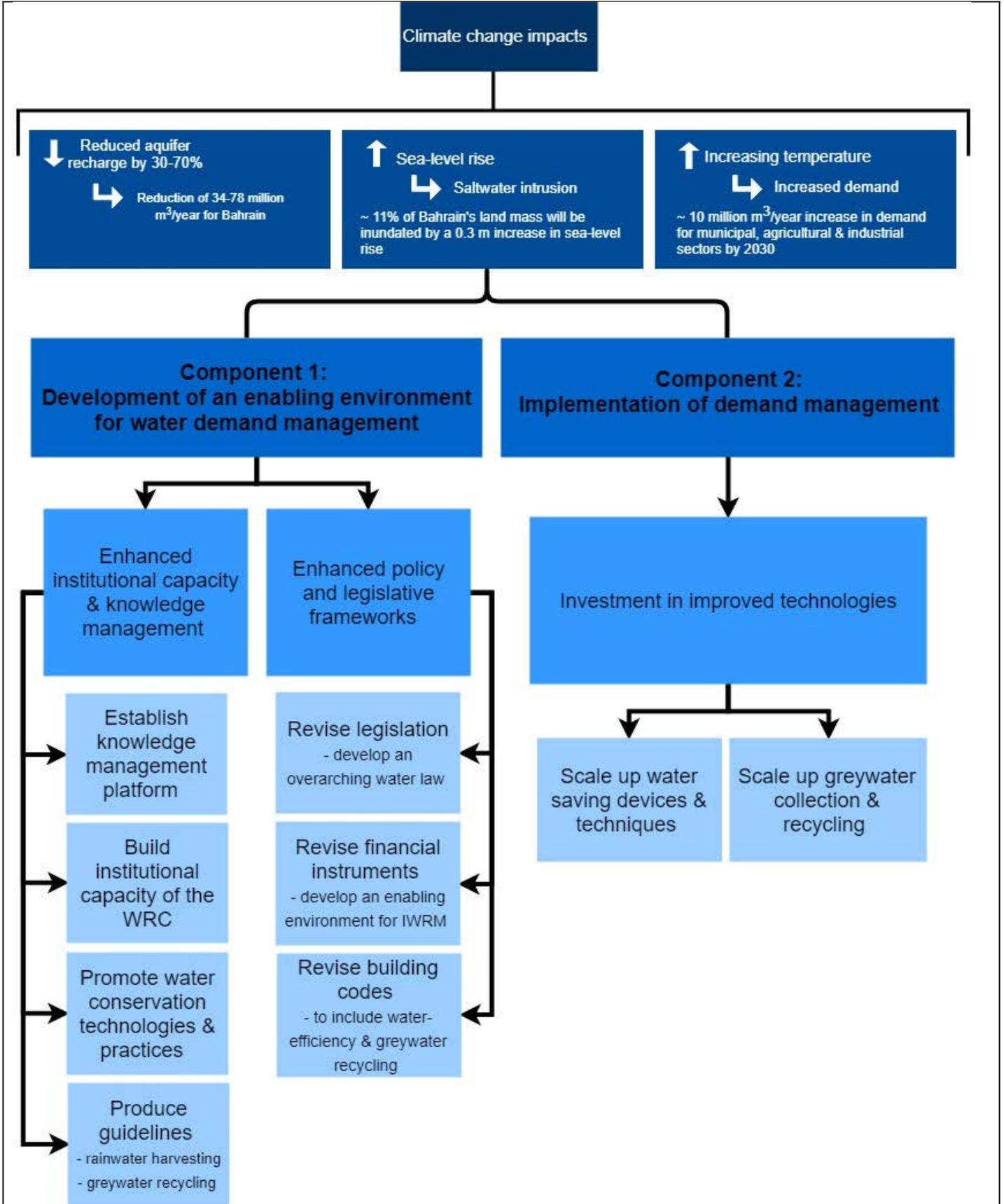


Figure 7: Flow diagram of the project conceptual framework.

Component 1: Development of an enabling environment for water demand management

Output 1.1: Enhanced institutional capacity and knowledge management to mainstream climate resilience into sectoral water management planning, with a focus on demand-side management.

Under this output, the project will build the technical and institutional capacity of the Water Resources Council (WRC) to use results of rigorous scientific data collection, analysis and modelling to manage water demand under climate change conditions in Bahrain. All knowledge generated through this output on the effects of climate change on national water resources and how to mitigate them will be disseminated via a knowledge management platform and linked decision support tool to government, private sector companies, academia and the general public. This will contribute to effective management of the risks of increasing water demand, sea level rise and saltwater intrusion on Bahrain's water sector and promote water conservation within the municipal, industrial and agricultural sectors. Activities within the output are described below.

Activity 1.1.1. Establish a knowledge management platform for climate change impacts on Bahrain's water sector to facilitate improved water demand management.

A cross-sectoral knowledge management platform will be established to bridge the gap between climate information and water resource management in Bahrain. This platform – to be implemented by the Water Resources Council (WRC) – will build the technical capacity of the Government of Bahrain to monitor the impacts of climate change on the water sector and related economic sectors. Memoranda of Understanding (MoUs) will be signed between the WRC and appropriate academic institutions (e.g. Arabian Gulf University) to establish long-term partnerships for sustainable knowledge generation and management. The facilitation of such partnerships will ensure national ownership of the knowledge management platform, the development of a long-term funding mechanism for the platform, as well as the retainment of the associated knowledge and technical capacity. This will result in the sustainability of the platform after the project's implementation period.

The establishment of the knowledge platform will include partnering with academic institutions to: i) model the impacts of sea level rise, temperature, evapotranspiration and rainfall variability on Bahrain's freshwater resources, with a focus on renewable and non-renewable groundwater resources; ii) undertake fine-scale modelling to build on existing models for identifying optimal locations for rainwater harvesting^{24;25}; and iii) conduct a water audit of the agriculture, industry, and oil and gas sectors to identify climate-resilient water management strategies. The water audits will include an assessment of water use, and vulnerability to climate change, across different income groups (e.g. small-scale farmers, low-income groups). Importantly, the knowledge platform will enable quantification of the relative impacts of climate change on water resources (as compared with pressures from the growth of the population and the industrial sector). In addition, lessons learned through the project's monitoring and evaluation (M&E) activities (Mid-Term Review and Terminal Evaluation) will be shared via the platform. These lessons will be used to inform future modelling, planning and investments related to the impacts of climate change on Bahrain's water sector, promoting improved water demand management.

The modelling of climate impacts on Bahrain's water sector will include the development of: i) a geophysical monitoring programme to continuously measure water table levels, rates of extraction and recharge, and water quality; ii) a hydrological and climate model to assess future impacts of temperature increases, evapotranspiration and rainfall variability on the water sector, based on different RCP scenarios; iii) groundwater hydrological models to perform long-term forecasts of water availability under climate-stressed scenarios; iv) sea level rise (SLR) simulation models using Digital Elevation Models (DEMs) to assess the effects of SLR on groundwater resources and coastal aquifers through salt water intrusion; v) a quantitative subsidence analysis (QSA); and vi) a Coastal Vulnerability Index (CVI) for Bahrain with salt water intrusion as the main indicator.

Additional assessments will be conducted to provide data to support the above-mentioned modelling and auditing. This will include assessing: i) changes in water demand as a result of climate change in the industrial and agricultural sectors; ii) land use land cover changes (LULCC) that affect watershed seepage; iii) hydrogeological-corrected DEMs and bathymetric-DEMs for the sea bottom area; iv) long- or short-term projections of changes in shoreline position and

²⁴ In 2017, Multi Criteria Decision Making (MCDM) was implemented using Geographic Information Systems (GIS) to generate an ordinal scaled map of the optimal locations for rainwater harvesting in Bahrain. Results from this modelling indicated that the Mamtallah location presented the best location for rainwater harvesting models. Finer-scale models will be used under Activity 1.1.1 of the project to enhance the results generated by the existing models.

²⁵ Kadhem G. 2017. Rain water harvesting and optimal locations for managed aquifer recharge in the Kingdom of Bahrain using GIS and MCDM techniques. Arabian Gulf University.

configuration; v) the effects of future climate projections on surface diffuse-localised recharge; and vi) the impacts of SLR on low-lying coastal areas.

Fine-scale modelling will be conducted to build on existing models for identifying optimal locations for rainwater harvesting infrastructure, including the potential financial returns and economic benefits associated with rainwater harvesting. Selection criteria will be based on the physical attributes of potential sites, including slope, infiltration rate, depth of groundwater, nature and quality of sediments, and the surrounding land use. This will be combined with an analysis of existing storm water infrastructure that can potentially be integrated into the design of the system, as well as rainfall models to estimate potential capture rates for each specific area. Filtering systems will also be assessed for the removal of potentially harmful suspended solids, as proposed by the pilot study^{26;27}.

To build the knowledge-base for climate-resilient water demand management, a comprehensive water use audit will be conducted for all non-municipal sectors, including private and public agriculture and industry (with a specific focus on the oil and gas industry). This will enable quantification of water use across different sectors, with the view of understanding the true value of water (including virtual water²⁸), optimizing water usage and reducing wastage. The audits will trace water use from its entry into the system through to its discharge, including identifying the source of water being used (groundwater, treated wastewater or municipal supply), the efficiency of usage and the disposal of wastewater. This activity will involve seven steps, specifically: i) the establishment of a water use inventory for each sector to understand how the sector uses water and where the water is sourced from; ii) the assessment of technology needs in the water sector; iii) the implementation of a metering system to record water usage at different stages in a particular facilities' operational framework; iv) a review of maintenance practices for water use and efficiency within each sector; v) the establishment of action plans for each sector on how to improve water use efficiency, to be enforced by the WRC²⁹, vi) the implementation of a monitoring and evaluation plan to assess effectiveness of the newly introduced measures; and vii) the documentation of best practices and lessons learned to support the scaling up of innovative approaches and techniques. In addition to this comprehensive audit of the non-municipal sectors, water use in the municipal sector will also be assessed, specifically to determine the amounts of water used for different purposes in households and public buildings. This will allow water-saving measures to be targeted at the specific water uses where the greatest savings can be achieved in the most cost-effective manner. Overall, the water use audit will provide a detailed quantification of the demand reduction achieved by the project. Moreover, the audit will also identify opportunities for tax incentives for water saving, as well as for the private sector to provide water efficient technologies to industry and agriculture. It is anticipated that the audits will create opportunities for establishing new water service companies, as happened with ESCOs (energy service companies) in Bahrain.

Activity 1.1.2. Build the institutional capacity of the Water Resources Council to establish and operate a climate-resilient integrated water resources management (IWRM) framework in a cross-sectoral manner.

The current national institutional framework in Bahrain will be analysed to identify gaps in the institutional capacity of government departments to implement climate change adaptation strategies across the water sector. Appropriate governance and institutional frameworks will be developed to enhance coordination and collaboration between and amongst institutions. In particular, the Water Resources Council (WRC) will be capacitated to fulfil its mandate of managing the nation's freshwater resources³⁰. A first step in this regard will be to establish its legal status and define its functions including climate risk management and policy formulation. To facilitate this, a strategy document will be developed, outlining terms of reference (ToRs) for the WRC committee and all subcommittees. The council will be further supported through the provision of the necessary tools and knowledge to make informed policy decisions for enhancing water security and climate resilience in the country.

Special thematic task forces will, for example, be established or strengthened to continuously monitor the water resource status and advise the WRC of any measures to be undertaken³¹. This will include the: i) establishment of a

²⁶ A pilot study was conducted in Isa Town in Bahrain, involving the installation of two rainwater injection wells in urban areas.

²⁷ Naik P.K, et al. 2017. Storm water injection in Bahrain: pilot studies. *Arab Journal of Geoscience*, 10: p453.

²⁸ Virtual water (also known as embodied water) refers to the hidden flow of water if food or other commodities are traded from one place to another.

²⁹ All options for managing reduced water resources as a result of climate change will be investigated. This includes dual systems of fresh water and seawater being used for municipal supplies.

³⁰The WRC mandate currently includes: i) formulating the water resources policies and strategies for the country, including setting up of appropriate institutional and legislative frameworks; ii) coordinating and integrating government water policies and strategies; iii) identifying priorities for the implementation; and iv) ensuring the implementation of water policies and strategies.

³¹ Specific focus will be applied to the application of international best practices for the reduction of non-revenue water (NRW), including the International Water Association (IWA) approach to developing a NRW strategy. See Farley. 2003. Non-Revenue Water – International best practices for assessment, monitoring and control. Available at <http://prowat2.pbworks.com/f/WS1+-+Non+Revenue+water+-+Best+Practice+for+assessment,+monitoring+and+control.pdf>

climate and water unit to oversee the integration of climate-resilience in water management planning; ii) restructuring of the existing Permanent Technical Advisory Committee to form a sub-committee for the reuse of waste and greywater; iii) strengthening of units responsible for water treatment and management in the various industrial, commercial and municipal sectors to maximise efficiency; and iv) setting up a permanent office space for the WRC and its associated units within NOGA.

Where necessary, training activities will be implemented to strengthen the capacity of these institutions to implement IWRM using a cross-sectoral approach. This will include providing training to Bahraini nationals, including relevant staff members from SCE, EWA, MoW and MoA, on the use and interpretation of the knowledge management platform established under Activity 1.1.1, for the integration of climate information into IWRM plans. To this end, a decision support system (DSS) will be established to facilitate the flow of information from researchers to policy-makers and decision-makers, via the knowledge platform. The DSS will ensure that the planning for short- and long-term management of national water resources is based on the latest climate change information and international best practices. Finally, a network of researchers, practitioners, private sector stakeholders, NGOs, and policy-makers will be established to facilitate knowledge sharing on the adaptation of the water sector to climate change.

Activity 1.1.3. Promote water conservation technologies and practices at the household and farm levels.

Water saving and recycling costs considerably less per m³ of water than other infrastructural investments such as desalination (see Annex 14a&b for a cost-effectiveness analysis of a wide range of options). Under this activity, an awareness-raising campaign will be conducted through various media and community organisations to inform the public of the potential water-saving technologies and practices available in Bahrain. Community leaders – with a specific focus on religious leaders – will be identified to champion the campaigns, acting as focal points within their communities. Print and social media will be used to disseminate information and provide guidance to the public on how to save water in their households, as well as in small-scale farming³². The awareness-raising campaign will target men and women equally and will use gender-sensitive communication methods. Although there is no disparity between sexes in their access to water, the project will consider the differential roles of men and women in the household and how this might impact their water usage. This activity will be closely aligned to the ongoing EWA water conservation initiatives³³, building on the campaigns to introduce a climate change focus.

To improve the public perception of re-using treated wastewater – including TSE and greywater – the awareness-raising campaigns will include a focus on the benefits of wastewater and the financial incentives supporting its use. Awareness-raising campaigns will be linked with practical demonstrations at large mosques (see Activity 2.1.2) on the use of innovative technologies for the collection, treatment and re-use of greywater, thereby scaling up similar initiatives across the Arab Region. By increasing the acceptance of treated wastewater, this activity will establish the basis for the revision of tariff structures for a wide range of water sources.

Activity 1.1.4. Produce guidelines for rainwater harvesting and greywater recycling.

Based on assessments conducted under Activity 1.1.1, guidelines will be produced to guide the design of landscape-level rainwater harvesting systems at appropriate locations. These guidelines will account for the natural topography, underlying geology and existing infrastructure to maximise the efficiency of the systems. Water quality will also be a central theme in design guidelines, including appropriate measures for managing contaminants.

In addition, guidelines for rainwater harvesting and greywater recycling will be produced. These will focus on household systems, large public buildings and mosques, and will present appropriate systems for each building category. Details on the specific design (including water treatment methods and water quality standards³⁴) and cost-effectiveness of greywater systems will also be presented, which will guide the implementation of Activity 2.1.2.

Output 1.2: Enhanced policy and legislative frameworks for climate-resilient water management.

Under this output, policy and legislative frameworks will be revised to create an enabling environment for the climate-resilient management of water resources in Bahrain. The activities will review current policy, institutional and legal

³² Awareness raising among small-scale farmers will include information on water-efficient crops, practices and technologies.

³³ Source: <http://www.ewa.bh/en/Conservation/Water/>

³⁴ following international standards as outlined in e.g. World Health Organisation, 2006. Guidelines for the safe use of wastewater, excreta and greywater. Volumes 1 – 4. Available at: http://www.who.int/water_sanitation_health/publications/en/

frameworks to identify which policies and laws are being enforced, as well as what improvements can be made to increase the resilience of the water sector under future climate scenarios. The policy and legislative frameworks enhanced under this output will be based around a unified water, energy and food (WEF) nexus approach³⁵.

Climate-resilient water management requires optimization of the equilibrium within the WEF nexus, allowing for adequate water to be produced in an energy-efficient and sustainable manner. By enhancing policy coherence and the alignment of climate change policies across the linked WEF sectors, the project will provide integrated solutions to mitigating climate risks facing the water sector. This will ultimately promote sustainable use and production of water in the country and contribute to the achievement of the Sustainable Development Goals (SDGs).

Activity 1.2.1. Revise current legislation to create an overarching water law that enables the government to sustainably regulate water use in the country under climate change conditions.

Under this activity an inventory of water-related legislation in Bahrain will be undertaken to identify gaps and inconsistencies, particularly pertaining to managing climate change risks. The activity will include reviewing laws governing the direct use of groundwater for agricultural, residential and commercial purposes – including well licensing, metering and charging. The use and treatment of produced water in the oil industry will also be assessed with regards to existing legislation. In addition, legislation and policies on private sector involvement in the water sector, including water treatment and the provision of water-efficient technologies, will be assessed for opportunities to engage the private sector in developing the market and meeting the growing demand for such technologies. This will specifically include consideration of the barriers to private sector investments.

Based on these analyses, a comprehensive water law will be drafted that reflects the policy and strategic focus of the water sector in its entirety. This will include aspects of control, ownership, management, governance and use of the water resources in the country. Finally, the national water quality standards will be reviewed and updated based on international best practices.

Activity 1.2.2. Revise financial instruments in the water sector to create an enabling environment for IWRM in Bahrain.

Water tariffs will be updated based on a comprehensive willingness-to-pay survey across multiple sectors – including municipal, oil and gas, agriculture and industry and benchmarking with comparable markets. Tariffs will be revised for all sources of water, including groundwater and treated sewage effluent (TSE). A detailed economic analysis of potential water tariffs will also be conducted in the third year of the project once the public has been sensitised to the concept of using alternative water sources (see Activity 1.1.3). The revised tariff structure will include the introduction of financial incentives for the recycling of greywater.

Activity 1.2.3. Revise building codes and develop guidelines to include greywater harvesting and recycling as a criterion for new developments.

Under this activity current legislation will be revised to introduce national standards for the treatment of greywater and to integrate greywater recycling into national building codes. The objective will be to make greywater harvesting, treatment and re-use a prerequisite for new building developments, particularly in commercial and industrial spaces. The activity will involve a review of existing building codes, international best practices and cost effectiveness of greywater systems. Based on the results of the review, a policy brief will be drafted that makes recommendations for greywater recycling processes suitable to the Bahraini context. The planned new public housing schemes under development by the Ministry of Housing will, for example, adopt the new building codes.

Component 2: Implementation of demand management technologies

Output 2.1: Investment in improved technologies for water demand management.

Activities under Output 2.1 will invest directly in water demand management technologies in households, public buildings, mosques and farms, including water-saving devices, greywater recycling systems and efficient irrigation. These interventions will scale-up existing initiatives to promote a decrease in water demand in response to the impacts of climate change. Output 2.1 will be implemented in two stages, the first of which will involve design-oriented inputs. The design of interventions will be informed by initial activities under Component 1, including the water use audit (Activity 1.1.1.) as well as specialist assessments of appropriate technologies. On-the-ground implementation of water-

³⁵ FAO. 2018. Water-Energy-Food-Nexus. Available at: <http://www.fao.org/energy/water-food-energy-nexus/en/>

efficient technologies will be conducted from year 3 onwards, following the aforementioned assessments and design work. The activities under Output 2.1 are described below, with additional details about the specific inputs under each activity provided in the detailed budget (Annex 3). Gender disaggregated targets will be developed for this output as a part of the baseline study.

Activity 2.1.1. Scale up the use of water-saving and efficiency devices and techniques in municipal and agriculture sector.

To actively reduce water demand in the municipal and agricultural sectors, water-saving devices will be distributed under the project at the household and farm levels. This will include the scaling up of existing water conservation initiatives currently being run by the Electricity and Water Authority (EWA), which will be facilitated through biannual national workshops on water conservation. Initial inputs will assess the effectiveness of the existing initiatives and current water-use patterns to identify the most effective technologies in the Bahrain context. The project will target 5,000 households and 50 farms across three years, that will be selected on the basis of water consumption and income status, targeting households and farmers without the financial means to adopt water saving devices and efficient irrigation without external support³⁶. Water saving devices will be distributed to women and men equally and will consider the specific needs of women where appropriate.

At the household-level, devices will include flow limiters/aerators for taps, water-efficient shower heads and water-efficient sanitation systems (dual-flush toilets). The full cost of the devices will be covered by the project, with the installation being the responsibility of the recipient. In most cases, the recipients will be able to install the devices themselves, with no extra costs incurred. There will be no or minimal costs involved in the operation of the devices.

At the small-scale farm level, vegetable farmers will be supplied with water-efficient irrigation systems. Since small-scale farmers are the most vulnerable to climate change impacts on water resources, the project will specifically target farms of 0.5–1 ha in size³⁷. In line with government initiatives to increase women's involvement in the business of agriculture³⁸, the project will target farms owned by women. The project will provide the additional equipment required to convert existing irrigation systems, as well as basic training on how to install and maintain the equipment. The irrigation systems will have minimal operation costs, but some basic maintenance will be required. The basic maintenance training received by farmers at the time of installation will minimise the costs of day-to-day maintenance. The costs for replacement parts to account for long-term wear-and-tear are not expected to exceed the operational costs of existing irrigation infrastructure. In addition, the financial incentives linked to improved demand management and revised tariff structures will be designed to supplement any additional maintenance costs, should they occur.

Overall, private-sector suppliers of water-efficient technologies will benefit from the enabling environment created by the project, thereby improving the availability and reducing costs for the maintenance and upscaling of these water-saving interventions. The project will also specifically engage the private sector³⁹ to identify business opportunities for household water-saving devices, water-efficient crops and efficient irrigation systems, following Bahrain's model for entrepreneurship development⁴⁰.

Activity 2.1.2. Scale up greywater collection and recycling initiatives in large mosques, public buildings (such as schools and community centres) and households across Bahrain.

The objective of this activity is to maximise the use and recycling of greywater after basic treatment. The project will target residential properties as well as public buildings such as mosques and public buildings, including schools and community centres. To maximise the efficiency of greywater recycling, an inventory system of quality, quantity and location of greywater resources, and their potential uses will be established to identify target sites. Workshops held during the first two years of implementation will be used to engage stakeholders and identify best practices and lessons learned from previous initiatives in Bahrain. This will include quantifying the efficiency and effectiveness of pilot studies, including mosques with existing greywater recycling systems. Greywater will not be recycled for human consumption. Guidelines for the installation and maintenance of greywater systems will be included in the outputs of Activity 1.1.4.

A total of 500 units in new residential developments will be equipped with innovative greywater systems. This activity will target government social housing (both single and multi-unit buildings) initiatives that are currently planned for the

³⁶ These selection criteria will be further articulated in a grant operation manual during project implementation.

³⁷ Farms in Bahrain range from 0.5 to 10 ha in size, with an average size of 2.5 ha.

³⁸ through business incubators and land-leasing arrangements

³⁹ represented by *inter alia* the Bahrain Chamber and Commerce and the Ministry of Industry and Commerce's investment promotion office.

⁴⁰ as developed by Bahrain and UNIDO and implemented in various countries.

short-term, integrating the greywater systems into the initial construction to support demand management. The maintenance of these systems is relatively simple, and recipients will receive basic training on the day-to-day maintenance requirements. The costs of replacement filters will be indirectly subsidised through financial incentives linked to the revised water tariff systems. This intervention will have significant potential for upscaling by establishing best-practices for the installation of greywater systems for new developments in the Bahraini context. Combined with the development of guidelines for household greywater recycling (Activity 1.1.4) and the revised building codes (Activity 1.2.3), the project will transform the government's approach to the development of social housing, with the potential to influence the target of 40,000 units by 2030.

Fifty mosques in total will be retrofitted with greywater systems, scaling up similar initiatives across the Arab Region using innovative technologies for the collection, treatment and re-use of greywater. Mosques offer significant potential for greywater recycling, given the quantities of water used for *wudu* (ritual purification)⁴¹. These systems will serve an additional function of providing demonstrations of the practical application of greywater recycling, linking with the awareness campaigns under Activity 1.1.3. Community organisations will be engaged to establish crowd-funding campaigns for the ongoing maintenance of greywater systems in mosques.

Finally, 10 public buildings such as schools and community centres will be targeted for greywater retrofitting. This will include the recycling of traditional greywater sources, as well as the capture and recycling of air-conditioner (AC) condensate. Given the high average temperatures in Bahrain, AC units produce significant amounts of water that can be captured and fed into the greywater recycling systems. As temperatures increase with climate change, it is likely that the use of AC units will increase, resulting in additional condensate being produced in the future. The financial incentives linked to reduced water use in the targeted buildings will be designed by the project to offset the maintenance costs of the greywater systems. Building owners/managers will be made aware of these financial incentives as well as the cost-effectiveness of the systems and will be trained on the maintenance requirements.

In the same manner as for Activity 2.1.1, the private sector will be actively engaged by the project to identify investment opportunities in the upscaling of greywater collection and recycling. This upscaling will be further facilitated by the enabling environment created by the project through: i) the implementation of greywater systems under this activity; ii) the revision of building codes under Activity 1.2.3; iii) public awareness raising; and iv) biannual national workshops on scaling up greywater collection and recycling across sectors. Overall, the promotion of private sector involvement by the project will contribute to the achievement of Bahrain's Vision 2030⁴².

B.3. Implementation / institutional arrangements (max. 750 words)

The proposed project will be executed by the Kingdom of Bahrain through the National Oil and Gas Authority (NOGA), which will host the Project Management Unit (PMU). UN Environment will sign a Project Cooperation Agreement (PCA) with NOGA, which will coordinate the national level execution of the project and will be accountable to UN Environment (as the Accredited Entity) for project execution, as well as for the effective and efficient use of resources. The PCA will include specific obligations for the EE on project execution, financial management, personnel administration and reporting, as well as on arbitration and liability terms. The EE will be required to comply with UN Environment rules, policies and procedures on procurement. An organogram of the project implementation structure is presented in Figure 8.

Accredited Entity

UN Environment will be responsible for overseeing the implementation of the proposed project in coordination with the Executing Entities, Project National Steering Committee (NSC) and the Project Management Unit (PMU). A UN Environment representative will fulfil the role of Task Manager (TM), taking responsibility for project oversight and supervision. The TM will also ensure consistency with GCF and UN Environment policies and procedures, whilst: i) participating in the annual NSC meetings; ii) facilitating the project's mid-term and final evaluations; iii) clearing the Progress Reports and Project Implementation Reviews; iv) undertaking the technical review of project deliverables; v) providing input to the annual portfolio reporting to GCF; and vi) preparing requests for disbursements. UN Environment will ensure that the project's activities are aligned with both GCF and Bahraini policies and priorities. Operating policies and procedures will follow UN Environment's programme manual, which includes provisions for financial management and procurement.

National Steering Committee (NSC)

⁴¹ See Annex 2a: Feasibility Study

⁴² Bahrain's Vision 2030. Available at: https://www.bahrain.bh/wps/portal/bahrain2030_en

The NSC will be chaired by the Chair of the Water Resources Council (WRC) at the Deputy Prime Minister level and will comprise members from: i) UN Environment; ii) NOGA; iii) MoW-MAUP; iv) Supreme Council for Environment (SCE); v) Electricity and Water Authority (EWA); vi) Chamber of Commerce and Industry; and vii) municipality councils. Additional stakeholders, including technical experts, will be represented in the relevant two technical committees detailed below. The NSC will not be involved in project implementation or decision-making. Its responsibility will be restricted to providing oversight and advisory support for the project. This will include: i) overseeing project implementation; ii) reviewing annual work plans and project reports; and iii) assessing any recommended changes to the project's targets, activities or timelines. Annual meetings will be held to provide oversight relating to: i) management and technical aspects of the project; ii) the project's main performance indicators; and iii) overarching strategic direction of the project⁴³. Any minor changes to the project's Results Framework or timeline recommended by the NSC will be communicated to the PMU by the Project Manager (PM). Beneath the NSC, two technical sub-committees will be established to guide the technical components of the project, namely the: i) Information and Knowledge committee; and ii) Finance and Legislation committee⁴⁴.

Project Management Unit (PMU)

The role of the PMU will be to coordinate the project's day-to-day activities between the project's AE, EEs and relevant stakeholders. Monthly meetings will be held with the PMU to facilitate this coordination. NOGA will assign a senior Project Director to the project who will provide overall institutional support and facilitate high-level coordination of project activities with other government institutions. The PMU will be based in NOGA – which will temporarily host the WRC – and will consist of staff who will be recruited competitively, financed by the project budget and held accountable to the GoB. These staff will fill the following positions: i) Project Manager (PM); ii) Administrative Officer (AO); and iii) Technical Officers⁴⁵. All PMU staff will report directly to the PM.

Responsibilities of the PM will include: i) supervising on-the-ground implementation of project activities; ii) managing the project in line with the budget and work plan in accordance with GCF and UN Environment guidelines; iii) being responsible for in-country financial management; and iv) working closely with national and local authorities to ensure that the project is managed effectively at a local level. To achieve the targets of the proposed project, the PM will: i) acquire on-the-ground information to inform UN Environment progress reports provided to the GCF; ii) engage with project stakeholders⁴⁶; iii) arrange NSC, PMU and other meetings; iv) provide technical support, including measures to address challenges to project implementation; v) participate in training activities; vi) write technical reports; vii) contribute to UN Environment's reports to the GCF; and viii) facilitate the involvement of relevant consultants. Additionally, the PM will liaise with members from the NSC and PMU, technical experts, government staff and relevant stakeholders to coordinate the implementation of the project's activities.

Monitoring and Evaluation Expert

A Monitoring and Evaluation (M&E) expert will be appointed on a part-time basis under the PMU to conduct and coordinate the M&E of the project. The expert will design a performance monitoring framework to track the project's progress towards achieving its targets. Tracking the project's progress will involve: i) measuring the indicators to evaluate project progress; ii) reporting on the project's performance to the NSC and PMU; and iii) providing technical support to the PM. At the inception stage, the M&E expert will undertake a baseline assessment to validate and update the targets in the project's Results Framework. Following this assessment, the M&E expert will be responsible for conducting regular monitoring of project activities.

Anti-money laundering

The Government of Bahrain has promulgated the Bahrain Anti Money Laundering Law 2001 *vide* Decree Law No. (4) of 2001 with respect to the Prevention and Prohibition of Laundering of Money. To assist its employees/secondees to report information about illegal acts or unethical acts committed by officials, NOGA, its affiliated companies and Ministry of Works, Municipalities Affairs & Urban Planning have developed an anti-money laundering policy to comply with the requirements under the law, its corporate governance guidelines and as part of its risk management to protect the company's long-term wellbeing and reputation.

⁴³ Additional meetings will be held when necessary.

⁴⁴ The information and knowledge, environment and social safeguards and finance and legislation committees will comprise representatives from the government, NGOs, local community and private sector.

⁴⁵ Recruitment of all project personnel will be guided by gender equality and non-discrimination principles.

⁴⁶ The PMU will develop a plan for continuing engagement with all stakeholders throughout project implementation, including through awareness raising and external communication activities.

Anti-corruption and bribery

NOGA’s anti-corruption and bribery policy for NOGA, its affiliated companies and the Ministry of Works, Municipalities Affairs & Urban Planning prevents acts of bribery and corruption that complies with legislation governing bribery and corruption globally. The policy provides guidance on the standards of behaviour to which petroleum sector employees/secondees and management must adhere to. The policy is designed to help employees/secondees identify prohibited activities so that bribery and corruption is avoided.

GCF Climate Resilience Project - Bahrain

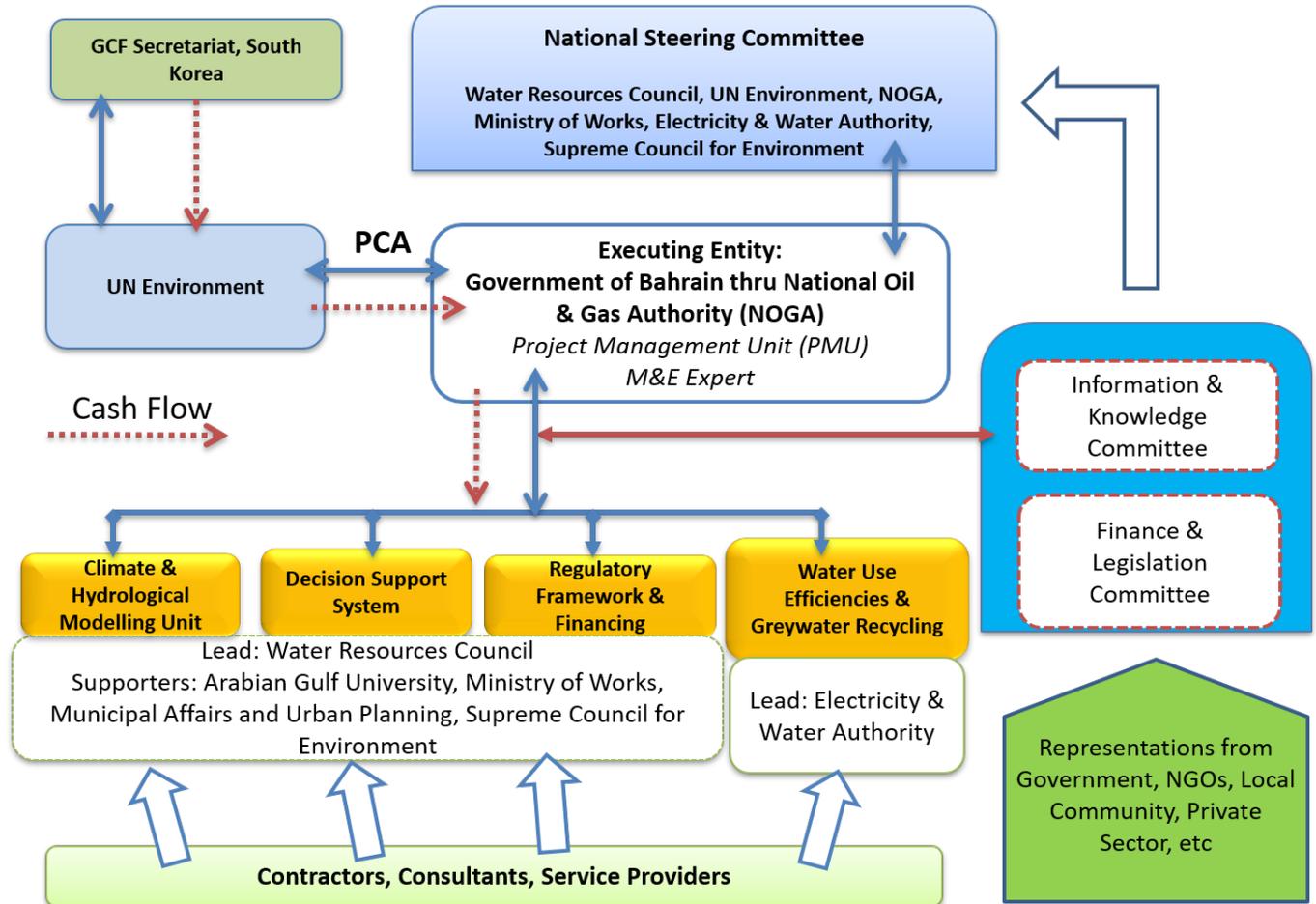


Figure 8. Project management structure for the proposed project.

The contractual relationships between the different entities are indicated in the figure below.

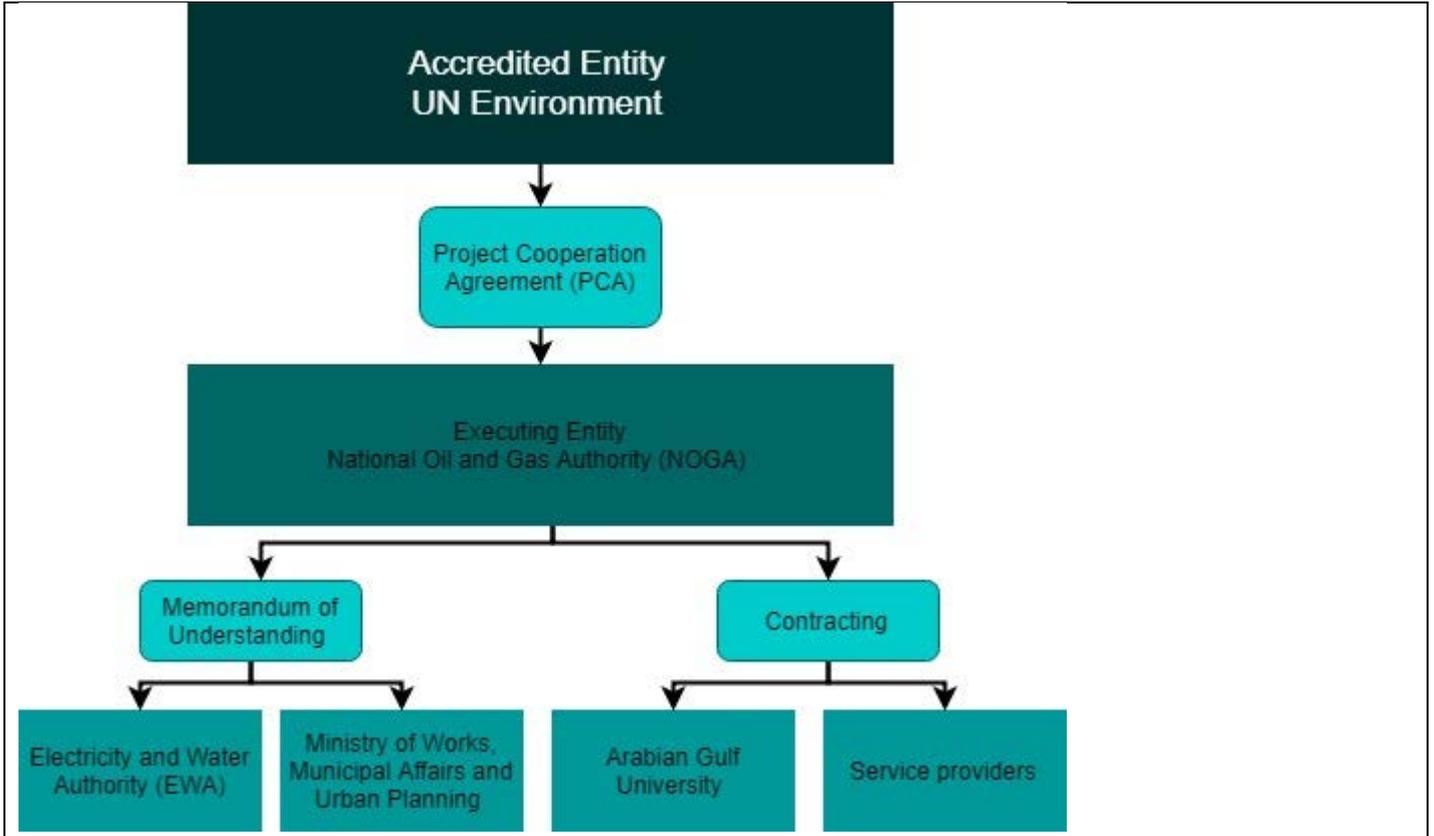


Figure 9. Contractual relationships between entities involved in the proposed project.

C. FINANCING INFORMATION							
C.1. Total financing							
(a) Requested GCF funding (i + ii + iii + iv + v + vi)		9.8		million USD (\$)			
GCF Financial Instrument		Amount	Currency	Tenor	Pricing		
(i)	Senior loans		Options	years	%		
(ii)	Subordinated loans		Options	years	%		
(iii)	Equity		Options		% equity return		
(iv)	Guarantees		Options	years	%		
(v)	Reimbursable grants		Options				
(vi)	Grants	9.8	million USD (\$)				
(b) Co-financing information		Total amount		Currency			
		2		million USD (\$)			
Name of institution		Financial instrument	Amount	Currency	Tenor	Pricing	Seniority
Government of Bahrain		Grant	1	million USD (\$)	years	%	Options
Government of Bahrain		<u>In kind</u>	1	million USD (\$)	years	%	Options
				Options	years	%	Options
				Options	years	%	Options

(c) Total investment (c) = (a)+(b)	Amount	Currency
	11.8	million USD (\$)
(d) Co-financing ratio (d) = (b)/(a)	0.21	
(e) Other financing arrangements for the project/programme (max ½ page)	<i>Please explain if any of the financing parties including the AE would benefit from any type of guarantee e.g. sovereign guarantee, MIGA guarantee, etc.</i>	

C.2. Financing by component

Component	Output	Indicative cost (Million USD)	GCF financing		Co-financing ⁴⁷		
			Amount (Million USD)	Financial Instrument	Amount (Million USD)	Financial Instrument	Name of Institutions
Component 1. Development of an enabling environment for water demand management	Output 1.1. Enhanced institutional capacity and knowledge management to mainstream climate resilience into sectoral water management planning, with a focus on demand-side management.	2.9	2.2	Grants	0.7	Grants	Government of Bahrain
	Output 1.2. Enhanced policy and legislative frameworks for climate-resilient water management.	1.4	1	Grants	0.4	Grants	Government of Bahrain
Component 2. Implementation of demand management technologies	Output 2.1. Investment in improved technologies for water demand management.	6.5	6.1	Grants	0.4	Grants	Government of Bahrain
Monitoring and Evaluation		0.1	0.1	Grants			Government of Bahrain
PMC		0.9	0.4	Grants	0.5	Grants	Government of Bahrain
Indicative total cost (USD)		11.8	9.8		2		

C.3. Justification for GCF funding request (max. 500 words)

The Government of Bahrain (GoB) is seeking US\$9.8 million of grant funding to address extreme climate change threats facing its water sector, including increasing water demand, saline intrusion into aquifers and reduced aquifer recharge as temperatures rise. These threats are expected to reduce Bahrain's freshwater reserves by at least 50 to 100 million m³ of water per year in the short-term. The objective of the project is to address this climate change impact of substantial reductions in the country's freshwater reserves by effecting a transformational change in how national water demand

⁴⁷ The Government of Bahrain will be providing US\$1 million in-kind grant.

and freshwater reserves are managed under climate change conditions. The transformational change will occur as a result of the project's investments in: a knowledge management platform; in-depth water audits of the agriculture, industry and oil and gas sectors; a climate-resilient and cross-sectoral IWRM framework; public awareness on water conservation and recycling; revision of legislative, regulatory and policy frameworks; development and implementation of financial instruments to incentivise water conservation and recycling; and scaling up of water saving and recycling initiatives.

Given the nature of the project as supporting public goods and services, there is little potential for the project activities to raise enough income to recover capital expenditure. In the absence of sufficient cost recovery, it is not feasible for the Government of Bahrain to service a loan to cover the costs of the proposed project. Project investments will also be targeted at the most vulnerable communities, particularly small-scale farmers and low-income households, who have limited adaptive capacity as a result of financial constraints. Maximum concessionality is therefore requested in the form of grant funding.

Without the GCF funding, business as usual will continue, with unsustainable water management practices exposing groundwater resources to climate change impacts from increased demand, saline intrusion and reduced aquifer recharge from rising temperatures. With the GCF grant funding, US\$2 million of government co-finance⁴⁸ will be leveraged for transforming the way in which Bahrain manages its water sector to address these climate change threats.

C.4. Exit strategy and sustainability (max. 250 words)

The proposed project incorporates several design features that will ensure the sustainability of activities following project termination. In particular, the project's alignment with national strategies, policies, and plans will guarantee full country ownership and ongoing support beyond the scope of GCF support. Sustainability of the project will also be ensured by building the required technical/institutional capacity and integrating sustainable water resource management practices under climate change conditions into national policy and legislative frameworks. Importantly, a comprehensive water law will be drafted and will be informed by assessments of: i) projected climate change impacts on water resources; ii) projected changes in water demand; iii) groundwater resources and their use – including well licensing, metering and tariffs; and iv) the use and treatment of wastewater (sewage water, produced water, and greywater). The inclusion of these multiple assessments will ensure that the law has a strong focus on long-term sustainability and management of climate risks. Long-term public support for effective management of water demand and supply will also be promoted through an awareness-raising campaign on the climate threats facing the Bahraini water sector, and what options are available for reducing demand and increasing supply. Taken together, these interventions will lead to the mainstreaming of climate-resilient IWRM in Bahrain. This will be achieved in particular through the proposed policy reforms, strengthened regulations, knowledge management, revised building codes and water tariffs. The result will be an increased focus on demand-side management through *inter alia* greywater recycling and water-efficient technologies and practices⁴⁹. Lastly, the sustainability of the project will be further enhanced through the implementation of Phase 2 of Bahrain's plan for adapting to the impacts of climate change on the water sector.

C.5. Financial management/procurement (max. 300 words)

The financial management and procurement will be guided by UN financial regulations, rules and practices, as well as UN Environment's programme manual. The financial rules of UN Environment, which follow International Public Sector Accounting Standards (IPSAS), are promulgated pursuant to the Financial Regulations and Rules of the United Nations. Within this context, funding allocation mechanisms are managed as per UN rules and procedures, including eligibility criteria, proposal evaluation processes, quality assurance and control, project monitoring and supervision. UN Environment is annually audited by the UN Board of Auditors. UN Environment has established dedicated trust funds for Green Climate Fund resources.

The funding of a project will be established through a distinct grant within the Trust Fund, with the project itself being set up in the UN Environment Enterprise Resource Planning (ERP) as a "Work Breakdown Structure" (WBS), which is itself further broken down into "Work Breakdown Structure Elements" (WBSEs) organised by output and outcome. The grant of the project will be linked to the WBSEs to fund the activities contributing to the delivery of specific output (as per the disbursement schedule detailed in the term sheet). The fee income will be managed through a dedicated grant independently and separately of the GCF project grant funds. In line with UN Environment practice, the project will appoint a Financial Officer within the PMU who will be responsible for monitoring, reporting on and approving requests for funds on a quarterly basis. Reports to summarize the disbursement and projected demands for project funding will be prepared and submitted to a UN Environment Programme Officer who will be in charge of project supervision, in

⁴⁸ A letter of commitment for co-financing from the Kingdom of Bahrain through its department NOGA is attached in Annex 5.

⁴⁹ Based on experiences in other cities globally, it is anticipated that savings of 20–30% of household consumption can be achieved. This equates to 21.6 Mm³ over the 15 years of the project lifespan.

line with reporting standards and methodologies applied in past projects such as those implemented using GEF modalities. The UN financial regulations and rules require the segregation of duties, and safeguards to ensure compliance with UN financial rules and regulations. In addition, a Fund Management Officer will be appointed to assist UN Environment's Programme Officer with all financial monitoring and supervision functions. All procurement will be undertaken in line with UN procurement regulations, rules and policies. UN Environment's modalities for project implementation, in the case of a national project, means that funds are transferred in tranches to the Executing Entity (EE) once the EE has satisfied the conditions that are defined under the legal instrument (Project Cooperation Agreement; PCA) to be signed between UN Environment and the EE. The PCA will include specific obligations for the EE on financial management and reporting, and will require periodic reporting from the EE to follow international financial and auditing standards. The PCA specifically requires the audit be undertaken by a recognised firm of certified public accountants or for governments by a government auditor. This auditor should state whether the GCF proceeds were covered by the scope of the audit.

As a GoB authority, the EE follows the government's financial and procurement rules and standards. During the proposed project's inception phase, UN Environment will conduct a thorough assessment of the EE's capacity to undertake procurement in line with UN regulations, rules and processes. This assessment will guide the procurement monitoring plan which will be agreed upon between UN Environment and the EE. The assessment will be conducted following project approval but prior to project implementation. It will include assessments of elements of governance and public accountability, such as *inter alia*, review of the existence and quality of policies, legal and institutional framework, and systems supporting transparency, accountability, and controls, especially in the use of donor funds. The outcome of the assessment will determine the threshold for procurement that can be undertaken by the EE, which will be reflected in the procurement monitoring plan. The procurement monitoring plan is an annex to the PCA and will be shared with GCF upon signature, as required by the FAA. The procurement monitoring plan will also be reviewed periodically. The project's investments in equipment will be undertaken in accordance with UN procurement procedures. Finally, in line with the UN Environment Programme Manual, the EE will be requested to provide an annual compliance audit covering all aspects of the project execution including review of all expenditures incurred during the financial year.

At the national level, all procurement processes will also align with the rules and regulations of the Kingdom of Bahrain's National Tender Board.

D. LOGIC FRAMEWORK AND MONITORING, REPORTING AND EVALUATION

D.1. Paradigm shift objectives

<i>Increased climate-resilient sustainable development</i>	The objective of the project is to increase the resilience of Bahrain's water sector under future climate scenarios by creating an enabling environment for climate-resilient water demand management.
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D.2. Impacts measured by GCF indicators

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
<i>A2.0 Increased resilience of health and well-being, and food and water security</i>	Indicator A2. Number of direct beneficiaries (males and females) with year-round access to reliable and safe water supply despite climate shocks and stresses.	Household surveys and reports	N/A	65,000 (40% women)	130,500 (40% women)	Climate change shocks and stresses continue to affect the population of Bahrain. Continued water insecurity

				Public buildings (through the introduction of greywater harvesting): 20 mosques and 5 public buildings	Public buildings: 50 mosques and 10 public buildings	
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D.4. Arrangements for Monitoring, Reporting and Evaluation (max. 300 words)

UN Environment will be responsible for managing the project’s progress towards the project targets described in the Results Framework. Results will be formally assessed through the baseline study, a Mid-Term Evaluation (MTE) at the project’s midpoint and a Terminal Evaluation (TE) at the end of the project implementation period. The mid-term and terminal evaluations will be undertaken by independent consultant(s), who will be recruited by the UN Environment independent Evaluation Office (EO). Evaluation will be undertaken using counterfactuals (i.e. with or without scenarios) to be used for impact evaluation. Monitoring will be undertaken in a routine, concurrent and participatory manner, as per the GCF’s monitoring and accountability framework. A baseline study (of the project’s beneficiaries and a comparable control group) will be undertaken at the project inception to generate an updated assessment of the project context, particularly with respect to the various indicators and targets proposed. The National Steering Committee (NSC) will participate in the MTE and develop a management response to the evaluation recommendations along with an implementation plan. The types of tools used (e.g. surveys, records of water use) and the evaluation methodology (including sampling methodologies) for monitoring and evaluating the project will be determined as part of the baseline study.

Independent assessments of project performance (in terms of relevance, effectiveness and efficiency) will be carried out to determine the likelihood of impact and sustainability. It will have two primary purposes, namely to provide evidence of results to meet accountability requirements; and to promote learning, feedback, and knowledge sharing through results and lessons learned among UN Environment and executing partners.

Monitoring and reporting arrangements for the project are detailed below.

NOGA will provide the following reports to UN Environment during project implementation:

- semi-annual progress reports will be provided by 30 July of each year
- annual performance reports will be provided by 15 February of each year
- the final report will be submitted within three months of project completion
- a financial report will be provided on a quarterly basis
- a final statement of accounts will be provided within three months of the completion of project activities

UN Environment will provide the following reports to GCF during project implementation:

- APRs and financial information will be provided on an annual basis by 28 February of each year
- the inception report will be provided within 12 months of the effective project start date
- an interim independent evaluation report will be submitted halfway through project period
- the project completion report/Final APR will be submitted within six months of the project completion date
- a final independent evaluation report will be submitted within six months of the project completion date

The MTE and TE reports will be sent to project stakeholders for comments. Formal comments on the report will be shared by the EO in an open and transparent manner. The project performance will be assessed against standard evaluation criteria using a six-point rating scheme. A final determination of project ratings will be made by the Evaluation Office when the report is finalised. These evaluation reports will be publicly disclosed and will be followed by a recommendation compliance process.

Final outcomes of all assessments will be analysed, and the best-practices and lessons learned will be incorporated into the knowledge management platform. This will align with other project learning activities (see Output 1.1) and will feed into the decision support tool to guide future climate-resilient development.

E. EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA

E.1. Impact potential (max. 300 words)

E.1.1. Expected tons of carbon dioxide equivalent (t CO ₂ eq) to be reduced or avoided (Mitigation only)	Annual	tCO ₂ eq
	Lifetime	tCO ₂ eq
E.1.2. Expected total number of direct and indirect beneficiaries, disaggregated by gender	Direct	Direct: 130,500 (male:female – 1.5:1) 40% female ⁵⁰
		Direct beneficiaries have been estimated based primarily on the number of people that will receive direct support in the form of water-saving devices and/or greywater systems. The most vulnerable groups will be targeted for each intervention, particularly focusing on those without the financial resources to make investments in water conservation and recycling systems independently. Households with water-saving devices: 5,000 (~30,000 people) Farms with water-saving devices: 50 (500 people) Mosques with greywater harvesting: 50 (50,000 people) Public buildings: 10 (50,000)
	Indirect	Indirect: ~1,600,000 40% female It is assumed that the entire population of Bahrain will indirectly benefit through soft interventions that create an enabling environment for climate-resilient water demand management.
<i>*For both, Specify the % of female against the total number.</i>		
E.1.3. Number of beneficiaries relative to total population	Direct	8.1%
	Indirect	100%
<p>The proposed project will contribute to the achievement of GCF's Fund-level adaptation objective of increased climate-resilient sustainable development by promoting demand management and the generation of new supplies of water across Bahrain under climate change conditions. In terms of Fund-level impacts, the project will enhance the resilience of the water sector of Bahrain, supporting the GCF Fund-level impact A2.0: Improved resilience of health and well-being, and food and water security.</p> <p>Based on experiences in other cities globally, it is anticipated that savings of 20–30% of the water consumption of each household targeted within the project can be achieved. This equates to ~21.6 Mm³ over 15 years. More detailed assessments on the expected savings for the entire project, across all economic sectors, will be conducted as part of the studies in Component 1, i.e. under Activity 1.1.1. Such numbers can only be validated after the water audits in Activity 1.1.1. have been conducted and all options for water savings have been assessed in detail.</p> <p>The potential water saving from the 5,000 households targeted by the project over the 5 years is small relative to the 50–100 Mm³/year expected to be lost as a result of climate change. However, a paradigm shift in water use across the country (from reduced demand for groundwater and desalinated water) is expected to make a major contribution to building the climate resilience of Bahrain's water sector as a whole over the 15 years of the project lifespan. The precise effects in terms of water saved will be modelled during the studies conducted in Component 1.</p> <p>Adaptation impact assessment factors</p> <p><i>A5.0 Strengthened institutional and regulatory systems for climate-responsive planning and development.</i> The project will build the institutional capacity of the Government of Bahrain to implement IWRM practices in response to climate pressures on water demand and supply. The policy and legislative frameworks governing the water sector will also be reviewed and revised through the project.</p> <p><i>A6.0 Increased generation and use of climate information in decision-making.</i> The project will build the technical capacity of the Government of Bahrain to model the impacts of climate change on water demand and supply. The</p>		

⁵⁰ Ratios are based on the observed sex ratios in the country, with men and women benefiting equally. Source: <https://www.cia.gov/library/publications/the-world-factbook/geos/ba.html>

knowledge generated will enable decision-makers and policymakers to plan appropriate interventions to reduce climate risks facing the water sector.

A7.0 Strengthened adaptive capacity and reduced exposure to climate risks. By enhancing technical and institutional capacity, revising policy and legislative frameworks, enhancing public awareness and promoting use of greywater and rainwater, Bahrain will increase the resilience of its water sector to climate change. In particular, groundwater reserves will be managed (through reducing demand across all sectors and increasing supply of water) such that the freshwater needs of the Bahraini population are met under climate change conditions in the future.

E.2. Paradigm shift potential (max. 300 words)

The theory of change (see Annex 2b) is that the project's interventions will overcome the barriers related to: i) accurate quantification of climate change impacts on water resources; ii) limited institutional capacity to integrate climate change risks into the management of national water resources; iii) inadequate legal and regulatory frameworks for managing climate change risks facing the water sector; and iv) limited public awareness of how to conserve and recycle water in households and businesses. By overcoming these barriers, there will be a paradigm shift in how Bahrain society approaches the management of its water resources to address climate change. Underpinning this shift will be a new understanding of firstly, the expected effects of increased demand, saline intrusion, and reduced aquifer recharge on Bahrain's freshwater resources, and secondly, what the best measures are for managing these effects, including through the introduction of new financial instruments for climate-resilient water management. The financial instruments, in the form of tariff reforms and incentives for the adoption of water-efficient technologies, will be central to creating a paradigm shift in the community-level approach towards water demand management.

Potential for scaling up and replication. The project's activities will catalyse scaling up and replication primarily through enhancing technical/institutional capacity, developing a knowledge management platform, revising policy and legislative frameworks, and raising public awareness of how to adapt Bahrain's water sector to climate change. Upscaling and replication of specific project activities include the implementation of greywater recycling through the use of demonstrations at mosques and the identification of suitable rainwater harvesting sites across the country. The multi-phased approach being adopted by Bahrain to reduce the impacts of climate change on the water sector further enhances the scalability of interventions, with design linkages between the two phases complementing one another and providing opportunities for expansion and replication. Specifically, the activities in Phase 1 will create a conducive environment for increased private sector investments in the water sector in Phase 2 and beyond. Such involvement of the private sector aligns with the government's Vision 2030. Overall, the project will position Bahrain as a regional leader in climate-resilient integrated water resource management, thereby enabling the replication of the project's approaches in other Middle Eastern countries.

Potential for knowledge and learning. Knowledge generation and learning will be achieved at both the national and community levels through three elements of project design, namely generating knowledge (particularly the impacts of climate change on the water sector and the scientific basis for adaptation), disseminating knowledge (across government agencies, industrial and agricultural sectors, academic institutions and communities) and promoting public awareness and uptake of water saving measures. The development of a knowledge management platform, integrated with a decision support system, will play a central role in facilitating the dissemination of knowledge, bridging the gap between research and application. This will be expanded to the community level through public awareness-raising campaigns that will educate people about the climate change threats facing Bahrain's water resources and how a reduction in demand and intensive management of freshwater resources are required to address these threats. Not only will the knowledge imparted during this project benefit Bahrain, but it will also be disseminated through other countries as departing migrants return home.

Developing an enabling environment. Continued investment in climate-resilient water management practices and technologies will be enabled through the revision of the national water strategy, legislation and regulations (including tariff reforms and the introduction of new financial instruments). Component 1 will build the institutional capacity of the GoB – in particular the WRC – to implement IWRM practices, thereby creating an enabling environment for future climate-resilient development in the water sector. The legal status and mandate of the WRC will be formally defined, enabling the council to coordinate water resource management policies and practices across Bahrain. This will not only facilitate the implementation of activities under the current project during Phase 1, but will also support the development of innovative unconventional water supply options⁵¹ in Phase 2. The supply interventions in Phase 2 will complement the improved demand-side management achieved by Phase 1. Furthermore, the proposed project will improve coordination between relevant sectors, particularly those involved in the WEF nexus. The uptake of adaptation

⁵¹ including produced water from the oil and gas sector, large-scale use of treated sewage effluent (TSE) and extensive rainwater harvesting for managed aquifer recharge.

interventions across Bahrain will be supported by the revision of building codes and the drafting of an overarching water law that will govern the production, treatment, distribution and use of water across all sectors.

E.3. Sustainable development (max. 300 words)

The GCF project **directly** contributes to three Sustainable Development Goals (SDGs)⁵² namely: i) SDG 6 – Clean Water and Sanitation; ii) SDG 12 – Responsible Consumption and Production; and iii) SDG 13 – Climate Action. Additionally, the GCF project will **indirectly** contribute to SDG 5 – Gender Equality, through the empowerment of women. Apart from its contribution to the SDGs, the project will yield numerous environmental, social and economic co-benefits. These are described below.

Environmental co-benefits. Managing water demand to decrease groundwater use under climate change conditions in Bahrain will ultimately increase groundwater reserves (to address saline intrusion), thereby increasing the height of the water table and making groundwater more accessible to indigenous plants. This will strengthen the climate resilience of Bahrain’s terrestrial ecosystems.

Social co-benefits. Reducing the risks of climate change on the water sector will safeguard access to water for sustaining livelihoods, human well-being, and socio-economic development across Bahrain for decades ahead.

Economic co-benefits. By promoting conservation measures and the use of greywater, the project will reduce the national demand for desalinated water. This will in turn reduce gas consumption by desalination plants, with associated cost savings for the country.

Gender-sensitive development. Enhancing the resilience of Bahrain’s water sector to climate change will contribute to ensuring equal access to water supplies for men and women in all sectors. Small-scale farms owned by women will specifically be targeted by the project. Overall, differences in the ways men and women in Bahrain use and relate to water have been taken into account during the project design. (Annex 4: Gender Assessment and Action Plan provides further details on gender-sensitive aspects of the project.)

E.4. Needs of recipient (max. 300 words)

Bahrain is a Small Island Developing State, which is extremely vulnerable to climate change, ranking 86th on the Notre Dame Global Adaptation Initiative (ND-GAIN) index⁵³. The water sector of Bahrain is considered especially vulnerable, given the extreme scarcity of water in the country. Climate change is making the challenge of water management increasingly urgent, particularly as a result of rising demand, saline intrusion and reduced aquifer recharge. This vulnerability is compounded by the fact that Bahrain is one of the most densely populated nations globally, is strongly dependent on groundwater, and has one of the lowest per capita freshwater availabilities in the world. While basic drinking water demand is currently largely met by desalination, Bahrain relies to a large degree on groundwater for agriculture, industry, sanitation, and the irrigation of gardens and public spaces. Improved management of groundwater reserves are consequently of critical importance for building climate resilience of the water sector.

Economic needs: Bahrain faces numerous severe economic stresses, with the public debt level at 90% of the GDP⁵⁴. As a result of this high debt, the government is constrained in its capacity to fund investments or secure international loans to manage the climate risks facing its water sector.

Social needs: The general public in Bahrain largely lacks awareness of the threats of climate change to the water sector, the importance of water conservation and the options available for alternative water supplies. As a result, innovative technologies for water recycling and conservation are underutilised.

Institutional needs: Bahrain currently lacks the technical and institutional capacity to address the climate change threats facing its water sector. There is for example insufficient capacity to comprehensively assess and quantify the effects of climate change on water resources; to mainstream climate risks into water management; to alter policies and legislation to reduce climate risks in the water sector; and to design and implement measures to reduce demand and enhance supply of water under climate change conditions across the country. The need for strengthening IWRM in Bahrain is evident in the country’s performance in terms of the relevant SDG indicator (6.5.1), according to which it ranks in the medium-low category globally, i.e. 48th for institutions and participation, 43rd for management instruments and 40th for financing⁵⁵.

⁵² Source: <http://www.undp.org/content/undp/en/home/sustainable-development-goals.html>.

⁵³ ND-Gain. 2016. Country Index – Bahrain. Source: <https://gain-new.crc.nd.edu/ranking>

⁵⁴ Trading Economics 2018. Bahrain Government Debt to GDP.

⁵⁵ SDG Index and Dashboard Report, 2017. Available at: <http://www.sdgindex.org/assets/files/2017/2017-SDG-Index-and-Dashboards-Report--regions.pdf>

E.5. Country ownership (max. 500 words)

The proposed project is well-aligned with the country's national priorities for climate change adaptation as outlined in the Intended Nationally Determined Contribution (INDC), and Bahrain's Second National Communication (Annex 15) on Climate Change. Adaptation targets outlined in the INDC include: i) building resilience; ii) adapting to the increasingly adverse impacts of climate change; and iii) improving disaster risk preparedness and response⁵⁶. To date, Bahrain has undertaken climate change vulnerability and impact assessments that have addressed four specific areas, namely coastal zones, water resources, human health and biodiversity⁵⁷. The focus on water resources in the proposed project came about through collaboration with multiple national stakeholders, including government and private sector representatives. Stakeholder consultations and site visits were undertaken during an in-country mission conducted in July 2018 including members of academia and government departments (documented in Annex 2a: Feasibility Study). Further consultations will be undertaken with practitioners and local communities during project implementation. During the consultations the project concept was presented to the Executing Entity (EE) and NDA. Based on these presentations, a decision was made by the stakeholders to validate the approach of the project. In addition, both the EE and NDA have endorsed the project. This endorsement is presented in the No-objection Letter signed by the relevant government authorities (Annex 1).

Accredited Entity

UN Environment is the United Nations agency mandated to set the global environmental agenda, promote the integration of environmental concerns into sustainable development within the UN system and serve as an authoritative advocate for the global environment. Since its establishment in 1972, the work of UN Environment has included: i) assessing global, regional and national environmental conditions and trends; ii) developing international and national environmental instruments; and iii) strengthening institutions for the wise management of the environment. In addition, UN Environment is mandated to monitor the impacts of climate change and provide technical support as well as advisory services to help countries pursue low-emission development pathways. This is achieved through addressing: i) science; ii) policy; iii) technology; and iv) finance.

UN Environment's Regional West Asia Office, located in Bahrain, has been operating in the country and the region for 30 years. It provides technical support and capacity building to countries in the field of climate change and has successfully executed several enabling activities through projects related to climate change such as national communications, and GCF Readiness. It also has supported activities on integrated water resources management, monitoring programmes for water-related SDGs and adaptation strategies and planning.

Executing Entity

The National Oil and Gas Authority (NOGA), a government department within the Kingdom of Bahrain, will serve as executing entity for the proposed project. As a regulator, NOGA has undertaken several large-scale initiatives to advance the petroleum sector in the Kingdom of Bahrain through the development of the oil industry, increasing energy conservation, engaging in renewable energy projects, executing voluntary environmental initiatives (e.g. mangrove restoration), improving the treatment of and benefits from natural resources, such as water, and complying with international health, safety and environment standards. This extensive experience and its established project management structures ensures the capacity of NOGA to execute the proposed project effectively.

Grievance Redress Mechanisms

Any grievances that may arise as a result of project activities will be addressed through the respective grievance redress mechanisms of UN Environment and NOGA, as well as through the project-level grievance redress mechanism, as described in Section 10 of the Feasibility Study (Annex 2a).

E.6. Efficiency and effectiveness (max. 1 page)

The interventions of the proposed project are inherently efficient in that increasing technical and institutional capacity, revising policy and legislative frameworks, enhancing public awareness and implementing water conservation

⁵⁶ Bahrain's Intended Nationally Determined Contribution (INDC).

⁵⁷ Results from these assessments are presented in Annex 15: Bahrain's Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC), published in 2012.

measures⁵⁸ are all low-cost interventions relative to infrastructural investments (see Annex 14a&b)⁵⁹, but can have major benefits for the conservation and management of water resources in the face of climate change at a national level. By enhancing the demand-side management of water resources, the project activities will reduce the need for costly additional supply infrastructure such as desalination plants. It will also reduce energy consumption thereby promoting low carbon climate-resilient development (in line with Bahrain's INDC). Moreover, the overall strengthening of the water sector's policies and capacity through the project will ensure that future infrastructure investments are more cost-effective and climate resilient. One of the specific ways in which the project activities will improve both efficiency and effectiveness is by promoting policy reforms that create a conducive environment for increased participation of the private sector, including through public-private partnerships in Phase 2.

The effectiveness of the interventions will be ensured by using cutting-edge science and international best practices to inform the capacity building, policy and legislative frameworks, public awareness raising and water conservation measures under climate change conditions within the project.

A grant instrument is requested for two main reasons: firstly, raising finance to address climate change impacts on water resources is difficult for the government given the economic stress and indebtedness facing the country (see Annex 2a: Feasibility Study), and secondly, the project activities will contribute to public goods that are not expected to generate financial reflows that can be used to service debt payments.

⁵⁸ For example, in Jordan the installation of water-saving devices provided an annualised return on investment of more than ten times the annualised cost. Rosenberg, D.E., Howitt, R.E. and Lund, J.R., 2008. Water management with water conservation, infrastructure expansions, and source variability in Jordan. *Water Resources Research*, 44(11). Further information on the cost-effectiveness of water-saving devices is provided in Annex 2A, Section 8.3.

⁵⁹Turner, A. *et al.* 2016. Managing drought: learning from Australia. *The Alliance for Water Efficiency, the Institute for Sustainable Futures, University of Technology Sydney and the Pacific Institute*. pp. 1–93. Available at: <https://opus.lib.uts.edu.au/handle/10453/58988>

F. ANNEXES

F.1. Mandatory annexes

- Annex 1 NDA No-objection Letter(s)
- Annex 2a Feasibility study (including, summary of stakeholder consultation)
- Annex 2b Theory of Change
- Annex 2c Project-level log frame,
- Annex 2d Project timetable,
- Annex 3 Budget plan that provides breakdown by type of expense (Template in excel sheet)
- Annex 4 Gender assessment and action plan
- Annex 5 Co-financing commitment letter
- Annex 6 Term sheet and evidence of internal approval
- Annex 7 Risk assessment and management
- Annex 8 Procurement plan

F.2. Other annexes to be submitted when applicable/requested

- Annex 9 Vulnerability assessment of municipal water management
- Annex 10 Vulnerability assessment of the impact of sea-level rise
- Annex 11 AE fee budget
- Annex 12 Environmental, Social and Economic Review Note
- Annex 13 Confirmation of review
- Annex 14a Economic analysis
- Annex 14b Economic analysis calculations
- Annex 15 Bahrain's Second National Communication

** Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*

Annex 2c. Project-level Log Frame

	Description	Indicators	Baseline	Targets (mid-term ⁶⁰)	Targets (final)	Sources and means of verification	Assumptions
Objective related to GCF RMF Impact Areas Impact	A2.0 <i>Increased resilience of health and well-being, and food and water security</i>	Indicator A2. Number of direct beneficiaries (males and females) with year-round access to reliable and safe water supply despite climate shocks and stresses.	N/A	65,000 (40% women)	130,500 (40% women)	Household surveys and reports	Climate change shocks and stresses continue to affect the population of Bahrain. Continued water insecurity in Bahrain.
Outcome(s)	Outcome 1: Strengthened institutional and regulatory systems for climate-responsive planning and development	Indicator 1. Institutional and regulatory systems that improve incentives for climate resilience and their effective implementation.	0	Capacity of 2 (WRC & EWA) institutions strengthened to undertake climate-responsive planning and development	Capacity of 4 (WRC, EWA, WMA-UP, NOGA) institutions strengthened to undertake climate-responsive planning and development	Project progress reports; and parliament decisions concerning the relevant institutions and regulatory systems	Political consensus for improving the legislative and institutional framework underlying water management remains throughout the period of implementation. Institutions are receptive to capacity building for climate-responsive

⁶⁰ Mid-term is taken as end of the third year.



						planning and development.
Outcome 2: Increased generation and use of climate information in decision-making	Indicator 2. Use of climate information products/services in decision-making in climate-sensitive sectors.	1	Models disseminated to at least 3 (WRC, EWA, AGU) institutions to inform decision-making	Models disseminated to at least 6 (WRC, EWA, AGU, MWMA-UP, NOGA, Min. Housing) institutions to inform decision-making	Annual progress reports, and stakeholder surveys. Models outputs: Hydrological; hydro-geological; H-DEM; B-DEM; CVI; and QSA.	Climate change impact and rainwater harvesting models are used by decision makers in the management of water resources.
Outcome 3: Strengthened adaptive capacity and reduced exposure to climate risks	Indicator 3. Use by vulnerable households, communities, businesses and public-sector services of Fund-supported tools, instruments, strategies and activities to respond to climate change and variability.	0	Households: N/A at midterm Agriculture (through the introduction of water efficient technologies):	Households (through new water tariffs): 100% of population, of which ~40% is female. Agriculture: 50 small-scale farms	Gender-sensitive household surveys; and annual progress reports	Updated tariffs and building codes provide sufficient incentives to conserve water. Households, farmers, mosques and public institutions



				25 small-scale farms			are prepared to install greywater systems and use water-efficient devices.
				Public buildings (through the introduction of greywater harvesting): 20 mosques and 5 public buildings	Public buildings: 50 mosques and 10 public buildings		
Outputs	<p>Output 1.1. (related to Outcome 1 & 2): Enhanced institutional capacity and knowledge management to mainstream climate resilience into sectoral water management planning, with a focus on demand-side management.</p>	<p>Indicator 4. Number of climate change impact models produced and used in planning</p>	0	3 climate change impact models; and 1 rainwater harvesting model	6 climate change impact models; and 1 rainwater harvesting model	Progress report of PMU; and published model results.	Climate change impact and rainwater harvesting models are used by decision makers in the management of water resources.
		<p>Indicator 5. Number of institutions using hydrological, hydrogeological, H-DEM, B-DEM, CVI, and QSA models to inform adaptation and development planning</p>	0	At least 2 (WRC, AGU) institutions using the relevant models to inform decision-making	At least 4 (WRC, AGU, Meteorology, MWMA-UP – WRD & Roads Directorate) institutions using the relevant models to inform decision-making	Annual progress reports; and stakeholder surveys.	
		<p>Indicator 5. Number of knowledge management platforms</p>	0	1	1	A functioning platform	
		<p>Indicator 6. Institutional capacity score of the WRC</p>	30	50	80	UNEP Capacity scorecard	
		<p>Indicator 7. Number of initiatives to increase awareness of water conservation technologies and practices</p>	0	1 initiative	3 initiatives	Documentation of events	

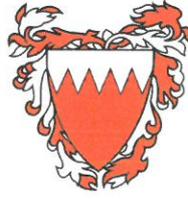
		<p>Indicator 8. Level of awareness regarding water conservation technologies and practices among beneficiaries targeted by awareness raising activities</p> <p>Indicator 9. Number of guidelines produced for rainwater harvesting and greywater recycling</p>	<p>To be determined by a baseline survey</p> <p>0</p>	<p>40% of survey questions from baseline survey answered correctly</p> <p>1 rainwater harvesting guideline</p> <p>1 greywater recycling guideline</p>	<p>75% of survey questions from baseline survey answered correctly</p> <p>1 rainwater harvesting guideline</p> <p>1 greywater recycling guideline</p>	<p>Stakeholder surveys</p> <p>The produced guidelines</p>	
	<p>Output 1.2. (related to Outcome 1 & 2): Enhanced policy and legislative frameworks for climate-resilient water management.</p>	<p>Indicator 10. Number of building codes, laws, and regulations established/revised.</p>	<p>0</p>	<p>1 building code.</p>	<p>1 building code; 3 revised water tariffs (municipal, groundwater and treated wastewater); and 1 water law.</p>	<p>Project progress reports of PMU; parliamentary declarations; and published regulations.</p>	<p>Political consensus for improving the legislative and institutional framework underlying water management remains throughout the period of implementation.</p>
	<p>Output 2.1. (related to Outcome 3): Investment in improved technologies for water demand management.</p>	<p>Indicator 11. Number of initiatives to increase awareness of climate change impacts and water conservation options</p> <p>Indicator 12. Number of households using water-saving devices</p>	<p>0</p> <p>0</p>	<p>1 initiative.</p> <p>1,500 households</p>	<p>3 initiatives.</p> <p>5,000 households</p>	<p>Documentation of events.</p> <p>Gender-sensitive household surveys</p>	<p>Beneficiaries use the installed water-saving devices, water-efficient irrigation systems and greywater recycling technologies.</p>



		<p>Indicator 13. Number of small-scale farms using water-efficient irrigation systems</p>	0	20 small-scale farms	50 small-scale farms	Annual progress reports	
		<p>Indicator 14. Number of mosques, public buildings and households collecting and recycling greywater</p>	0	20 mosques 4 public buildings 200 households	50 mosques 10 public buildings 500 households	Site surveys	
Activity	Description						Inputs
<p>Activity 1.1.1. <i>Establish a knowledge management platform for climate change impacts on Bahrain’s water sector to facilitate improved water demand management.</i></p>	<p>A cross-sectoral knowledge management platform will be established to bridge the gap between climate information and water resource management in Bahrain. This platform – to be implemented by the Water Resources Council (WRC) – will build the technical capacity of the Government of Bahrain to monitor the impacts of climate change on the water sector and related economic sectors.</p> <p>The establishment of the knowledge platform will include partnering with academic institutions to: i) model the impacts of sea level rise, temperature, evapotranspiration and rainfall variability on Bahrain’s freshwater resources, with a focus on renewable and non-renewable groundwater resources; ii) undertake fine-scale modelling to build on existing models for identifying optimal locations for rainwater harvesting; and iii) conduct a water audit of the agriculture, industry, and oil and gas sectors to identify climate-resilient water management strategies. This will enable quantification of the relative impacts of climate change on water resources (as compared with pressures from the growth of the population and the industrial sector).</p>						<ul style="list-style-type: none"> • Professional/ Contractual Services • Local consultants • Equipment • Travel • Staff cost
<p>Activity 1.1.2. <i>Build the institutional capacity of the Water Resources Council to establish and operate a climate-resilient integrated water resources management (IWRM) framework in a cross-sectoral manner.</i></p>	<p>The current national institutional framework in Bahrain will be analysed to identify gaps in the institutional capacity of government departments to implement climate change adaptation strategies across the water sector. Appropriate governance and institutional frameworks will be developed to enhance coordination and collaboration between and amongst institutions. In particular, the Water Resources Council (WRC) will be capacitated to fulfil its mandate of managing the nation’s freshwater resources.</p>						<ul style="list-style-type: none"> • International consultants • Local consultants • Travel • Training, workshops and conference
<p>Activity 1.1.3. <i>Promote water conservation technologies and</i></p>	<p>An awareness-raising campaign will be conducted through various media and community organisations to inform the public of the potential water-saving technologies and practices available in Bahrain. Print and social media will be used to disseminate information and</p>						<ul style="list-style-type: none"> • Professional/contractual services • Local consultants • Travel

<p><i>practices at the household and farm levels.</i></p>	<p>provide guidance to the public on how to save water in their households, as well as in small-scale farming.</p> <p>To improve the public perception of re-using treated wastewater the awareness campaigns will include a focus on the benefits of wastewater and the financial incentives supporting its use. Awareness raising campaigns will be linked with practical demonstrations at large mosques (see Activity 2.1.2) on the use of innovative technologies for the collection, treatment and re-use of greywater, thereby scaling up similar initiatives across the Arab Region. By increasing the acceptance of treated wastewater, this activity will establish the basis for the revision of tariff structures for a wide range of water sources.</p>	
<p>Activity 1.1.4. <i>Produce guidelines for rainwater harvesting and greywater recycling.</i></p>	<p>Based on assessments conducted under Activity 1.1.1, guidelines will be produced to guide the design of landscape-level rainwater harvesting systems at appropriate locations. These guidelines will account for the natural topography, underlying geology and existing infrastructure to maximise the efficiency of the systems.</p> <p>In addition, guidelines for rainwater harvesting and greywater recycling will be produced. These will focus on household systems, public buildings and mosques and will present appropriate systems for each building category. Details on the specific design and cost-effectiveness of greywater systems will also be presented, which will guide the implementation of Activity 2.1.2.</p>	<ul style="list-style-type: none"> • International consultants • Local consultants • Travel • Professional/contractual services
<p>Activity 1.2.1. <i>Revise current legislation to create an overarching water law that enables the government to sustainably regulate water use in the country under climate change conditions.</i></p>	<p>Under this activity an inventory of water-related legislation in Bahrain will be undertaken to identify gaps and inconsistencies, particularly pertaining to managing climate change risks. The activity will include reviewing laws governing the direct use of groundwater for agricultural, residential and commercial purposes – including well licensing, metering and charging. The use and treatment of produced water in the oil industry will also be assessed with regards to existing legislation.</p> <p>Based on these analyses, a comprehensive water law will be drafted that reflects the policy and strategic focus of the water sector in its entirety. This will include aspects of control, ownership, management, governance and use of the water resources in the country. Finally, the national water quality standards will be reviewed and updated based on international best practices.</p>	<ul style="list-style-type: none"> • International consultants • Professional/contractual services • Local consultants • Travel
<p>Activity 1.2.2. <i>Revise financial instruments in the water sector to create an enabling environment for IWRM in Bahrain.</i></p>	<p>Water tariffs will be updated based on a comprehensive willingness-to-pay survey across multiple sectors – including municipal, oil and gas, agriculture and industry and benchmarking with comparable markets. Tariffs will be revised for all sources of water, including groundwater and treated sewage effluent (TSE). A detailed economic analysis of potential water tariffs will also be conducted once the public has been sensitised to the concept of using alternative water sources (see Activity 1.1.3). The revised tariff structure will include the introduction of financial incentives for the recycling of greywater.</p>	<ul style="list-style-type: none"> • International consultants • Local consultants • Travel • Training and consultation workshops

<p>Activity P.2.3. <i>Revise building codes and develop guidelines to include greywater harvesting and recycling as a criterion for new developments.</i></p>	<p>Under this activity current legislation will be revised to introduce national standards for the treatment of greywater and to integrate greywater recycling into national building codes. The objective will be to make greywater harvesting, treatment and re-use a prerequisite for new building developments, particularly in commercial and industrial spaces. The activity will involve a review of existing building codes, international best practices and cost effectiveness of greywater systems. Based on the results of the review, a policy brief will be drafted that makes recommendations for greywater recycling processes suitable to the Bahraini context. The planned new public housing schemes under development by the Ministry of Housing will, for example, adopt the new building codes.</p>	<ul style="list-style-type: none"> • International consultants • Training and consultation workshops • Travel
<p>Activity 2.1.1. <i>Scale up the use of water-saving and efficiency devices and techniques in the municipal and agriculture sector.</i></p>	<p>To actively reduce water demand in the municipal sector, the project will distribute water-saving devices at the household and farm levels. At the household-level, devices will include flow limiters/aerators for taps, water-efficient shower heads and water-efficient sanitation systems (dual-flush toilets). At the small-scale farm level, vegetable farmers will be supplied with water-efficient irrigation systems, including drip irrigation. The project will target 5000 households and 10 farms per year that are selected on the basis of water consumption and income status, targeting households and farmers without the financial means to adopt such devices without external support. Water saving devices will be distributed to women and men equally and will consider the specific needs of women where appropriate.</p>	<ul style="list-style-type: none"> • Training and consultation workshops • Professional/contractual services • Local consultants • International consultants • Travel
<p>Activity 2.1.2. <i>Scale up greywater collection and recycling initiatives in large mosques, public buildings (such as schools and community centres and households across Bahrain.</i></p>	<p>To maximise the efficiency of greywater recycling, an inventory system of quality, quantity and location of greywater resources, and their potential uses will be established to identify target sites.</p> <p>A total of 500 new residential developments will be equipped with innovative greywater systems. This activity will target government housing initiatives that are currently planned for the short-term, integrating the greywater systems into the initial construction to support demand management. Ten mosques will be retrofitted with greywater systems per year, scaling up similar initiatives across the Arab Region using innovative technologies for the collection, treatment and re-use of greywater. Finally, 10 public buildings such as schools and community centres will be targeted for greywater retrofitting. This will include the recycling of traditional greywater sources, as well as the capture and recycling of air-conditioner (AC) condensate.</p>	<ul style="list-style-type: none"> • Professional/contractual services • International consultants • Travel • Training and consultation workshops



To: The Green Climate Fund ("GCF")

Date: 19/8/2018

Re: Funding proposal for the GCF by UN Environment regarding "Enhancing Climate Resilience and Water sector in Bahrain"

Dear Madam, Sir,

We refer to the project "Enhancing Climate Resilience and Water sector in Bahrain" as included in the funding proposal submitted by UN Environment to us on 16 August 2018.

The undersigned is the duly authorized representative of Supreme Council for Environment, the National Designated Authority of the Kingdom of Bahrain.

Pursuant to GCF decision B.08/10, the content of which we acknowledge to have reviewed, we hereby communicate our no-objection to the project "Enhancing Climate Resilience and Water Sector in Bahrain" as included in the attached proposal.

By communicating our no-objection, it is implied that:

- The government of the Kingdom of Bahrain has no-objection to the project as included in the funding proposal;
- The project as included in the funding proposal is in conformity with Bahrain's national priorities, strategies and plans;
- In accordance with the GCF's environmental and social safeguards, the project as included in the funding proposal is in conformity with relevant national laws and regulations.

We also confirm that our national process for ascertaining no-objection to the project as included in the funding proposal has been duly followed.

We acknowledge that this letter will be made publicly available on the GCF website.

Kind regards,

Name: Dr. Mohamed Mubarak Bin Daina

Title: Chief Executive

UNEP Environmental, Social and Economic Review Note (ESERN)

I. Project Overview

Identification	
Project Title	GCF SAP Funding Proposal “Enhancing Climate Resilience of the Water Sector in Bahrain”
Managing Division	<i>West Asia Office</i>
Type/Location	<i>National</i>
Region	<i>West Asia</i>
List Countries	<i>Bahrain</i>
Project Description	<p>The water sector of the Kingdom of Bahrain, a Small Island Developing State, is severely threatened by multiple climate change impacts and a growing population. The main climate change threats are: i) sea level rise causing saline intrusion into aquifers; ii) rising temperatures and greater intensity of rainfall causing reduced rates of aquifer recharge; and iii) rising temperatures causing increases in water demand across all sectors. In combination, these threats are likely to reduce Bahrain’s freshwater supplies by at least 50 to 100 million m³ of water per year in the short-term¹. A paradigm shift is, however, required across Bahrain society to adopt innovative solutions in a manner that is climate-resilient as well as socially, environmentally and financially sustainable. Technical and institutional capacity needs to be built to model all impacts of climate change on water resources, to manage aquifers under climate change conditions using innovative, scalable technologies, and to recover costs of the aquifer management from users through tariff reforms. Furthermore, public awareness on how to address the climate change threats facing the water sector (through demand management and increasing supply) needs to be raised.</p> <p>The overarching objective of the proposed project is to increase the climate resilience of Bahrain’s water sector through a balance of technical support and direct investments. The technical support will develop the enabling environment – in terms of policies, legislation, public awareness and scientific capacity – to reduce climate change impacts on freshwater resources. The direct investments will be in the form of scaling up water conservation, water use efficiencies in the municipal and agriculture sectors as well as greywater collection and recycling.</p> <p>Please note that the ESERN was done for the Concept Note of the original large project (USD49M). The project is split into two phases; this one focusing on soft components and another one to be</p>

¹ Section C.2. provides a breakdown of this range of 50 to 100 million m³.

	developed later focusing on the investment (constructed wetland). Therefore, no risk is associated with this project.
Estimated duration of project:	<i>5 Years (60 months)</i>
Estimated cost of the project :	<i>Total 11.8 Million US Dollars (GCF: USD 9.8, co-finance 2.0M USD)</i>

II. Environmental Social and Economic Screening Determination

A. Summary of the Safeguard Risks Triggered

Safeguard Standard Triggered by the Project	Impact of Risk ² (1-5)	Probability of Risk (1-5)	Significance of Risk (L, M, H)
SS 1: Biodiversity, natural habitat and Sustainable Management of Living Resources	1	1	L
SS 2: Resource Efficiency, Pollution Prevention and Management of Chemicals and Wastes	1	1	L
SS 3: Safety of Dams	N/A	N/A	N/A
SS 4: Involuntary resettlement	N/A	N/A	N/A
SS 5: Indigenous peoples	N/A	N/A	N/A
SS 6: Labor and working conditions	1	1	L
SS 7: Cultural Heritage	1	1	L
SS 8: Gender equity	1	1	L
SS 9: Economic Sustainability	2	1	L
Additional Safeguard questions for projects seeking GCF-funding (Section IV)	1	1	L

B. ESE Screening Decision³ (Refer to the UNEP ESES Framework (Chapter 2) and the UNEP's ESES Guidelines.)

Low risk Moderate risk High risk Additional information required

C. Development of ESE Review Note and Screening Decision:

² Refer to UNEP Environment, Social and Economic Sustainability (ESES): Implementation Guidance Note to assign values to the Impact of Risk and the Probability of Risk to determine the overall significance of Risk (Low, Moderate or High).

³ **Low risk:** Negative impacts negligible: no further study or impact management required.

Moderate risk: Potential negative impacts, but less significant; few if any impacts irreversible; impact amenable to management using standard mitigation measures; limited environmental or social analysis may be required to develop a ESEMP. Straightforward application of good practice may be sufficient without additional study.

High risk: Potential for significant negative impacts, possibly irreversible, ESEA including a full impact assessment may be required, followed by an effective safeguard management plan.

Prepared by:	Name: _Abdul-Majeid Haddad__	Date: _____
Safeguard Advisor:	Name: _Yunae Yi	Date: 17 August 2018
Project Manager:	Name: _Abdul-Majeid Haddad_	Date: 17 August 2018

D. Recommended further action from the Safeguard Advisor:

I agree that the project is likely to be in the low safeguard category. However, please be attentive to potential environmental, social and economic implication of the knowledge package, information analysis, capacity building (in terms of selecting the targets and delivery modalities) and related policy advisory services.

III. ESES Principle and Safeguard checklist

(Section III and IV should be retained in UNEP)

Precautionary Approach
The project will take precautionary measures even if some cause and effect relationships are not fully established scientifically and there is risk of causing harm to the people or to the environment.
Human Rights Principle
The project will make an effort to include any potentially affected stakeholders, in particular vulnerable and marginalized groups; from the decision making process that may affect them.
The project will respond to any significant concerns or disputes raised during the stakeholder engagement process.
The project will make an effort to avoid inequitable or discriminatory negative impacts on the quality of and access to resources or basic services, on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups. ⁴

Screening checklist	Y/N/ Maybe	Comment
Safeguard Standard 1: Biodiversity, natural habitat and Sustainable Management of Living Resources		
Will the proposed project support directly or indirectly any activities that significantly convert or degrade biodiversity and habitat including modified habitat, natural habitat and critical natural habitat?	N	
Will the proposed project likely convert or degrade habitats that are legally protected?	N	
Will the proposed project likely convert or degrade habitats that are officially proposed for protection? (e.g.; National Park, Nature Conservancy, Indigenous Community Conserved Area, (ICCA); etc.)	N	
Will the proposed project likely convert or degrade habitats that are identified by authoritative sources for their high conservation and biodiversity value?	N	

⁴ Prohibited grounds of discrimination include race, ethnicity, gender, age, language, disability, sexual orientation, religion, political or other opinion, national or social or geographical origin, property, birth or other status including as an indigenous person or as a member of a minority. References to “women and men” or similar is understood to include women and men, boys and girls, and other groups discriminated against based on their gender identities, such as transgender people and transsexuals.

Will the proposed project likely convert or degrade habitats that are recognized- including by authoritative sources and /or the national and local government entity, as protected and conserved by traditional local communities?	N	
Will the proposed project approach possibly not be legally permitted or inconsistent with any officially recognized management plans for the area?	N	
Will the proposed project activities result in soils deterioration and land degradation?	N	
Will the proposed project interventions cause any changes to the quality or quantity of water in rivers, ponds, lakes or other wetlands?	N	
Will the proposed project possibly introduce or utilize any invasive alien species of flora and fauna, whether accidental or intentional?	N	
Safeguard Standard 2: Resource Efficiency, Pollution Prevention and Management of Chemicals and Wastes		
Will the proposed project likely result in the significant release of pollutants to air, water or soil?	N	
Will the proposed project likely consume or cause significant consumption of water, energy or other resources through its own footprint or through the boundary of influence of the activity?	N	
Will the proposed project likely cause significant generation of Green House Gas (GHG) emissions during and/or after the project?	N	
Will the proposed project likely generate wastes, including hazardous waste that cannot be reused, recycled or disposed in an environmentally sound and safe manner?	N	
Will the proposed project use, cause the use of, or manage the use of, storage and disposal of hazardous chemicals, including pesticides?	N	
Will the proposed project involve the manufacturing, trade, release and/or use of hazardous materials subject to international action bans or phase-outs, such as DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Convention on Persistent Organic Pollutants or the Montreal Protocol?	N	
Will the proposed project require the procurement of chemical pesticides that is not a component of integrated pest management (IPM) ⁵ or integrated vector management (IVM) ⁶ approaches?	N	

⁵ "Integrated Pest Management (IPM) means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms <http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/ipm/en/>

⁶ "IVM is a rational decision-making process for the optimal use of resources for vector control. The approach seeks to improve the efficacy, cost-effectiveness, ecological soundness and sustainability of disease-vector control. The ultimate goal is to prevent the transmission of vector-borne diseases such as malaria, dengue, Japanese encephalitis, leishmaniasis, schistosomiasis and Chagas disease." (http://www.who.int/neglected_diseases/vector_ecology/ivm_concept/en/)

Will the proposed project require inclusion of chemical pesticides that are included in IPM or IVM but high in human toxicity?	N	
Will the proposed project have difficulty in abiding to FAO's International Code of Conduct ⁷ in terms of handling, storage, application and disposal of pesticides?	N	
Will the proposed project potentially expose the public to hazardous materials and substances and pose potentially serious risk to human health and the environment?	N	
Safeguard Standard 3: Safety of Dams		
Will the proposed project involve constructing a new dam(s)?	N	
Will the proposed project involve rehabilitating an existing dam(s)?	N	
Will the proposed project activities involve dam safety operations?	N	
Safeguard Standard 4: Involuntary resettlement		
Will the proposed project likely involve full or partial physical displacement or relocation of people?	N	
Will the proposed project involve involuntary restrictions on land use that deny a community the use of resources to which they have traditional or recognizable use rights?	N	
Will the proposed project likely cause restrictions on access to land or use of resources that are sources of livelihood?	N	
Will the proposed project likely cause or involve temporary/permanent loss of land?	N	
Will the proposed project likely cause or involve economic displacements affecting their crops, businesses, income generation sources and assets?	N	
Will the proposed project likely cause or involve forced eviction?	N	
Will the proposed project likely affect land tenure arrangements, including communal and/or customary/traditional land tenure patterns negatively?	N	
Safeguard Standard 5: Indigenous peoples⁸		
Will indigenous peoples be present in the proposed project area or area of influence?	N	
Will the proposed project be located on lands and territories claimed by indigenous peoples?	N	
Will the proposed project likely affect livelihoods of indigenous peoples negatively through affecting the rights, lands and territories claimed by them?	N	
Will the proposed project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	N	

⁷ Find more information from http://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/CODE_2014Sep_ENG.pdf

⁸ Refer to the Toolkit for the application of the UNEP Indigenous Peoples Policy Guidance for further information.

Will the project negatively affect the development priorities of indigenous peoples defined by them?	N	
Will the project potentially affect the traditional livelihoods, physical and cultural survival of indigenous peoples?	N	
Will the project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	N	
Safeguard Standard 6: Labor and working conditions		
Will the proposed project involve the use of forced labor and child labor?	N	
Will the proposed project cause the increase of local or regional un-employment?	N	
Safeguard Standard 7: Cultural Heritage		
Will the proposed project potentially have negative impact on objects with historical, cultural, artistic, traditional or religious values and archeological sites that are internationally recognized or legally protected?	N	
Will the proposed project rely on or profit from tangible cultural heritage (e.g., tourism)?	N	
Will the proposed project involve land clearing or excavation with the possibility of encountering previously undetected tangible cultural heritage?	N	
Will the proposed project involve in land clearing or excavation?	N	
Safeguard Standard 8: Gender equity		
Will the proposed project likely have inequitable negative impacts on gender equality and/or the situation of women and girls?	N	
Will the proposed project potentially discriminate against women or other groups based on gender, especially regarding participation in the design and implementation or access to opportunities and benefits?	N	
Will the proposed project have impacts that could negatively affect women's and men's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services?	N	
Safeguard Standard 9: Economic Sustainability		
Will the proposed project likely bring immediate or short-term net gain to the local communities or countries at the risk of generating long-term economic burden (e.g., agriculture for food vs. biofuel; mangrove vs. commercial shrimp farm in terms of fishing, forest products and protection, etc.)?	N	
Will the proposed project likely bring unequal economic benefits to a limited subset of the target group?	N	

IV. Additional Safeguard Questions for Projects seeking GCF-funding

Community Health, Safety, and Security			
Will there be potential risks and negative impacts to the health and safety of the Affected Communities during the project life-cycle?	N		
Will the proposed project involve design, construction, operation and decommissioning of the structural elements such as new buildings or structures?	N		
Will the proposed project involve constructing new buildings or structures that will be accessed by public?	N		
Will the proposed project possibly cause direct or indirect health-related risks and impacts to the Affected Communities due to the diminution or degradation of natural resources, and ecosystem services?	N		
Will the proposed project activities potentially cause community exposure to health issues such as water-borne, water-based, water-related, vector-borne diseases, and communicable diseases?	N		
In case of an emergency event, will the project team, including partners, have the capacity to respond together with relevant local and national authorities?	N/A		Not applicable
Will the proposed project need to retain workers to provide security to safeguard its personnel and property?	N		
Labor and Supply Chain			
Will UNEP or the implementing/executing partner(s) involve suppliers of goods and services who may have high risk of significant safety issues related to their own workers?	N		

Secretariat's assessment of SAP003

Proposal name:	Enhancing climate resilience of the water sector in Bahrain
Accredited entity:	United Nations Environment Programme (UNEP)
Country/(ies):	Bahrain
Project/programme size:	SAP

I. Overall assessment of the Secretariat

1. The funding proposal is presented to the Board for consideration with the following remarks:

Strengths	Points of caution
The project will help to establish a good knowledge base on the management of Bahrain's water resources under changing climatic conditions	Though beneficial, the establishment of a knowledge management platform may not be an end in itself, as continued use of the platform after the project ends is not guaranteed
The project will build public awareness and institutional capacity on water demand management, which could be the most cost-effective water management option for the country	Capacity-building seems to be focused on the Water Resources Council, which is a governance body, with little mention of the Electricity and Water Authority, which is the water utility and thus should ideally be the main implementer of the technical components of the project
The project will provide water-saving devices and greywater recycling systems to lower-income houses as well as mosques and schools. This provides dual benefits of conserving water and increasing water user awareness on the benefits of water conservation and greywater recycling	The assumption that lower-income households will install the water-saving devices themselves may only hold if the water tariffs are raised to a level that incentivises them to do so. To maximise project impact, the correct water-saving devices need to be selected, corresponding to the areas of greatest water usage in Bahraini households today

2. The Board may wish to consider approving this funding proposal with the terms and conditions listed in the respective term sheet and addendum XXXVI, titled "List of proposed conditions and recommendations".

II. Summary of the Secretariat's assessment

2.1 Project background

Climate objective: according to current estimates, Bahrain is reported to suffer a deficit of 10 million cubic metres of water per year due to climate change. This is caused by reduced aquifer recharge due to decreasing rainfall, saltwater intrusion into the aquifers, as well as increased consumption due to high temperatures. The project will enable Bahrain's water authorities to more accurately determine the extent to which water resources are being influenced by climate change. Currently, water demand and consumption patterns are partially understood for the domestic

sector, but less understood for agriculture, industry and other uses. By improving the knowledge base on water resources and climate change in Bahrain, as well as integrating climate change considerations into water management and planning, the project will facilitate improved water resources management under climate change conditions.

3. The provision of water saving devices and greywater recycling systems to schools, mosques and lower-income households is an adaptation option that will help ensure water security for users in Bahrain under future climate change scenarios.

4. The accredited entity (AE) has requested USD 9.8 million in grant financing from GCF. Co-financing will be provided by the Government of Bahrain worth USD 2.0 million as grant and in-kind contributions.

2.2 Component-by-component analysis

Component 1: Development of an enabling environment for water demand (total cost: USD 4.3 million; GCF contribution: USD 3.2 million, or 74.4 per cent)

5. Analysis of key technical strengths and weaknesses and possible remedial measures for the component:

Output 1.1: Enhanced institutional capacity and knowledge management to mainstream climate resilience into sectoral water management planning, with a focus on demand-side management

6. This component envisions the development of several related monitoring programmes and models that will facilitate informed decision-making and planning. The knowledge generated will be disseminated via a knowledge management platform, linked with a decision support tool, to the Government, private sector companies, academia and the general public. This will contribute to the management of climate risks with respect to increasing water demand, sea level rise and saltwater intrusion on Bahrain's water sector and will promote water conservation within the municipal, industrial and agricultural sectors. The project will also build the technical and institutional capacity of the Water Resources Council to use results of the rigorous scientific data collection, analysis and modelling to manage water demand under changing climatic conditions in Bahrain.

7. Furthermore, a public awareness campaign on water demand management will be conducted, to promote water conservation technologies and practices at household and farm level. This will be supported by the provision of guidelines for rainwater harvesting and greywater recycling.

Output 1.2: Enhanced policy and legislative frameworks for climate-resilient water management.

8. The activities under this output include review of current policy, institutional and legal frameworks to identify improvements that can be made to increase water security under future climate scenarios.

9. Establishment of an overarching water law that takes climate change into account will enable the Government to sustainably regulate water use in the country under changing climatic conditions. In particular, the revision of tariffs for drinking water, treated sewage effluent and groundwater should increase the financial viability of the water sector, thereby increasing the sector's ability to maintain water infrastructure and sustain water supply.

10. The incorporation of greywater harvesting and recycling into the national building codes will increase water use efficiency in all new developments, as well as encourage retrofitting of existing buildings.

Component 2: Implementation of demand management technologies (total cost: USD 6.5 million; GCF contribution: USD 6.1 or 93.8 per cent)

11. Analysis of key technical strengths and weaknesses and possible remedial measures for the component:

Output 2.1: Investment in improved technologies for water demand management

12. Activities under this output will focus on direct investment in water demand management technologies, including water-saving devices and greywater recycling. These interventions will scale up existing initiatives to promote a decrease in water demand in response to the impacts of climate change.

13. Household water-saving devices such as low-flush toilets and low-flow showerheads will be provided to existing lower-income households and will be fitted in new social housing developments, with a target of 5,000 households over the project duration. Furthermore, 50 small-scale farms over the project period will be provided with water-efficient irrigation systems. This will demonstrate the water savings potential of these devices/equipment and encourage their adoption by other households and farms.

14. In addition, greywater collection and recycling systems will be installed in large mosques, and public buildings such as schools and community centres. This will also serve a dual purpose of conserving water and encouraging the replication of these systems by households and businesses.

15. A follow-on project with further water supply augmentations is envisioned.

III. Alignment with investment criteria

16. The project has presented its climate rationale as follows: erratic rainfall patterns and rising temperatures due to climate change have reduced aquifer recharge in Bahrain and increased water demand and consumption. The project seeks to integrate climate considerations into planning and policy frameworks to identify and address bottlenecks related to sustainable water consumption and model long-term climate impacts for the water sector. This will create a knowledge base that will facilitate improved planning of the water sector in Bahrain and create an enabling environment, which will encourage public and private investments and interventions towards increasing climate resilience and better management of the water sector.

17. The project adopts a phased approach, which aims to increase the climate resilience of the water sector in Bahrain. The current phase focuses on two main components that deal with creating enabling institutional and policy environments and implementing water demand management interventions to conserve and recycle greywater for addressing water shortages exacerbated by climate impacts.

3.1 Impact potential

Scale: Medium

18. The project will contribute to achieving increased climate resilience and sustainable development in Bahrain's water sector by promoting demand management and improving understanding of climate risks among planners, policy makers and local communities.

19. The project is expected to benefit 130,500 direct beneficiaries who will receive direct support in the form of water-saving devices and/or greywater systems. Depending on the actual selection of devices to be installed, approximately 21.6 million m³/year volume of savings may be attained. The savings from reduced water use will relieve water shortages exacerbated by climate impacts (i.e. erratic rainfall and extreme temperatures).

20. The project will also develop enabling policy environments and knowledge base, which may help ensure that climate risks are integrated into water sector planning and policies. Public awareness around water saving devices and greywater recycling and reuse will potentially create behavioural changes that will reduce water consumption and waste among users.

3.2 Paradigm shift potential

Scale: Medium/High

21. The project can contribute to creating an enabling environment for improved water management in Bahrain by integrating climate risks into water sector planning and policies. The project aims to demonstrate the viability and cost effectiveness of water management devices in public buildings that can unlock further investments in the sector and result in behavioural change among water users through improved understanding of climate risks and demand management strategies.

22. The financial sustainability of the interventions (especially under component 2) is a relevant risk factor that needs to be addressed by the United Nations Environment Programme (UNEP) and the Government of Bahrain. Residents and private entities are unaccustomed to paying for water and the present tariff system does not encourage water savings. The project does not identify an innovative financial mechanism that can facilitate upscaling and replication of these activities after the life of the project. Furthermore, such replication would need to occur by mobilizing significant public and private investments. It is hoped that the enabling environments developed through the project will encourage such investments in the water sector in Bahrain.

23. The project aims to generate a knowledge base and facilitate learning at both the national and community levels through scientific assessments and studies, dissemination strategies, and promoting public awareness and uptake of water-saving measures.

3.3 Sustainable development potential

Scale: Medium

24. The funding proposal demonstrates substantial economic and social benefits for local populations through better management of water resources and climate risks. It will contribute to three Sustainable Development Goals (SDGs), including: SDGs 6, 12, and 13. Furthermore, the project will achieve gender benefits through focusing on improvement of access to water for women users – both in farming contexts and for residents of beneficiary households – and the provision of sufficient water resources.

3.4 Needs of the recipient

Scale: Medium

25. The water sector in Bahrain is vulnerable to climate impacts, making water management an urgent priority. The country lacks institutional frameworks and policies to adequately address these impacts. Technical and institutional capacity in Bahrain is also lacking to tackle climate challenges in the water sector. Public awareness around better water management is also limited. The project aims to address these challenges throughout its lifetime.

3.5 Country ownership

Scale: High

26. The funding proposal is in accordance with Bahrain's nationally determined contribution and Second National Communication on Climate Change. The project addresses three adaptation priorities outlined in Bahrain's nationally determined contribution document, including: (i) building resilience; (ii) adaptation to increasingly adverse impacts of climate change; and (iii) improving disaster risk preparedness and response.

27. The project will directly contribute to institutional and regulatory frameworks in Bahrain to govern water resources, which can have long-term impacts. A comprehensive water law will be drafted under the project that will guide the water sector's policy and strategic focus. National building codes will also be revised to integrate national standards for the treatment and recycling of greywater. Adoption of these legislations by local and national authorities will be crucial, and the

project has committed to address this by engaging government and non-government stakeholders and improving public awareness on water conservation and management.

28. The project aims to set up a National Steering Committee comprising key Government agencies including: the Water Resources Council, National Oil and Gas Authority (NOGA), Ministry of Works, Electricity and Water Authority, and Supreme Council for Environment to advise project planning and implementation efforts, and ensure that project outcomes are well aligned with national priorities.

29. The funding proposal also notes that various consultations were undertaken with stakeholders, including academia and government departments. Further consultations with practitioners and local communities are planned during project implementation.

30. UNEP has wide experience in technical and capacity-building activities in the region on climate change issues and has successfully executed several enabling activities on integrated water resources management, monitoring programmes for water-related SDGs, and adaptation strategies and planning.

3.6 Efficiency and effectiveness

Scale: Medium

31. As a simplified approval process project, UNEP completed a cost-effectiveness analysis instead of a full economic and cost-benefit analysis. This analysis estimated the annualized investment and operating costs of several alternatives to achieve additional bulk water supply and divided them by the estimated annual volume of water supplied by each. The results showed costs per cubic metre ranging from USD 0.04/m³ for water-saving measures (in general) to USD 0.45/m³ for wastewater reuse. For comparison, the global average willingness-to-pay for water is approximately USD 2/m³, and it may be even higher in a water-scarce environment such as Bahrain. This suggests that the interventions are likely to be cost effective even if costs are higher or yields lower than anticipated.

32. The project also seeks to contribute to tariff reform. The water service is currently subsidized, and tariff reform is necessary to improve revenues and incentivize lower water consumption. It is argued that due to this situation, Bahrain would be unable to service a loan through tariff revenue. However, it is unclear why a private concessionaire (operating under a special purpose vehicle or public-private partnership structure), cannot take on loans, assume responsibility for repayments and spread the risks of the project. As part of tariff reform, the project will conduct a detailed economic analysis of potential water tariffs based on a comprehensive willingness-to-pay and ability-to-pay survey across multiple sectors. These studies and additional policy outcomes from the project are public goods that are appropriate for grant financing.

IV. Assessment of consistency with GCF safeguards and policies

4.1 Environmental and social safeguards

33. The project aims to address the impacts of climate change on Bahrain's water sector by creating an enabling environment and investments in climate-resilient water-demand management. The project will have two components. One component will focus on creating the enabling environment through institutional strengthening, technical and institutional capacity-building, policy and regulatory framework enhancements, and mainstreaming climate resilience in water management planning. The other component will invest in technologies identified early in the project to improve demand management. The AE has classified the project as having low to no environmental and social risks, equivalent to Category C of the GCF environmental and social risk

categorization. The risk category takes into consideration the likely environmental and social risks and impacts arising from the activities of the two components of the project. Component 1 is seen as having no particular environmental and social risks given the nature of the activities. Where there may be future environmental and social implications of policies and planning support these will be assessed in the future through the country's environmental and social safeguards systems. Component 2, however, may have environmental and social risks and impacts, but these are considered benign and are rated as low-risk. Still, once the specific water-saving and re-use technologies are identified by Component 1, a review should be carried out to assess their specific social and environmental risks, and to confirm if the project should remain in Category C.

34. The AE conducted an environmental and social risk screening through its Environmental, Social and Economic Review Note (ESERN) after determining safeguard standards (SS). The ESERN seeks to initially identify likely risks and impacts of the project that will inform the extent and scope of the project's assessment and management plans. The result of the screening by the AE indicated the following: (1) the project has not triggered the SS of the AE on involuntary resettlement, indigenous peoples, and the safety of dams; (2) where the other safeguards were triggered (SS1 on biodiversity, SS2 on pollution prevention and management, SS6 on labour and working conditions, SS7 on cultural heritage, SS8 on gender equality, and SS9 on economic sustainability) these were considered as not significant, with low impact or magnitude and low probability of occurrence. The due diligence by GCF confirms that the environmental and social risks and likely impacts are not significant. One key consideration of the project would concern occupational health and safety; the accredited entity will ensure that appropriate health and safety management is included in any work related to Component 2 and will adhere to relevant standards and guidelines, including the country systems.

35. In the course of project development, multi-stakeholder consultations were undertaken with Government ministries, non-governmental organizations, and private sector representatives. As awareness-raising is a focus of the project, consultations and a feedback system will be embedded in the various awareness-raising and external communication activities by the executing entities. Further consultations will be undertaken at a general level (e.g. through steering and technical committee meetings) and at an activity-specific level (during awareness building). These will be complemented by annual consultations with the broader stakeholders during project implementation. The Project Management Unit will develop a plan for continuing stakeholder engagement during project implementation. A project-level grievance redress mechanism was developed for this project, complementing the grievance redress mechanism of the AE and describing the processes for receiving, handling and resolving complaints.

36. The AE has indicated in their assessment that the executing entity (EE), NOGA, has the capacity and experience to implement the project, which may also involve addressing any environmental and social impacts that may arise.

4.2 Gender policy

37. The proposal contains a gender assessment and therefore complies with the operational guidelines of the GCF Gender Policy and Action Plan. It also includes a gender and social action plan.

38. The gender assessment outlines gender issues in Bahrain, some of which are explained in relation to the existence of an enabling regulatory framework, the favourable situation for both females and males in education as well as in access to employment and financial resources, equality in quality of life and some civil liberties. Favourable conditions also exist for people with disabilities and the law protects certain aspects of their rights. The assessment also indicates that there are gender inequality issues in relation to marriage and certain rights associated with it, inheritance rights, wage gaps, gaps in leadership positions held by women, marriage, incidents of domestic violence and sexual harassment.

39. The assessment and funding proposal further elaborated that while access to water services will not affect women and men differently, the proposal recognized the need to invest in awareness-raising campaigns targeting men and women equally while using gender-sensitive communication methods. Although there is no gender disparity in access to water, the project will consider the differential roles of men and women in the household and how this might impact their water usage. In addition, the proposal identified small scale farmers to be targeted as they are most vulnerable to climate change impact. At the small-scale farm level, vegetable farmers will be supplied with water-efficient irrigation systems. These farms are between 0.5–1 ha in size. In line with Government initiatives to increase women’s involvement in the business of agriculture, the project will target farms owned by women. The project will provide the additional equipment required to convert existing irrigation systems, as well as basic training on how to install and maintain the equipment. The project is recommended to include women as trainees in the maintenance of their own irrigation systems.

40. Further, water-saving devices will be distributed to women and men equally and the specific needs of women will be considered where appropriate. A 40 per cent target is identified for women, however no baselines or targets are set for all the outputs indicated in the gender action plan, for example, water saving devices for women farmers. The proposal indicates that the target is set at 40 per cent (outcome 3) and 50 small-scale farms; it is recommended that consistency between the gender action plan and the Funding Project be maintained for activities, indicators and targets. Further, while gender disaggregated targets will be developed for output 2.1 (investment in improved technologies for water demand management) as part of the baseline study, it is also important to establish baselines for smallholder farmers (as vulnerable groups), women and people with disabilities. It is also recommended that the stakeholder engagement planned in the future for monitoring implementation should include meaningful participation of women, people with disabilities and women smallholder farmers.

4.3 Risks

41. **Overall programme assessment** *Scale: Medium*

(a) GCF is requested to provide a grant of USD 9.8 million to create an enabling environment for climate-resilient water demand management and to invest in improved technologies for water demand management. The Government of Bahrain is providing a grant of USD 1 million and an in-kind contribution of USD 1 million. The disbursement of co-financing from the Government will be included in the annual reports in accordance with the project cooperation agreement between the AE and the EE. Because of its high debt (public debt level at 90 per cent of gross domestic product), the Government is constrained to secure international loans to manage climate risks facing its water sector. The proposed interventions are presented as non-revenue generating activities, although they are likely to generate utility bill savings for end users, and a corresponding drop in service subsidies that the Government pays.

(b) The funding proposal stated that this project is phase 1 of a two-phase approach, which is to focus mainly on the demand side and support the development and implementation of phase 2, which will focus on direct investments to reduce water demand. The AE is encouraged to explore and assess the revenue-generating potential of Phase 2.

42. **Accredited entity/executing entity capability to execute the current programme** *Scale: Medium*

(a) UNEP, as the AE, is mandated to monitor the impacts of climate change and provide technical support to countries. It has been operating in Bahrain for 30 years. The AE is considered a reliable partner to support integrated water management and capacity building to the country.

(b) The NOGA is part of the Government of Bahrain. It will be an EE for the project and host the Project Management Unit (PMU). The funding proposal stated that NOGA has experience in implementing voluntary environment initiatives and established project management structures. The EE will have contractual relationships with other partners such as ministries, university, and other service providers to execute the project. Limited coordination among partners has been identified as a gap in the proposal. The AE/EE along with the PMU and steering committee are relied upon to closely coordinate the implementation.

(c) The Secretariat notes that the water utility (the Energy and Water Authority) and the Ministry of Municipalities and Agriculture Affairs play a relatively limited role in the implementation of this project, despite their mandates in agriculture and municipal water supply.

43. **Programme-specific execution risks** *Scale: Medium*

(a) Technologies for water demand management: approximately 62 per cent of GCF financing is supporting Component 2 (investment in improved technologies for water demand management) for the use of water-saving devices and scaling up greywater collection and recycling, targeting vulnerable households, farms, residential buildings, mosques and public buildings. To date, no research has been conducted for estimation of the size of demand. The full cost of the devices and equipment will be covered by the project. To enhance the ownership of the devices and equipment, a cost-sharing method with end users could have been explored. Project monitoring could be strengthened by ensuring there has been sufficient uptake and installation of water savings devices by the end users, before each subsequent disbursement is made.

(b) Revised water tariff and willingness-to-pay: the timely maintenance and replacement of equipment is necessary for sustainability of the project. It is expected that additional costs of maintenance or replacement will be covered by the anticipated financial incentives linked to the revised water tariff system. According to the feasibility study, the cost of water substantially increased due to a rise in the cost of energy in 2012, and the Government provided subsidies of USD 326 million in 2013 for water. However, most of the population (85 per cent) is unwilling to pay the actual cost of water as it is considered a public good. The treated wastewater is currently provided free of charge for agriculture use. The project is planning to update water tariffs for different sources of water based on a comprehensive willingness-to-pay survey and will carry out economic analysis of potential water tariffs. As stated in the funding proposal, the intensive stakeholder consultations and awareness-raising activities to sensitize the public and key sectors on different water sources and cost implications for water supply, need to be conducted prior to the survey and economic analysis in order to have buy-in from the demand side.

44. **Project viability and concessionality**

(a) The grant from GCF will cover the entire capital cost of the water-saving devices. The long-term viability depends on timely installation, maintenance and replacement after their useful life. The project proposes tariff incentives and awareness-raising activities for supporting the maintenance and replacement costs by users.

(b) The project does not propose to install the water-saving devices provided under Component 2. There is therefore a risk that end users do not have the capacity and/or willingness to install the devices and achieve the expected water savings. Financial incentives (for installation by end users) could be investigated further to encourage uptake. The AE is requested to ensure that the devices financed by GCF grant are not made available to commercial or other entities that are able to pay for such devices and recover cost through savings in water usage.

45. **Compliance risk** *Scale: Low*

(a) The GCF policy on anti-money laundering (AML) and countering the financing of terrorism (CFT) stipulates that AEs bear responsibility for identifying and mitigating the risks of money laundering and terrorist financing in deploying and managing GCF resources. In this context, AEs

are required to ensure that non-accredited EEs adopt and implement effective AML/CFT controls in the management of project activities. Section B.3 and annex 7 of the funding proposal emphasize the commitment of Bahrain to combating money laundering and terrorist financing as well as the capacity and governance framework of the EE in the context of AML/CFT risk mitigation – which is deemed adequate. Furthermore, the nature and structure of the project pose limited risks of money laundering and financing of terrorism. In addition, secondary due diligence conducted on the relevant parties to the project did not produce any adverse outcomes.

46. **GCF portfolio concentration risk** *Scale: Low*

(a) In case of approval, the impact of this proposal on GCF portfolio risk remains non-material and within the risk appetite in terms of concentration level, results area or single proposal.

(b) **Conclusion (medium risk):** It is recommended that any approval by the Board is made taking into consideration the above points.

Summary risk assessment		Rationale
Overall programme	Medium	GCF financing will be mainly used for non-revenue generating activities such as awareness-raising, technical assistance, and for financing the capital cost of water-saving devices. The accredited entity is requested to ensure that the devices financed by GCF grant are not made available to commercial or other entities who can pay for such devices and recover cost through savings in water usage. GCF relies on the accredited entity for effective coordination with other stakeholders.
Accredited entity/executing entity capability	Medium	
Project-specific execution	Medium	
Compliance	Low	
GCF portfolio concentration	Low	

4.4 Fiduciary

47. The EE for the project is the Kingdom of Bahrain through the department of National Oil and Gas Authority (NOGA).

48. NOGA will sign a project cooperation agreement with the AE, UNEP, to coordinate the national-level execution of the project. NOGA will be accountable to the AE for project execution as well as for the effective and efficient use of resources. The project cooperation agreement will include specific obligations for the EE on project execution, financial management, personnel administration and reporting. The EE will be required to comply with UNEP rules, policies and procedures on procurement.

49. As the AE, UNEP will be responsible for overseeing the implementation of the proposed project in coordination with the EE, Project National Steering Committee and the PMU. UNEP will ensure that the project’s activities are aligned with both GCF and Bahraini policies and priorities.

50. The National Steering Committee will not be involved in project implementation or decision-making. It will primarily provide oversight and advisory support for the project, which will include overseeing project implementation, reviewing annual work plans and project reports and approving any changes to the project’s targets, activities or timelines.

51. The PMU will be hosted within NOGA whose role will be to coordinate and implement the project’s day-to-day activities between the project’s AE, EEs and relevant stakeholders. The PMU

will temporarily host the Water Resources Council and will consist of staff who will be recruited competitively, financed by the project budget and held accountable to the Government of Bahrain. These staff will fill the following positions: (i) Project Manager; (ii) Administrative Officer; and (iii) Technical Officers. All PMU staff will report directly to the Project Manager.

52. The financial management and procurement will be guided by United Nations financial regulations, rules and practices as well as the UNEP programme manual. In line with UNEP practice, the project will appoint a Financial Officer within the PMU who will be responsible for monitoring, reporting on and approving requests for funds on a quarterly basis. All procurement will be undertaken in line with United Nations procurement regulations, rules and policies. UNEP will conduct an assessment of the EE immediately after the project is approved by the GCF Board and will follow GCF specifications, in addition to UNEP and the United Nations Harmonized Approach to Cash Transfer processes.

53. UNEP will be responsible for managing the project's progress towards the project targets described in the results framework. Results will be formally assessed through the baseline study, a mid-term evaluation at the project's midpoint and a terminal evaluation at the end of the project implementation period.

4.5 Compliance

54. As part of a two-phase adaptation project, the proposed phase 1 intervention is expected to facilitate transformational change within Bahrain's water sector by building technical and institutional capacity to monitor and model climate change impacts on water resources, mainstreaming climate resilience into sectoral water management planning, developing new policy and legislative frameworks and designing new financial instruments. It will also raise public awareness of the climate change threats, and promotion of water saving and reuse. The project is expected to directly benefit 130,500 people, including small scale farmers and lower-income groups who are the most vulnerable to the climate change impact of reduced availability of water.

55. The proposal provides a good programme description outlining expected outputs that align with those indicated in the theory of change and in the logic framework. The logic framework complies with the performance measurement frameworks of GCF and is considered adequate. However, targets on gender will need to be confirmed when the project baseline survey is conducted and submitted by the AE to GCF alongside the project inception report.

4.6 Results monitoring and reporting

56. The monitoring reporting and evaluation arrangements are well detailed and considered adequate except for evaluation methodologies, which need to be further elaborated. It is recommended that the AE submits to GCF the details of the evaluation methodologies to be used prior to, or together with, the project inception report and ensures that the evaluations are adequately budgeted for.

57. The project does not propose to install water-saving equipment for end users. The project monitoring should therefore verify periodically that equipment previously supplied under this project is actually in use.

58. The timetable of implementation has well detailed activities, milestones and deliverables. However, the AE will need to update and align the reporting timelines for project completion reporting and end of project evaluation, with the project implementation period.

4.7 Legal assessment

59. The accreditation master agreement was signed with the AE on 15 December 2016, and it became effective on 20 February 2017.

60. The AE has provided a legal opinion/certificate confirming that it has obtained all internal approvals and has the capacity and authority to implement the project.

61. The proposed project will be implemented in the Kingdom of Bahrain, a country in which GCF is not provided with privileges and immunities. This means that, among other matters, GCF is not protected against litigation or expropriation in this country, risks that need to be further assessed.

62. The Heads of the Independent Redress Mechanism and Independent Integrity Unit have both expressed that it would not be legally feasible to undertake their redress activities and/or investigations, as appropriate, in countries where GCF is not provided with relevant privileges and immunities. Therefore, it is recommended that disbursements by GCF are made only after GCF has obtained satisfactory protection against litigation and expropriation in the country, or has been provided with appropriate privileges and immunities.

4.8 List of proposed conditions

63. In order to mitigate risk, it is recommended that any approval by the Board is made subject to the following conditions:

- (i) Signature of the funded activity agreement in a form and substance satisfactory to the Secretariat within 180 days from the date of Board approval;
- (ii) Completion of legal due diligence to the satisfaction of the Secretariat;
- (iii) Delivery to the Fund by the AE a completed fiduciary risk assessment including an evaluation of the financial management capacity of the EE in line with UN regulations, rules and processes.
- (iv) Delivery to the Fund by the Accredited Entity of evidence, satisfactory to the GCF Secretariat, demonstrating that the inter-ministerial coordination mechanisms have been strengthened, the engagement of relevant line agencies has been enhanced, and the full involvement of municipal water supply and agriculture water supply agencies has been confirmed, as proposed in the Funding Proposal.
- (v) Delivery to the Fund by the Accredited Entity of evidence, satisfactory to the GCF Secretariat, verifying that at least forty per cent (40%) of water demand management technologies, including water saving devices provided under the Project, were deployed to the targeted beneficiaries, and at least seventy per cent (70%) of such deployed technologies are operating as specified in the Funding Proposal.
- (vi) Delivery to the Fund by the Accredited Entity of evidence, satisfactory to the GCF Secretariat, verifying that at least forty per cent (40%) of grey-water recycling systems were deployed to the targeted beneficiaries, and at least seventy per cent (70%) of such deployed systems are operating as specified in the Funding Proposal.

Independent Technical Advisory Panel's assessment of SAP003

Proposal name:	Enhancing climate resilience of the water sector in Bahrain
Accredited entity:	United Nations Environment Programme
Project/programme size:	SAP

I. Assessment of the independent Technical Advisory Panel

1.1 Impact potential

Scale: N/A

1. Bahrain is an island nation located in the Arabian Gulf. The country's climate is arid, typical of the arid zone that is expanding from the Sahara Desert, across the Arabian Peninsula and towards the Central Asian desert. In addition to the mild winter, the country faces hot summer months, where the temperature may rise from an average range of 25-34°C to as high as 48°C (particularly in July and August). The high temperature accompanied by hot, dry south-west winds give rise to high rates of evaporation. Hot weather leads to an increase in municipal water demand while high evapo-transpiration also causes water losses from top soils in agricultural fields and gardens.

2. Bahrain is classified as a water scarce country, owing to its limited natural water resources, small catchment area, very low average rainfall (about 80mm as against potential evapo-transpiration of about 1,850mm/year) and rapidly declining per capita freshwater availability, which decreased from 525m³/year in 1970 to less than 100 m³/year in 2010. Meanwhile, the average municipal water consumption in Bahrain is as high as 500 litres per capita per day (lpcd), and about 28 per cent of this is non-revenue municipal water. Such contrasting features involving extremely limited freshwater availability and very high municipal water demand has led to a general inference that there must be something wrong in the demand-supply balance regarding municipal water in Bahrain.

3. Several other major factors in addition to climate change are contributing to a rapid increase in municipal water demand: (i) high economic growth fuelled by the implementation of policies on economic diversification, including industrial and commercial expansions, which in turn has been enticing expatriate migrants to cause extremely rapid densification, and (ii) high rates of urbanization, which also contributes to the formation of an urban heat island and further affecting the increase in water demand. In the backdrop of ongoing refining and processing of crude oil for export, Bahrain has emerged as a major economic hub in the Arabian Gulf. The result has been spectacular: the country exhibits a per capita gross domestic product (GDP) of about USD 51,800, and the economy is growing (in terms of GDP growth) by 3.2 per cent per annum.

4. The funding proposal has made reference to a recently published paper¹ to establish that the 'water deficit observed' in the municipal supply estimates is a function of climate change. The estimation assumed that the average warming will be 0.4°C/decade, which is perhaps an overestimation, indicating a scenario that essentially accepts that the Paris

¹ Al-Zubari et al., 2018. Impacts of climate change on the municipal water management system in the Kingdom of Bahrain: Vulnerability assessment and adaptation options, *Climate Risk Management*, 20:95-110.

Agreement will fail². It is estimated that the projected water deficit caused by climate change is likely to be about 10Mm³, which is only 2.6 per cent of estimated demand with respect to 2011 (as claimed in the paper³). However, the overall estimated deficit will be severalfold higher than the demand caused by climate change related factors.

5. In the medium term, the paper indicates two other factors that might increase water-related vulnerability: (i) the sea-level rise induced salinization of aquifers might lower freshwater availability further, for example, a 0.3m rise in sea level is anticipated to inundate 10 per cent of the land area by 2050; and (ii) due to increasing rainfall variability and change, aquifer recharge potential in Bahrain is likely to decrease, as it is also likely to decrease by 30 to 70 per cent across the Arab region. However, such longer-term changes might not affect immediate demand on municipal water. Therefore, there is a weak link between climate change and water deficit, where the latter is predominantly a function of growth in demand due to population growth, very high per capita municipal water demand compared with other countries, and high demand due to rapid growth in both urbanization and the economy of Bahrain.

6. While the funding proposal refers to and heavily relies on the diagnostic paper (as cited above) and considers it as a planning tool in the short run, it does not present a thorough analysis of allocation of water in various sectors, either for the present case or for the projection years. It is understood from the funding proposal that, despite the extremely high per capita municipal water usage rates, the Government of Bahrain charges disproportionately to smaller users compared to larger users,⁴ thereby incentivizing those users who (mis)use large volumes of municipal water at household levels. Moreover, the entire municipal and industrial water sectors are hugely subsidized, as it is claimed that over 85 per cent of household users are unwilling to pay for water efficient devices to reduce their household consumption levels.

7. Having a weak climate change rationale, the funding proposal calls for addressing the water deficit vulnerability with a two-pronged, two-step approach. While in the first approach, the project will build institutional, legal and regulatory capacity to understand, estimate and manage municipal water demand, gradually building a knowledgebase that can be used to promote informed decision-making for climate-resilient water management. Once the understanding is clearer, with adequate efforts on data and analyses, the mandated authority will impose regulatory measures. In the second approach, the project is supposed to promote water efficient technologies so that the growing demands on municipal water are reduced and contained within sustainable production levels. It is also envisaged that, based on the success of this project, the Government of Bahrain will embark on an investment project later, where the major emphasis will be demand-side management involving efficient technologies.

8. The project's first approach is necessary for Bahrain. Otherwise, the wasteful practices due to the large subsidies, coupled with a lack of disincentives to waste municipal water cannot be contained. This approach is necessary with or without climate change, and the modest increase in demand due to climate change related factors can easily be compensated if this first

² The modeling effort did not consider the 2°C pathway that might be created by the Paris Agreement; rather it deliberately chose representative concentration pathway 4.5 and 8.5 scenarios, each of which resulted in an overestimation of water deficits for the projection year 2030. Yet, it is estimated that municipal water demands in Bahrain will increase due to climate change by about 5Mm³ by 2030, with a matching increase in demand by another 5Mm³ in agricultural and industrial sectors in Bahrain by 2030. The total demand escalation, therefore, will be only 10Mm³ by 2030.

³ The paper, based on models and a number of assumptions, highlights the results of a diagnostic tool that presents about ± 15 per cent error and indicates that the 2011 total water demand in Bahrain was 386.44Mm³.

⁴ In 2017, according to figures provided in the feasibility study, smaller domestic users (<60 m³/month) are asked to pay USD0.53/m³, while the domestic water users of medium (61-100 m³/month) and large (>100m³/month) volumes were asked to pay USD0.8 and USD1.06/m³, respectively, as against the average production cost of municipal water (including the energy cost) of USD1.86/m³.

approach is implemented. The measures considered in the funding proposal appear to be useful in building the knowledge-base, institutional capacities as well as catalysing a transformational change in municipal water demand management.

9. The funding proposal claims that an estimated 130,500 people, about 40 per cent of whom are female, will directly benefit from the project activities. Such a number constitutes about 8.1 per cent of the current population of Bahrain. Indirectly, as high as 1.6 million people in Bahrain will benefit. However, the estimation assumes that all the measures will be implemented without flaws and all the potential beneficiaries will continue to use the efficient technologies, despite their established wasteful behavioural practices.

10. There is a lack of adequate data and analyses regarding: (i) the barriers to the population overcoming their very low willingness to pay a suitable price for municipal water, despite their having high income levels (i.e. the ability to pay); (ii) the barriers to implementation of various regulatory measures; (iii) the behavioural and cultural norms and practice-related aspects of users in various sectors; (iv) the relative effectiveness of a number of water-efficient technologies and barriers to their relative penetration in households as well as public sector buildings. The absence of all the above-mentioned elements gives rise to major uncertainties regarding the impact of the second approach. The baseline analyses of knowledge-attitude-behaviour regarding various types of consumers are missing. While the project can truly but indirectly affect the entire population of Bahrain by bringing a paradigm shift in municipal water demand management, the impact involving direct beneficiaries who are likely to directly benefit from giving away water-efficient technologies (at household and public building sub-sectors) appears highly uncertain. The extent of the impact will depend largely on the effective use of the policy and regulatory regime, which cannot be estimated in the absence of adequate data and analyses.

11. In recent decades, almost all the expansion in water supply volume has been achieved through the application of medium-to-large-scale desalinization technologies, including the application of reverse osmosis technology, the latter being applied among high users of electricity, and, therefore, has a high carbon footprint. Any potential reduction in the use of such technology can potentially have emission reduction potential. However, the funding proposal does not discuss the potential positive impacts from saving emissions from future expansion of reverse osmosis or other desalinization technologies.

1.2 Paradigm shift potential

Scale: Medium

12. There is a theory of change described in the annexes to the funding proposal. However, the lack of adequate analyses makes such a theory of change ineffective. Before assuming specific measures, one must pay attention to building on the real cause and effect relationships. There is a knowledge gap here. The funding proposal, however, calls for mending the existing knowledge gaps during the first stage of the implementation. The potential of paradigm shift can only be realized if the current paradigm is thoroughly understood with adequate facts and figures and such knowledge bases are shared among stakeholders. Therefore, the paradigm shift potential is subject to effective implementation of the first stage of the project.

13. If one assumes that the decision-making processes will be facilitated adequately by conducting the baseline studies, among other elements, then certain hypotheses need to be tested to build an evidence base. This may be the case for the second stage, as envisaged in the funding proposal. However, this premise does not guarantee that scaling-up will be done without further stimulation, imposition of further regulatory measures and rationalization of tariff structures, among others. The project will only pave the way towards understanding the dynamics of water use and demand management in the municipal water system in Bahrain and

initial promotion of water saving technologies. This will be quite valuable for learning and for informed decision making. However, full realization of paradigm shift potential will depend on whether the intended development of an enabling environment with commensurate enhancement of an institutional mechanism indeed take place. The independent Technical Advisory Panel (iTAP) is of the opinion that stage1 of the current project is a step in the right direction. The iTAP believes that the understanding and knowledge as well as the data emanating out of the studies and research, and, simultaneously, the policy and regulatory reform, including tariff restructuring, that would follow, may pave the way towards realizing the potential for a paradigm shift in municipal water management in Bahrain.

14. The structure of the second stage of the project indicates that there will not be a financially sustainable continuation of the promotion of water efficient technologies for households and/or public buildings (such as schools and mosques) that might be derived from the project beyond its completion. Rather the project already indicates that the next phase will be a bigger investment, where water efficient technologies will be further installed without a hint of actual realization of their costs at market price. There is a lack of a robust plan to monitor the effective use of such water saving appliances following their free distribution, particularly at the household level. Therefore, the sustainability of the results alongside a paradigm shift cannot be envisaged from the funding proposal.

15. It is indeed envisaged that water efficient technologies will be procured from the market, which is likely to signal the private sector to align their businesses to influence the paradigm shift. However, without subsidies and with the current void of research-based information, it is difficult to envision how the promotional effort will significantly influence the development of the market of such technologies, especially when there is almost no willingness to pay among the water users. Rather, full subsidies for such technologies will distort the market with a likelihood that the true behavioural barriers among water consumers remain unnoticed.

16. The request for a full grant for giving away water efficient technologies (in the second stage of the project, as suggested), without any consideration to spreading the capital cost burden on the private users clearly suggests that the potential for expanding the proposal's impacts without equally increasing its cost (i.e., scalability) is slim.

17. In view of the above, the iTAP rates the paradigm shift potential to be "Medium".

1.3 Sustainable development potential

Scale: Medium

18. Sustainable Development Goal (SDG) 6 targets "ensuring availability and sustainable management of water" and the project directly contributes to this SDG. The project also contributes directly to SDG13 to "take urgent action to combat climate change and its impacts", although the justification for reducing demand to combat climate change-related demand escalation is rather weak. With the changes in the regulatory regime, as envisaged under stage-1 in the funding proposal, sustainable consumption of municipal water will be promoted, which is the theme of SDG12. The project will tangentially address gender equity and SDG5, although women in Bahrain do not face vulnerability to the extent⁵ that women in other water scarce countries generally do in the wake of climate change.

19. In addition to these contributions to the SDGs, the project will make a few beneficial contributions to sustainable development. The most significant co-benefit may be accrued on environmental ground: water saving, if it happens at all, will decrease pressure on the dwindling groundwater aquifer system.

⁵ No evidence for this is included in the funding proposal or the annexes.

20. Roughly half of the water requirement for agriculture in Bahrain is met by recycling greywater. Although the area under agriculture in the completely arid terrain is declining with increasing urbanization, a significant proportion of the supplied water goes for compensating evapo-transpirative losses at the root zone. An increased emphasis on the supply of and subsequent use of greywater in agriculture will reduce pressure on desalinated water, which is likely to make economic sense in crop agricultural production. Therefore, the project has the potential for economic co-benefits. Moreover, water saving will lead to saving government spending in the form of subsidies.

21. The funding proposal claims that small-scale farms owned by women will specifically be targeted by the project. However, section 3 of the project's gender action plan clearly states that all 3,000 people who are economically active in the agriculture sector are males. Therefore, the intended targeting of women-owned, small-scale farms might not have even a modest gender-sensitive development benefit. Since the water usage behaviour of women and men has not yet been analysed for various needs,⁶ it is premature to see how this project will further contribute to gender-specific development aspects.

22. In view of the above points under sustainable development potential, the iTAP considers the overall contribution of the project to sustainable development to be "Medium".

1.4 Needs of the recipient

Scale: N/A

23. Bahrain is a small island developing State. As explained earlier, its municipal water scarcity has been increasing due to very high per capita water consumption resulting from recent policies encouraging higher economic growth through diversification that have led to increasing population density. Additionally, climate change has been found to add to the existing complexities in water demand. Bahrain needs urgent policy formulation and commensurate actions to address its growing water deficit. However, the extent of the influence of climate change is small compared to the overall problem.

24. The Government of Bahrain is providing large subsidies to supply potable water and reduce its dependence in groundwater abstraction. However, people/the water users do not pay attention to their extremely high per capita water consumption and are not willing to pay for such services. This has already made the system and the utility economically unviable. There is no incentive structure in the current tariff system.⁷

25. Therefore, much needs to be done and many options are available. However, there is a knowledge-level disconnect with the water-related realities, which is compounded by institutional weakness and a lack of preparedness to tackle unsustainable conditions.

26. It is understood that the recipients need to first analyse what options are available in policy and regulatory reform to rationalize municipal water demand, strengthen the mandated institutions, including the utility, to build their capacities, and identify options that are generally least-cost but highly implementable. Raising awareness and the use of knowledge in decision-making appear to be the key steps towards allowing market mechanisms to interplay, complemented with adequate incentive structures for water conservation.

27. The existing barriers to potential solutions are not fully analysed, instead these will likely be analysed if the proposal is approved. Bahrain, with the size of its economy (i.e. GDP at USD32 billion), should be able to invest on its own to address the issue. However, the proponent

⁶ The gender action plan included in the funding proposal indicates that data will be collected under the project.

⁷ The feasibility study indicates that, starting in 2019, the tariff for all types of domestic users will be the same, effectively giving incentive to large users (>100m³/month) to misuse municipal water.

of the funding proposal has decided to ask for GCF support with full concessionality (as a grant), declaring that the Government is not in a position to provide additional finance for the cause.

28. It appears that if the Board approves the project, it will have great potential to strengthen the institutional capacity of the Water Resources Committee (WRC) and, to a lesser extent, the water utility. However, the overall needs of the recipient still lack proper justification.

1.5 Country ownership

Scale: High

29. The proposed project is well aligned with the country's priorities for climate change adaptation. The issues are highlighted in the Nationally Determined Contribution (NDC) as well as in the Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC).

30. The institutional framework has weaknesses: the existing capacity is inadequate, while there are major gaps in understanding, analysis and policy formulation. The policy formulation body with the national mandate is emerging from being a mere committee meeting to a fully functional institution while the utility is surviving on huge national subsidies. Both these institutions need immediate measures to become stronger and fully operational if a sustainable municipal water supply system may be envisaged for Bahrain.

31. The National Designated Authority endorsed the project. Perhaps sensing the inherent weaknesses of both the WRC and the utility, major coordination of the project is given to the National Oil and Gas Authority (NOGA), based on their past experience and capacity to handle/execute projects. Since a majority of the investment will go for procurement and distribution of water efficient technologies (targeted for the second stage of the project) and NOGA has little capacity to guide and monitor the distribution processes, smooth functioning of the project is questionable. It will all depend on the coordination function and oversight of the executing agency, UN Environment (or United Nations Environment Programme, UNEP). It will be a challenging venture for UNEP.

32. Apparently, this project has been developed following a number of stakeholder engagements. It is claimed that, during the consultations the project concept was presented to the executing agency and the NDA. The Government of Bahrain has exhibited high ownership by co-financing USD 2.0 million out of an estimated budget of USD 11.8 million, with a co-financing ratio of 1:4.9. Overall, the country ownership is high for the project.

1.6 Efficiency and effectiveness

Scale: Uncertain

33. The economic analysis presented in annex-14(a) and (b) of the funding proposal takes into account cost-benefit analyses of individual alternatives (as many as nine alternatives), however, considering the management of an escalated demand of 50-100Mm³ municipal water (of which only 10Mm³ is for climate change related escalated demand, as claimed by the funding proposal). It is to be noted that, such an analysis does not represent the project specific economic analysis and, therefore, the iTAP could not find adequate explanations regarding the economic efficiency of the project.

34. In the absence of an analysis, it is understood from the disaggregated options (which are embedded in various project outputs) that construction of a transmission pipeline for USD0.02/m³ (output 2.1), reducing domestic consumption for USD 0.04/m³ (output 1.4), rainwater harvesting for USD0.06/m³ (output 2.3), and treatment of water produced in the oil and gas sector for USD0.07/m³ (output 2.2) are the cheapest individual options. However, these options do not offer high quality domestic water that is generally supplied with a significant

subsidy. The above solutions may cater to the needs of industry, agriculture and gardening in the hospitality industry (including maintenance of green areas for recreational purposes) for water supplies, however, these are not viable economic solutions for supplied water systems for households and public buildings.

35. Neither the funding proposal nor its annexes talk about the relative effectiveness of reducing non-revenue water (NRW) with respect to other viable options. The documents claim that the Government is keen on reducing NRW from 28 per cent to 20 percent by 2020 (with no further explanation given). A simple arithmetic suggests a 3 per cent decline in NRW achieved by mending leaky pipes through enhanced monitoring mechanisms, as an immediate and no-regret measure, could be a more cost-effective solution to the escalation of water demand due to climate change for the projection year 2030 and beyond. Since the options and their relative effectiveness are not fully analysed and understood, it is premature to infer until the first stage of the project is properly implemented.

36. The project design requests that external consultants are engaged, which is justified as needed since the WRC is rather weak. The analysis of the financial flows clearly demonstrates that almost 40 per cent of the financing goes for maintaining the external consultant pool. The accredited entity justified the investment by indicating that, unless the WRC is strengthened, such support will be required. However, it is not yet certain that strengthening the WRC beyond the lifetime of the project will be fully supported by the Government of Bahrain. It remains uncertain whether the in-house human resource pool paid for by Government revenue will be able to effectively replace the external consultant pool and carry forward the activities, as envisaged.

37. There is another layer of inherent inefficiency in the project proposal. Unless the efficacy of imposition of the policy options and incentives are thoroughly analysed, an investment for water efficient technologies provided free of cost to the users, where there is little awareness regarding water conservation, generally is an inefficient use of GCF resources. Providing full concessionality in the form of a grant appears to be the least attractive financing option.

II. Overall remarks from the independent Technical Advisory Panel

38. The Board has indicated to the iTAP many times that addressing water scarcity, if the latter is caused even partially by climate change, should be treated as adaptation. Since most of the increase in overall municipal water demand is caused by non-climate change factors and no effective measure has so far been considered to address those major factors, the climate change rationale for the current project appears weak. However, climate change is causing a modest escalation of the overall demand and such escalation will be a prominent factor in a medium to longer timeframe.

39. The iTAP recognized certain weaknesses in the funding proposal, as stated throughout the assessment including weaknesses in impact, paradigm shift potential and effectiveness. The proposal is related to water usage and resulting increases in per capita municipal water demand, which in Bahrain is among the highest in the world. However, the overall municipal water scarcity is also, to a lesser extent, caused by climate change, which cannot be ignored. The proposal is also placed within the simplified approval process (SAP) window.

40. The aspects mentioned above lead to an inference that the iTAP recommends the project for the Board's approval with the following conditions:

(a) The accredited entity shall not start the implementation of any activities under component 2, before submitting to the GCF Secretariat a report, in form and substance satisfactory to the Secretariat, of the studies carried out by the accredited entity to determine

the levels of water usage that result in high per capita daily consumption rates at the household and commercial levels for different categories of consumers.

(b) The accredited entity shall not start the implementation of any activities under component 2, before submitting to the GCF Secretariat an assessment, in form and substance satisfactory to the Secretariat, informing how much water will be saved by each water efficient technology or other proposed water efficiency actions (e.g., tariff signals, grey water reuse, etc.) to be delivered under component 2, and ensuring by comparison that such measures (i.e. distribution of these technologies/actions) are the most cost-effective alternatives in terms of cost per cubic meter saved. Costs must be calculated on a life-cycle basis, i.e., taking into account operation and maintenance costs (if expected) over the expected life-span of the technology/action. Only those technologies/actions that prove to be the most efficient within those evaluated should be implemented under Component 2.

Response to the Independent Technical Advisory Panel's assessment of SAP003

Proposal name: Enhancing climate resilience of the water sector in Bahrain

Accredited entity: United Nations Environment Programme

Project/programme size: SAP

Detailed Response to the iTAP Review

independent Technical Advisory Panel (iTAP) review	AE Responses
I. Assessment of the independent Technical Advisory Panel	
<p>1.1 Impact potential <i>Scale: N/A</i></p> <p>1. Bahrain is an island nation located in the Arabian Gulf. The country's climate is arid, typical of the arid zone that is expanding from the Sahara Desert, across the Arabian Peninsula and towards the Central Asian desert. In addition to the mild winter, the country faces hot summer months, where the temperature may rise from an average range of 25-34°C to as high as 48°C (particularly in July and August). The high temperature accompanied by hot, dry south-west winds give rise to high rates of evaporation. Hot weather leads to an increase in municipal water demand while high evapo-transpiration also causes water losses from top soils in agricultural fields and gardens.</p> <p>2. Bahrain is classified as a water scarce country, owing to its limited natural water resources, small catchment area, very low average rainfall (about 80mm as against potential evapo-transpiration of about 1,850mm/year) and rapidly declining per capita freshwater availability, which decreased from 525m³/year in 1970 to less than 100 m³/year in 2010. Meanwhile, the average municipal water consumption in Bahrain is as high as 500 litres per capita per day (lpcd), and about 28 per cent of this is non-revenue municipal water. Such contrasting features involving extremely limited freshwater availability and very high municipal water demand has led to a general inference that</p>	<p>1. Noted</p> <p>2. The Accredited Entity takes notes that the high per capita use is high and needs to be further researched. The results of assessments in Output 1 will inform the rollout of interventions in Component 2. overall demand will be several folds higher than the demand caused by climate change and this is a development baseline that the government is/will be addressing. This project is addressing the fraction concerning the climate additionality.</p>



<p>there must be something wrong in the demand-supply balance regarding municipal water in Bahrain.</p> <p>3. Several other major factors in addition to climate change are contributing to a rapid increase in municipal water demand: (i) high economic growth fuelled by the implementation of policies on economic diversification, including industrial and commercial expansions, which in turn has been enticing expatriate migrants to cause extremely rapid densification, and (ii) high rates of urbanization, which also contributes to the formation of an urban heat island and further affecting the increase in water demand. In the backdrop of ongoing refining and processing of crude oil for export, Bahrain has emerged as a major economic hub in the Arabian Gulf. The result has been spectacular: the country exhibits a per capita gross domestic product (GDP) of about USD 51,800, and the economy is growing (in terms of GDP growth) by 3.2 per cent per annum.</p> <p>4. The funding proposal has made reference to a recently published paper¹ to establish that the ‘water deficit observed’ in the municipal supply estimates is a function of climate change. The estimation assumed that the average warming will be 0.4°C/decade, which is perhaps an overestimation, indicating a scenario that essentially accepts that the Paris Agreement will fail². It is estimated that the projected water deficit caused by climate change is likely to be about 10Mm³, which is only 2.6 per cent of estimated demand with respect to 2011 (as claimed in the paper³). However, the overall estimated deficit will be severalfold higher than the demand caused by climate change related factors.</p>	<p>3. Noted</p> <p>4. The two RCP scenarios (4.5 & 8.5) cited in the FP reflect the latest information currently available and resulting from the ongoing preparations of the Third National Communication to the UNFCCC report from Bahrain. The same two scenarios have also been adopted widely in the Arab region through the Regional Initiative for the Assessment of Climate Impacts on Water Resources in the Arab Region (RICCAR). The climatological modelling team, together with the UNFCCC/Paris Agreement focal points in Bahrain, also decided to use these scenarios because, in their judgement, they represent the most probable and applicable RCP pathways.</p>
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1. Al-Zubari et al., 2018. Impacts of climate change on the municipal water management system in the Kingdom of Bahrain: Vulnerability assessment and adaptation options, *Climate Risk Management*, 20:95-110.

2 The modeling effort did not consider the 2°C pathway that might be created by the Paris Agreement; rather it deliberately chose representative concentration pathway 4.5 and 8.5 scenarios, each of which resulted in an overestimation of water deficits for the projection year 2030. Yet, it is estimated that municipal water demands in Bahrain will increase due to climate change by about 5Mm³ by 2030, with a matching increase in demand by another 5Mm³ in agricultural and industrial sectors in Bahrain by 2030. The total demand escalation, therefore, will be only 10Mm³ by 2030.

3 The paper, based on models and a number of assumptions, highlights the results of a diagnostic tool that presents about ± 15 per cent error and indicates that the 2011 total water demand in Bahrain was 386.44Mm³.



<p>5. In the medium term, the paper indicates two other factors that might increase water-related vulnerability: (i) the sea-level rise induced salinization of aquifers might lower freshwater availability further, for example, a 0.3m rise in sea level is anticipated to inundate 10 per cent of the land area by 2050; and (ii) due to increasing rainfall variability and change, aquifer recharge potential in Bahrain is likely to decrease, as it is also likely to decrease by 30 to 70 per cent across the Arab region. However, such longer-term changes might not affect immediate demand on municipal water. Therefore, there is a weak link between climate change and water deficit, where the latter is predominantly a function of growth in demand due to population growth, very high per capita municipal water demand compared with other countries, and high demand due to rapid growth in both urbanization and the economy of Bahrain.</p> <p>6. While the funding proposal refers to and heavily relies on the diagnostic paper (as cited above) and considers it as a planning tool in the short run, it does not present a thorough analysis of allocation of water in various sectors, either for the present case or for the projection years. It is understood from the funding proposal that, despite the extremely high per capita municipal water usage rates, the Government of Bahrain charges disproportionately to smaller users compared to larger users,⁴ thereby incentivizing those users who (mis)use large volumes of municipal water at household levels. Moreover, the entire</p>	<p>It is also recognised that Bahrain needs to address the problem of non-revenue water and has a comprehensive strategy in place to reduce its non-revenue water. The total non-revenue water has been reduced from 38% in 2012 to 20% in 2017 and Bahrain aims to reduce it further to 15% in the next few years. These figures as well as details about Bahrain’s strategy to reduce non-revenue water have been added to Annex 2a (Feasibility Study) in Section 1.7.1. (pg. 32). Although addressing non-revenue water will contribute to building the climate resilience of Bahrain’s water sector, numerous other interventions, such as water-saving and use of treated wastewater, will ultimately be required.</p> <p>5. Bahrain is a SIDS that is extremely vulnerable to climate change impact. The 10 Mm³ extra per year from climate change effects is one component of the combined climate change threats facing Bahrain’s water sector. The total climate change effect is conservatively estimated to be 50 to 100 million m³ of water per year in the short-term, comprising increasing demand, saline intrusion and reduced aquifer recharge (Funding Proposal; Section B1). The other factors will directly affect water supply from the groundwater aquifers, which Bahrain is still utilizing to provide potable water to its population and for agriculture. Water demand is directly linked to such water resources. The rationale is to reduce water demand so that pressure on limited ground water resources is lessened.</p> <p>6. The statement that “the Government of Bahrain charges disproportionately to smaller users compared to larger users – thereby incentivizing those users who (mis)use large volumes of municipal water at household levels” is not accurately reflecting the situation. The tariffs have three thresholds, where tariffs are increased based on increased water usage. Additionally, the objective of the tariffs is to ensure that the low income population is not adversely</p>
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⁴ In 2017, according to figures provided in the feasibility study, smaller domestic users (<60 m³/month) are asked to pay USD0.53/m³, while the domestic water users of medium (61-100 m³/month) and large (>100m³/month) volumes were asked to pay USD0.8 and USD1.06/m³, respectively, as against the average production cost of municipal water (including the energy cost) of USD1.86/m³.



<p>municipal and industrial water sectors are hugely subsidized, as it is claimed that over 85 per cent of household users are unwilling to pay for water efficient devices to reduce their household consumption levels.</p> <p>7. Having a weak climate change rationale, the funding proposal calls for addressing the water deficit vulnerability with a two-pronged, two-step approach. While in the first approach, the project will build institutional, legal and regulatory capacity to understand, estimate and manage municipal water demand, gradually building a knowledgebase that can be used to promote informed decision-making for climate-resilient water management. Once the understanding is clearer, with adequate efforts on data and analyses, the mandated authority will impose regulatory measures. In the second approach, the project is supposed to promote water efficient technologies so that the growing demands on municipal water are reduced and contained within sustainable production levels. It is also envisaged that, based on the success of this project, the Government of Bahrain will embark on an investment project later, where the major emphasis will be demand-side management involving efficient technologies.</p> <p>8. The project's first approach is necessary for Bahrain. Otherwise, the wasteful practices due to the large subsidies, coupled with a lack of disincentives to waste municipal water cannot be contained. This approach is necessary with or without climate change, and the modest increase in demand due to climate change related factors can easily be compensated if this first approach is implemented. The measures considered in the funding proposal appear to be useful in building the knowledge-base, institutional capacities as well as catalysing a transformational change in municipal water demand management.</p> <p>9. The funding proposal claims that an estimated 130,500 people, about 40 per cent of whom are female, will directly benefit from the project activities. Such a number constitutes about 8.1 per cent of the current population of Bahrain. Indirectly, as high as 1.6 million people in Bahrain will benefit. However, the estimation assumes that all the measures will be implemented without flaws and all the potential beneficiaries will continue to use the efficient</p>	<p>affected by high prices and that the entire population of Bahrain has access to drinking water.</p> <p>7. Point 5 above elaborated more on the climate rationale and the project approach.</p> <p>8. Noted</p>
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<p>technologies, despite their established wasteful behavioural practices.</p> <p>10. There is a lack of adequate data and analyses regarding: (i) the barriers to the population overcoming their very low willingness to pay a suitable price for municipal water, despite their having high income levels (i.e. the ability to pay); (ii) the barriers to implementation of various regulatory measures; (iii) the behavioural and cultural norms and practice-related aspects of users in various sectors; (iv) the relative effectiveness of a number of water-efficient technologies and barriers to their relative penetration in households as well as public sector buildings. The absence of all the above-mentioned elements gives rise to major uncertainties regarding the impact of the second approach. The baseline analyses of knowledge-attitude-behaviour regarding various types of consumers are missing. While the project can truly but indirectly affect the entire population of Bahrain by bringing a paradigm shift in municipal water demand management, the impact involving direct beneficiaries who are likely to directly benefit from giving away water-efficient technologies (at household and public building sub-sectors) appears highly uncertain. The extent of the impact will depend largely on the effective use of the policy and regulatory regime, which cannot be estimated in the absence of adequate data and analyses.</p> <p>11. In recent decades, almost all the expansion in water supply volume has been achieved through the application of medium-to-large-scale desalination technologies, including the application of reverse osmosis technology, the latter being applied among high users of electricity, and, therefore, has a high carbon footprint. Any potential reduction in the use of such technology can potentially have emission reduction potential. However, the funding proposal does not discuss the potential positive impacts from saving emissions from future expansion of reverse osmosis or other desalination technologies</p>	<p>9. The monitoring and evaluation plan includes data collection to establish the baseline and regular assessment of target achievements.</p> <p>10. Activities related to water audits and awareness will provide more insights into the specific “micro” barriers (including those at the household level) to water conservation. Willingness to pay has three aspects to it, namely economic, awareness and behavioural aspects. For example, the benefit of delivering water saving devices through the project will go beyond saving few dollars per household, with the saving being accompanied by intensive awareness and education programmes, which will contribute significantly to scaling up such water saving methods throughout Bahrain. Scaling up will be achieved through several means, including regulations, incentives, awareness and cost sharing from the government and house owners. Effective tariff structures are an effective way to reduce demand. To address this, the project includes policy reforms and revised tariff structures that will help incentivise water-efficiency, particularly in the municipal sector. This aligns with current government plans to increase tariffs of non-municipal water to the point where industrial water use is charged for at full cost price. With regards to willingness to pay, extensive public awareness campaigns will be conducted to increase support for revised tariff structures in a phased approach for municipal water.</p> <p>11. The positive potential emission reduction/avoidance will be calculated as part of the cost efficiency studies that will be done prior to stage II of the project.</p>
<p>1.2 Paradigm shift potential <i>Scale: Medium</i></p> <p>12. There is a theory of change described in the annexes to the funding proposal. However,</p>	<p>12. A study on the psychology of behaviour change in the water sector in Bahrain has not been undertaken to date. Based on experience elsewhere in the world,</p>



<p>the lack of adequate analyses makes such a theory of change ineffective. Before assuming specific measures, one must pay attention to building on the real cause and effect relationships. There is a knowledge gap here. The funding proposal, however, calls for mending the existing knowledge gaps during the first stage of the implementation. The potential of paradigm shift can only be realized if the current paradigm is thoroughly understood with adequate facts and figures and such knowledge bases are shared among stakeholders. Therefore, the paradigm shift potential is subject to effective implementation of the first stage of the project.</p> <p>13. If one assumes that the decision-making processes will be facilitated adequately by conducting the baseline studies, among other elements, then certain hypotheses need to be tested to build an evidence base. This may be the case for the second stage, as envisaged in the funding proposal. However, this premise does not guarantee that scaling-up will be done without further stimulation, imposition of further regulatory measures and rationalization of tariff structures, among others. The project will only pave the way towards understanding the dynamics of water use and demand management in the municipal water system in Bahrain and initial promotion of water saving technologies. This will be quite valuable for learning and for informed decision making. However, full realization of paradigm shift potential will depend on whether the intended development of an enabling environment with commensurate enhancement of an institutional mechanism indeed take place. The independent Technical Advisory Panel (iTAP) is of the opinion that stage1 of the current project is a step in the right direction. The iTAP believes that the understanding and knowledge as well as the data emanating out of the studies and research, and, simultaneously, the policy and regulatory reform, including tariff restructuring, that would follow, may pave the way towards realizing the potential for a paradigm shift in municipal water management in Bahrain.</p> <p>14. The structure of the second stage of the project indicates that there will not be a financially sustainable continuation of the</p>	<p>it can, however, be expected that changes in legislation, tariffs and awareness will catalyse reductions in water use (as described in Annex 14a). The main indicator to assess this reduction in water use and change in behaviour will be per capita water use in m3 per annum. The knowledge management platform will be supported through the long-term partnerships with appropriate academic institutions (underpinned with Memoranda of Understanding). During the design of the platform, a sustainability plan and associated long-term funding mechanism will be developed by all stakeholders. This point has been inserted under the description of Activity 1.1.1.</p> <p>13. Noted</p> <p>14. Noted. A plan to monitor use of water saving devices will be detailed during inception.</p>
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<p>promotion of water efficient technologies for households and/or public buildings (such as schools and mosques) that might be derived from the project beyond its completion. Rather the project already indicates that the next phase will be a bigger investment, where water efficient technologies will be further installed without a hint of actual realization of their costs at market price. There is a lack of a robust plan to monitor the effective use of such water saving appliances following their free distribution, particularly at the household level. Therefore, the sustainability of the results alongside a paradigm shift cannot be envisaged from the funding proposal.</p> <p>15. It is indeed envisaged that water efficient technologies will be procured from the market, which is likely to signal the private sector to align their businesses to influence the paradigm shift. However, without subsidies and with the current void of research-based information, it is difficult to envision how the promotional effort will significantly influence the development of the market of such technologies, especially when there is almost no willingness to pay among the water users. Rather, full subsidies for such technologies will distort the market with a likelihood that the true behavioural barriers among water consumers remain unnoticed.</p> <p>16. The request for a full grant for giving away water efficient technologies (in the second stage of the project, as suggested), without any consideration to spreading the capital cost burden on the private users clearly suggests that the potential for expanding the proposal's impacts without equally increasing its cost (i.e., scalability) is slim.</p> <p>17. In view of the above, the iTAP rates the paradigm shift potential to be "Medium".</p>	<p>15. The project is providing only a small portion and limited number of water saving devices to serve for demonstration and scaling up. As stated earlier, this is coupled with a package of other interventions and cannot be looked at in isolation from them. In addition, activity 1.1.1. will model the expected quantities of water to be: i) redirected to different water reuse activities; and ii) saved by reduction in water losses, reduction of water use by tariff reform and protection of water resources.</p> <p>16. The detailed assessment to be done in stage 2 will include plans to co-finance the scaling up of these devices. As stated above, the project providing small portion for demonstration purpose.</p> <p>17. Noted</p>
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<p>1.3 Sustainable development potential <i>Scale: Medium</i></p> <p>18. Sustainable Development Goal (SDG) 6 targets “ensuring availability and sustainable management of water” and the project directly contributes to this SDG. The project also contributes directly to SDG13 to “take urgent action to combat climate change and its impacts”, although the justification for reducing demand to combat climate change-related demand escalation is rather weak. With the changes in the regulatory regime, as envisaged under stage-1 in the funding proposal, sustainable consumption of municipal water will be promoted, which is the theme of SDG12. The project will tangentially address gender equity and SDG5, although women in Bahrain do not face vulnerability to the extent⁵ that women in other water scarce countries generally do in the wake of climate change.</p> <p>19. In addition to these contributions to the SDGs, the project will make a few beneficial contributions to sustainable development. The most significant co-benefit may be accrued on environmental ground: water saving, if it happens at all, will decrease pressure on the dwindling groundwater aquifer system.</p> <p>20. Roughly half of the water requirement for agriculture in Bahrain is met by recycling greywater. Although the area under agriculture in the completely arid terrain is declining with increasing urbanization, a significant proportion of the supplied water goes for compensating evapo-transpirative losses at the root zone. An increased emphasis on the supply of and subsequent use of greywater in agriculture will reduce pressure on desalinized water, which is likely to make economic sense in crop agricultural production. Therefore, the project has the potential for economic co-benefits. Moreover, water saving will lead to saving government spending in the form of subsidies.</p> <p>21. The funding proposal claims that small-scale farms owned by women will specifically be targeted by the project. However, section 3 of</p>	<p>18. Noted</p> <p>19. Noted</p> <p>20. Noted</p> <p>21. There is currently insufficient baseline information in terms of gender and households. The baseline study will collect this information to inform</p>
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⁵ No evidence for this is included in the funding proposal or the annexes.



<p>the project’s gender action plan clearly states that all 3,000 people who are economically active in the agriculture sector are males. Therefore, the intended targeting of women-owned, small-scale farms might not have even a modest gender-sensitive development benefit. Since the water usage behaviour of women and men has not yet been analysed for various needs,⁶ it is premature to see how this project will further contribute to gender-specific development aspects.</p> <p>22. In view of the above points under sustainable development potential, the iTAP considers the overall contribution of the project to sustainable development to be “Medium”.</p>	<p>the development of gender targets for Output 2.1. This point has been noted in the FP under the description of Output 2.1</p> <p>22. Noted</p>
<p>1.4 Needs of the recipient <i>Scale: N/A</i></p> <p>23. Bahrain is a small island developing State. As explained earlier, its municipal water scarcity has been increasing due to very high per capita water consumption resulting from recent policies encouraging higher economic growth through diversification that have led to increasing population density. Additionally, climate change has been found to add to the existing complexities in water demand. Bahrain needs urgent policy formulation and commensurate actions to address its growing water deficit. However, the extent of the influence of climate change is small compared to the overall problem.</p> <p>24. The Government of Bahrain is providing large subsidies to supply potable water and reduce its dependence in groundwater abstraction. However, people/the water users do not pay attention to their extremely high per capita water consumption and are not willing to pay for such services. This has already made the system and the utility economically unviable.</p>	<p>23. The influence of climate change in the water sector on Bahrain is significant. National studies and reports confirm that. As stated above, the 10 Mm³ extra per year from climate change effects is one component of the combined climate change threats facing Bahrain’s water sector. The total climate change effect is conservatively estimated to be 50 to 100 million m³ of water per year in the short-term, comprising increasing demand, saline intrusion and reduced aquifer recharge (Funding Proposal; Section B1).</p> <p>24. The project takes note of this aspects and designed a package of measures to address incentives, tariff system, behaviour, subsidies, etc.</p>

⁶ The gender action plan included in the funding proposal indicates that data will be collected under the project.



<p>There is no incentive structure in the current tariff system.⁷</p> <p>25. Therefore, much needs to be done and many options are available. However, there is a knowledge-level disconnect with the water-related realities, which is compounded by institutional weakness and a lack of preparedness to tackle unsustainable conditions.</p> <p>26. It is understood that the recipients need to first analyse what options are available in policy and regulatory reform to rationalize municipal water demand, strengthen the mandated institutions, including the utility, to build their capacities, and identify options that are generally least-cost but highly implementable. Raising awareness and the use of knowledge in decision-making appear to be the key steps towards allowing market mechanisms to interplay, complemented with adequate incentive structures for water conservation.</p> <p>27. The existing barriers to potential solutions are not fully analysed, instead these will likely be analysed if the proposal is approved. Bahrain, with the size of its economy (i.e. GDP at USD32 billion), should be able to invest on its own to address the issue. However, the proponent of the funding proposal has decided to ask for GCF support with full concessionality (as a grant), declaring that the Government is not in a position to provide additional finance for the cause.</p> <p>28. It appears that if the Board approves the project, it will have great potential to strengthen the institutional capacity of the Water Resources Committee (WRC) and, to a lesser extent, the water utility. However, the overall needs of the recipient still lack proper justification.</p>	<p>25. Indeed, this project will build the knowledge base and the enabling environment for climate-resilient water management in Bahrain.</p> <p>26. The focus of component 1 of the project is geared towards building sound institutional and regulatory framework</p> <p>27. Bahrain is developing country highly vulnerable to climate change. Without GCF funding business as usual will continue and result in increasing vulnerabilities of the water sector. The project is catalytic in nature and does not reflect the full cost of adaptation in the medium and long term.</p> <p>28. Strengthening the Water Resources Council is a corner stone for this project to achieve impacts. The WRC is at the apex of water resources management but lacks the technical and financial means to fulfill its objectives.</p>
<p>1.5 Country ownership <i>Scale: High</i></p> <p>29. The proposed project is well aligned with the country's priorities for climate change adaptation. The issues are highlighted in the Nationally Determined Contribution (NDC) as well as in the Second National Communication to</p>	<p>29. Noted with thanks.</p>

⁷ The feasibility study indicates that, starting in 2019, the tariff for all types of domestic users will be the same, effectively giving incentive to large users (>100m³/month) to misuse municipal water.



<p>the United Nations Framework Convention on Climate Change (UNFCCC).</p> <p>30. The institutional framework has weaknesses: the existing capacity is inadequate, while there are major gaps in understanding, analysis and policy formulation. The policy formulation body with the national mandate is emerging from being a mere committee meeting to a fully functional institution while the utility is surviving on huge national subsidies. Both these institutions need immediate measures to become stronger and fully operational if a sustainable municipal water supply system may be envisaged for Bahrain.</p> <p>31. The National Designated Authority endorsed the project. Perhaps sensing the inherent weaknesses of both the WRC and the utility, major coordination of the project is given to the National Oil and Gas Authority (NOGA), based on their past experience and capacity to handle/execute projects. Since a majority of the investment will go for procurement and distribution of water efficient technologies (targeted for the second stage of the project) and NOGA has little capacity to guide and monitor the distribution processes, smooth functioning of the project is questionable. It will all depend on the coordination function and oversight of the executing agency, UN Environment (or United Nations Environment Programme, UNEP). It will be a challenging venture for UNEP.</p> <p>32. Apparently, this project has been developed following a number of stakeholder engagements. It is claimed that, during the consultations the project concept was presented to the executing agency and the NDA. The Government of Bahrain has exhibited high ownership by co-financing USD 2.0 million out of an estimated budget of USD11.8 million, with a co-financing ratio of 1:4.9. Overall, the country ownership is high for the project.</p>	<p>30. Noted. A number of activities in the project are directed towards strengthening the institutional capacities of the WRC, the utility and other stakeholders in water management.</p> <p>31. NOGA is capable of coordinating the project and engage with wide range of stakeholders. Capacity assessment for procurement and financial management of NOGA will be undertaken prior to effectiveness of the Funded Activity Agreement (FAA) and capacity building measures will be provided to NOGA and the water utility as needed. Note that NOGA is coordination project execution and hosting the PMU. The utility (EWA) will be responsible for the procurement, distribution and monitoring of water efficient technologies.</p> <p>32. Noted with thanks.</p>
<p>1.6 Efficiency and effectiveness <i>Scale: Uncertain</i></p> <p>33. The economic analysis presented in annex-14(a) and (b) of the funding proposal takes into account cost-benefit analyses of individual alternatives (as many as nine alternatives), however, considering the management of an escalated demand of 50-</p>	<p>33. The economic analysis provided in Annex 14 includes options for water supply. Such analysis has been envisaged for a larger project that encompasses demand and supply side.</p>



100Mm³ municipal water (of which only 10Mm³ is for climate change related escalated demand, as claimed by the funding proposal). It is to be noted that, such an analysis does not represent the project specific economic analysis and, therefore, the iTAP could not find adequate explanations regarding the economic efficiency of the project.

34. In the absence of an analysis, it is understood from the disaggregated options (which are embedded in various project outputs) that construction of a transmission pipeline for USD0.02/m³ (output 2.1), reducing domestic consumption for USD 0.04/m³ (output 1.4), rainwater harvesting for USD0.06/m³ (output 2.3), and treatment of water produced in the oil and gas sector for USD0.07/m³ (output 2.2) are the cheapest individual options. However, these options do not offer high quality domestic water that is generally supplied with a significant subsidy. The above solutions may cater to the needs of industry, agriculture and gardening in the hospitality industry (including maintenance of green areas for recreational purposes) for water supplies, however, these are not viable economic solutions for supplied water systems for households and public buildings.

35. Neither the funding proposal nor its annexes talk about the relative effectiveness of reducing non-revenue water (NRW) with respect to other viable options. The documents claim that the Government is keen on reducing NRW from 28 per cent to 20 percent by 2020 (with no further explanation given). A simple arithmetic suggests a 3 per cent decline in NRW achieved by mending leaky pipes through enhanced monitoring mechanisms, as an immediate and no-regret measure, could be a more cost-effective solution to the escalation of water demand due to climate change for the projection year 2030 and beyond. Since the options and their relative effectiveness are not fully analysed and understood, it is premature to infer until the first stage of the project is properly implemented.

To clarify figures related to water deficits, please note that the 50 to 100Mm³ is the deficit as a result of climate change, the 10Mm³ is the increase in demand in the municipal sector as a result of increasing temperature due to climate change.

34. The economic analysis provided in Annex 14 includes options for water supply. Such analysis has been envisaged for a larger project that encompass demand and supply sides. Yet, the analysis showed that water-saving was considerably more cost-effective than other methods such as desalination and wastewater treatment. The design of the proposed GCF project took this analysis into account, and also relied on research from other countries in the region published in the literature. For example, Rosenberg et al. (2018) developed a hydro-economic model for Jordan and found that installation of water-saving devices matched or provided better gains than from infrastructure projects. The annualised return on investment for water-saving devices was more than 10 times the annualised cost. Another example is Becker et al. (2010) found that installation of water-saving devices would reduce consumption of water by ~25% and cost the equivalent of US\$0.45 per m³, which was similar to waste water treatment, desalination, policy measures and changes in garden irrigation systems.

35. It is well noted that policy measures and tariff reforms, which address, for example, non-revenue water, have been demonstrated to be cost-effective (Becker et al., 2010; Olmstead et al., 2009; Grafton et al., 2011). Indeed, the cost of these measures per cubic meter of water saved is likely to be less than installation of water-saving devices and greywater systems. However, the project takes the view that transformational change in water management across Bahrain will require more than policy measures and tariff reforms. A change in public awareness of the value and scarcity of water is required. This will be achieved through numerous interventions, including having the public engaging directly with water-saving devices and greywater systems. The use of these devices and systems is consequently not a stand-alone intervention in the project. They are rather a crucial part of an integrated and comprehensive package that include awareness-raising, tariff reforms, legislation revision, building

<p>36. The project design requests that external consultants are engaged, which is justified as needed since the WRC is rather weak. The analysis of the financial flows clearly demonstrates that almost 40 per cent of the financing goes for maintaining the external consultant pool. The accredited entity justified the investment by indicating that, unless the WRC is strengthened, such support will be required. However, it is not yet certain that strengthening the WRC beyond the lifetime of the project will be fully supported by the Government of Bahrain. It remains uncertain whether the in-house human resource pool paid for by Government revenue will be able to effectively replace the external consultant pool and carry forward the activities, as envisaged.</p> <p>37. There is another layer of inherent inefficiency in the project proposal. Unless the efficacy of imposition of the policy options and incentives are thoroughly analysed, an investment for water efficient technologies provided free of cost to the users, where there is little awareness regarding water conservation, generally is an inefficient use of GCF resources. Providing full concessionality in the form of a grant appears to be the least attractive financing option.</p>	<p>code revision, and capacity building to transform how Bahraini's think about and manage their water resources.</p> <p>Metering is already standard practice in Bahrain for all municipal water use. Where there is currently some uncertainty is with regards to the relative contributions of real versus apparent water losses to non-revenue water. The water audit under Activity 1.1.1. will assist in refining Bahrain's understanding of NRW and how to address the problem. Further capacity building for addressing NRW will be addressed in Activity 1.1.2.</p> <p>36. We believe that the portion allocated to consultants is appropriate given that a large proportion of the project's interventions involve data collection, data analysis, modelling, building capacity of government institutions, policy/legislation revisions, tariff reforms and public awareness-raising. All of these activities will require procuring the services of consultants</p> <p>The long-term sustainability of the WRC is ensured by the mandate provided to it through: i) the Royal Decree No. 36 of 2009; ii) the re-constituting of the membership of the Council through the Prime Minister Decision of 42 in 2015; and iii) the appointment of the Deputy Prime Minister to head the Council. Additionally, the National Water Strategy, under preparation, calls for strengthening the Council and the provision of a wide range of support to fulfil its mandate. The project will strengthen its capacities through the provision of technical expertise. The proposed new water law, the reform of the tariff system and the foundational capacities to be build within this project, will all contribute to and ensure sustainability of the WRC and project results. The Government is providing co-financing and is committed to the water sector reform.</p> <p>37. Analysis of policy options are included in the project activities. Water audits, assessments of water saving potential as part of fine tuning component 2 will all support the cost-effectiveness of this project.</p>
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II. Overall remarks from the independent Technical Advisory Panel

38. The Board has indicated to the iTAP many times that addressing water scarcity, if the latter is caused even partially by climate change, should be treated as adaptation. Since most of the increase in overall municipal water demand is caused by non-climate change factors and no effective measure has so far been considered to address those major factors, the climate change rationale for the current project appears weak. However, climate change is causing a modest escalation of the overall demand and such escalation will be a prominent factor in a medium to longer timeframe.

39. The iTAP recognized certain weaknesses in the funding proposal, as stated throughout the assessment including weaknesses in impact, paradigm shift potential and effectiveness. The proposal is related to water usage and resulting increases in per capita municipal water demand, which in Bahrain is among the highest in the world. However, the overall municipal water scarcity is also, to a lesser extent, caused by climate change, which cannot be ignored. The proposal is also placed within the simplified approval process (SAP) window.

40. The aspects mentioned above lead to an inference that the iTAP recommends the project for the Board's approval with the following conditions:

1. The accredited entity shall not start the implementation of any activities under component 2, before submitting to the GCF Secretariat a report, in form and substance satisfactory to the Secretariat, of the studies carried out by the accredited entity to determine the levels of water usage that result in high per capita daily consumption rates at the household and commercial levels for different categories of consumers.
2. The accredited entity shall not start the implementation of any activities under component 2, before submitting to the GCF Secretariat an assessment, in form and substance satisfactory to the

38-40 . The Accredited Entity take note of the recommendations of the Panel.



<p>Secretariat, informing how much water will be saved by each water efficient technology or other proposed water efficiency actions (e.g., tariff signals, grey water reuse, etc.) to be delivered under component 2, and ensuring by comparison that such measures (i.e. distribution of these technologies/actions) are the most cost-effective alternatives in terms of cost per cubic meter saved. Costs must be calculated on a life-cycle basis, i.e., taking into account operation and maintenance costs (if expected) over the expected life-span of the technology/action. Only those technologies/actions that prove to be the most efficient within those evaluated should be implemented under Component 2.</p>	
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Enhancing Climate Change Resilience of the Water Sector in Bahrain

Gender Assessment and Social Inclusion Action Plan

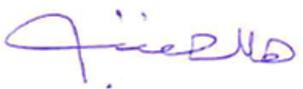
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Table of Abbreviations

AEWRD	Agricultural, Engineering and Water Resources Directorate
BWU	Bahrain Women Union
CIO	Central Informatics Organization
CEDAW	Convention on the Elimination of All forms of Discrimination Against Women
GII	Gender Inequality Index
EWA	Electricity and Water Authority
ESS	Environmental and Social Safeguard
GASIAP	Gender Assessment and Social Inclusion Action Plan
GAP	Gender Gap Analysis
GCF	Green Climate Fund
MoE	Ministry of Education
NOGA	National Oil and Gas Authority
SCW	Supreme Council for Women
TSE	Treated Sewage Effluent

1 INTRODUCTION

1.1 Overview

This Gender Assessment and Action Plan (GAAP) has been prepared in support of a project proposal for 'Enhancing Climate Resilience and Water Security in Bahrain'. The GAAP follows the Gender Assessment and Gender and Social Inclusion Action Plan UN template and the 2017 Green Climate Fund (GCF) Mainstreaming Gender in Green Climate Fund Projects report.

1.2 Background to the Project

The overarching objective of the proposed project is to increase the climate resilience of Bahrain's water sector. This will be achieved by creating an enabling environment – in terms of policies, legislation, public awareness and scientific capacity – for directly addressing the climate change threats currently causing precipitous declines in the country's freshwater resources.

The Kingdom of Bahrain, a Small Island Developing State, is severely threatened by multiple climate change impacts. The country's water sector is in particular facing threats from: i) rising temperatures causing increases in water demand across all sectors; ii) sea level rise causing saline intrusion into aquifers; and iii) rising temperatures and greater intensity of rainfall causing reduced rates of aquifer recharge. In combination, these threats are likely to reduce Bahrain's freshwater supplies by at least 50 to 100 million m³ of water per year in the short-term. Innovative solutions need to be adopted by the general public, the private sector and government to manage this expected reduction in water supply in a manner that is climate-resilient as well as socially, environmentally and financially sustainable. To develop, promote and implement such solutions, the project will build new technical and institutional capacity to monitor and model climate change impacts on water resources, to mainstream climate resilience into sectoral water management planning, and to develop new policy and legislative frameworks (including water tariff reforms). It will also raise public awareness of the need for managing water resources under climate change conditions (through demand management and increasing supply) and promote the use of greywater and harvested rainwater.

1.3 Project Description

The overarching objective of the proposed project is to increase climate resilience of Bahrain's water sector.

Table 2.1 provides the Project Components and Outputs.

Table 1.1 Project Components and Outputs

Project Component	Outputs	Activities
Component 1. Development of an enabling environment for water demand management	Output 1.1. Enhanced institutional capacity and knowledge management to mainstream climate resilience into sectoral water management planning, with a focus on demand-side management.	Activity 1.1.1. Establish a knowledge management platform for climate change impacts on Bahrain's water sector to facilitate improved water demand management.
		Activity 1.1.2. Build the institutional capacity of the Water Resources Council to establish and operate a climate-resilient integrated water resources management (IWRM) framework in a cross-sectoral manner.
		Activity 1.1.3. Promote water conservation technologies and practices at the household and farm levels.
		Activity 1.1.4. Produce guidelines for rainwater harvesting and greywater recycling
	Output 1.2. Enhanced policy and legislative frameworks for climate-resilient water management.	Activity 1.2.1. Revise current legislation to create an overarching water law that enables the government to sustainably regulate water use in the country under climate change conditions.
		Activity 1.2.2. Revise financial instruments in the water sector to create an enabling environment for IWRM in Bahrain
Activity 1.2.3. Revise building codes and develop guidelines to include greywater harvesting and recycling as a criterion for new developments.		
Component 2. Implementation of demand management technologies	Output 2.1. Investment in improved technologies for water demand management.	Activity 2.1.1. Scale up the use of water-saving and efficiency devices and techniques in municipal and agriculture sector.
		Activity 2.1.2. Scale up greywater collection and recycling initiatives in large mosques, public buildings (such as schools and community centres) and households across Bahrain.

1.4 Gender and Social Analysis

1.4.1 Introduction

According to the GCF Gender Policy, proposed projects or programmes submitted to the Fund are required to be aligned with national policies and priorities on gender and with the GCF Gender Policy and Action Plan 2015-2017. The core elements of the policy include:

1. A mandatory initial socioeconomic and gender assessment, complementary to the environmental and social safeguard (ESS) process, which accredited entities will be required to undertake in order to collect baseline data and to;
 - i. Determine how the project/programme can respond to the needs of women and men in view of the specific climate change issue to be addressed;
 - ii. Identify the drivers of change and the gender dynamics in order to achieve the project/programme adaptation or mitigation goals;
 - iii. Identify and design the specific gender elements to be included in the project/programme activities;
 - iv. Estimate the implementation budget;
 - v. Select output, outcome and impact indicators; and
 - vi. Design project/programme implementation and monitoring institutional arrangement.
2. Gender equitable stakeholders' consultation with the gender parameters provided in the policy.
3. Inclusion of gender perspective in the application of the mandatory project/programme social and environmental safeguard in line with project/programme-specific requirements of the Fund's ESS.
4. Project screening for gender sensitivity at the various stages of the project preparation, appraisal, approval and monitoring process, by the relevant bodies.

In line with the above mentioned GCF Gender Policy, a gender analysis is conducted at an early stage of the preparation phase of a project in order to identify potentials for prompting gender equality and risks that need to be avoided or at least mitigated through specific measures. The results and recommendations of this analysis are directly taken into account for the objective, indicator, the methodological approach and the results monitoring system of the project.

The purpose of the Gender Action Plan (GAP) is to provide a time-bound framework to operationalize the gender policy. Implementation of the GAP will provide the Fund and all implementation partners, public or private, with the tools and processes to achieve gender sensitivity in all areas within the Fund's mandate. It will also provide the Board with the necessary information to exercise its oversight responsibility for the Fund's gender policy as mandated by the Governing Instrument.

2 GENDER AND SOCIAL ASSESSMENT

2.1 Regulatory Framework

Historically, the Kingdom of Bahrain is considered a progressive nation relative to neighboring GCC countries. Women have had opportunities for education since the early 1900s, enabling them to pursue careers outside of their households. In 2002, Bahrain's constitution was amended, providing equal rights to women and men under Articles 1 and 5 and banning discrimination on the basis of gender so long as this is compatible with Sharia Law (*Cedaw, 2004*).

Bahrain ratified the Convention on the Elimination of All forms of Discrimination Against Women (CEDAW) in 2002, but with reservations to Article 2, on prohibition against discrimination within government policies, particularly in the area of inheritance; the right of a woman to pass her citizenship to her husband and children under Article 9, paragraph 2; a woman's freedom of movement and choice regarding residence and housing under Article 15, paragraph 4; and equality in marriage and family life under Article 16.5. It has not yet ratified the Optional Protocol on violence against women.

Bahrain is currently working towards achieving the 2030 Economic Vision which was launched in October 2008 by King Hamad bin Isa Al Khalifa, as a comprehensive economic vision for Bahrain, providing a clear direction for the continued development of the Kingdom's economy and, at its heart, is a shared goal of building a better life for every Bahraini. The vision of this national plan is;

Bahraini society in 2030 will be a meritocracy where hard work and talent are rewarded with success. Basic care will be available irrespective of abilities, and all Bahrainis will enjoy equal opportunities.

"Fairness" is one of the principals of the Bahrain 2030 National Plan.

Fairness in society means that all are treated equally under the law, in accordance to international human rights; and that everyone has equal access to services, namely education and health care, and that the needy are supported via adequate job training and a targeted social safety net.

Law No 36 of 2012

Articles 29 to 36 provides requirements on employment of women. It states that there shall be no discrimination in the provisions of employment between men and women. Article 32 and 35 provides the maternity entitlement of female workers. Article 33 states that the employer shall not dismiss or terminate a female worker as a result of her marriage or during her maternity leave. Article 36 states that the employer shall post in a prominent location in the workplace a copy of the regulations governing employment of female workers.

Law No 36 of 2012

Article 11 states that companies with more than 50 employees (working in one place or in different places) must employ special needs people nominated by the Minister of Labour or from their own will. The number of disabled employees must be not less than

2%. The company must employ the disabled in a position for which they have been trained and other suitable jobs. In all cases, the company must notify the Ministry of Labour in writing within ten days of employing the disabled person.

Law No. 17 of 2015

This law is concerning Protection against Domestic Violence specifies that physical, psychological and sexual domestic abuse is punishable by imprisonment for not more than three months and/or a fine not more than 200 Bahraini Dinars (BD).

2.2 Demographic Information

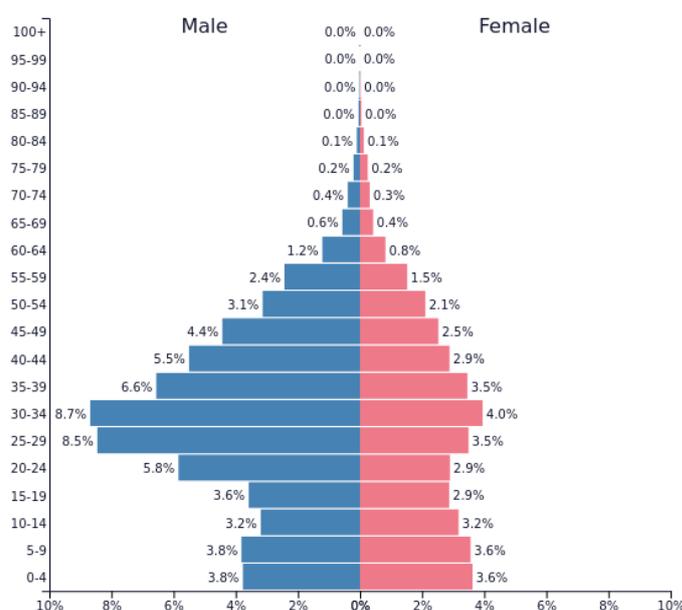
2.2.1 Population of Bahrain

The population of Bahrain has experienced rapid growth between the year 2001 and 2010, with the population doubling from 650,172 to 1,234,571 respectively.

Factors such as the natural growth of the native population and the influx of expatriate workers and immigrants contributed significantly to this increase. This growth rate has since slowed down as the most recent census (2017) estimates the population to be 1,501,116; 45% Bahraini, 55% non-Bahraini and 63.4% males, 36.6% females. Looking at the population of Bahraini nationals, there is a slightly higher male to female ratio (49.3% female and 50.7% are male).

Natural growth rates between the year 2010 and 2016 have shown a small increase, rising from 12.6 to 13.7 (per 1000 of the population). Population growth is expected to rapidly continue in the coming years relative to previous decades due to stable growth and fertility rates as well as the fact that the current population is considered "youthful" where the majority is in the reproductive age group (15-45) (see Figure 2.1).

Figure 2.1 Bahrain Population Pyramid (Source: CIO, 2017)



2.2.2 Education and Employment

Bahraini women have had opportunities for education since the early 1900s, commencing with religious education and Quran studies. In 1928, Bahrain became the first Gulf state to have official institutionalized education for women, when the first secular school (*Khadija Al-Kubra Girls School*) was established.

UNICEF data on education statistics reveal that the gender gap in both primary education and literacy rates is almost closed. Boys and girls' literacy rates for the 15-24 age group are almost identical, at around 98%. (*Unicef Statistics, 2013*)

In the year 2017, net attendance in primary and secondary schools was 50% boys and 50% girls. In addition, women form the bulk of university students. In 2017, 61% of university students were found to be women (*SCW, 2017*).

Women were granted scholarships to study in Egypt and Lebanon since the 1950s. In 2013, 70% of Ministry of Education Scholarships were granted to women (*Ministry of Education (MOE), 2015*).

Early education of women aided the contribution of women in the labour market, where they represented 31.8% of the Bahraini Work force in 2010. The majority of working women are engaged in the private sector (*SCW 2017*). On average, women's wages have increased from 690 Bahraini Dinars (BD) in 2010 to 807 BD in 2015 in the public sector and from 439 BD in 2010 to 516 BD in the private sector. (*SCW 2015*) Furthermore, women have owned commercial registrations for various business since 1960. In 2010, approximately 41% of commercial registrations were owned by women.

In general, women are engaged in various occupations across the public and private sector; however, there are certain occupations which are prohibited to women in accordance to Decree No 5 of 1977, due to potential health risks.

Discrimination in employment on the basis of gender is illegal in Bahrain, and it is illegal to dismiss a woman from employment while she is on maternity leave. Pregnant women in Bahrain are entitled to 60 days' paid maternity leave, and a further 15 days unpaid. While on maternity leave, a woman receives 100% of her salary. Paid maternity leave is financed by the employer.

Furthermore, in 2015 unemployment in Bahrain was recorded at 3.1%, 2.7% of which is female unemployment.

With regard to wages, between 2010 and 2015 women in the public sector were getting slightly less wages than men on average. However, during the same time period in the private sector, women were paid, on average, approximately 240 Bahraini Dinars less than men (**Table 2.1**).

Table 2.1 Average Income of Women and Men in the Public and Private Sectors from 2010 – 2015 (Source: LMRA, 2015)

Year	Public Sector		Private Sector	
	Average monthly salary for women	Average monthly salary for men	Average monthly salary for women	Average monthly salary for men
2010	690	679	439	681
2011	787	782	465	710
2012	781	811	483	729
2013	787	817	493	738
2014	798	835	500	745
2015	807	834	516	764

2.2.3 Marriage and Family Structure

No minimum age of marriage had been defined in Bahrain until October 2007 when the Minister of Justice fixed the legal ages at 18 for males and 15 for females. (CEDAW, 2008). However, a Sharia court can give permission for a marriage to take place before a girl reaches the age of 15, in cases of 'urgent need' (CEDAW, 2011). Up-to-date figures for early marriage are not available, but data held by the UN from 2001 indicates that at that point, 4.2% of girls aged 15-19 were married, divorced or widowed.

According to the 2007 official CEDAW report, parents enjoy joint custody of children during marriage. In addition, the husband is legally recognised as the guardian of his wife.

Only men are able to initiate divorce, unless a clause allowing the wife to do so has been included in the marriage contract. (CEDAW, 2007) The only other way a woman can obtain a divorce is if she requests a 'khula' divorce. Under 'khula', a woman is able to request a divorce unilaterally, but forfeits her dowry and any future financial support from her ex-husband.

In the event of divorce, under the new personal status code, custody of children is assigned to Sunni women until boys reach the age of 15 and daughters reach the age of 17 (or marry, whichever comes first). For Shiites, mothers retain custody until boys reach the age of seven, and girls reach the age of nine. In both cases, women in any event would only have physical custody over their children, as the father retains legal custody. Also, a woman also loses custody of her children if she remarries.

2.2.4 Access to Financial Resources

Under Bahrain's Constitution, Commercial Code, and National Action Charter, women have the right to own, access, and manage land and non-land assets. On marriage, a woman retains control and ownership of any property that she owns unless stipulated in the marriage contract; she can manage and dispose of that property without her husband's consent. The Bahrain Women's Union note that in practice, in the case of divorce, it is often difficult for women to claim their right to property purchased jointly

during the marriage. Women and men have the same legal rights to access financial services, including credit and bank loans (*CEDAW 2011*).

Some government programmes to support the establishment of small and medium-sized businesses have specifically targeted women. These include the Family Bank, established in 2007, which provides micro-credit as well as other services to support women entrepreneurs, and the Edbaa Bank (established in 2009), which provides micro-credit to low-income recipients. Women made up 65% of recipients of micro-credit loans from the Edbaa Bank, to the end of 2010 (*CEDAW 2011*).

Inheritance is governed by Sharia law, which provides guidelines for calculating inheritance shares. Al Gharaibeh outlines an important distinction between Bahrain's two primary Muslim sects; Sunni and Shiite. For example, in the absence of a direct male heir, Bahraini Shia interpretations allow daughters to inherit the full estate of a deceased father. By contrast, Sunni traditions oblige daughters to share such an inheritance with the brothers or other male relatives of the deceased. At the same time, a Shiite wife cannot inherit land, only moveable property.

2.2.5 Leadership and Political Rights

Bahraini women have a more liberal situation than women in other Middle Eastern countries. Bahraini women have had the right to vote since 2002. In 2014, 46.41% of voters in the Municipal Council and Representative Council elections were women (SCW 2015).

A woman was directly elected onto a Municipal Council for the first time in 2010 and in 2014, women made up 22.5% of the Shura Council members. In 2015, there were 21 female judges in Bahrain. Bahrain has also had female Ministers.

Generally speaking, there is a gap in leadership position in Bahrain as shown in **Table 2.2** which shows the number of men and women in select high positions.

Table 2.2 Number of Men and Women per Leadership Position, October 2015

Position	Number of women	Number of Men	Percentage of Women	Percentage of Men
Minister	1	19	5%	95%
Deputy Minister	3	29	9%	91%
Council of Representative Member	3	37	7.5%	92.5%
Shura Council Member	9	31	22.5%	77.5%
Municipal Council Member	3	27	10%	90%

In 2011, UNDP Bahrain, in partnership with the Supreme Council for Women, supported an advocacy campaign for women's participation in the parliamentary by-elections for eighteen vacant seats. As a result, three additional women were elected, raising the number of elected female MPs from one to four among 40 MPs in total.

Bahraini women have assumed leading positions in various fields of work and responsibilities, including high holding, high diplomatic and decision-making posts. This is reflected in its Gender Inequality Index (GII) value of 0.258 (HDR 2013), ranking it 45 out of 148 countries in the 2012 index. In Bahrain, 18.8% of parliamentary seats are held by women.

2.2.6 Quality of Life and Health Care

There is no evidence that access to health care is discriminatory in Bahrain.

Life expectancy for women increased from 75.9 to 77.4 and for men from 74.2 to 75.8 during the period between (2000-2015) reflecting improved life conditions and better healthcare. This is further reflected in decreased infant mortality (for children under five) from 9.6 to 8.2 per 1000 from 2010-2013.

The number of women diagnosed with chronic illnesses between the year 2010-2014 significantly dropped from 18,935 to 8,489. A rise in the number of female participants in nutrition, health, physical fitness, self-examination and smoking prevention programs has increased from 574 in 2013 to 3,505 to 2014 (*SCW, 2015*).

Abortion is provided in cases when the mother's health is in danger and there is no evidence that female genital mutilation (FGM) is practiced in Bahrain (*CEDAW, 2007*).

2.2.7 Civil Liberties

The law provides for freedom of movement and access to public space for all persons. Women do not need permission from their husband or guardian to obtain a passport and it is illegal for a husband to confiscate his wife's travel documents. However, married women in Bahrain are legally required under Sharia law to live in the matrimonial home (chosen by the husband). It remains socially unacceptable for unmarried women to live alone.

On the other hand, migrant women workers face legal restrictions on their freedom of movement, as their legal status in the country is dependent on their employers. They cannot leave the country until their employer has cancelled their work visa, and must wait one year before they can change jobs within Bahrain (*Human Right Watch 2012*).

Until 2015, there was no criminal or civil legislation in place in Bahrain protecting women from domestic violence. Law No. 17 of 2015 concerning Protection against Domestic Violence specifies that physical, psychological and sexual domestic abuse is punishable by imprisonment for not more than three months and/or a fine not more than 200 Bahraini Dinars (BD).

Furthermore, under the Penal Code, rape is a criminal offence in Bahrain; the punishment is life imprisonment; however, the law does not recognize the concept of spousal rape.

Sexual harassment is illegal in Bahrain under provisions of the Criminal Code; this includes verbal harassment as well as physical. No information was found regarding the existence of any mechanisms or measures in place to ensure implementation of the legal provisions relating to sexual harassment.

Sexual harassment appears to be a problem in Bahrain, but is widely underreported, as women are fearful of bringing shame upon themselves and of the potential negative impact on their careers, and because of the lack of support to victims.

All sex outside of marriage is illegal. So called 'honour' killings are punishable under Bahraini law, but provisions in the Penal Code allow for lower penalties if a crime is committed in anger by a man against his wife or sister, when he discovers his wife in the act of adultery, or his sister in the act of fornication.

2.2.8 NGOs and Support Groups

Isolated and small women's movements have existed since 1950, in addition to women's participation in male-directed political parties and movements. In 1994 women participated actively in anti-government protests. Since 2001, women's activists have worked under the umbrella of the Supreme Council for Women (SCW), headed by the king's first wife Sheikha Sabika bint Ibrahim al-Khalifa. The council promotes women's rights mainly in these areas: economic, political and within the family. Moreover, also in 2001, the Bahrain Women Union (BWU) was created. This union of 12 women's association works for women's economic, social and political empowerment.

UNDP Bahrain works in partnership with national institutions to strengthen the capacities of women to empower them to occupy positions of leadership and to provide women with new work opportunities. In addition, efforts will continue towards activating the rights detailed in international instruments and implementing national strategies guaranteeing equality for women. In order to evaluate the impact of development strategies, disaggregated data and budgeting must also be considered. These are the key areas in which UNDP will provide support to women's empowerment in Bahrain.

2.2.9 Disabled Groups

In September 2014, the number of disabled individuals registered with the Ministry of Development and Social Affairs was estimated to be 9312 (source: A brief on the status of the disabled in the Kingdom of Bahrain and the challenges facing them (In Arabic), May 2015).

Many challenges face the disabled, especially disabled children and their families. These challenges include psychological stress that cannot always be assessed and quantified, and financial pressure that results from the need to enroll disabled children in special schools and facilities, in addition to extensive medical bills. Furthermore, social

impacts may arise from disability. Social ties often suffer with friends and neighbor, or between the disabled and their siblings, or between parents of the disabled child.

In Bahrain, the law protects the rights of persons with disabilities and a variety of governmental, semi-governmental and religious institutions are mandated to support and protect persons with disabilities. Law 74 of 2006 regarding rehabilitations and disabled individuals Article 11 states that companies with more than 50 employees (working in one place or in different places) must employ special needs people nominated by the Minister of Labour or from their own will. The number of disabled employees must be not less than 2%. The company must employ the disabled in position for which they have been trained and other suitable jobs. In all cases, the company must notify the Ministry of Labour in writing within ten days of employing the disabled person.

Other laws put in place for the protection of the disabled include:

- Law no 59 of 2014 (amending Article 5 of Law no 74 of 2006) and Law no 40 of 2010 (amending provisions of Law no 74 of 2006) regarding care and rehabilitation and employment of the disabled;
- Law no 22 of 2011 ratifying the agreement of on disabled rights.

The Ministry of Health provides various services to the disabled including home visits and home care, priority of service in health centers in addition to routine checkups, prenatal care, treatment and awareness campaigns.

In 2007, the High Committee for Disabled Affairs was established under the Ministry of Labour and Social Affairs. The Committee deals with rehabilitation efforts and counseling for the disabled and their families.

Other mechanisms for help and support for disabled Bahrainis are through the Disabled Services Centre, headquartered in Manama. This service centre specialises in employing and training the disabled, educating and providing social services to the disabled and their families, creating a support system for the disabled, and conducting special research on disabilities.

3 GENDER AND SOCIAL ANALYSIS

With education provided equally for boys and girls in the Kingdom of Bahrain, women are publicly active and are well represented in commerce and industry. There are established active women's societies and organisations at both the community and national level. However, there are more females recorded as unemployed than males. In 2015, the unemployment rate was reported at 3.1%, 2.7% of which were females.

Although women were given the right to stand for election and vote in 2002, there is a significant difference in the number of males and females in office (**Table 2.1, 2015**). Looking at the 2015 statistics, at the Ministerial level there is only one woman as opposed to 19 men in the Cabinet. At the local level there were 3 women as opposed to 27 men.

Due to the large male immigrant population working in the construction sector, there are substantially more males aged between 20 and 49 (**Figure 2.1, 2017**). These men are based largely in bachelor-style living accommodation, outside the main towns and villages of the Kingdom. The men live in dormitory style rooms with central cooking and recreation facilities. With regard to the Bahraini population the numbers of males and females is roughly equal at 49.3% female and 50.7% male.

In 2016 there were approximately 3,000 people working in the agriculture sector of Bahrain (CIO, 2016). This is a sector that is dominated by men. A survey undertaken by the FAO in 2008 found that the total economically active population in agriculture was only 3 000, all of whom were men¹.

Vulnerable groups such as families with low incomes, single-parent families, the disabled or the elderly may face challenges in the implementation of new technologies for water demand management. Similarly, construction and domestic workers living in shared accommodation on very low wages are at risk from being financially affected by the project.

The key issue identified by the analysis is that decision-making and policy development is lead by affluent men and women and vulnerable social groups are poorly represented at policy making level. Therefore, it is important that policy makers engage with stakeholder and plans and policy proposals are reviewed by a representative range of stakeholders. Stakeholders should include equal representation of women and men and should also include representatives of appropriate vulnerable groups, including: disabled persons, low income families, single parents and the elderly. Stakeholder engagement activities should be recorded and documented to include identification of how the views of women and vulnerable groups have been considered in development of policy and plans that may impact their interests.

¹ Irrigation in the Middle East region in figures – AQUASTAT Survey 2008

4 GENDER AND SOCIAL INCLUSION ACTION PLAN

The activities will mainly comprise policy and legislation development by public sector institutions. Some activities in Component 2 will involve small-scale construction works and will require the employment of design engineers and construction contractors.

Table 4.1 provides the recommended Gender Social Inclusion Action Plan for the Project Components, based on the project scope and the Gender and Social Assessment.

Table 4.1 Gender and Social Action Plan

Item	Activities	Indicators and Targets	Timeline	Responsibilities
Component 1 - Development of an enabling environment for water demand management				
Output 1.1. Enhanced institutional capacity and knowledge management to mainstream climate resilience into sectoral water management planning, with a focus on demand-side management.				
Activity 1.1.1. <i>Establish a knowledge management platform for climate change impacts on Bahrain's water sector to facilitate improved water demand management.</i>	Ensure a gender inclusive employment plan.	A policy on Gender Inclusion and Equality must be developed.		Project Owner
Activity 1.1.2. <i>Build the institutional capacity of the Water Resources Council to establish and operate a climate-resilient integrated water resources management (IWRM) framework in a cross-sectoral manner.</i>	Ensure a social inclusion employment plan.	Target employing as a minimum 2% of disabled number of employees if employing over 50 people. Notify the Ministry of Labour within ten days of employing the disabled person.		
	Stakeholder engagement required with governmental and non-governmental organisations.	Consult with Bahrain Women's Association (BWA) and Supreme Council for Women (SCW)		
	Collection of sex-disaggregated data required in the monitoring and evaluation of the project	Encourage local women to apply for relevant jobs. % women employed for relevant jobs opportunities.		
Activity 1.1.3. <i>Build the institutional capacity of the Water Resources Council to establish and operate a climate-resilient integrated water resources management (IWRM) framework in a cross-sectoral manner.</i>	Ensure training and education is targeted to meet needs of all cross-sections of Bahrain society. Encourage female participation in agriculture.	A policy on Gender Inclusion and Equality must be developed. Prepare training and education information in multiple languages using various media and graphics. Consult Bahrain Agricultural Engineers Society and AEWRD. Increased % of women in agriculture.		Project Owner
Activity 1.1.4. <i>Produce guidelines for rainwater harvesting and</i>	Stakeholder engagement is	Prepare training and education information in		Project Owner

Item	Activities	Indicators and Targets	Timeline	Responsibilities
<i>greywater recycling.</i>	required with government and non-government organisations. Ensure training and education is targeted to meet needs of all cross-sections of Bahrain society.	multiple languages using various media and graphics.		
Output 1.2. Enhanced policy and legislative frameworks for climate-resilient water management.				
Activity 1.2.1. <i>Revise current legislation to create an overarching water law that enables the government to sustainably regulate water use in the country under climate change conditions.</i>	Stakeholder engagement is required with government and non-government organisations and civil societies representative of vulnerable groups. Ensure legislation and instruments are not limiting for Vulnerable Groups.	A policy on Gender Inclusion and Equality must be developed. Monitor % reduction in water usage.		Project Owner
Activity 1.2.2. <i>Revise financial instruments in the water sector to create an enabling environment for IWRM in Bahrain</i>				
Activity 1.2.3. <i>Revise building codes and develop guidelines to include greywater harvesting and recycling as a criterion for new developments.</i>	Ensure codes are not limiting for disabled people and vulnerable groups. Conduct stakeholder engagement.	Consult Ministry of Housing and suitable cross-section of house building contractors (equal % split of small, medium and large enterprises). Stakeholder engagement with civil societies representative of vulnerable groups.		
Component 2. Implementation of demand management technologies.				
Output 2.1. Investment in improved technologies for water demand management.				
Activity 2.1.1. <i>Scale up the use of water-saving and efficiency devices and techniques in municipal and agriculture sector.</i>	Ensure training and education is targeted to meet needs of all involved in sectors. Ensure vulnerable households are not disadvantaged.	Monitor % reduction in water usage. Stakeholder engagement with civil societies representing vulnerable groups and disabled people.		Project Owner
Activity 2.1.1. <i>Scale up greywater collection and recycling initiatives in large mosques, public buildings (such as schools and community centres) and households across Bahrain.</i>				



5 CONCLUSION

It is evident that the Kingdom of Bahrain is performing well with regard to important indicators such as education and health care. Women have had early opportunities for education (both primary and higher) allowing them to actively participate in the labour market. Although there is no evidence of gender discrimination in employment, males makeup the higher percentage of the work force in Bahrain. Gaps in leadership and political positions are also evident. Female representation in leadership is a top indicator for hiring of women at all levels, thereby creating a deeper bench of female talent at more junior levels to be promoted into leadership roles.

Women need to be better represented in the work place through provision of better employment opportunities and suitable working conditions. To enable gender and social fairness within the project, it is proposed that contractors have an equality and non-discrimination clause in their contracts and subcontracts. Contractors must report male to female ratios in the work place and where women are found to be underrepresented; the contractor must provide their own Gender Action Plan to identify measures to be implemented to reduce the gap.

6 REFERENCES

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