Final Evaluation of the UNDP-GCF project:

Supporting vulnerable communities in Maldives to manage climate change-induced water shortages

Maldives

2017-2023

Volume 1: Main Report

GCF ID: FP007
UNDP PIMS: 5705

Implementing partner: Ministry of Environment, Climate Change and Technology (MECCT)
Final evaluation timeframe: 30 March – 21 September 2023

14 October 2023

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Acronyms and abbreviations

AMA	Accreditation Master Agreement
APR	Annual Performance Report
AWS	Automatic Weather Station
CO	Country Office
CPD	UNDP Maldives Country Programme Document
CTA	Chief Technical Advisor
DCC	Department of Climate Change
DE	Department of Energy
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ESIA	Environmental and Social Risk Assessment
ESMP	Environmental and Social Management Plan
FAA	Funded Activity Agreement
FE	Final Evaluation
FENAKA	FENAKA Corporation Ltd.
FP	Funding Proposal
GCF	Green Climate Fund
GEF	Global Environment Fund
GIS	Geographic Information System
GoM	Government of the Republic of Maldives
HPA	Health Protection Agency
ICT	Information and Communications Technology
IE	Interim Evaluation
ILWRMP	Island Level Water Resource Management Plan
IWRM	Integrated Water Resource Management
LGA	Local Government Authority
LMS	Learning Management System
MAR	Managed Aquifer Recharge
MECCT	Ministry of Environment, Climate Change and Technology
MEE	Ministry of Environment and Energy (former)
MMS	Maldives Meteorological Service
MNPHI	Ministry of National Planning, Housing and Infrastructure
MNU	Maldives National University
MoGFSS	Ministry of Gender, Family and Social Services
MoH	Ministry of Health
MWSC	Maldives Water and Sanitation Company
NDA	National Designated Authority
NDMA	National Disaster Management Authority
NIM	National Implementation Modality
O&M	Operation and Maintenance
PB	Project Board
PMU	Project Management Unit
ProDoc	Project Document
PSC	Project Steering Committee
PWSP	Potable Water Security Plan
QPR	Quarterly Progress Report
RO	Reverse Osmosis
SESP	Social and Environmental Screening Procedure
RWH	Rainwater Harvesting
SMART	Specific, Measurable, Achievable, Relevant, Time-Bound
SOP	Standard Operating Procedures
STELCO	State Electric Company Ltd.
ToC	Theory of Change
ToR	Terms of Reference
UN	United Nations
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UGA	Utility Regulatory Authority
UNSDCF	United Nations Sustainable Development Cooperation Framework
USAID	United States Agency for International Development
WDC	Women's Development Committees

Project information table

Project/outcome Information		
Project/outcome title	Supporting vulnerable communities in Maldives to manage climate change-induced water shortages	
Atlas ID	Atlas ID: 00094293 GCF ID: FP007 UNDP PIMS: 5705	
Corporate outcome and output	**UNDP Strategic Plan (2018-2021) Output 1.4:** Scaled up action on climate change adaptation and mitigation cross sectors which is funded and implemented. **UNDP Strategic Plan (2022-2025):** Resilience: Supporting countries and communities in building resilience to diverse shocks and crises, including conflict, climate change, disasters and epidemics. **UNDAF (2016-2020) outcome 4 + UNDP CPD (2016-2020), under Outcome 2**: By 2020, growth and development are inclusive, sustainable, increase resilience to climate change and disasters and contribute to enhanced food, energy and water security and natural resource management. **UNSDCF (2022-2026) outcome 3 + UNDP CPD (2022-2026), under Outcome 2**: By 2026, national and sub-national institutions and communities in Maldives, particularly at-risk populations, are better able to manage natural resources and achieve enhanced resilience to climate change and disaster impacts, natural and human-induced hazards, and environmental degradation, inclusively and in a sustainable manner.	
Country	Maldives	
Region	Asia and the Pacific	
Date project document signed	9 May 2017	
Project dates	Start	Planned end
	FAA signature: 23 March 2017 ProDoc signature: 9 May 2017	Completion: 23 September 2022 Closing: 23 June 2023
Total committed budget	USD 23,736,364	
Project expenditure at the time of evaluation	GCF: 23,595,139.89 (30 June 2023) UNDP TRAC: 100,000.00 (31 December 2022)	
Funding source	Green Climate Fund, UNDP TRAC, Government of Maldives (in kind)	
Implementing partner	Ministry of Environment, Climate Change and Technology (MECCT)	
Evaluation Information		
Evaluation type	Project	
Final/midterm review/ other	Final	
Period under evaluation	Start	End
	23 March 2017	23 June 2023
Evaluators	Kris B. Prasada Rao Azlifa Yoosuf	
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Evaluation dates	Start	Completion
	1 April 2023	14 October 2023

1. Executive summary

1.1 Project Description

1. The project was intended to achieve a paradigm shift by addressing the main barriers to implementing integrated water supply systems: cost recovery, management capacity, and institutional mandates, coordination, and policy direction. Thereby, the project set out to contribute to a climate-resilient development pathway in the water sector, by ensuring year-round water self-sufficiency at the targeted outer atoll and islands. Hence, the project aimed to contribute to GCF fund-level impact A2.0 "*increased resilience of health and well-being, and food and water security*".

2. The project's objective, presented in the funding proposal (FP) and the UNDP project document (ProDoc) narrative, was "*to deliver safe and secure freshwater to 105,000 people in the islands of Maldives in the face of climate change risks*". The intended outcome provided in the results framework was "*strengthened adaptive capacity and reduced exposure to climate risks*". The project had three intended outputs:
    1) Scaling up an integrated water supply system to provide safe water to vulnerable households (at least 32,000 people, including 15,000 women)
    2) Introduction of decentralized and cost-effective dry season water supply systems benefiting 73,000 people across 7 Northern Atolls
    3) Groundwater quality improved to secure freshwater reserves for long term resilience on 49 islands (later reduced to 29 islands)

3. The main elements of the project were a) construction of four integrated water resources management (IWRM) supply systems combining reverse osmosis (RO) desalination and rainwater harvesting (RWH) on northern atoll islands and RWH systems on 25 central and southern atoll islands; b) improving the legal and regulatory framework for the water sector (water supply operation and management and tariff setting, provision of emergency water, and groundwater management); and c) enhancing institutional and professional knowledge and capacities in the water sector (water supply operation and management, economic modelling and tariff setting, water quality testing, coordination of emergency responses, and groundwater management).

4. The project was supported with USD 23,636,364 from GCF, USD 100,000 from UNDP, and USD 4,493,000 (in-kind) from the Government of the Republic of Maldives (GoM).

1.2 Evaluation Rating Table

5. The performance ratings are summarised in table 1.2.1 for GCF evaluation criteria, Annex 15 provides an overview of the finding against each GCF criterion. Table 1.2.2 provides the ratings for UNDP evaluation criteria. The overall performance is rated as moderately satisfactory.

Table 1.2.1: Project performance rating – GCF criteria	
Criterion	**Rating***
(i) Relevance, effectiveness, efficiency, impact and sustainability of projects and programmes (OECD/DAC evaluation criteria)	

Relevance	Moderately satisfactory
Effectiveness	Moderately satisfactory
Efficiency	Moderately satisfactory
Impact	Moderately unsatisfactory
Sustainability	Moderately likely
Overall OECD/DAC criteria	**Moderately satisfactory**
(ii) Coherence in climate finance delivery with other multilateral entities	
Coherence	**Satisfactory**
(iii) Gender equity	
Gender equity	**Satisfactory**
(iv) Country ownership of project	
Country Ownership	**Highly satisfactory**
(v) Innovativeness in result areas	
Innovativeness	Satisfactory
Paradigm shift towards low-emission and climate-resilient development pathways	Satisfactory
Overall innovativeness	**Satisfactory**
(vi) Replication and scalability	
Upscaling in other locations in the Maldives	Satisfactory
Replication in other countries	Satisfactory
Overall replication and scalability	**Satisfactory**
(vii) Unexpected results, both positive and negative	
Unexpected positive results	Satisfactory
Unexpected negative results	Moderately unsatisfactory
Overall unexpected results	**Moderately satisfactory**
Overall performance	**Moderately satisfactory**
**See annex 7 for the rating scale applied*	

Table 1.2.2: Project performance rating – UNDP criteria	
Criterion	**Rating***
Monitoring and evaluation (M&E)	
- M&E design at entry	Highly satisfactory
- M&E plan implementation	Moderately satisfactory
Overall quality of M&E	**Satisfactory**
Implementation/oversight and execution	
- Quality of UNDP implementation/oversight	Highly Satisfactory
- Quality of implementing partner execution	Satisfactory
Overall quality of implementation/oversight and execution	**Satisfactory**
Assessment of outcomes	
- Outcomes	Moderately unsatisfactory
- Relevance	Moderately satisfactory
- Effectiveness	Moderately satisfactory
- Efficiency	Moderately satisfactory
Overall project outcome	**Moderately satisfactory**
Sustainability	
- Financial	Moderately unlikely
- Socio-political	Likely

- Institutional framework and governance	Moderately likely
- Environmental	Moderately likely
Overall likelihood of sustainability	**Moderately likely**
Overall performance	**Moderately satisfactory**
**See annex 7 for the rating scale applied*	

1.3 Summary of findings, conclusions, and lessons learned

6. The project was implemented in a complex context, where external factors caused major challenges and delays, such as a unique geography with numerous and scattered small islands, major changes in GoM's strategy, changed institutional mandates, and the COVID-19 pandemic. Nonetheless, these challenges were navigated through adaptive management. As a result of considerable effort to engage stakeholder and the relevance of the project to national priorities, the project enjoyed strong ownership from GoM and stakeholders. To remain relevant in the context of a profound policy shift that happened during implementation, where GoM decided to provide RO-based piped water supply to all households instead of RWH systems with communal collection points, the RWH infrastructure was redesigned to enable integration with the RO systems.

7. The project's IWRM water supply approach is already being upscaled to national coverage, as the model of installing systems, which integrate RO and RWH, are solar powered, and recharge excess water to the groundwater, has been adopted by GoM in the Water and Sewerage Act and is currently being rolled out across all inhabited islands in the Maldives. Thereby, the project made a significant contribution to improving the cost-effectiveness of the national provision of water to communities, while reducing the environmental impact and carbon footprint and contributing to improving the groundwater status. Similarly, the support for the formulation of acts and regulations led to an improved legal and regulatory framework for water supply, sewerage, and groundwater management. A considerable contribution was also made to enhanced institutional and individual capacities vis-à-vis water supply, sewerage, and groundwater management. Of particular importance was the development of national certificate technical training courses which provide the basis for ensuring access to qualified staff in the future. Groundwater assessments carried out on 37 islands provide the foundation for future action and investment vis-à-vis improved groundwater management. Considerable effort was made to enhance the participation of women in the water sector. Careful attention was paid to risk management and the implementation of environmental and social safeguards and major negative and social impacts were avoided. The stakeholder ownership, the changes to the regulatory framework, and adoption by national institutions of the training modules developed by the project are conducive for post-project sustainability.

8. However, the project did not fully achieve its targets. The RWH systems are not operational on 14 islands (and are unlikely to be operational on the remaining 11 islands) due to a range of generally minor issues, such as inadequate quality of some of the construction work, some design shortcomings, poor quality of some small parts, extended period of dormancy of the systems after completion, incorrect operation and maintenance due to insufficient knowledge of the system, and, on some islands, lack of proactiveness vis-

à-vis fixing relatively minor problems (linked to unclarity among island stakeholders regarding institutional mandates and decision-making authority). There is little evidence of the project having contributed to an improved emergency water response. The targets vis-à-vis improved groundwater status were unrealistic, since it takes several years for measurable improvements to emerge, and the project mainly invested in improving the regulatory framework and knowledge base as a foundation for future action.

9. The financial sustainability of the project, and of the IWRM-based water supply in general, is an area of some concern. GOM's strategy of installing RO plants and piped household water supply on numerous small islands with small populations does not seem cost-effective, and achieving full cost recovery while maintaining affordable tariffs is unfeasible. Considerably increasing the operational costs in a sector that is already subsidised by GoM could create future challenges vis-à-vis operation and maintenance. The project was unable to influence the water supply tariff setting. RO systems can in principle provide all the water needed by the islands and the cost savings associated with supplementing with RWH are modest and not transferred to the islands, so there is probably limited incentive to invest in maintaining the RWH component, even if a formal requirement.

10. GoM's transfer of the mandate for the water supply civil works from MECCT to the Ministry of National Planning, Housing and Infrastructure (MNPHI) affected the infrastructure component of the project, with both ministries carrying parallel (but generally coordinated) implementation of RWM and RO systems on the same islands. The cost-effectiveness could have been better, had a geographic division of labour been agreed with MNPHI, or had the responsibility the project's civil works contracts been handed over to MNPHI to be implemented in sync with GoM's overall investment in water supply. Moreover, while MECCT is committed to ensuring all RWH systems become operational and has committed to cover the costs of operation and maintenance for five years, this lies outside MECCT's mandate, and staff and financial resources available for this are limited.

11. GoM's decision to provide piped water on all islands, had far-reaching implications for the added value and impact potential of the project's infrastructure component, compared to the policy context during the early years of implementation. With RO systems on all islands, RWH systems will no longer be essential for water security, even if they do contribute to reduced costs and can serve as backup systems. Moreover, when the IWRM systems currently being installed by GOM become operational on all islands within the next few years, the need for emergency water will be limited. A further decrease in the number of RWH systems installed by the project to 15-20 systems would have made it easier to ensure the functionality of the RWH systems installed and released considerable resources for the soft components of the project, while fully maintaining the demonstration value of the infrastructure installed by the project. GoM is fully committed to providing IWRM to all islands, so the remaining island would still have received water supply infrastructure, even if not provided by the project. An increase in the resources available for engagement in policy and regulation, addressing institutional bottlenecks, capacity development at the island level, tariff structure and cost recovery,

and groundwater quality, could arguably have further increased the transformative role and contribution to the intended paradigm shift. Given the far-reaching implications of the GoM strategy change for the project's added value and impact potential, a profound redesign of the project would have been fully justified – even if it would have required negotiating major changes to the infrastructure contracts (or perhaps even cancellation).

12. The project generated the lessons presented in table 1.3.1.

Table 1.3.1: Lessons learned	
1	Infrastructure investments combined with policy, regulatory and institutional strengthening can be a powerful package vis-à-vis transformational change, but care should be taken to give sufficient attention to the soft components.
2	Experience from the Maldives is essential for the successful delivery of quality water infrastructure, and experts from the Maldives or with experience from the Maldivian context should play a prominent role in all stages of infrastructure investments; this should be factored into procurement requirements.
3	Attention should be paid to setting up quality control mechanisms, samples of small parts should be tested prior to installation, systems should be thoroughly tested to ensure the operationality before commissioning, and a functionality control should be made some time after commissioning but before the warranty expires.
4	Indicators and targets at output and outcome level should be realistic and attributable to project interventions.
5	When the context is challenging and dynamic, adaptive management and close dialogue with stakeholders are essential for the achievement of results.
6	When there is a major shift in policy or context which could undermine a project's added value and impact potential, a profound redesign may be necessary to maintain the impact potential, even if this may be complicated, time-consuming, and have some contractual and financial implications.

1.4 Recommendations

13. Table 1.4.1 presents a summary of the FE's recommendations. The detailed recommendations including possible actions (sub-recommendations) are presented in section 5.4.

Table 1.4.1: Recommendations			
Rec #	**FE recommendation**	**Entity responsible**	**Timeframe**
1	Ensure that all RWH and IWRM systems become fully operational and of good quality and serving all households on the islands	MECCT, FENAKA, STELCO, MNPHI, UNDP	Sep. 2023 – Jun. 2024
2	Implement follow-up actions aimed at strengthening water sector governance and addressing remaining bottlenecks after the project	UNDP, MECCT, URA, LGA, MoGFSS	Sep. 2023 – Jul. 2025

2. Introduction

2.1 Purpose and objective of the final evaluation

14. The final evaluation (FE) assesses the performance of the UNDP-GCF project "Supporting vulnerable communities in Maldives to manage climate change-induced water shortages" (henceforth referred to as "the project") and the extent which it achieved its intended results (objectives, outcomes, outputs as outlined in the project results framework). It also assesses the extent to which the project contributed to an impact vis-à-vis climate resilience and access to water. Particular attention is paid to cross-cutting issues, especially gender and how the project impacted on women. Lessons learned are captured, and forward-looking and implementable recommendations are provided vis-à-vis ensuring sustainability of the project's results as well as UNDP's, GCF's and MECCT's future engagements in climate change adaptation and water supply.

2.2 Scope of the final evaluation

15. The FE covers the project from its formulation in 2015 and implementation start in 2017 to its completion in 2023. It covers all components of the project as well as management and coordination with other development partners. A sample of all stakeholders were consulted from the UNDP Country Office (CO), key government institutions at national and island levels, private contractors, technical experts, and end beneficiaries on islands visited (see Annex 2 for the mission programme and sites visited, and Annex 3 for the full list of people interviewed). The FE covers the GCF and UNDP standard evaluation criteria presented in Box 2.2.1.

Box 2.2.1: Evaluation criteria
GCF evaluation criteria: (i) relevance, effectiveness, efficiency, impact and sustainability of projects and programmes; (ii) coherence in climate finance delivery with other multilateral entities; (iii) gender equity; (iv) country ownership; (v) innovativeness in result areas; (vi) replication and scalability; (vii) unexpected results, both positive and negative. Additional UNDP evaluation criteria: (i) adaptive management; (ii) stakeholder participation; monitoring and evaluation; (iii) Accredited Entity (AE) oversight and Executing Entity (EE) execution; (iv) risk management (incl. social and environmental standards); (v) sustainability; (vi) progress to impact.

2.3 Evaluation methodology

16. The FE adhered to the 2020 UNDP and GCF guidelines for final evaluations. It was carried out as a mixed-method evaluation, using a combination of methods to gather information in order to triangulate information/data and thereby ensure their solidity, and to ensure that information gaps were filled/minimised and to avoid information bias. The methods used were a) review of available technical, financial, managerial and policy documentation related to the project; b) interviews with key stakeholders and implementing partners (in person and virtual); c) community consultations; and d) site visits. The document review provided quantitative and qualitative data on project implementation, financial information, and progress against project indicators. The stakeholder consultations focused on a) triangulating and validating information obtained from the document review, b) filling information gaps, and c) obtaining views and perspectives

from the different types of stakeholders and from different locations to prevent information bias. The site visits were used to a) verify the completion status, quality and functionality of the infrastructure installed, and b) engage directly with end beneficiaries (community consultations) in their own environment and obtain information of stakeholder participation and the obtained/anticipated benefits. The data analysis was guided and structured by an evaluation criteria matrix containing a series of evaluation questions and indicators (see Annex 5).

17. The FE addressed and analysed gender equality by assessing the gender approaches implemented under the project, the integration of gender and gender disaggregation of the indicators and targets, engagement of women and their inclusion in decision-making, and the specific project benefits (materialised and anticipated) for women. To guide the gender analysis, the evaluation matrix included a specific section on gender equality and women's empowerment including several gender-specific indicators and gender-disaggregated indicators (see Annex 5). This analysis was carried out based on available gender information in the project documentation and reporting, and consultations with implementing partners and female beneficiaries.

18. The FE was carried out by a team of independent evaluators without any prior involvement in the project.

2.4 Data collection and analysis

19. **Evaluation questions:** The FE Terms of Reference (ToR) provided a comprehensive set of evaluation questions (see Annex 1). These were further crystallised and expanded with indicators (see Annex 5). The project's own indicators were utilised as much as possible for answering the evaluation questions. The evaluation questions were organised in accordance with UNDP and GCF final evaluation guidelines. The assessments of results, outcomes, impact, and assumptions were structured on the basis of the project's results framework. The FE used the standard scoring matrix for UNDP final evaluations as a tool for assessing project performance. The evaluation question matrix (Annex 5) provides detailed information on the indicators, methodology and data sources used for each evaluation question. Several sources were used for each evaluation question to allow for triangulation and filling of information gaps.

20. **Document review:** All available project documentation was reviewed, including: the UNDP project document (ProDoc), the Funded Activity Agreement (FAA) and revisions, the Funding Proposal (FP) submitted to GCF and attached to the FAA, the interim evaluation (IE), annual performance reports, Project Board (PB)/Project Steering Committee (PSC) minutes, financial statements, audit reports, and written products produced with support from the project. The assessment of results (outcomes) utilised the project's own indicators and monitoring data as much as possible. Moreover, key Government, UNDP and GCF policy and strategy documentation was consulted in relation to the assessment of relevance and alignment of the project. Thirty documents were reviewed. See Annex 4 for a complete list of the documents reviewed.

21. **Mission to the Maldives:** A total of five project islands were visited by the FE team:

Dharavandhoo (Baa atoll), Foakaidhoo (Shaviyani atoll), Hoandehdhoo (Gaafu Dhaalu atoll), Kondey (Gaafu Alifu atoll), and Mathiveri (Alifu Alifu atoll). Meetings were also held in Malé. The islands visited were selected based on the following criteria: a) ensuring a mix of IWRM (two islands) and RWM islands (three islands); b) ensuring a mix of islands in northern, central, and southern atolls; and c) accessibility.

22. **Stakeholder consultation:** Different methods of stakeholder consultations were carried out. In-person interviews and group discussions were carried out with key stakeholders in Malé, including staff from the Project Management Unit (PMU), the Ministry of Environment, Climate Change and Technology (MECCT), the UNDP country office (CO), private contractors, the State Electric Company Ltd. (STELCO), the Ministry of National Planning, Housing and Infrastructure (MNPHI), and the Maldives Meteorological Service (MMS). Moreover, on the islands visited, in-person interviews were carried out with Island councils, Women's Development Committees, utility staff responsible for operating and maintaining the water infrastructure. Eighty-six stakeholders (40 women, 46 men) were interviewed, including 61 island-level stakeholders on five islands. Several community-members (women and men) were consulted on the five project islands visited. Remote/virtual interviews were carried out with stakeholders based outside the Maldives or who were unavailable during the missions, including technical advisers and staff from the UNDP Asia-Pacific Regional Hub and the Ministry of Gender, Family and Social Services (MoGFSS). Moreover, brief remote interviews were carried out with one island council or one utility staff member on an additional nine project islands not visited by the FE team. See Annex 3 for a list of interviewees and Annex 2 for information about the people consulted on the islands.

23. **Site inspection:** The installed water infrastructure was inspected in the five islands visited. Pictures for documentation were taken at each site.

24. **Analysis:** The data analysis was an iterative process throughout the FE, where initial findings and recommendations were discussed and tested with stakeholders as the FE progressed to ensure their validity and appropriateness, as well as stakeholder participation and ownership. Both qualitative and quantitative analysis was used, depending on the nature of the data, evaluation question, and indicator.

25. **Quality control and verification:** The draft inception report, in particular the methodology and approach and evaluation question matrix, was reviewed by the UNDP CO (evaluation officer and technical staff involved in the project) and the PMU/MECCT. Early findings were presented and discussed with the UNDP CO and the PMU/MECCT. The first draft FE report was reviewed by the UNDP CO and Bangkok Regional Hub, and a second draft was reviewed by MECCT. A third draft was reviewed by UNDP HQ and the GCF Secretariat.

2.5 Ethics

26. Throughout the evaluation process and in the compilation of the evaluation report, efforts were made to represent the views of all stakeholders. Data were collected in respect of ethics and human rights issues. All information was gathered after explaining

the purpose of the FE and obtaining prior informed consent from people, all discussions responses remained anonymous, and all information was collected according to the UN Standards of Conduct.

2.6 Limitations to the evaluation

27. Table 2.6.1 presents the limitations the terminal evaluation encountered, and the measures taken to mitigate these.

Table 2.6.1: Limitations of the final evaluation

Limitation/risk	Mitigation measure
Impacts have not yet fully materialised. Most of the installed infrastructure was not operational at the time of the FE mission. Moreover, the full benefits and impacts often materialise some years after project completion.	The FE team looked at results achieved, early impacts, and the prospects for further impacts to materialise.
Sustainability can only be fully confirmed over time. The sustainability of the results achieved, and the structures and processes (including the operation and maintenance of infrastructure) put in place, will only be fully revealed over time, not shortly after project completion.	The FE team assessed the likeliness of sustainability by looking at the project exit strategy, handover agreements, government policy commitments, and provisions for operation and maintenance and cost recovery.
Only a sample of islands could be visited by the FE team. Due to the large number of islands covered by the project (29 islands, original target 49 islands), budget constraints, and the costs and time associated with travelling between islands only a sample of five project islands could be visited by the FE team. However, the nature and extent of the challenges faced vary among the islands, due to differences in rainfall, size of island and freshwater lens, population size and density, economic activities (e.g. tourism), and distance to Malé.	The selection of five islands was based included atolls in the North, South and centre of the country, thus representing the main geographical differences. Both RWH and IRWM islands were covered. Brief remote consultations (phone, email) were carried out with island councils and utilities/operators in 9 project islands not visited (focal points on all islands were contacted, but not all responded).
Some key stakeholders could not be reached. Due to budget and time restrictions on the FE, as well as unavailability or unresponsiveness of a small number of stakeholders, it was not possible to engage with some key project stakeholders in Malé and on the project islands. It was only possible to visit five out of 29 project islands. Representatives from 11 of the 22 RWH islands not visited could not be reached.	The FE team in cooperation with the PMU and UNDP CO identified key stakeholders to interview. Virtual interviews were conducted with a number of key stakeholders that were not available during the mission. Representatives from 13 islands not visited were consulted through telephone calls.
Difficulties with engaging women and vulnerable groups. Some women were reluctant to express their views, especially in the presence of male community-members and community leaders, as well as in the presence of the International Consultant (a man).	Women and men were consulted in separate interviews and focus group discussions. Some female groups were consulted only by the National Consultant (a woman).
Staff movement and loss of institutional memory. Since the start of the project in 2017, there has	The PMU, MECCT and UNDP had core staff who had been involved from the early

been staff turnover, not least with government partners and in particular with island councils, so the perspectives on the project preparation and choices made in the early stages of implementation could not always be fully captured.	stages of the project. Moreover, project documentation and especially the IE shed light on the early stages of the project.

2.7 Structure of the final evaluation report

28. The FE report is structured in five main sections plus annexes. The first section presents a brief executive summary of the findings, conclusions, and recommendation of the FE. The second section presents the terminal evaluation purpose, scope, and methodology, whereas the third section presents the project objective, scope, strategy, management arrangements and stakeholders. The fifth section presents the detailed findings of the FE, followed by the sixth section, which presents the main overall findings, conclusions, recommendations, and lessons. The annexes present supplementary information, including the terms of reference for the FE, a list of people consulted, a list of documents reviewed, and the evaluation matrix guiding the FE.

3. Project description

3.1 Project start, duration, including milestones

29. The Funded Activity Agreement (FAA) between the GCF Secretariat and UNDP was signed on 23 March 2017. Project implementation formally started on 9 May 2017, when the Project Document (ProDoc) was signed by UNDP and the Ministry of Environment and Energy (MEE), now the Ministry of Environment Climate Change and Technology (MECCT). The first tranche of funding was made available to MECCT in July 2017 and the inception workshop was held on 7-9 August 2017. At design, the operational closing date was scheduled for on 23 March 2021, and the completion date was on 23 March 2022. An interim evaluation (IE) was carried out from 17 September 2019 to 13 November 2019. The project completion date was extended twice, to adjust to delays caused by COVID-19 pandemic. The first extension was signed on 9 February 2021, with 23 September 2021 as completion date and 23 September 2022 as closing date. The second extension was signed on 23 September 2022, and with 23 September 2022 as closing date and 23 June 2023 as completion date.

3.2 Development context

30. The outer islands of the Maldives experience drinking water shortages during the dry season. These shortages have had significant adverse human, environmental and social impacts on the communities living on these islands. The key problems pertaining to freshwater security are exacerbated by the increasingly variable rainfall patterns induced by climate change and sea-level rise induced salinity of groundwater and shrinking freshwater lenses. Responses on the outer islands are constrained by remoteness and limited land space. At the same time, the inhabited islands are small and densely populated putting further pressure on the limited freshwater resources available.

31. The Government of the Republic of Maldives (GoM) faces constraints in responding to the challenge at hand without assistance. Firstly, the precarious fiscal status that confronts GoM limits the response options to this emerging crisis to largely reactive emergency measures. Longer-term solutions, without additional financial support, are out of reach. Secondly, a dispersed and small population on 194 islands prevents the possibility of economy of scale in providing water and sanitation services to all islands, including capital infrastructure. FENAKA (FENAKA Corporation Ltd.), STELCO (State Electric Company Ltd.) and MWSC, state-owned entities responsible water and sanitation services in the outer islands, are faced with insufficient staff capacities and funding. The existing water supply systems have mainly been developed through “supply-based planning,” in which local operation and maintenance (O&M) capacities or abilities (and willingness) to pay for the services were not fully taken into account during planning. An overarching water policy existed at project start but was under revision and did not take into account the implications of climate change. Moreover, the underpinning sub-laws were insufficient and there were no regulations to effectively protect water sources or regulate their use.

32. The Maldives is undergoing a decentralisation process. Island councils have become re-

sponsible for development planning at the island level and have been mandated to provide services to their constituencies, including water and sewerage services. However, due to capacity constraints and to benefit from the specialised skills and mandates of the utilities, the operation and maintenance of water supply systems in the outer islands are handed over to FENAKA and STELCO.

33. At the time of the project design, government policy was to ensure there were public rainwater harvesting (RWH) systems with communal collection points on all islands to provide households with water during periods of scarcity. It was also government policy to install integrated water resource management systems (IWRM) that combine reverse osmosis (RO) desalination plants and RWH systems on islands with larger populations, which would also serve as hubs for providing water to other islands during periods of scarcity. However, in 2019, following a change of government, a new policy was adopted, committing to install RO plants and provide household water connections on all inhabited islands. It was later decided that the RO plants should be integrated with RWH systems, mixing up to 20 pct. of rainwater into the island water supply systems.

Box 3.2.1: household water sources in the outer islands

- People on the outer islands of the Maldives tap into different sources of water for different purposes. Households have for many years collected rainwater from their rooftops and groundwater from shallow wells in their compounds.
- Due to pollution, e.g. from sewerage, as well as saltwater intrusion due to overextraction, the groundwater quality is often low, with several households reporting (periodic) discoloration and smell of water drawn from wells. Hence groundwater is only used for washing, laundry, and cleaning.
- Rooftop rainwater is used for cooking and drinking. Usually, the rainwater collected is not filtered, but after the first flush of rain, households would clean their roofs and water tanks before starting to collect water. However, many households would run out of rainwater during the dry season.
- Several households would mainly purchase bottled water for drinking – some households would do so, when there is scarcity of rainwater, whereas other household would rely on bottled water throughout the year.
- Many households would during periods of scarcity use rainwater collected from public roofs and sometimes groundwater from public wells – e.g. from mosques.
- Island councils would request the central government to provide water during periods of scarcity. The Government would provide water by ship, but such provision is costly, and water delivery would sometimes be delayed, and the water would sometimes be contaminated by the time of delivery.

Sources: Project documentation, stakeholder interviews and group discussions

3.3 Problems the project sought to address

34. The project aimed at improving the access to, and the quality of, water for domestic uses, in particular vis-à-vis addressing recurrent water shortages during the dry season – a growing challenge in the light of current and projected climate change and population growth.

35. The project sought to address the following threats:

- Further increased scarcity of water resources during the dry season as a result of the impacts of climate change, such as:
    - sea level rise and associated saltwater intrusion reducing the size of the fresh groundwater lens
    - less annual rainfall and extended dry season length reducing rain- and groundwater availability and quality and recharge of groundwater lens
    - increased frequency and intensity of storms and storm surges and associated floodings causing saltwater intrusion and sewage pollution of groundwater
    - greater heat stress for people and ecosystems due to rising temperatures leading to increased water withdrawal
- Increased demand and risk of overexploitation of scarce water resources driven by population growth – leading to increased water shortages and prolonged periods of shortage during the dry season

36. According to the FP and ProDoc, the project sought to address the following main barriers to designing and implementing an integrated water supply systems:
    a) Insufficient cost recovery for operation and maintenance for water supply systems: lack of a defined tariff structure, which is fair and affordable and conducive for improving service standards and investment in the system over time; and consumer willingness to pay for the costs associates with water service provision
    b) Management capacity both at the utility level and at the regulatory levels: institutional and human resource capacity constraints at central and island levels vis-à-vis implementing water legislation and providing water services
    c) Institutional mandates, coordination, and policy direction: an incomplete policy and regulatory framework vis-à-vis ensuring year-round access to water in the outer islands and protecting groundwater sources from pollution and overextraction; and insufficient inter-institutional coordination vis-à-vis water supply services, including the provision of emergency water supplies

37. Furthermore, addition to the barriers identified in the FP and ProDoc, the project also sought to address the following barriers to improving water access in the outer islands:
    - Insufficient collection of rainwater to ensure sufficient year-round access to water for domestic use for all households in outer islands
    - High costs and delays associated with provision of emergency water supplies from Malé during the dry season
    - Financial constraints vis-à-vis provision of water services at scale across numerous small, inhabited islands
    - High costs of bottled water (for households) and plastic pollution associated with the use of bottled water
    - Insufficient data and information available vis-á-vis enabling effective protection of groundwater resources and integration of groundwater considerations in island development planning and regulation

3.4 Project description and strategy

38. The project was intended to achieve a paradigm shift by addressing the main barriers to implementing integrated water supply systems: cost recovery, management capacity, and institutional mandates, coordination, and policy direction. Thereby, the project set out to contribute to a climate-resilient development pathway in the water sector, by ensuring year-round water self-sufficiency at the targeted outer atoll and islands. Hence, the project aimed to contribute to GCF fund-level impact A2.0 "*increased resilience of health and well-being, and food and water security*".

39. The project's objective presented in the FP and ProDoc narrative was "*to deliver safe and secure freshwater to 105,000 people in the islands of Maldives in the face of climate change risks*".

40. The intended outcome provided in the results framework was "*strengthened adaptive capacity and reduced exposure to climate risks*".

41. The project had three intended outputs:
    1) Scaling up an integrated water supply system to provide safe water to vulnerable households (at least 32,000 people, including 15,000 women)
    2) Introduction of decentralized and cost-effective dry season water supply systems benefiting 73,000 people across 7 Northern Atolls
    3) Groundwater quality improved to secure freshwater reserves for long term resilience on 49 islands

42. The main expected deliverables under each output are presented in table 3.4.1.

Table 3.4.1: project sub-outputs/activities
Output 1:
1.1 11,502[3] rainwater harvesting systems for 26,000 residents in 45 islands installed
1.2 Standard operating Procedures (SOPs) prepared and used by utilities, local councils, and households
1.3 4 RO desalination water plants in 4 islands installed and made operational, using a grid-tied and/or off grid solar PV technology to provide backup capacity in times of water stress
1.4 Groundwater recharge system installed for excess rainwater from the RWH collection system on 49 islands, including greywater recycling on selected islands
1.5 Tariff evaluation criteria and tariff setting guidelines designed and introduced
1.6 Training programmes in integrated water resource management, planning and budgeting, water economic modelling, expenditure management and performance monitoring developed and delivered for relevant atoll and island councils and the ministries (MEE, MoH) and public utilities
1.7 Certification courses for the utilities and sector specialists in the areas of water engineering, capital construction, operation, maintenance, financial management and planning
Output 2:
2.1 4 sub-national water production and distribution locations to serve all Northern atolls established
2.2 Institutional coordination and accountability mechanisms between the utilities, the NDMC, MEE and LGA/councils to facilitate cost-effective and timely water supply during dry season

2.3 Regulatory framework for competitive and wholesale water distribution services established 2.4 Early warning system established on the basis of forecasted meteorological information for water emergency alerts and for effective operation of integrated water system
Output 3: 3.1 Baseline assessment (hazards inventory and catchment characterization) completed 3.2 Groundwater monitoring protocols with associated equipment and training delivered 3.3 Regulatory framework established for coastal land use, including zoning to protect coastal catchment areas and enable natural recharge of groundwater lenses
Source: FP, ProDoc

43. The project initially targeted 49 islands across the country, with the installation of IWRM systems on four islands in the Northern atolls and RWH systems on 45 islands across the country. However, in response to the changed government policy of installing RO systems on all inhabited islands the RWH designs were modified to enable RO-RWH integration and the initial RWH designs were also upgraded to higher technical standards (additional conveyance pipes, collection points, and pressure lines). Due to the increased costs associated with these changes as well as with general price increases in the sector (see section 4.2.1), the number of RWH islands was reduced to 25, bringing the total number of project islands down to 29.

44. The project was supported by the GCF with an allocation of USD 23,636,364 (cash), USD 100,000 (cash) from UNDP (TRAC), and USD 4,493,000 (in-kind) from GoM. Hence the total budget was USD 28,229,364 of which the total grant funding administered by UNDP was USD 23,736,364.

3.5 Project timing and milestones

45. Major milestones of the project implementation are presented in Annex 8.

3.6 Main stakeholders

46. The main stakeholders were: a) UNDP, which provided oversight and technical support; b) MECCT's Department of Water and Sanitation (DWS), which implemented the project; c) island councils as the responsible authorities for providing services to island communities; d) FENEKA and STELCO being responsible for the operation and maintenance of the installed water infrastructure; and e) the Utility Regulatory Authority (URA) being responsible for utility regulation and tariff setting. Annex 10 provides a detailed overview of the stakeholders and their role in the project.

47. **Project management:** The project was executed according to UNDP's National Implementation Modality (NIM), where GoM was responsible for the implementation with oversight and support from the UNDP Maldives Country Office (CO). The implementing partner was MECCT (former MEE), which was is responsible and accountable for managing the project, including monitoring and evaluation of project interventions, achieving project outcomes, and effective use of resources.

48. The management setup for the project is depicted in Annex 9. The Project Board (PB)/Project Steering Committee (PSC) was the executive body, overseeing the project. It provided overall guidance and direction, addressed project issues, reviewed project

progress, and reviews and endorses annual work plans and budgets. The PB was chaired by a representative of MECCT or the UNDP Resident Representative. The PB met annually or when needed; a total of seven PB meetings were held. The PB was supported by a Technical Committee (TC), guiding and advising the project on technical issues related to specific project activities and interventions. The TC convened upon request, but at least biannually. The Project Management Unit (PMU), housed at the Water and Sanitation Department of MECCT, was responsible for the day-to-day project management and decision-making.

49. When it was fully staffed, the PMU comprised 13 staff members, headed by the Project Manager (PM) and supported by the water department at MECCT and a UNDP-recruited Chief Technical Advisor (CTA). UNDP provided oversight and quality assurance involving the UNDP CO and the Asia-Pacific Regional Hub, and to a lesser extent, headquarters.

50. As accredited GCF entity, UNDP delivered GCF-specific oversight and quality assurance and was accountable to the GCF board, as reflected in the GCF-UNDP Accreditation Master Agreement (AMA). The project was also supported by a specialist team in UNDP's Bangkok Regional Hub comprising engineers, procurement, communication, and human resource experts. Moreover, international payments, e.g. of the contractors for the infrastructure construction, was handled by UNDP on behalf of GoM.

4. Findings

4.1 Project design/formulation

4.1.1 Analysis of Results Framework, project logic and strategy, indicators, and Theory of Change

51. The narrative theory of change (ToC) description in the FP and ProDoc was brief, generic and unspecific, and not fully in line with general ToC practice. It did thus not provide an overview of the change pathway and the underlying assumptions. As such, it's utility vis-à-vis underpinning the project implementation strategy and results framework was limited. Moreover, no theory of change diagram (ToC) was elaborated; such diagrams are useful tools for establishing the intended change pathway of a project. Nonetheless, as also noted by the IE, the main barriers and root causes were in general identified and described. The underlying analysis was clear, as was the problem and stakeholder identification.

52. The results framework was generally clear and coherent, with a clear a logical causal pathway from sub-outputs/activities to outputs and further to outcome. However, output 3 (improved groundwater quality) was overly ambitious and could not be expected to be directly achieved with the planned activities, as also noted by the IE. The presence of groundwater baseline assessments, groundwater monitoring protocols, and regulatory frameworks for land use are important elements that contribute to enabling better protection and management of groundwater. But ultimately, the groundwater quality would hinge on the level of use of the groundwater data and information and the degree and quality of implementation and enforcement of regulations, which were beyond the scope of the project.

53. A minor inconsistency was that sub-output/activity 1.4 (groundwater recharge system installed for excess rainwater from the RWH systems) in practice would contribute mainly to output 3 (improved groundwater quality), although directly connected to the water supply systems installed under output 1 (scaling up water supply system), activity 1.1 (installation of RWH systems).

54. Most of the indicators specified were appropriate and SMART, and all indicators had baseline information and clear targets, which were reported against in the annual performance reports. However, for the indicators related to groundwater recharge and the increased use of groundwater/groundwater quality, measurable improvements would only materialise a number of years of implementation and enforcement of the regulations, and not during the lifespan of the project. A minor issue was that the target unit for the indicators for outcome and output 1 indicators was households, whereas for output 2, the unit was persons. While both persons and households are useful measures, it would have been logical to apply the same metric for these indicators, and there is no apparent reason as to why this was not the case. Appropriate means of verification for the indicators and targets were provided in the results framework in the FP. These were not included in the results framework in the ProDoc, but were included as data sources/collection methods in the monitoring plan annexed to the ProDoc.

55. The overall strategy of improving the water supply and the protection and management of groundwater through a combination of infrastructure, institutional capacity development, and legislative and regulatory improvements as a means to increase the resilience to the impacts of climate change on water availability was appropriate and realistic, although more work would be required beyond the project vis-à-vis groundwater.

4.1.2 Assumptions and risks

56. The outcome- and output-level assumptions presented in the results framework were for the larger part appropriate and valid, such as the assumptions related to the ability to collect enough rainwater, willingness to pay for water services, policy influence, communication of groundwater monitoring results. However, the assumption "*groundwater can be recharged and the quality can be improved*" was overly generic as it did not specify the underlying factors that would need to be in place. No assumption was made regarding the implementation and enforcement of the regulations developed with project support, which would be essential for the achievement of any improvement. Furthermore, the assumptions identified at the SDG and UNDP Strategic Plan levels were not truly assumptions, as they merely referred to the collection and sharing of data by the project.

57. The risk identification and environmental and social risk assessment (ESIA) were thorough and comprehensive and considering a broad range of risks. The overall risk was appropriately assessed as moderate; this rating was also confirmed by the IE. The social risk was assessed as low, and the risks were mainly environmental. As per UNDP's social and environmental standards, the risk areas that were identified in the FP and ProDoc as requiring safeguards were biodiversity conservation, natural resource management, climate change mitigation and adaptation, and pollution prevention. Unsurprisingly, the risks identified were mainly related to the infrastructure construction and the operation of infrastructure, in particular in relation to the RO systems (e.g. the extraction of water and release of brine), and to a lesser extent to the RWH systems and groundwater recharging.

58. In response to the identified risks, a comprehensive set of risk monitoring and appropriate mitigation measures were identified with responsibilities assigned to specific organisations and/or personnel functions. The risks and proposed mitigation measures were described in a UNDP risk log, in an annex on risk assessment, and in the ESIA. The three documents were largely aligned, but there were some differences in the risks listed as well as in the proposed mitigation measures. The FP and ProDoc described that risks were to be regularly monitored and reported in the UNDP ATLAS online risk log and in the annual performance reports, the latter was also planned to contain management responses to critical risks. A detailed plan for mitigation was outlined in a comprehensive environmental and social management plan (ESMP), which also had clearly assigned responsibilities. A small budget of USD 1,500 per year was allocated for environmental and social risk monitoring.

4.1.3 Lessons from other projects incorporated into project design

59. The project drew upon the experiences and lessons from two projects, the Adaptation

Fund financed: "*Increasing climate resilience through an Integrated Water Resource Management Programme*", which MECCT implemented with execution support from UNDP, and the USAID financed "*Integrated water management project*", which was co-implemented by USAID, MECCT, and FENAKA. These projects also engaged in the installation of IWRM systems (i.e. integrated RO-RWH systems), working with island communities and utilities. The project built on the experiences of these projects, e.g. drawing on their IWRM/RO system designs. Moreover, an important lesson from the Adaptation Fund and USAID projects was that the three main barriers to the installation of IWRM systems that would need to be addressed were cost recovery, utility and regulatory authority capacities, and institutional mandates coordination and policy frameworks (see also section 3.3). An important finding of the USAID project was that for RO systems, the main running cost is electricity, so using solar power significantly reduces operational costs, and the solar power installation costs can be recovered in eight years. The IWRM system designs for the GCF project included solar power, for the dual benefits of reducing operation costs and avoiding carbon emissions from depending on the diesel-powered island grids. The activities and budget in the GCF project design included review and modification of the designs of the Adaptation Fund and USAID financed RO systems to adapt them to the conditions and water requirements of the four islands targeted with RO systems by the project. As such, the GCF project was conceptualised to further improve the system designs of the Adaptation Fund project, and to upscale its IWRM approach of integrating RO-RWH in the water supply systems.

4.1.4 Planned stakeholder participation

60. The project design was based on a comprehensive stakeholder consultation process. Firstly, the project design was informed by the dialogue, discussions, and consultations on water-related challenges with GoM officials, local authorities and communities held in connection with the implementation of the Adaptation Fund project, albeit these islands were not the same as those covered by the GCF project. This included consultations held in relation to willingness-to-pay surveys conducted, which informed the GCF project design. Furthermore, leading up to the project formulation process, stakeholder consultations were implemented by MECCT and supported by UNDP specifically in relation to the GCF, with dedicated field missions by UNDP technical experts meeting MECCT staff, staff from other GoM entities, local authorities, and Maldivian experts. On 16 June 2015, a consultation meeting was held with all major stakeholders in connection with a National Stakeholder Consultation Meeting for the sector, where feedback was provided on the project concept.

61. Project stakeholders interviewed by the FE team generally had a clear understanding of their respective roles in the project.

4.1.5 Linkages between project and other interventions (coherence)

62. GoM is investing significantly in the construction of RO systems in the outer islands with credit from the EXIM Bank of India. The design of the RWH systems installed by the project was modified to allow for integration with these RO systems, effectively becoming joint GCF-GoM investments in IWRM systems in 25 islands. On Dharavandhoo island, the

project installed an IWRM system, and subsequently FENAKA installed additional RO capacity, which is integrated in the infrastructure installed by the project: the RO system is located in the building, connected to the tanks, and distributed via the pipes installed by the project. The RWH systems were similar to already existing RWH systems in the Maldives, including the systems installed by the UNDP Low Emission Carbon Resilient Development (LECReD) project, albeit with an improved filtering system.

63. In 2018, the project implemented a knowledge sharing and coordination workshop for 45 participants (incl. 15 women) representing the main stakeholders in the water sector in the Maldives.

Table 4.1.5.1: Rating of Coherence	
Coherence	**Rating***
	Satisfactory
**See annex 7 for the rating scale applied*	

4.2 Project implementation

4.2.1 Adaptive management

64. Some significant contextual changes took place from the initial project design to its completion. No changes were made to the results framework, but important changes were made to the project implementation approach and geographic coverage in response to these changes. The project was among the first GCF projects and the first GCF project that UNDP was engaged in. Hence, due to t 1$he time it took to finalise the legal agreements between GCF and UNDP as accredited entity, the ProDoc was signed by MECCT and UNDP in mid 2017, 1.5 years after the project approval in November 2015. The inception workshop was held in August 2017. During the inception period, the project strategy was adjusted to the changing context and the environmental and social management plan was updated. For example, due to the delay, MECCT had initiated consultant contracts related to the IWRM system design, which was thus completed and ready for implementation when the first tranche was transferred in July 2017.

65. **RWH:** It was realized in 2017-2018, that the costs of each RWH system would be significantly higher than envisaged in the original project budget due to contextual changes: a) the construction boom in the Maldives driving up costs in the water sector as a result of demand exceeding supply, and b) increased variance in costs related to transport of people and materials to islands and labour mobilisation (see section 3.4). Moreover, to align with new government policies vis-à-vis water supply on inhabited islands, the following changes were made to the RWH system design: a) improved technical standards for the RWH systems, such as the inclusion of a rainwater filtration and treatment system, and b) modifications to RWH designs to enable integration of the RWH systems with the planned RO systems on all islands; these changes further contributed to the increased costs of the RWH systems (see sections 3.2 and 3.4). To accommodate the price developments and system changes within the available project budget; the number of

RWH project islands was reduced from 45 to 25 after consulting, and obtaining clearance from, GCF and UNDP's regional technical team. GoM committed to install RWH systems in the remaining 20 islands with government funding.

66. **COVID 19:** The restrictions on movement and social distance provisions implemented in response to the COVID-19 pandemic caused significant challenges and delays for all components and activity types, as well as for programme management and coordination. Due to the major delays and disruptions caused by the protracted pandemic, the project was extended twice. There were two periods of lockdown and closure of government offices (in March-July 2020 and again in the first half of 2021 due to the Delta variant). Moreover, international border closure, travel restrictions, social distancing measures, and prolonged COVID-19 testing processes caused further delays. Work was in particular impeded during the first half of 2021. On some islands, construction work halted during the periods of lockdown and quarantining of contractor and supervising consultant staff due to contact with COVID-19 positive individuals. Delivery of construction materials were delayed. Groundwater baseline assessments were delayed for 32 islands, due to travel restrictions. While the gender screening at FENAKA was carried out as planned in 2020, the planned final presentation to FENAKA's board was cancelled. All trainings and workshops that required physical attendance were postponed, including trainings on groundwater assessment and tariff modelling. Other areas of work were also slowed down/delayed, including regulatory framework inputs, and consultant engagements in general. Moreover, COVID-19 restrictions were a significant challenge for stakeholder engagement, project management, oversight, and monitoring. During the lockdown periods, the PMU could not visit the project islands. Moreover, physical meetings could not be held, and the PMU staff had to work from home.

67. Nonetheless, project implementation, including infrastructure construction and capacity development, continued during the pandemic, albeit at a reduced scale and pace. This was to a significant extent a result of adaptive management with adjustments of the implementation approaches. Due to the delays and extension beyond the originally planned timeline, the contractors faced over-runs and overall higher operational costs than anticipated. Nonetheless, they were still able to meet their contractual obligations. The inability to conduct physical meetings was to a good extent mitigated by holding online meetings and email communication, for example in relation to PB endorsement of annual work plans. Virtual means (calls and emails) were also used for engaging with different stakeholders, e.g. to keep island councils informed about progress during lockdown and the challenges faced.

68. In response to the COVID-19 restrictions, an online Learning Management System (LMS) was developed for conducting online trainings. The LMS enabled the project to conduct several trainings. In 2020, three online courses were held. In addition to enabling the implementation of planned trainings under the project, the LMS has also been adopted by MECCT as an online platform for overall capacity development in the water sector. The system enables users to carry out studies at their own pace and is also a platform for hosting course/training material. Thereby, the LMS enables the delivery of courses developed by the project beyond the project lifetime and beyond the project islands. As of

2022, the LMS hosted 12 short term training courses and two tools.

69. **Ministerial mandate change:** After the change of government in 2018, the mandate for constructing water infrastructure on the outer islands was transferred from MECCT to the Ministry of National Planning, Housing and Infrastructure (MNPHI). MNPHI is thus the lead ministry for the ongoing large-scale investment in constructing IWRM systems on islands not covered by the GCF project as well as RO systems on the 25 islands with RWH systems installed by the project. However, MECCT remains the lead ministry for water sector policy and regulations and water resource management. Moreover, while oversight and regulation of water utilities had been transferred to the recently formed autonomous Utility Regulatory Authority (URA), the parent ministry of URA is MECCT. It was decided that the project in its entirety would remain with MECCT, since the project had important policy, regulation, and water sector institutional capacity development elements and was intended to lead to transformational change in the water sector in the context of climate change adaptation and resilience. Overall, this decision was appropriate, but as a consequence, the project's water infrastructure was constructed by another ministry (MECCT) than other GoM-constructed water infrastructure in the Maldives (MNPHI). In particular, water infrastructure on the RWH islands was constructed by two different ministries, despite the intention to integrate the GCF/MECCT-constructed RWH systems and the MNPHI-constructed RO systems. Overall, the engagements of the two ministries were coordinated with regular communication and dialogue between the PMU and MNPHI and the PMU sharing information with MNPHI. However, there were some coordination issues. For example, on Kondey island, the contractor for the ongoing construction of the RO system had disconnected various parts of the RWH-related infrastructure recently installed by the project, such as the pipes connecting the tanks and pumps to the water collection points, which had been removed to make room for the foundation for the RO system. This could have been avoided through better coordination, e.g. vis-à-vis avoiding overlapping land allocation for the two systems and vis-à-vis not installing RWH-related elements that will be redundant once the RO system is completed. It would arguably have been simpler to have just one ministry and department responsible for the construction of all water infrastructure on a given island, ideally under the same contract and with the same supervision structure.

70. MECCT is committed to following up on the 29 project islands on the small number of outstanding elements related to ensuring the functionality of the RWH and IWRM systems installed (see section 4.3.1). However, after project completion and the associated disbanding of the PMU, the staff- and financial resources available to of MECCT to carry out such follow-up has been significantly reduced. On the other hand, MNPHI already has a presence on the islands in relation to overseeing the ongoing construction of RO systems, as well as the overall government mandate and designated department for such work, and thus probably better positioned vis-à-vis follow-up on the installed water infrastructure.

4.2.2 Actual stakeholder participation and partnership arrangements

71. The project was implemented under UNDP's national implementation modality (NIM), whereby day-to-day implementation fell under the responsibility of GoM/MECCT. As per

UNDP's standard model, project implementation was overseen by a senior Government staff member, the Director General of the Department of Water and Sanitation (DWS). Day-to-day project implementation was managed by a PMU, which mainly comprised staff recruited by MECC specifically for the project, but also had a few permanent MEECT staff members assigned to work on the project. This model allowed for daily interaction and close cooperation between the PMU and MECCT, including regular meetings (weekly in the first couple of years of implementation) with senior management (Minister and/or State Minister) for strategic direction, addressing bottlenecks, and timely decision-making. As such, the project was well embedded in MECCT. The PMU staff were Maldivian but received technical support from an international CTA. Procurement and consultant recruitment was done directly by MECCT following GoM procedures and processes, whereas international CTA recruitment was handled by the UNDP CO on behalf of MECCT.

72. The key government entities were members of the Project Board (PB) and thus engaged in project oversight and work plan approval. The PB also provided technical guidance. Board meetings were held annually (two were held in 2019), with a total of six board meetings in 2017-1012. Unsurprisingly, UNDP and MECCT participated in all the meeting, as did the Ministry of Finance. MNPHI participated in most meetings, except in 2021. The Environmental Protection Agency (EPA), which was responsible for regulating the utility companies prior to the formation of URA, participated in four of five meetings in 2017-2020; whereas the URA participated in 2022. However, the participation of other institutions was more irregular, the Ministry of Health only participated in 2017 and the first meeting in 2019, and the National Disaster Management Authority (NDMA) only participated in the meetings in 2019 and in 2021. FENAKA only participated in the first meeting (2017), whereas STELCO did not participate in any meetings. The Local Government Authority (LGA) was according to the FP and ProDoc a board member but did not participate in any board meetings. Reportedly, some Board meeting participants only engaged in discussions to a limited extent.

73. The Technical Committee provided technical advice and vetting, e.g. reviewing reports, guidelines, and policy/regulatory deliverables. It also facilitated ownership and served as forum for coordination and dialogue between the different government entities. The Committee comprised representatives at the technical level from the same government institutions as the Board: MECCT (DWS and Department of Climate Change/DCC), MNPHI, EPA/URA, LGA, FENAKA, and STELCO. However, the Ministry of Gender, Family and Social Services (MoGFSS) and Ministry of Fisheries, Marine Resources and Agriculture were neither Board members nor Technical Committee members, despite the important linkages that gender and agriculture have to the water sector, with women being the primary users of household water, agriculture drawing on water for irrigation, and the risk of agricultural chemicals polluting ground water.

74. Significant effort was made by the PMU to engage stakeholders in project activities. An inception workshop was held at the beginning of project implementation to introduce GCF requirements and the project to stakeholders, and helped inform the PMU about

the rules and regulations the project should adhere to and respond to. The PMU regularly met representatives from relevant ministries and authorities and the utility companies (FENAKA, STELCO, MWSC). Moreover, government stakeholders were consistently consulted in relation to the planning and review of policy and regulatory deliverables, such as the elaboration of a water tariff model and of a groundwater monitoring framework. Gender focal points were nominated and trained in the key GoM institutions to engage in the implementation of the project's gender action plan. A number of stakeholder workshops and meetings were arranged, incl. a sector knowledge sharing workshop in 2018, a stakeholder workshop for discussing gender inequality in the sector and the project's gender action plan, and a stakeholder meeting for the development of a framework for Standard Operating Procedures (SOP). Participants in trainings were also identified in consultation with stakeholders. Stakeholders were also heard when research, studies and assessments were carried out, for example in relation to a review of GOM's dry period water demand and supply management process and in the identification of a suitable management process and investments to optimize water production and distribution through decentralised hubs (the four IWRM islands).

75. Similarly, considerable effort was made to engage with stakeholders in the islands covered by the project; with consultations with island councils, WDCs (where available), island branches of utilities, health centres, schools, police, courts, telecommunication and cable tv operators, civil society (women groups and youth groups) and community-members. Island councils were consulted in the planning of the water infrastructure construction and allocated land for the infrastructure in dialogue with the PMU. Scoping visits and a "willingness-to-pay" survey were carried out in connection with the design of the IWRM and RWH systems. Beneficiaries were also consulted vis-à-vis environmental and social risks. Attention was paid to ensuring active participation of women in the consultations, and in some (but not all) islands separate group discussions were held with women. Periodic meetings were held to provide information and updates on the project and address community concerns. In 2018, the PMU reportedly visited all 29 islands and carried out stakeholder meetings, and sensitisation activities were implemented in nine islands with 245 community members (incl. 141 women). Moreover, in 2019, the PMU reported a total of 102 stakeholder meetings being held, covering all 29 islands. On each island, a council member was appointed as ESMP focal points, and a community-member was employed to monitor and report on grievances. On most islands, a community member was recruited as Field Officer by the project and housed by the island council tasked with monitoring/reporting on progress, grievances, and complaints (on the remaining islands, ESMP focal points would carry out Field Officer functions).

76. Project trainings and workshops had participation of staff from relevant central government institutions (ministries, authorities, agencies), local government institutions (island councils, WDCs, school management), and utilities (FENAKA, STELCO, to a lesser extent MWSC). The Maldives National University (MNU) was engaged in the provision of national certificate level 3 and 4 courses for sector stakeholders, and sector stakeholders were consulted on the course contents. The PMU and gender consultant cooperated closely with MoGFSS in relation to the development of the project's gender action plan

and the provision of gender training. Additional trainings were added to the online LMS upon request from stakeholders.

77. The contractors installing the water infrastructure as well as the supervising consultant were foreign companies and mainly relied on foreign engineers and labourers.

78. **Challenges for stakeholder participation:** The COVID-19 pandemic significantly disrupted dialogue with stakeholders, although this was partly mitigated with phone calls and emails (see section 4.2.1).

79. Stakeholder consultation and participation processes sometimes took longer than anticipated and delayed a few activities, e.g. due to late feedback on draft regulations and lack of responsiveness by utilities vis-à-vis providing data for the financial model.

80. On some islands, community participation was low, due to tensions within the communities related to political affiliations. Furthermore, the participation of women was low on some islands, as a result of a reluctance among women towards engaging in consultations due to workload and/or social and cultural perceptions and gender norms.

81. Island councils and WDCs were elected in April 2021, so a number of the current council and WDC members only had a limited engagement in the project. Moreover, island council staff are not always fully aware of the project, or where to find technical information about the water infrastructure or the groundwater assessment reports.

82. Decentralisation and devolution of roles and responsibilities to island councils is a new and ongoing process in the Maldives. Island council and WDC's face significant capacity- and financial constraints vis-à-vis effectively fulfilling their increased roles. While the councils by law are the owners of the water infrastructure, they do not have the capacity to operate and maintain the infrastructure. They are thus expected to outsource the operation and maintenance to the utilities (FENAKA or STELCO). Initially, MECCT would hand over the water systems to the councils, who would then sign an agreement with the utility, but later, the systems were handed over directly to the utilities since the councils did not have the capacity to manage the water supply systems. However, this has created ambiguity regarding the ownership of the water infrastructure and of the role of the island councils. On most islands visited by the FE team, the understanding of the councils and the utilities was that the utilities own the systems, leaving the councils little influence on decisions related to the system. On one island visited, both the council and the utility claimed that they were the owners of the water infrastructure.

83. The information flow between Malé and the islands was not always sufficient, but this was partly beyond the control of the project. For example, island level FENAKA staff and councils do not have access to the technical specifications and drawings for the IWRM systems, although the technical specifications have been provided to the utility headquarters by MECCT.

84. **Local stakeholder proactiveness:** Among some councils and island level utility branches,

the mindset is still that decisions related to the water system must be made centrally and that they need approval to make changes to the system. The handover of the systems to the utilities, not the councils, has further reinforced this perception. For example, on both Dharavandhoo and Foakaidhoo, the water from school rooftops is perceived as being polluted by bat droppings (despite the filtering and chlorination), hence the entire RWH component is not used. Instead of the council taking the decision to authorise FENAKA to simply disconnect the pipes of the concerned rooftops from the systems, so that the rest of the system could be operated, the perception is that disconnection would require approval from FENAKA headquarters and/or MECCT. On other islands, the councils and/or operators appear more proactive, for example, on both Dharanvandhoo and Foakaidhoo, the lid on the backwash filter was damaged by the high water pressure in the system; on Dharavandhoo, the RO component installed by the project is therefore currently not operational, whereas on Foakaidhoo, FENAKA staff have designed, made and mounted a metal brace to keep the damaged lid in place, thereby being able to keep the RO component operational. On Dharavandhoo, the island council provided interest-free loans to community-members for the installation of water filters to support the poorest households and promote the use of RO water (community-members find that filtered RO water tastes better than unfiltered water) instead of bottled water.

4.2.3 Project finance and co-finance

85. The project was supported by the GCF with an allocation of USD 23,636,364 (cash). At project design, USD 100,000 was committed (cash) from UNDP (TRAC) for project management. GoM committed provide USD 4,493,000 (in-kind) of which USD 4,193,000 would be for ten years of operation and maintenance of the RWM and IWRM infrastructure and USD 300,000 to cover GoM staff time and use of government premises for five years of project implementation. Hence, the total budget was USD 28,229,364 of which the total cash funding (GCF and UNDP TRAC) was USD 23,736,364. No budget revisions or reallocations between components were made.

86. Annex 11 provides a detailed overview of spending by agency, component, and year for the GCF grant and the UNDP TRAC co-financing.

87. As of 27 June 2023, 98.8 pct. (USD 23,595,139.97) of the GCF grant and 100 pct. of the UNDP (TRAC) co-financing was utilised (spent or committed). Spending on output 1 (101.8 pct.) and project management (99.2 pct.) largely corresponded to the allocated budget, despite the delays experienced, whereas spending on output 2 (88.0 pct.) and output 3 (89.6 pct.) was below the allocated budget.

88. As of 31 December 2022, MECCT reported the total estimated in-kind co-financing realised to be USD 411,030.56. Most of this amount, USD 409,997.23, was for project management, significantly exceeding the estimated contribution, which is unsurprising, as the project was extended for one year and nine months, leading to additional MECCT staff time and an extended duration of the use of office premises. Given that the water infrastructure was commissioned within the last two years of implementation, the bulk of the co-financing for ten years of operation and maintenance will be provided after

project completion. As of end 2022, USD 1,033.33 were provided, with MECCT reconfirming the commitment to fully provide the expected co-financing for operation and maintenance by 23 June 2028.

89. Annual audits were carried out of the grant funds managed directly by GoM. The audit reports for 2017, 2018, 2020, 2021, and 2022 had unqualified opinions. However, the 2019 audit report had a qualified opinion related to the financial assets and equipment for USD 2,739 transferred to a local council, which the auditors were unable verify, as they did not physically visit the concerned location and the council did not respond to follow-up verification requests by the auditors in 2021 due to difficulties related to COVID-19 restrictions. All audit reports found some mostly minor issues, e.g. in relation to underspending, delays, activities carried out before approval of work plans, delayed reporting and reconciliation of bank accounts, non-provision to the auditors of bids received and evaluation of bids, some discrepancies in asset recording and coding, delayed updating of assets register, unreported damages to assets, and unpaid pension contributions.

4.2.4 Monitoring and evaluation

90. **M&E design:** The FP and ProDoc contained a comprehensive and realistic monitoring and evaluation (M&E) framework, which specified the main types of M&E activities, responsible parties, and the estimated costs. The M&E activity types in the plan were:
    - Meetings: inception workshop and report, PB meetings
    - Baseline assessments
    - Indicator monitoring: external experts, project surveys, data analysis
    - Progress reporting: annual project reports (APR), quarterly progress reports (QPR)
    - Monitoring of plans: environmental and social risk management plan, gender action plan, stakeholder engagement plan, addressing environmental and social grievances, risk log
    - Capturing lessons learned: e.g. case studies, knowledge generation
    - Missions: supervision missions (UNDP CO), oversight missions (UNDP-GEF team), GCF learning meetings/site visits (PMU, UNDP CO, UNDP-GEF team)
    - External evaluation: interim evaluation, final evaluation, translation into English
    - Financial control: audit

91. Baselines, mid-term targets and end-of-project targets were defined for the indicators project results framework. Most indicators were appropriate (see section 4.1.1). Moreover, for most of the indicators the M&E plan annexed to the ProDoc specified data collection methods, frequency of assessments, responsible party, means of verification, assumptions, and risks. The monitoring plan itself was adequately budgeted (total estimated costs USD 281,000 excluding PMU staff time and UNDP travel costs), but the monitoring budget was not clearly reflected in the overall project budget. The FFA, FP and ProDoc contained provisions for the engagement of a fulltime M&E Officer in the PMU, with ToR for the M&E Officer annexed.

92. **M&E implementation:** As per the provisions of the FFA, FP, and ProDoc, a full-time M&E

Officer was employed in the PMU. PMU staff carried out several monitoring missions to islands, and UNDP also carried out a number of monitoring visits. Moreover, the community-members employed on the islands would submit reports on construction progress and grievances to the PMU. The supervision consultants would also submit reports on the implementation status. A periodically updated comprehensive monitoring spreadsheet was kept; this spreadsheet contained information about the project progress as well as overall progress in the water sector (incl. the status of GoM's installation of water supply systems on all inhabited islands). The annual performance reports (APR) reported systematically on indicators and targets in the results framework, as well as activities implemented (incl. the number of people trained). The APRs did not report on the higher-level SDG and UNDP Strategic Plan indicators. Implementation delays and challenges were described in the APRs, as were the measured implemented and planned measures to address the challenges. The APRs also contained sections on risk management, grievances, environmental and social safeguards, the gender and social action plan, and communication. The quarterly progress reports (QPR) in 2017-2021 provided more detailed information on the progress on the sub-outputs/activities, work plans and milestones, the status of each risk in the risk log, environmental and social safeguard issues arising, and grievances and complaints. However, a different format was used for the QPRs in 2022, and the QPRs from 2022 were considerably less detailed and informative, e.g. they did not provide clear and comprehensive overviews of the progress on sub-outputs/activities, risk log, safeguards, and grievances – while implementation in 2022 was at a stage, where there were less such issues, this could still have been more clearly reflected, and overall, the 2022 QPRs did not provide a proper overview of progress.

93. The 2022 APR stated that 14 islands had operational RWH systems, but in practice, the RWH systems installed were not functional during the dry season in 2023 and have thus not supplied water to communities (other than in short test runs during commissioning and handover), nor have they collected rainwater after the rains commenced (as of mid-June 2023). Similarly, the lack of functioning of the RWH components in the IWRM systems was not reflected in the 2022 progress report. Apparently, the supervision consultants did not adequately identify and report issues related to the water infrastructure, such as design related flaws and quality issues related to the construction or the materials used, as evidenced by the fact that the systems were approved and commissioned without the flaws being rectified. It should be noted that the demand for water from the RWH systems is only in the dry season, hence, on many islands water supply from the installed systems had not yet been fully experienced at the time of reporting. Moreover, it was not easy to keep track on the implementation status on 29 islands. Travelling in the Maldives is costly, and travelling to islands that are far from Malé and airports is time consuming. During the COVID-19 pandemic, it was a challenge to monitor progress (or lack hereof) on the islands (see section 4.2.1). While phone calls and emails were used for follow-up in the island status, the FE team experienced that the information obtained by phone would not always fully reflect the actual operational status found when visiting islands.

Table 4.2.4.1: Rating of M&E	
Monitoring and evaluation (M&E)	**Rating***
M&E design at entry	Highly satisfactory
M&E plan implementation	Moderately satisfactory
Overall quality of M&E	**Satisfactory**
**See annex 7 for the rating scale applied*	

4.2.5 Implementation/oversight and execution

94. **UNDP implementation/oversight:** UNDP proactively carried out oversight, support and quality assurance, and liaison with the GCF Secretariat. UNDP provided procurement support, communication support, reporting and financial management support, and, when needed, targeted technical support. Both the UNDP Regional Hub and the Country Office (CO) were engaged in the provision of oversight and technical advice. The GCF project was a major project in UNDP's Maldives portfolio and thus of strategic importance and enjoyed considerable attention and support from UNDP. However, the resources made available to the UNDP CO were insufficient for fully covering the costs of the required support. This was a limiting factor vis-à-vis the ability to oversee implementation progress on the islands, despite the CO contributing with resources from its core budget, e.g. for a dedicated national staff position. The Resident Representative and/or Deputy Representative and Assistant Resident participated in all Board meetings. In addition to joint UNDP-MECCT/PMU field missions, the UNDP Regional Technical Advisor (RTA) and CO staff also carried out a small number of island visits independently without PMU/MECCT participation. Moreover, the RTA and other UNDP regional staff provided technical, procurement, human resources, communications, and administrative support remotely. Overall, UNDP support was provided in a timely manner. International CTA recruitment was handled by UNDP.

95. **MECCT execution:** The PMU was housed at MECCT, which facilitated collaboration and regular dialogue. The State Minister and/or the Permanent Secretary and the Director General for DWS participated in all Board meetings. Moreover, the PMU had regular meetings with MECCT senior management, and in these, strategic advice was obtained for policy-related work. The project was important to the Ministry, and senior management wad well informed about the project. Some PMU staff members were regular MECCT staff that had been appointed to the project.

96. The PMU was proactive and effectively applied adaptive management to respond to contextual changes and challenges encountered (see section 4.2.1). The PMU successfully overcame initial delays and slow progress, and also applied approaches that allowed implementation to continue (albeit at a reduced pace) during the COVID-19 pandemic. The PMU brought up key issues and constraints in the Board meetings to mobilise guidance and senior level support vis-à-vis addressing these. Moreover, the PMU paid considerable attention to engaging regularly with stakeholders in Malé as well as on the Islands (see section 4.2.2). At times, staff turnover affected the PMU's capacity, but arrangements were made to cover these temporary gaps with available staff resources. The IE found that MECCT and the PMU had focused mainly on the implementa-

tion of the infrastructure component, paying insufficient attention to the policy, institutional and capacity-development aspects of the project. Nonetheless, in the second half of the project, considerably more attention was paid to the implementation of these aspects.

97. Procurement was handled by GoM. National procurement rules stipulate that all larger GoM procurement is to be handled centrally by the National Tender Section of the Ministry of Finance. This also applied to procurement for the project and created some delays. In 2018, the presidential elections and change of government delayed the signing of larger contracts by four months. Another procurement challenge, which was outside the control of GoM was limited availability of qualified candidates for a number of consultant assignments, in some cases forcing the project to retender for consultants due a low number of bids received, thus delaying work.

98. **Chief Technical Adviser (CTA):** In the ProDoc, the CTA role was envisaged as a full-time position, but in the first years of implementation, the CTA was a part time and home-based position, where the CTA only spent limited time (a few short-term missions, less than 30 days) in the Maldives, seemingly due to a wish from GoM to reduce the associated costs, but this was found insufficient by the IE. The CTA position was in late 2019 changed to a full-time in-country staff position for one year, which allowed for a more comprehensive and strategic input as well as ad-hox assistance to MECCT. However, the position was subsequently reverted to a part-time home-based consultant position, again upon request from GoM as a cost-saving measure.

99. **UNDP-MECCT/PMU coordination:** UNDP, MECCT, and the PMU had a cordial relationship and were well coordinated. The UNDP CO and PMU had frequent meetings and phone calls. UNDP and the PMU carried out joint monitoring visits to project islands, and, on some islands, UNDP participated in the handover of the infrastructure installed to island stakeholders.

Table 4.2.5.1: Rating of implementation and execution

UNDP implementation/oversight and implementing partner execution	Rating*
Quality of UNDP implementation/oversight	Highly Satisfactory
Quality of implementing partner execution	Satisfactory
Overall quality of implementation/oversight and execution	**Satisfactory**
**See annex 7 for the rating scale applied*	

4.2.6 Risk management, including social and environmental standards (safeguards)

100. The original risk log was updated during implementation. The IE updated the UNDP risk log (ProDoc Annex B), the risk probability and impact was downgraded for three risks, one risk was rephrased, and three new risks were identified and added. The online UNDP risk log was also revised and updated, the latest iteration was based on the risk assessment and proposed mitigation measures (ProDoc Annex E) but the risks in the initial UNDP risk log (ProDoc Annex B) were also covered. The risk log was overall comprehensive. However, the three additional risks identified by the IE were not included in the risk

log, despite their relevance. Moreover, three significant issues that affected the project, had not been considered and were not added to the risk log, when they materialised, namely: increased costs of materials and construction, change in government water supply strategy, and change in institutional mandates.

101. It is clear that the PMU tracked risks and implemented risk management and environmental and social safeguards measures. A full-time Safeguards Officer was employed in the PMU (albeit the function was covered only part-time for a period to time). The environmental and social management plan (ESMP) was updated in 2018 with support from an international Safeguards Adviser and approved in 2019, prior to embarking on infrastructure construction. Surveys, ESIAs (for IWRM systems) and environmental screenings (for RWH systems) were carried out on the project islands, and island councils, utilities, other relevant authorities, and communities on project islands were consulted using UNDP's social and environmental screening procedure (SESP). Contracts included ESMP-related clauses. Contractors' and the supervision consultant's key experts were sensitised on ESMP, including roles and responsibilities. The supervision consultant's implementation and quality assurance plan was harmonised with ESMP reporting requirements. Key island stakeholders (e.g. councils, public institutions with rooftops to be connected to the systems, utilities) were sensitised on the ESMP and mitigation measures. The PMU monitored the identified risk factors and put in place mitigation measures. On each island, a council member was appointed as ESMP focal point, and a community-member was employed to monitor and report on grievances. The work of contractors was monitored by the supervision consultant. The PMU made quality checks and caried out supervision missions. The PMU communicated regularly with island councils. All legal requirements, regulations and MECCT guidelines for water and sewerage projects were complied with. COVID-19 related restrictions and quarantine measures were followed.

102. The annual performance reports (APR) contained sections on environmental and social safeguards, which in a narrative style provided information on risks faced and responses implemented including grievances received. However, the APRs did not contain information about the status and implementation for all the risks in the risk log. In 2017-2022, the quarterly progress reports (QPR) provided updated information on the risk log and status of each identified risk, ESMP and safeguards implementation, and grievances and complaints and how these were addressed. However, the 2022 QPRs did not contain such information in a meaningful way. Separate and comprehensive ESMP quarterly monitoring reports were also prepared. Risks were reviewed at Project Board (PB) meetings.

103. The actual risk status and mitigation measures implemented were not entirely reflected in risk log maintained by UNDP, which depended on the risk-related information provided by the PMU, e.g. in the APRs and QPRs. Often, intended mitigation measures were described, but the extent to which, how and when they have been implemented is not clearly stated.

104. The environmental and social risks of the project were mainly related to the construction of the water infrastructure and to the operation and maintenance of the RO systems. The environmental and social risks associated with the policy work and capacity development were minimal. For each risk in the risk log as well as the additional risks identified by the IE and FE, Annex 6 presents the assessed status, the mitigation measures, and the sufficiency of the risk mitigation measures implemented. Overall, the risk management and mitigation measures implemented were sufficient. In practice, no major environmental or social damage was reported (nor encountered by the FE during site visits and community consultations), no major accidents or incidents occurred, and the complaints and grievances were minor (e.g. power lines, internet, and TV cables being cut) and addressed, thus indicating that the ESMP implementation was effective. External risks posing a threat or challenge to the project were handled to the best ability of the project. Delays were inevitable but overall, the risks were appropriately and adequately handled (see also section 4.1.1 and 4.2.5).

4.3 Project results and impacts

4.3.1 Progress towards objective and expected outcomes

105. Table 4.3.1.1 provides an overview of the project outputs and sub-outputs. Annex 13 provides an overview of the project's achievements vis-à-vis its targets, and Annex 14 provides an overview of the achievement of the project sub-outputs.

Table 4.3.1.1: project sub-outputs/activities
Output 1: Scaling up an integrated water supply system to provide safe water to vulnerable households (at least 32,000 people, including 15,000 women)
1.1 11,502[3] rainwater harvesting systems for 26,000 residents in 45 islands installed
1.2 Standard operating Procedures (SOPs) prepared and used by utilities, local councils and households
1.3 4 RO desalination water plants in 4 islands installed and made operational, using a grid-tied and/or off grid solar PV technology to provide backup capacity in times of water stress
1.4 Groundwater recharge system installed for excess rainwater from the RWH collection system on 49 islands, including greywater recycling on selected islands
1.5 Tariff evaluation criteria and tariff setting guidelines designed and introduced
1.6 Training programmes in integrated water resource management, planning and budgeting, water economic modelling, expenditure management and performance monitoring developed and delivered for relevant atoll and island councils and the ministries (MEE, MoH) and public utilities
1.7 Certification courses for the utilities and sector specialists in the areas of water engineering, capital construction, operation, maintenance, financial management and planning
Output 2: Introduction of decentralized and cost-effective dry season water supply systems benefiting 73,000 people across 7 Northern Atolls
2.1 4 sub-national water production and distribution locations to serve all Northern atolls established
2.2 Institutional coordination and accountability mechanisms between the utilities, the NDMC, MEE and LGA/councils to facilitate cost-effective and timely water supply during dry season
2.3 Regulatory framework for competitive and wholesale water distribution services established
2.4 Early warning system established on the basis of forecasted meteorological information for water emergency alerts and for effective operation of integrated water system.

Output 3: Groundwater quality improved to secure freshwater reserves for long term resilience on 49 islands
3.1 Baseline assessment (hazards inventory and catchment characterization) completed
3.2 Groundwater monitoring protocols with associated equipment and training delivered
3.3 Regulatory framework established for coastal land use, including zoning to protect coastal catchment areas and enable natural recharge of groundwater lenses
Source: FP, ProDoc

106. **Output 1 (*scaling up an integrated water supply system to provide safe water to vulnerable households*):** This was by far the largest component, both in terms of budget allocation and number of activities. The water infrastructure, operating procedures, tariff-related work, and most of the capacity development were implemented under output 1. Annex 12 provides an overview of the sub-outputs and activities delivered under output 1.

107. IWRM systems: Four IWRM plants were constructed, commissioned, and handed over to FENAKA and/or island councils on the following islands in the northern Maldives: Dharavandhoo (Baa Atoll), Foakaidhoo (Shaviyani Atoll), Maduvvari (Raa Atoll), and Nolhivaranfaru (Haa Dhaalu Atoll). These systems integrate RO and RWM components, are solar powered, and have groundwater recharge installed, which also serve as outlets for excess water. At the time of the FE mission, the RO component was operational on three out of four islands and supplying piped water. However, the RWH component was not operational on any of the four islands due to various, often minor, issues (described below). On Dharavandhoo, neither the RO nor the RWH component worked, but a second RO line installed by FENAKA supplied water through the pipes installed by the project. Moreover, as per Maldivian law, only households that had applied to be connected at the time of construction were connected, whereas FENAKA did not have the parts required to connect households that applied after the completion of the construction.

108. RWH systems: RHW systems were constructed, commissioned and handed over to FENAKA, STELCO and/or island councils on 25 islands in the following central and southern atolls: Alifu Alifu Atoll (Boldufulhadhoo, Himandhoo, Mathiveri), Alifu Dhaalu Atoll (Dhigurah, Kunburudhoo), Dhaalu Atoll (Bandidhoo, Hulhudheli, Meedhoo), Meemu Atoll (Veyvah, Raimandhoo, Naalaafushi), Thaa Atoll (Dhiyamingili, Gaadhifushi, Kandhoodhoo, Kinbidhoo, Omadhoo, Vandhoo), Gaafu Dhaalu Atoll (Hoandehdhoo, Nadehlla, Rathafandhoo, Fiyoree, Fares-Maathodaa), and Gaafu Alifu Atoll (Kondey, Maamendhoo, Nilandho). These systems have groundwater recharge installed, which also serve as outlets for excess water. However, due to different, often minor, issues (described below), the RWH systems were not operational on any of the 14 islands, where the FE was able to consult stakeholders.

109. Issues with water supply systems: The reason that the RO component on Dharavandhoo was not operational at the time of the FE mission was that the thread in the lid on the backwash filter had become deformed, seemingly due to the plastic material being insufficiently strong to withstand the pressure. Nonetheless, RO water was still supplied to the households, since MNPHI had installed a second RO line in the system with

GoM funding. The same issue happened in Foakaidhoo, but local staff in the FENAKA island branch office had designed and manufactured a clamp to attach the lid of the backwash filter, thereby enabling operation of the RO system. Reasons for the RWH component of IWRM systems not working included lack of confidence in the water quality from school rooftops that were below banyan tree canopies and thus polluted by droppings from flying foxes. However, the RWH systems include filters and chlorination, so in practice, this should not affect the water quality. Lack of confidence in water quality from some other rooftops were also reported. No stopcocks were installed in the system, so individual rooftops cannot be isolated from the system. In principle the pipes connecting the concerned rooftops could be disconnected, but the local FENAKA staff and island councils were waiting for approval from MECCT, although the decision could be taken on the island. Moreover, the dosing pump controlling the chlorine contents of the water in the RO system on Dharavandhoo is not operating properly, so it can only be operated manually.

110. Issues related to the lift wells was one of the main reasons given for the lack of functionality of RWH systems/components, such as cracks in lift wells and groundwater leaking into lift wells due to cracks in connections between underground tanks. The issue here appears to be that the prefabricated lift wells are not well-suited for the high groundwater table on the islands, causing the prefabricated wells to be pushed upwards by the pressure from the groundwater when they are empty. Local operators had been requested to leave the tanks half full when cleaning them and instructed on how it could be done, but the tanks seen by the FE team were empty. On Kondey, the contractor had replaced the cracked prefabricated tank with a concrete tank. On Hoandhedhoo, groundwater had seeped in and polluted the lift well due to small leakages in the connection between the two prefabricated tanks installed, therefore the system was not in operation. Other reported issues included inability to pump water from the lift wells to the rainwater tanks. Moreover, given that the RWH systems in the near future are to be integrated in GoM financed RO systems, the operators appear to be waiting for the completion of the RO systems before investing in repairs of the RWH systems. On some islands, coordination between the project and NPNHI's installation of RO systems was insufficient; on Kondey, this had led to overlapping land allocations, and therefore the RO system contractor had removed parts of the RWH infrastructure installed by the project, such as a water collection point, underground pipes, and floodlights.

111. On Mathiveri, the reason for the RWH system not being operational at the time of the FE visit appears to have been that the pump had not been primed by the operators after the system had been inactive for a period of time. However, on Kondey, the RWH system was not working, although the operator reported that they had primed the pumps; it had worked earlier. Similarly, on Dharavandhoo, the RWH pump reportedly did not lift water despite two attempts to prime it. On Hoandhedhoo, the operator reported that the pump was recently damaged and thus not working.

112. The FE team also noted minor issues with the quality of some small parts, such as leaking pipes and taps, corroded or missing clamps for pipes. Moreover, some of the

construction seen by the FE team had not been done entirely satisfactorily – time pressure due to delays (e.g. caused by COVID-19) appears to have caused rushed implementation. For example, on Kondey Island, the pump shed was poorly assembled and rats had entered the sheds, and the gutter and pipes installed on the school rooftop were leaking and overflowing. The system in Kondey had several issues with leaking pipes and joints disconnecting when the system was running, so it could only be operated with constant supervision due to the risk of sudden leaks, and they would thus only run it for one hour per day during periods of water scarcity. Currently, the system in Kondey is not operational as the pump is not working and the water collection points have been disconnected.

113. Overall, problems with the quality of installation and parts were found on all five islands visited by the FE. Moreover, such issues were also reported during calls with key informants from six additional islands.

114. Notwithstanding the above issues, it appears that the issues related to the non-functionality of the systems in part are due to: a) extended periods of dormancy of the systems (e.g. filtration membranes drying up and needing replacement, leaking pipes); b) incorrect operation and maintenance (e.g. emptying lift wells entirely, lack of priming of pumps); and c) in some islands lack of proactiveness vis-à-vis fixing relatively minor problems. Among ten islands, only two operators reported that the training provided on how to operate the water supply system had been sufficient and fully enabled them to effectively carry out operation and maintenance, whereas most found that the training provided by the contractors at handover was insufficient.

115. Water supply procedures: Under output 1, the project supported two important procedures for ensuring effective, efficient, and sustained operation and maintenance of the installed water infrastructure, as well as for other water supply infrastructure installed by GoM. Standard operating procedures (SOPs) for utilities/operators and island councils were elaborated. However, after the SOPs were finalised, the responsibility for regulation of utilities and operators of water supply systems was transferred from the Environmental Protection Agency (EPA) to the newly formed URA, thus requiring that the SOPs were realigned to the new institutional arrangements. While such work was planned, available evidence suggest that this revision was not finalised. The other important procedural work undertaken was in relation to the development of tariff setting criteria and guidelines, to ensure that the tariffs would enable the utilities to recover operation and maintenance costs. With project support, MECCT developed the Water and Sewerage Tariff Regulation, which was published by MECCT in 2021. Moreover, a tariff model was developed for URA, and an online course on its use was held; this course is available on MECCT's LMS online platform developed by the project. However, while this tool was developed and URA staff were trained on it, URA has not been able to apply it; URA is a very young institution and tariff setting is politically sensitive, the current tariff is 30 years old and with the installation of water supply systems on all islands, the tariff would inevitably increase if operation and maintenance costs were to be recovered. GoM decided that a uniform tariff (with three tiers depending on volume used) was to be applied

across all islands, irrespective of the actual operation and management costs of each system.

116. Capacity development: A comprehensive capacity development package was implemented. Of particular significance was the development of national certificate level 3 and 4 courses related to operation and maintenance of water systems, sewer systems, and water testing laboratories. A number of utility staff were trained. More significantly, the certificate course curricula and materials developed were handed over to the National Skill Development Authority and Maldives National University (MNU), so that qualified operator staff will be trained across the Maldives as GoM rolls out IWRM systems, and that new staff entering service will also have the necessary qualifications. Water quality testing equipment was provided to FENAKA, STELCO, and URA. However, all island-level utility staff consulted by the FE reported that they had not been properly/sufficiently trained in the use of the water testing equipment provided. Many are thus unable to conduct water testing. Most of them also found that the training on system operation and management was not entirely sufficient. The issues appear to be twofold, namely that a) the training-of-trainer model did not fully ensure that the individuals trained by the project actually trained island-level staff, and b) the above-mentioned insufficiency of the training provided by the contractors to the island-level utility staff. The laboratory at URA is not yet installed, as construction work is still ongoing in URA's new office building.

117. In response to COVID-19, the online LMS system was developed to enable the implementation of capacity development during lockdowns. A number of online trainings for ministry, authority, and utility staff were delivered through the LMS: a) hydraulic modelling of water supply, b) water utility financial model, c) water and sewerage governance, d) rainwater harvesting and dry period water supply management, e) island water cycle and groundwater management, f) IWRM system, g) UAV surveying, h) advanced hydraulic modelling of water supply, i) water supply and risk management, j) survey data gathering and rapid assessment; and k) the tariff model. The LMS has proven a useful tool and has been adopted by MECCT a mechanism to deliver online training, e.g. to island stakeholders, and a as an easy to access repository for training materials. As of June 2023, 12 different online courses were available on the LMS.

118. Moreover, training was provided to utility and ministry staff in groundwater assessment and gender awareness.

119. Island councils, school management, WDCs, health institutes, and utilities from 17 islands were given water awareness training. Moreover, a training course on island level water resource management plan (ILWRMP) development was developed; MECCT plans to roll this training out across atolls.

120. Achievement of output 1 target: Overall, good progress was made towards the output 1 target of providing at least 6,400 households/32,000 persons on 29 islands with a year-round supply of safe water (the registered population on the 29 islands was 30,887

people in 2021 and the living population was 21,098 people in 20221). However, the target has currently not been achieved, as the RWH systems are not yet operational. On the islands with three operational RO systems the total registered population was 6,444 in 2021 (21 percent of the population on the 29 target islands) and the living population was 4,578 in 2022 (22 percent of the living population on the target islands), and addition, the project infrastructure contributed to the distribution of water on the fourth IWRM island, which in had a registered population of 1,176 persons on 2021 and living population of 1,003 persons. Hence, the project directly contributed to the current year-round provision of water to a registered population of 7,620 in 2021 (25 percent of the target) and a living population of 5,581 (26 percent of the target), although some households among these have not been connected, since they did not apply for connections when construction was ongoing. The islands with the 14 RWH systems that are not operational have a total registered population of 15,025 (49 percent of the target population) and a living population of 9,959 (47 percent of the target). The 11 RWH islands for which the operational status is unknown have a total registered population of 8,242 (27 percent of the target population) and a living population of 5,558 (26 percent of the target) but it appears unlikely that these 11 systems currently provide water. Nonetheless, the 25 RWH systems have been installed and in general, only minor pending work is required to make them operational. Hence, the FE assesses the target for output 1 as **partly achieved**. Annex 13 provides an overview of the achievement of targets.

121. **Output 2 (*introduction of decentralised and cost-effective dry season water supply systems in northern atolls*):** This component focused on improving the coordination, cost-effectiveness, and timeliness of dry season provision of emergency water in the driest part of the country, as well as early-warning related work to contribute to enhancing rainwater harvesting. Moreover, legislative and regulatory work was implemented under output 2. Annex 12 provides an overview of the sub-outputs and activities delivered under output 2.

122. Dry season emergency water provision: The four IWRM plants installed under output 1 are also intended to serve as water supply hubs for the provision emergency drinking water to other islands in the northern atolls when they face periods of water shortage. Thereby, the project would reduce the costs and response time compared to the current practice of delivering emergency water from Malé as well as the costs at household level vis-à-vis purchasing bottled water when they run out of rainwater. However, on Dharavandhoo, the capacity of the RO component was views as insufficient for covering the island's own needs. Hence, FENAKA had subsequently installed a second RO line with three times the capacity of the project's RO line.

123. The project also addressed institutional and coordination challenges vis-à-vis timely delivery of emergency water. A digital portal for monitoring water demand and improving aid coordination for timely water distribution was developed and launched. It is the

[1] Registered population refers to the total population registered belonging to a household on an island, living population are those who live on the island less people that in practice live elsewhere, e.g. in Malé or on resort islands, usually due to work or studies.

intention to connect it to the Local Government Authority's (LGA) online portal, but the LGA portal is not yet operational. Furthermore, a Potable Water Security Plan (PWSP) was developed; it has been adopted and is utilised by MECCT. Moreover, strategies were drafted to improve coordination among islands councils, FENAKA and DWS/MECCT and to make it easier for islands to access emergency water. However, the extent to which these strategies have been adopted and coordination has improved is unclear, and some stakeholders reported that the delivery of emergency water still took considerable time during the 2023 drought. Online training was provided on dry period water supply management and rainwater harvesting.

124. The project also engaged with the Maldives Meteorological Service (MMS) to improve the forecasting of droughts, water shortages and scope for harvesting rainwater. Six automated weather stations were provided to MMS, bringing the total number of MMS weather stations up to 31. Of the stations provided, four were operational and two were in need of maintenance at the time of the ME mission. These weather stations have contributed to improving the accuracy of weather forecasts. Moreover, MMS staff were trained on weather modelling to improve the forecasting of water shortages. The project also funded the development of a "probable area of rainwater harvesting alerts" upgrade, which has been added to MMS' Moosun weather mobile app, which has 62,980 registered users. Thereby, the Moosun app now alerts alerting island councils and communities about rainwater collection possibilities to maximize collection and improve dry period preparedness.

125. Water and sewerage sector legislation: The project support to the development of acts and regulations went well beyond dry season water supply in northern atolls and addressed regulation of Maldivian water sewerage services more comprehensively. Technical and financial support was provided for the development of two central acts for the sector, the Water and Sewerage Act and the Utility Regulatory Authority Act, which were both passed by Parliament in 2020. Moreover, the project supported the development of regulations supporting the implementation of the two acts, namely: the Water & Sewerage Service Maximum Tariff Regulation and the Water and Sewerage Service Subsidy Regulation, which were published by MECCT in 2021, and the Water & Sewerage Service Regulation, which was published in 2023. Thereby, the project contributed to important elements of the establishment of a regulatory framework with provisions for operations, maintenance and cost recovery for water supply and sewerage services across the country.

126. Achievement of output 2 target: Overall, good progress was made towards the output 2 targets of providing at least 73,000 persons on seven atolls with dry season water and a 40 percent reduction in dry season water distribution costs. Four hubs (IWRM systems) were installed in four northern atolls, but the extent to which water from these hubs will be distributed to other island during dry seasons remain to be seen, as does the extent to which this will lead to reduced distribution costs. Inputs were made to improve the coordination and timeliness of water emergency responses, but in 2023, some stakeholders still reported long timespans from requesting water to delivery. The ongoing rollout by GoM of IWRM systems on all inhabited islands will significantly reduce the

need for emergency water distribution, and with IWRM systems on all islands, emergency water may not necessarily be provided from the project islands. Overall, the FE assesses the target for output 2 as **partly achieved**.

127. **Output 3 (*groundwater quality improved to secure freshwater reserves for long term resilience*):** Work related to groundwater monitoring and protection was implemented under output 3, although groundwater recharge from water infrastructure fell under output 1 (sub-output 1.4). Annex 12 provides an overview of the sub-outputs and activities delivered under output 3.

128. Groundwater assessment and monitoring: Comprehensive groundwater studies were carried out on 37 islands. At the time of the FE mission, some of these had been published on the MECCT website, the rest are scheduled for publishing during 2023. It is thus too early to assess the extent to which these will be put into use by island councils in their land use and infrastructure planning and regulation of activities that can impact on the groundwater. Some island councils are not aware of the assessment reports and where to find them. For continuous monitoring of groundwater quality, the project planned to support in 2023 the installation of boreholes for collecting samples and piezometers for measuring hydraulic pressure, and the setup of a geographic information system (GIS) with DWS/MECCT for analysing changes to groundwater conditions and the impact of groundwater management. However, the status of this is not clear from the available information. Moreover, online trainings were held for ministry and utility staff on a) groundwater assessment, b) hydraulic modelling and advanced hydraulic modelling of water supply, b) island water cycle and groundwater management, c) survey data gathering and rapid assessment, and d) surveying with unmanned aerial vehicles (drones).

129. Regulation for groundwater protection: The project supported the development of two key regulations for the protection of groundwater: a) the Water Resource Protection Regulation, and b) the Dewatering Regulation, both published by MECCT in 2021.

130. Groundwater recharge: The water infrastructure installed under output 1 include a mechanism for groundwater recharge using excess water collected. Furthermore, island-specific designs were developed for managed aquifer recharge (MAR) based on the groundwater assessments, these were scheduled for publishing in 2023. Web-based tools for community co-design of flood management and groundwater recharge pits were developed and made available on the LMS.

131. Achievement of output 3 targets: As described in section 4.1.1, ambition of output 3 leading to measurable groundwater quality improvements within the lifespan of the project was unrealistic. Nonetheless, the project made a modest direct and more comprehensive indirect contribution toward achieving the intended end-of-project targets of a) maintaining groundwater recharge rates at minimum 3 percent, and b) increasing groundwater consumption 20 percent by 50 percent of the households in IWRM islands. The project made contributions towards improved groundwater protection and recharge

with the regulations, information about groundwater status on several islands, and designs for groundwater recharge – thereby strengthening the scope for GoM to protect groundwater and increase recharge, which in turn would improve groundwater quality and thus potentially increase the use of well-water by households. The installed infrastructure (once operational) will directly contribute by recharging excess water to the groundwater, and since the RO systems extract saline groundwater from below the freshwater lens, this is in a sense increasing the use of groundwater, although unrelated to groundwater quality. Overall, the FE assesses the targets for output 3 as **not achieved**, although this is more related to **overambitious target setting** than project performance.

132. **Outcome (*strengthened adaptive capacity and reduced exposure to climate risks*):** four indicators were linked to the project outcome. There was no target attached to the first indicator: "*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*". GoM has adopted the project's IWRM approach to water supply with RO-RWH integration, solar power, and groundwater recharge, as spelled out in the Water and Sewerage Act. Moreover, the supported acts have been adopted by the Parliament and regulations published by MECCT. MECCT has also adopted the Potable Water Security Plan (PWSP) and plans to roll out the training course on island level water resource management plan (ILWRMP) development. MNU has adopted the national certificate courses developed, and MMS is using the weather stations and upgrade made to the Moosun app. However, water testing is not done on all IRWM islands, and there is little evidence of an improved emergency water response. It is too early to assess the use of the groundwater assessments and monitoring at the island level. The FE thus assesses the **first outcome indicator as partly achieved**. Annex 13 provides an overview of the achievement of targets.

133. The target for the second indicator was that 20,000 households on the 29 target islands are using the water supply services (the total registered population on the 29 islands in 2021 was 30,887, so the target should have been around 6,200 households). On the four IWRM islands, RO water is being delivered to households, thus covering 25 percent of the target population on the 29 islands. However, the extent to which they use the water varies significantly, depending on individual preferences and level of access to rainwater from the households' own rooftops and wells. In the remaining islands, no water was supplied at the time of the FE, but in principle, only minor work is required to make the systems operational. The FE thus assesses the target for the **second outcome indicator as partly achieved**.

134. The third and fourth indicator both relate to groundwater. The third indicator had a target of increased consumption of groundwater by 20,000 households in the project islands due to water quality improvement (the target should have been revised to correspond to population of the islands covered by the project: 29 with water supply with groundwater recharge, 37 with groundwater assessments). However, as described in section 4.1.1, it was unrealistic to expect any measurable changes in groundwater quality during the lifespan of the project. Moreover, the project did not actively promote the use of groundwater (other than saline groundwater extracted for RO supplies). Hence,

the FE assesses the target for the **third outcome indicator as not achieved**. Nonetheless, the project has laid the ground for future investments in groundwater and as well as improved regulation of activities affecting the groundwater, is thus **likely to have contributed to improvement of the future groundwater status**. The fourth indicator concerned increased groundwater recharge, but had no target attached. A future contribution may be made by the project if the MAR designs are implemented and if the installed water infrastructure once operational produces significant amounts of excess water that is recharged to the groundwater. Hence, the FE assesses the target for the **fourth outcome indicator as not achieved (and unrealistic)**, but that the project may have contributed to future increases in groundwater recharge.

135. **Objective (*to deliver safe and secure freshwater to 105,000 people in the islands of Maldives in the face of climate change risks*):** Only four of the 29 water supply systems installed are confirmed to be delivering water (supplying 25 percent of the target registered population) and the actual supply of emergency water to additional northern atoll islands is still to be seen. Nonetheless, only minor investments and work is required to make the remaining systems operational. Hence, the FE assesses the target for the objective indicator as **partly achieved**.

4.3.2 Relevance

136. **Alignment with GCF objectives and investment criteria:** The project responded well to GCF priorities. The project aimed at ensuring year-round water access in a context, where dry season water scarcity is a recurrent challenge and climate change is projected to lead to increased temperatures, less rainfall, longer dry seasons, and reduce the freshwater lenses due to sea level rise. The project was thus fully in line with the GCF adaptation priority of increasing water security.

137. The project also responded to GCF's investment criteria:
- The impact potential of the project was to increase climate resilience of vulnerable island communities already affected by and limited access to quality water and recurrent periods of water scarcity by improving year-round access to safe water for domestic purposes for a significant proportion of the Maldives' population.
- The project's paradigm shift potential was to exert influence on GoM's other investments in water supply across the country and the regulatory framework for water services and groundwater management, as well as improving institutional capacities and increasing the access to knowledge and information.
- The sustainable development potential was linked to the contribution to SDG 6 (clean water and sanitation) and SDG 13 (climate action). Moreover, the project addressed environmental sustainability through the promotion of measures to improve groundwater quality, increase groundwater recharge and the promotion of solar energy in water infrastructure as a sustainable alternative to diesel-powered energy use. Moreover, the improved access to clean water could reduce the use of plastic water bottles and related waste management and pollution issues. Considering that the primary users of household water in the Maldives are women, they would in particular benefit from the easier access to quality water.

The project also included a gender action plan aiming at enhancing the participation of women in the water supply sector.

- Needs of the recipient were addressed by the project by addressing a fundamental constraint (water scarcity and water quality) of the targeted island populations. Moreover, the project sought to address legal and institutional capacity barriers to effective water supply and water sector governance.
- Country ownership was sought by the project through embedding the project in existing institutional structures and aligning with, and contributing to, the further development of, national policies and legislation.
- Effectiveness and efficiency were sought by the project through support for the development of a water supply tariff structure that would allow for cost recovery. Moreover, the project sought to promote operational cost-savings through the provision of solar power, by integrating less costly RWH with RO, and by reducing the need to transport emergency water from Malé to the outer islands during periods of water scarcity.

138. **Alignment with UNDP's priorities:** The project responded well to UNDP's priorities at global and county level as well as the overall UN strategies for the Maldives:

- UNDP Strategic Plan (2018-2021) Output 1.4: *Scaled up action on climate change adaptation and mitigation cross sectors which is funded and implemented.*
  Project response: The project funded and implemented adaptation action at scale.
- UNDP Strategic Plan (2022-2025): Resilience: *Supporting countries and communities in building resilience to diverse shocks and crises, including conflict, climate change, disasters and epidemics.*
  Project response: The project aimed at enhancing resilience to the projected increased water scarcity due to climate change.
- UNDAF (2016-2020) outcome 4: *By 2020, growth and development are inclusive, sustainable, increase resilience to climate change and disasters and contribute to enhanced food, energy and water security and natural resource management.*
  Project response: The project aimed at increasing climate resilience and water security.
- UNSDCF (2022-2026) outcome 3 + UNDP CPD (2022-2026), under outcome 2: *By 2026, national and sub-national institutions and communities in Maldives, particularly at-risk populations, are better able to manage natural resources and achieve enhanced resilience to climate change and disaster impacts, natural and human-induced hazards, and environmental degradation, inclusively and in a sustainable manner.*
  Project response: The project aimed at enhancing resilience to the impacts of climate change and improving the management of rainwater and groundwater resources.

139. **Alignment with national priorities:** The project was at design embedded in existing institutional structures and aligned with institutional mandates and engaged with the relevant institutions at national and island levels. When institutional mandates changed,

the project adapted its setup and activities to the changes. However, the transfer of the mandate for water supply civil works from MECCT to MNPHI was a challenge for the project, which was not easily solved. On the one hand, the significant investment in water infrastructure should ideally have followed the new institutional roles and mandates and have been handed over to MNPHI to benefit from its capacities and facilitate coordination and economy of scale with GoM's largescale investment in IWRM systems. But on the other hand, the work on the legal and regulatory framework and related capacity development, emergency water supply, and groundwater management was rightly housed at MECCT. The choice of keeping the project with MECCT was therefore well justified, but at the same time; it would have been appropriate to transfer the infrastructure component of the project to MNPHI. This, however, would probably have required a re-design of the project.

140. The project was implemented in line with GoM policies and legislation, and also contributed to MECCT's efforts to improve the legislation and regulations governing the water supply sector. When GoM's water supply strategy changed, the project was adjusted to remain in line with, and supportive of, the new strategy. The legislative and regulatory work of the project directly contributed to making the new strategy more environmentally sustainable and reducing the carbon footprint.

141. **Responsiveness to beneficiary needs:** Water scarcity during the dry season, limited access to quality water, and poor quality of groundwater are widespread and significant challenges for many households on the outer islands, as are the costs of bottled drinking water. The project aimed at addressing these issues by improving the year-round access to safe water, contributing to longer-term improvements of longer-term groundwater quality, while also reducing the need to purchase bottled water.

142. However, GoM's decision and ongoing effort to provide piped water to households on every island had major implications for the overall relevance and added value of the infrastructure component of the project vis-à-vis beneficiary needs. RWH systems will no longer be essential for water security, as every island will have RO systems, although RWH can still contribute to water security, serving as a backup when the RO system is undergoing maintenance or repair, and the use of rainwater will also reduce the release of brine, which potentially can have negative environmental impacts. The need for hubs for emergency water will be limited, once each island has its own IWRM system, and emergency water may as well be supplied by IWRM systems from other islands than the four project islands. Nonetheless, the infrastructure component has an economic value for GoM, as the grant-financed installation of infrastructure reduced the amount of loans required to fulfil the obligation of providing water connections for all households.

4.3.3 Effectiveness

143. **Contribution to SDGs:** The project mainly contributed to SDG 6 (clean water and sanitation) and SDG 13 (climate action). Under SDG6, the project mainly contributed to target 6.1: *by 2030, achieve universal and equitable access to safe and affordable drinking water for all.* A direct contribution was made in the 29 project islands on which there will be universal access to water, if/when all the systems are operational and provided that

all households are connected to the systems or have access through public collection points. Other northern atoll islands may be provided with emergency water during periods of scarcity thereby a potential contribution is also made to their water security (until GoM has installed IWRM systems on these islands). Moreover, a contribution was made to target 6.5: *By 2030, implement integrated water resources management at all levels*. This was done through the four IWRM water supply systems, inspiring GoM to adopt the project's IWRM approach to water supply nationally, and the work related to assessing groundwater, groundwater recharge, and establishing regulations to protect groundwater.

144. Under SDG 13, the project mainly contributed to adaptation-related targets, in particular 13.1: *Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries*. On the 29 project islands, the installed infrastructure, once operational, will reduce or even remove the vulnerability to water scarcity, despite the projected increased length of the dry season and reduced annual precipitation. Moreover, the work on improving the access to emergency water and the work related to providing forecasts on when there will be water scarcity and on possibility for rainwater harvesting has contributed to target 13.3: *Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning*. Moreover, the use of solar power in project water infrastructure and the adoption by GoM of this approach contributes to preventing greenhouse gas emissions from the operation of the new water supply systems being installed.

145. **Contribution made to GCF investment criteria:** Until all the water supply systems installed become operational, the direct impact remains modest, with water being supplied only on a few project islands (and potentially also to other northern atoll islands when they face periods of water shortage). However, only minor work is required to get the remaining systems operational. Hence, releasing the full impact potential on year-round access to safe water for drinking and other domestic purposes and increased resilience to climate change-induced water scarcity is within fairly easy reach and may yet be achieved.

146. The project made a tangible contribution to a paradigm shift by addressing the main barriers towards the provision of year-round water access, and thereby to the achievement of GCF fund-level impact A2.0 "*increased resilience of health and well-being, and food and water security*". In particular, GoM has adopted the project's approach IWRM water supply with integration of RO and RWH, installation of solar power, and recharging groundwater with excess water produced. GoM is currently in the process of installing IWRM systems on all inhabited islands that do not have piped water supply and household connections. With the certificate training courses, which have been adopted by national stakeholders, the project has also laid the foundation for ensuring effective water and sewerage service delivery across the country in the long term. Moreover, the project has laid the foundation for better groundwater protection and future investments in groundwater rehabilitation.

147. The project contributed to sustainable development with the above-described contributions to SDG 6 and SDG 13. Moreover, the project has likely contributed towards future environmental improvements vis-à-vis reduced groundwater pollution. Furthermore, if the water systems become operational and the population is confident in the quality and safety of the water provided, the project is anticipated to lead to reduced use of plastic water bottles and the related pollution. A contribution has also been made towards increased access to jobs for women in the male-dominated water sector, through the training of women as well as through awareness raising on gender-related water issues among stakeholders in Malé and on the islands (see section 4.3.10).

148. On the islands with operational IWRM systems, the needs of the recipients have been addressed by providing year-round access to safe water. When/if the RWH systems become operational, the project will have contributed to addressing needs of the recipients at a larger scale, supplementing GoM's investment in RO systems. Moreover, the project made a tangible contribution to improving the legal and regulatory framework for the sector, as well as to institutional capacities, thereby strengthening GoM's capacity toward providing water services and regulating the water sector in line with its policy commitments.

149. The project enjoyed a high degree of country ownership, and in particular strong MECCT ownership, as evidenced by the influence on GoM's approach to water supply, the passing of laws and regulations developed with project support, the integration of the certificate training courses, and the adoption of the LMS platform.

150. The contribution to effectiveness and efficiency was modest. The project sought to establish a tariff model that would ensure that the water supply operation and maintenance costs are recovered to ensure long term financial sustainability, but till now, the tariff structure has been decided politically, and there is little evidence of the use of the tariff model provided. Nonetheless, the GoM's decision to install solar energy and integrate of RO and RWS, will contribute to lowering the costs of water supply beyond the 29 project islands. The PMU estimates that the costs of RWH supply is approximately 30 percent lower that RO supply, so with the specified maximum of 30 percent rainwater in the water supply mix, addition of RWH has the potential to reduce the costs of water supply by up to nine percent. Moreover, the use of solar power in IWRM systems is estimated by the project to reduce the operational costs by an additional ten percent. Insofar that the IWRM systems installed by the projects supply dry season water to other islands, the project will also contribute to lowering the costs of emergency water provision.

151. **Contribution made UNDP priorities:** The key priorities across the relevant UNDP strategies that the project addressed were enhanced climate resilience, improved water security, and improved management of natural resources (see section 4.3.2). As described vis-à-vis the GCF investment criteria, the project enhanced the resilience and water security of the population on the IWRM islands, and a contribution to enhanced resilience can relatively easily be achieved on the RWH islands. Furthermore, the project has

laid the foundation for improved management of groundwater resources across the Maldives.

152. **Contribution made to GoM priorities:** the project directly contributed to the delivery of GoM's water supply and climate change adaptation aspirations. When GoM's ambition increased with the commitment to provide piped water and household connections across the entire country, the project adapted its approach to water supply, so that the systems would contribute directly to the new aspirations of GoM in the 29 project islands, e.g. by enabling integration of the RWH systems with GoM investments in RO systems. Moreover, the IWRM model promoted by the project was adopted by GoM, thereby enabling reduced costs of water delivery. Furthermore, the project made a tangible contribution to improving the legal and regulatory framework, as well as the institutional capacities vis-à-vis service delivery and regulation.

153. **Major external factors:** The project enjoyed considerable government ownership and commitment throughout the period of implementation. MECCT demonstrated particularly strong ownership with engagement in oversight and facilitation from the highest level. Other actors also demonstrated ownership and participated in the project, albeit to varying degrees.

154. However, the context in which the project was implemented was challenging for several reasons. Firstly, the geography of the Maldives with numerous small islands scattered over a large area made the logistics challenging and costly. All materials had to be transported by boat, and person transport was by a combination of flying and boat, and when no scheduled ferries were available, boats would have to be chartered. Moreover, during the monsoon period bad weather or rough sea conditions often led to cancelled flights and boats, leading to implementation delays. Furthermore, the unique geography of the islands also posed challenges for the construction, with high and fluctuating groundwater levels affecting the underground lift wells, salinity in the air leading to corrosion of some materials, high transport costs, and complicated the planning of logistics. International contractors and consultants were not always familiar with the Maldivian context and how to operate in it, which created some implementation challenges, and meant that the PMU would have to pay careful attention to the infrastructure designs.

155. As already described, the COVID-19 pandemic caused significant challenges vis-à-vis stakeholder engagement and caused major delays. In some cases, due to the delays, construction was rushed to be completed. This appears to have negatively affected the construction quality in some locations (e.g. the pump shed on Kondey), as well as the commissioning and handover process.

156. Other external challenges also affected the project delivery. A construction boom on the Maldives, drove the prices of contractors and materials up, to a degree where the number of islands had to be considerably reduced. Moreover, limited availability of qualified companies and experts complicated procurement, and in some instances, contracts had to be retendered due to low response rates, which contributed to delays.

157. The Maldives has in recent years embarked on a process of decentralisation, where the mandates and responsibilities of the island councils have significantly increased. However, the island councils do not have sufficient capacity to fulfil the enhanced role; for example, while they are the legal owners of water infrastructure on the islands, they do not have the capacity to operate the infrastructure, so the operation has been handed over to the utilities (FENAKA, STELCO). However, communication from Malé to the islands can be a challenge, and island level stakeholders were not always fully aware of the formal ownership of the water systems, which both island councils and utility staff often believe is with FENAKA. Hence, on some islands, they wait from permission from FENAKA headquarters or MECCT to make changes or repairs to the systems, whereas such decisions in principle could be made on the islands. Moreover, while the project/MECCT has handed over the technical drawings of the systems to the utilities with the expectation that the drawings would be provided to the island branches, on a number of islands, neither the local utility staff nor the island councils have the drawings – or they are unaware of where the drawings are located.

158. On some islands, the communities are to some extent divided along political party lines, and community-members who belong to another party than the party ruling on the island do not engage in community meeting and consultations announced by the island council, thus making broad community consultations a challenge. Moreover, due to local gender dynamics, it was difficult to engage women in the consultation processes on some islands.

159. When the mandate for the construction of water supply infrastructure was moved from MECCT to MNPHI, it was decided to keep the project with MECCT for the reasons described earlier. While this was a well justified decision, it also meant that the infrastructure component of the project was no longer fully aligned with the institutional setup of the country and that the project installed water infrastructure in parallel to the larger GoM investment installed by MNPHI. While the overall coordination of the two initiatives worked overall, there are a few examples of coordination challenges, for example on Kondey where some parts installed by the project were removed shortly after by the contractor installing the RO system.

160. GoM's decision and ongoing effort to provide piped water to every household with installation of RO/IWRM systems on each island has major implications for the overall impact potential of the infrastructure component. While the project appropriately adapted to the new strategy, the RWH infrastructure will no longer be essential for water security since every island within the next few years will have RO systems. The project investment still contributes to water security as RWH can serve as a backup when the RO system is undergoing maintenance or repair. Moreover, the need for the four IWRM systems installed by the project to serve as hubs for emergency water will be limited once each island has its own IWRM system. Should situations arise, where there is a need for emergency water (due to temporary lack of functionality of the IWRM systems on a given island), then water could be supplied by IWRM systems from any other inhabited island, it would necessarily be provided by one of the four IWRM project islands.

4.3.4 Efficiency

161. As described earlier, the project experienced significant delays for reasons outside the control of the project, such as:

- Need to reorient the project and revise the RWH system design due to policy and institutional change
- Slow GoM procurement processes
- Slow payments since the project did not have its own bank account and all payments had to be made through the Ministry of Finance
- Limited availability of qualified experts and contractors, which at times necessitated retendering, elections and change of government
- Two COVID-19 pandemic lockdowns

162. Moreover, the project faced logistical challenges vis-à-vis transport and oversight on 29 scattered islands. Overall, the PMU and UNDP managed to navigate these challenges, and the PMU implemented measures to reduce the delays, such as online trainings and meetings, and UNDP handling international payments on behalf of GoM. However, delays could not be avoided, and budget execution was slower than expected (see Annex 11) and the project could only reach its completion due to two project extensions. Due to delays of the infrastructure construction, some implementation was rushed to be completed, which in a few places gave rise to some construction quality issues.

163. The number of RWH islands had to be reduced from 45 to 25, due to a) higher-than-expected costs due to high demand in the construction sector and increased costs of materials, and b) upgrades made to the RWH system design.

164. While the extension of the project meant that some PMU staff were employed for longer than planned, the spending on project management was within budget, and accounted for 8.7 pct. of the spending (see Annex 11). The additional salary costs were covered through savings on other project management items, e.g. the budget for staff travel. As such, the project management costs were in accordance with expectations. Three quarter of the grant was spent on output 1, mainly on water supply infrastructure. The spending on output 1 was slightly above budget, but that also meant that the funding spent on the other outputs was 10-12 pct. lower than their respective budget allocations.

165. The PMU was generally well staffed and overall proved capable of managing project implementation and engaging with stakeholders, despite the major challenges posed by COVID-19 and the complex geography of the Maldives. However, while the costs of having a full-time in-country CTA for a period were relatively high, the contribution and benefits fully justified the costs, not least when considering the total value of the project and the level of ambition. As also found by the IE, part time remote support from the CTA did not allow for getting the full benefits of the CTA's expertise and international experience.

4.3.5 Overall outcome

166. Table 4.3.4.1 provides the FE's rating of the project's outcomes, relevance, effectiveness, and efficiency, based on the finding presented in the previous sections.

Table 4.3.4.1: Rating of outcomes	
Assessment of outcomes	**Rating***
Outcomes	Moderately unsatisfactory
Relevance	Moderately satisfactory
Effectiveness	Moderately satisfactory
Efficiency	Moderately satisfactory
Overall project outcome	**Moderately satisfactory**
**See annex 7 for the rating scale applied*	

4.3.6 Sustainability

167. **Financial sustainability:** With the Water & Sewerage Service Maximum Tariff Regulation and Water and Sewerage Service Subsidy Regulation, the project contributed towards the establishment of the regulatory framework for ensuring cost recovery and adequate revenues to cover the operation and maintenance costs of the installed water infrastructure as well as for public water infrastructure in general in the Maldives. Moreover, with the tariff model developed and training on its use, the project in principle provided the necessary tools to establish tariffs that are both affordable and sufficient for recovering costs. However, there is no evidence of the national tariffs set being based on this tool and calculations of the actual investment, operation, and maintenance costs of the water supply systems in the Maldives. The current tariffs are set nationally and uniform for all islands, and do not reflect the actual running costs of each water supply system. Household connections installed in the Maldives are metered, whereas water collected at public water points is free, but rationed.

168. The project carried out a survey, which confirmed there is a general willingness to pay for water. However, rainwater and groundwater are generally regarded as free resources, since most households harvest rainwater from their own rooftops and have their own shallow wells, and rain- and well-water provided at public collections points (e.g. mosques, schools) is free. Since water tariffs are uniform nationally, the cost savings from mixing rainwater and RO water do not directly benefit the communities, whereas the connection of public roofs to the water system also means that community-members can no longer be accessed for free. Hence, there is among community-members, island council representatives and local operator staff a widespread perception that the RWH should not be integrated with RO systems. However, the perception does not take into consideration that the tariff for water from the IWRM systems is much lower than the costs of bottled water, which is widely consumed on the islands. While the project's IWRM approach will reduce the overall operation and maintenance costs of water supply, this is unlikely to affect the tariffs, since the utilities' budgets are subsidised by GoM, so the cost savings cannot be transferred to the consumer.

169. The IWRM model that GoM has adopted from the project contributes to lowering the cost of water supply at the national level. Firstly, the integration of RWH with RO will lead to a modest cost reduction of up to nine percent, and furthermore, the use of solar power will reduce the operational costs by ten percent compared to having the power supplied from the existing diesel-powered electricity supply systems on the islands.

Moreover, the IWRM systems installed by the project can in principle significantly reduce the costs of providing emergency water to northern atoll islands, but the ongoing roll-out of IWRM on all inhabited islands will minimise the need for emergency water. However, GoM's general strategy of installing RO systems on numerous small islands with small communities with limited financial capacity does not appear cost-effective so there will likely be future challenges vis-à-vis generating sufficient revenue for operation and maintenance.

170. GoM has committed politically to provide piped water to all households in the country and is already investing significant resources in rolling out the necessary infrastructure. The Maldives is an upper middle-income country due to the large tourism sector. GoM/MECCT has committed to cover the costs of five years of post-project operation and maintenance of the water infrastructure as co-financing for the project. However, while MECCT is committed to carry out the remaining work to ensure all RWH systems become operational, this lies outside MECCT's mandate and its staff and financial resources available for this appear limited.

171. Post-project continuation of the soft components, e.g. carrying out institutional mandates based on the acts and regulations passed, weather forecasting, running training courses, is far less capital-intensive and thus less financially problematic for the responsible institutions. They fall well within the mandates of the institutions involved, hence also within their budgets, although they in practice face budget constraints. For example, MMS carries out maintenance of its weather stations, but this can be delayed by financial constraints; and currently approximately two-thirds of its weather stations are operational.

172. **Socio-political sustainability:** There is clearly strong political support and commitment for providing IWRM-based piped water to all households as evidenced by the adoption of the Water and Sewerage Act and the ongoing large-scale GoM investments in IWRM systems. While the government may change after the presidential election in September 2023, it is unlikely that a new government will stop ongoing investments in the provision of basic services. The previous government was also committed to the project.

173. Water access and water quality is a major concern of the communities on the islands visited. While many households stated that they were able to collect enough rainwater for year-round consumptions, several others were unable to do so. Moreover, the rainwater harvested was exclusively used for drinking and cooking. Well-water was used for washing, laundry and cleaning and many households expressed concern about the quality of the groundwater, i.e. its colour and smell. Some community-members also expressed concern about skin irritation and diseases, which appears to be connected to the use of well-water for showering. On Dharavandhoo, many households have installed filters on their water supply, a good indication of the demand for piped water, once there is confidence in the water quality.

174. **Institutional and governance sustainability:** The legal and regulatory framework,

which the project supported, provides the necessary foundation for post-project continuity, vis-à-vis both the water supply infrastructure and improved management and protection of groundwater. The mandates and responsibilities of the different government institutions are clear, and the project for the most part engaged within the mandates of the different stakeholders supported, e.g. working with a) MECCT on water sector and groundwater regulation and coordination of the provision emergency water, b) utilities (at national and island level) on water supply system operation and maintenance, c) MNU vis-à-vis provision of certificate training, d) URA on tariff setting, and e) MMS on forecasting of water shortages and rainwater availability. Similarly, the various key stakeholders at the island level were engaged, e.g. in relation to allocation of land for infrastructure, supervision of progress and handling of grievances, community mobilisation, groundwater assessment, and awareness raising. For the most part, the engaged stakeholders demonstrate ownership and an understanding of their respective roles and responsibilities vis-à-vis post-project continuation.

175. The installed IWRM and RWH systems were commissioned and handed over, the first ones were handed over to the island councils, where the others were handed over to the utilities as the councils do not have the technical capacity to operate and maintain them. It is appropriate that the utility companies operate and maintain the water infrastructures on behalf of the islands councils, who by law are the owners of the systems. Utility staff on the islands have clearly assumed responsibility for operating the systems, although the proactiveness and capacity vis-à-vis making the RWH systems operational appears to vary. Similarly, the islands councils show a clear appreciation of the systems and willingness to be involved. However, the understanding of the ownership of the systems varies, and the understanding of the role of the island councils is unclear. On one island visited, both the island council and the utility understood that the council was the owner, whereas the operator was tasked to operate the systems, but on two islands the councils and utility staff understood that the utility was the owner, and the councils felt they did not have much of a role vis-à-vis the systems; an understanding that was also evident from phone calls to council members from other islands. On one island visited, both the island council and the utility staff claimed that they were the owners of the system. Such ambiguity seems to be an issue on island where the systems were handed over directly to the utilities, rather than the councils. There was a degree of discontent among island council interlocutors over the lack of role in, and influence on, the management of the systems.

176. With the installation of RO systems on all islands, which in principle can supply all the water the islands need throughout the year, the incentive at the island level to invest staff time and resources in maintenance and repairs of the RO components of the IRWM system may be insufficient, even if it is a formal requirement. The cost-savings associated with mixing up to 30 percent rainwater are as mentioned earlier modest, and given the tariff is set nationally, island stakeholders will not experience a direct financial benefit from supplementing RO water with rainwater. Furthermore, there is a certain lack of confidence in the water quality from public rooftops among stakeholders despite the filtration and treatment of rainwater. Moreover, many island stakeholders are of the view

that rainwater should be provided for free, as it has been so far. One key sector stakeholder found that it would be simpler and better to just use RO, as it would be easier to ensure the water quality and the confidence of the users, whereas another found that the RWH component would be a good backup system when the RO component was under maintenance or would benefit from a period of cooling, but that as a community-member he felt that rainwater should be free of charge. Furthermore, MNPHI has installed two RO lines on some islands (e.g. Mathiveri), which minimises the need for the RWH component as a backup system.

177. In general, while there is good ownership, institutional and individual capacity constraints, appear to be limiting factors, which would need further attention. For example, while MECCT no longer is the legal owner of the water supply systems, leadership still shows a sense of responsibility towards fixing the outstanding issues to make the systems operational; however, without the PMU, MECCT's capacity to do so may not be sufficient, since it is no longer mandated or staffed to manage infrastructure construction. MNPHI on the other hand has the mandate and staff to oversee civil works, but the GCF project did not fall under their purview.

178. In particular, it is uncertain whether the work on groundwater protection and recharge will be used and carried forward by MECCT and island councils to an extent where measurable improvements will be achieved – it seems likely that further external support would be required to move the groundwater work forwards. Furthermore, challenges with inter-institutional coordination and communication between Malé and the islands are other constraints that may negatively affect post-project continuation, as seen with the seeming lack of access on the islands to technical drawings of the water systems.

179. **Environmental sustainability:** The project has delivered some environmentally positive result. The legal adoption by GoM of the project's IWRM approach reduces the negative environmental impacts of the installation of water supply systems; the integration of RWH reduces the use of RO and hence also the release of brine, and the commitment to 100 percent use of solar power prevent or at least significantly reduce the use of diesel-generated power for water supply, hence preventing CO_2 emissions and air pollution. The groundwater recharge with excess water will contribute to improving the groundwater quality and availability. Moreover, the acts and regulations developed with project support and adopted by GoM contain provisions that promote environmental sustainability in relation to the IWRM approach and to groundwater management, protection, and recharge. To the extent the groundwater regulations are enforced, the groundwater assessments are used at island level for land use planning, and the groundwater recharge designs are put into use, the groundwater status will gradually improve. Similarly, several of the training courses developed enhance the awareness and capacities of training participants vis-à-vis sustainable management of water resources.

180. During implementation, considerable attention was paid to implementing the ESMP and to adhere to environmental regulations. Moreover, certain design features have contributed to reducing the environmental risk, for example, the RO systems extract saline water from the underground, instead of using sea water, hence it does not affect marine

life. The main environmental risk that remains is associated with the release of brine from the RO systems. The brine is released on the outside of the reefs, so generally, the negative impact on marine life is low. However, even if significant care has been taken to minimise environmental risk, e.g. with the use of corrosion resistance pipes, there will enviably be some degree of residual risk, that if not monitored and maintained properly, some outfall pipes may over time burst and leak brine. Hence, careful monitoring and maintenance is required, including monitoring pipes that run along the floors of the lagoons. Nonetheless, the overall environmental risk associated with the water infrastructure appears low. Moreover, any accidental spills of chemicals used for water treatment or flooding from pipe bursts will be localised.

181. The environmental risks associated with the soft components are minimal. However, one policy recommendation in the "Groundwater Resource Management and Aquifer Protection in Maldives, Recommendations on Policy and Regulatory Framework" (Dec 2019) is problematic from an environmental perspective, namely policy recommendation 19 "*Encourage the use of fallow or abandoned land which has been allowed to reforest and re-vegetate with mature trees*", which in effect is encouraging the clearing of regenerated natural forest on abandoned land. Natural forest is already scarce on several inhabited islands, and deforestation is an ongoing issue associated with population growth and economic development; moreover mature (and dead) trees are particularly important for forest biodiversity.

182. Based on the information made available to the FE, it is not possible to assess the extent to which the installed water infrastructure is resilient to the expected effects of climate change, such as sea level rise, and increased occurrences of floods. The documentation available does not give much explanation as regards to the climate-proofing of the infrastructure. Nonetheless, the pump houses and above-ground water tanks stand on concrete plinths, which should protect against inundation caused by floods or swells. Being located close to the Equator, the Maldives are rarely affected by cyclones, but storms and floods do occur.

Table 4.3.6.1: Rating of Sustainability

Sustainability	Rating*
Financial	Moderately unlikely
Socio-political	Likely
Institutional framework and governance	Moderately likely
Environmental	Moderately likely
Overall likelihood	**Moderately likely**
**See annex 7 for the rating scale applied*	

4.3.7 Innovativeness in results areas

183. The project successfully influenced GoM to adopt a few innovations in the Maldivian context vis-à-vis rolling out piped water supply to all households based on RO, namely: a) the IWRM approach with integration of RO and RWH and using excess water for groundwater recharge, and b) the strategy of making the new water systems 100 percent pow-

ered by solar energy instead of using the existing, diesel-powered island electricity supply system. Thereby, the project made a tangible contribution to making the new water supply more environment- and climate-friendly as well as more cost-effective. Moreover, the design of the RO systems to pump up deep-lying saline groundwater instead of supplying the systems with sea water was an innovation that removed a risk for marine life identified in the original risk log of the project. Filtration and chlorine treatment was introduced in the RWH approach, whereas RWH collection in households and from public rooftops has otherwise been unfiltered, this addition will ensure the water is up to drinking quality standards, even if the water coming public roofs has been polluted by animal droppings.

184. The project approach of combining large-scale infrastructure investment with work on legal and regulatory framework, was an innovative one, that successfully enable national-scale influence.

185. Initially established as a response to the limitations imposed by the COVID-19 pandemic, the LMS proved to be an innovation that will help MECCT in the long-term vis-à-vis developing national water resource capacities at central and islands levels. The LMS approach could also be adopted for capacity development in relation to other elements of MECCT's mandate as well as by other Maldivian institutions working in other sectors.

186. As described in section 4.3.3, the project made a tangible contribution to a paradigm shift by addressing the main barriers towards the provision of year-round water access.

Table 4.3.7.1: Rating of Innovativeness in Results Areas	
Innovativeness	**Rating***
Innovativeness	Satisfactory
Paradigm shift towards low-emissions and climate resilient development pathways	Satisfactory
Overall innovativeness	**Satisfactory**
**See annex 7 for the rating scale applied*	

4.3.8 Unexpected results, both positive and negative

187. The FE did not observe any unexpected positive results of the project. One temporary negative effect observed was that with the installation of RWH systems; the already existing rainwater harvesting from some public rooftops had been disconnected or damaged, so the rainwater from these rooftops is currently not available, since the RWH systems are not operational.

188. There are a few inherent risks of negative effects in the future, that would need to be managed. The backwash filters in the RO systems may be a potential hazard to the safety of operator staff; the deformed lids on two of the four systems appears an indication of the plastic material used not being sufficiently strong to withstand the pressure over time. Moreover, as described in section 4.3.6, there could be a risk of brine pollution in case of pipe bursts. Furthermore, with the easy access to affordable piped water, households may discontinue collecting rainwater and maintaining their rainwater collection

systems, which in turn may increase surface runoff of rainwater in settled areas. The FE met one community member that has already discontinued to collection of rainwater.

Table 4.3.8.1: Rating of Unexpected Results	
Unexpected results	**Rating***
Unexpected positive results	Satisfactory
Unexpected negative results	Moderately unsatisfactory
Overall unexpected results	**Moderately satisfactory**
**See annex 7 for the rating scale applied*	

4.3.9 Country ownership

189. As described earlier, the project enjoyed strong ownership from GoM and the key stakeholders. This was achieved through ensuring good degree of stakeholder consultation and participation (see section 4.2.2) but was also because the project responded to national priorities and project adapted to GoM's new policies and priorities (see sections 4.2.1 and 4.3.2). Due to these features and the resulting strong country ownership, the project was able to exert considerable influence on the legal and regulatory framework and GoM's approach to water service provision (see section 4.3.3). Moreover, the strong country ownership is main reason for an overall reasonable prospect for sustainability (see section 4.3.6).

Table 4.3.9.1: Rating of Country Ownership	
Country ownership	**Rating***
	Highly satisfactory
**See annex 7 for the rating scale applied*	

4.3.10 Gender equality and women's empowerment

190. The ProDoc included a gender action plan. Moreover, the indicators related to the number of households/people provided with water were gender disaggregated. The annual performance reports contained a section on the implementation of the gender action plan. The Project Manager heading the PMU was a woman, but overall, the PMU had more male than female staff. Two of the community Field Officers employed on the islands were women. Attention was paid to ensuring active participation of women the consultations, and in some (but not all) islands separate group discussions were held with women, but on the islands visited by the FE, this had reportedly not been the case, and while there were diverging opinions, a number of women expressed that separate consultations could have enhanced the participation of women. However, it was also acknowledged that it could be difficult to mobilise women to participate, even for women-only consultations.

191. In 2018-2019, a national gender specialist/consultant was engaged to strengthen the project's gender engagement, carrying out the following tasks: revision/updating of the gender action plan to make it operational, review of the project indicators and targets, provision of recommendations for integration gender concerns in the implementation of project activities, gender scans of utility companies, stakeholder consultations, and gender training workshops. Two regional (central region, south region) consultation workshops on gender norms/relations in relation to water were held for stakeholders from 12

islands with participation of island council members and civil servants, WDC members, utility staff, female community leaders (e.g. teachers, nurses, health workers), and NGO representatives. In Malé, interviews were carried out with staff from MECCT, Ministry of Gender, Family and Social Services (MoGFSS), LGA, the three utility companies, UNDP, UN Women, UNICEF, private contractors working on the project, the PMU, and other gender informants (NGOs, consultants). A one-day technical training on gender mainstreaming was carried out with staff from DWS/MECCT, FENAKA, island council and WDC members from two islands (Mathiveri, Dhigurah), and the PMU. The revised gender action plan was validated in a workshop with participants from DWS/MECCT, LGA, FENAKA, MWSC, the PMU, and UNDP. Other relevant entities were also invited but did not participate. Gender scans of FENAKA and MWSC were carried out, but not of STELCO. MoGFSS was closely engaged in the process of revising the gender action plan.

192. Following the revision process, the gender action plan was integrated in a number of project activities, aiming at ensuring meaningful participation of women, including:

- Support for a review of, and incorporation of gender targets in, the National Water and Sewerage Strategic Plan (NWSP), published in 2020
- Water awareness programmes on 17 islands with participation of island councils, WDCs, utilities, school management, and health centres – 51 participants (26 women, 25 men)
- Agreement with DWS/MECCT to follow MoGFSS's Gender Equality Action Plan 2022-2026
- Discussion with DWS/MECCT and LGA to cooperate on the inclusion of WDCs in the water governance functions of the island councils
- Appointment and training of gender focal points in FENAKA, MWSC, STELCO – training done by MoGFSS
- Gender screening of FENAKA
- Support to utilities to initiate gender inclusive internships and training – FENAKA provided a three-month internship to a female chemical engineering student, MWSC provided five paid on-the-job training internships, three were for women
- Promotion of the participation of women in capacity development activities – overall 30 percent of the persons trained were women, and the first female RO plant operator in the Maldives was trained
- Promotion of gender sensitive good communication and stakeholder engagement practices in MECCT
- Participation of women in groundwater assessments – three female MECCT staff participated
- Gender disaggregation of monitoring data collection

193. Overall, considerable attention was paid to the inclusion of women in the water sector, and a tangible contribution was made to increasing the participation of women in a sector that is male dominated (especially on the technical side). However, it is too early to assess the extent to which the project will lead to changes in the employment of women in the sector. Table 5.3.10.1 provides an overview of how the project addressed the three domains of gender: agency, structure, and relational dynamics.

194. While piped RO water is now provided to communities in the IWRM islands, it is too early to assess the broader impact of the project on women on the 29 islands. Most community-members interviewed still drink rainwater collected from their roof-tops or bottled water, although some have installed filters and are now drinking RO water or using it for cooking. Others are also planning to install filters. The households interviewed have not yet to install pipes to bring the IWRM/RO water into their kitchens, but plan to do so.

Table 5.3.10.1: Project coverage of gender domains	
Domain	**Project contribution**
Agency	• Participation of women in project's training courses (30% female participation) incl. certificate trainings (1st female RO plant operator in Maldives trained) • Participation of women in groundwater assessments • PMU headed by a female Project Manager • Gender inclusive internships at utilities
Structure	• Incorporation of gender targets in NWSP • Gender scans and screenings of utilities • Promotion of WDC inclusion in island council water governance • Strengthened relationship between MECCT and MoGWSS
Relational dynamics	• Appointment of gender focal points in utilities • Gender sensitisation/awareness for stakeholders in Malé and on islands

Table 4.3.10.2: Rating of Gender Equity	
Gender equity	**Rating***
	Satisfactory
**See annex 7 for the rating scale applied*	

4.3.11 Cross-cutting issues

195. Poverty alleviation and inclusion: The target islands were selected on the basis of the level of water scarcity, thus the project targeted some of the most vulnerable communities in the Maldives. The water infrastructure is intended to supply the entire community on each target island, reaching everybody, including the most vulnerable. The improved access to water, whether from RWH or RO systems, would in particular benefit the households which are not able to cover their water needs through their own rainwater harvesting (e.g. due to large family size, small rooftop area, rooftops affected by pollution from animals, physically unable to clean rooftops and rainwater tanks), who live in locations where the groundwater quality is very poor (e.g. near the shores), and/or who cannot afford bottled water. There is no evidence of any links between the access to water and employment or economic opportunities for vulnerable people on the islands.

196. For the RWH systems, public water collection points were installed in accessible locations on the islands, aiming at ensuring that every household would be within 200 meters of the nearest water point. However, with the scheduled integration with the RO systems installed by MNPHI, the RWH systems will also be connected to the household water distribution work. The IWRM systems were installed with individual household connections. However, to be connected to the system, an application form must be submitted, as per GoM policy. The IE pointed out that this could be a hindrance for the most

vulnerable to benefit, but according to the PMU, island councils would assist households that had difficulties with applying with filling out and submitting the applications. The extent to which all vulnerable households will benefit from a household connection remains to be seen as the IWRM integration is completed on the RWH islands. On Dharavandhoo and Maduvvari, a number of households had not submitted applications at the time of construction and were thus not connected; more households have now applied to be connected, but FENAKA does not have the parts required to connect them.

197. The PMU engaged significantly in community consultations, including with civil society groups (e.g. women groups, youth groups), when such were available on the islands. On some islands, separate consultations were held with women. However, there is no evidence of specific consideration given to other vulnerable groups, such as people living with disabilities, female-headed households, and low-income households. Project indicators were gender disaggregated, but there was no disaggregation based on other vulnerability markers.

198. Human rights: Access to water and sanitation is a human right recognised by the UN and also a stated citizen right in the Constitution of the Maldives. Hence, by nature, the project contributed positively to this human right. However, the only example of the project applying a deliberate human rights-based approach is the revision of the gender action plan.

199. Climate change: With an adaptation focus, the project by nature addressed the cross-cutting issue of climate change. The project's contribution to increased climate resilience is covered in sections 4.3.1 and 4.3.3. Moreover, the integration of solar power in the IWRM systems contributed to preventing carbon emissions from operating the systems, and the project influenced GoM policy, which pursues 100 percent solar powering of new water supply systems. Carbon emissions emanating from the project was mainly related to the construction of the infrastructure, transport of materials, and air- and boat travel by staff, contractors, and consultants.

200. Environment: As described in more detail in section 4.2.6, environmental safeguards were implemented with rigour. Overall, no major negative environmental impacts were observed, but there is an inherent environmental risk associated with the release of brine from the RO systems, which calls for conscientious monitoring and maintenance of the installed RO systems (see sections 4.3.2 and 4.3.6). Natural vegetation was cleared on some plots before the IWRM/RWH plants could be installed, but this was done in adherence to environmental regulations, and the felling of large trees was generally avoided. The project is expected to contribute to improvements in groundwater quality and recharge. The use and promotion of solar power in water supply will help preventing air pollution form diesel combustion. Moreover, the expected reduction in the use of bottled water will contribute to reducing plastic pollution on the islands, in the lagoons, on the coral reefs, and in the surrounding ocean.

4.3.12 Replication and scalability

201. With GoM's current investment in water infrastructure, which follows the IWRM approach of the project and is in accordance with the Water and Sewerage Act the project helped formulating, upscaling to national coverage is already happening. Moreover, the various regulations and trainings developed with support from the project have been adopted by MECCT and the certificate courses have been adopted by MNU and the utilities. Hence, the project has had a tangible influence on water supply and sewerage at the sector level. The LMS as well as the expected continued application of the training courses and material developed have the potential to become effective vessels for communicating the approaches of the project more widely to stakeholders in the sector. The project also contributed to the establishment of an online E-library at MECCT as a repository for assessments and studies carried out by the project and by MECCT more broadly, but it is yet to be populated with documents.

202. The extent to which MECCT will be in a position to move forwards on groundwater management and protection remains to be seen. In relation to tariff setting, it would require political support for the project contributions to be adopted and rolled out.

203. Moreover, some of approaches and lessons of the project could be of relevance to other SIDS, especially those comprising atolls. However, caution and strong environmental safeguards would be needed if the RO component is to be replicated. Overall, RWH is less costly, less complex technically and less environmentally risky than RO, hence a more appropriate option for many SIDS, especially if the government does not have the financial space to subsidise the water supply or if maintenance capacity is a constraint. The successful approaches to influencing the legal and regulatory framework and setting up longer term arrangements for capacity development could also be relevant for other countries and sectors.

Table 4.3.12.1: Rating of Replication and Scalability

Replication and scalability	Rating*
Upscaling in other locations in the Maldives	Satisfactory
Replication in other countries	Satisfactory
Overall replication and scalability	**Satisfactory**
**See annex 7 for the rating scale applied*	

4.3.13 Progress to impact

204. A direct impact in terms of year-round water security was achieved for the communities on the three islands with operational RO components. On Dharavandhoo, the RO component installed by the project is not operational, but the RO line installed FENAKA is operational and distributes water via the pipes installed by the project; hence the improved water security on Dharavandhoo can be partly attributed to the project. While improved year-round water security has not yet been achieved on most or all RWH islands, water security will be achieved over the next few years. First and foremost because MNPHI is installing RO systems, but if/when the project's RWH systems are also made operational, the project will have a) contributed up to 30 percent of the water supplied, and b) provided additional water security as an emergency system when the RO

system needs repairs or maintenance.

205. For the benefitting communities, the access to water from the project infrastructure will have the following benefits: a) reliable access to drinking quality water throughout the year, and b) significantly reduced costs of drinking water for those who currently depend on bottled water. Furthermore, on the IWRM islands, the supplied water can also reduce the dependency on low-quality and polluted groundwater for washing/showering, laundry, and cleaning – although since well-water is free, some households may also choose to continue using groundwater for these purposes. It is, however, too early to establish exactly how household water consumption and livelihoods practices will be impacted by the improved access to water.

206. As described earlier, the project has not directly led to measurable changes in the groundwater quality or recharge. Nonetheless, the project has laid the foundation for future improvements in the protection and management of groundwater resources by MECCT and island councils. Moreover, the introduction of using water supply excess water for groundwater recharge will to some extent directly contribute to improving the groundwater status. Unrelated to the project, GoM is currently installing sewerage systems on the inhabited islands; this will likely lead to a major reduction in groundwater pollution.

Table 4.3.13.1: Rating of Impact	
Impact	**Rating***
	Moderately unsatisfactory
**See annex 7 for the rating scale applied*	

5. Main findings, conclusions, recommendations, and lessons

5.1 Main Findings

207. Annex 14 presents the main findings of the FE vis-à-vis the evaluation questions, and Annex 15 provides the main findings vis-à-vis the GCF evaluation criteria.

5.2 Conclusions

208. **Strengths:** The project was generally well designed, with a clear and appropriate strategy based on a good underlying analysis of the climate vulnerability and water supply challenges faced by communities in the outer islands of the Maldives. Drawing on earlier experiences in the Maldives, the project approach was comprehensive and addressed the main barriers vis-à-vis water security, with largescale investment in water infrastructure, while addressing regulatory and institutional constraints at central and island levels. The project thus responded well to climate change adaptation, water supply and natural resource management related objectives of GCF, UNDP, and GoM.

209. The project was implemented in a complex context, where several external factors caused major challenges and delays, such as a unique and challenging geography with numerous and scattered small islands, major changes in GoM's strategy, changed institutional mandates, and the COVID-19 pandemic. Nonetheless, through adaptive management, a proactive PMU and support and advisory from UNDP, the challenges were navigated, the budget fully executed, and the project completed. The PMU made considerable effort to engage stakeholders at national and island levels. As a result of this, in combination with the relevance of the project to national priorities, the project enjoyed strong ownership from GoM and sector stakeholders, in particular from MECCT (where there was participation from the top level), but also from utilities, which have assumed ownership of the installed water supply infrastructure, and island stakeholders. GoM/MECCT have committed to cover the costs of post-project operation and management for five years.

210. Moreover, considerable effort was made to enhance the participation of women in the sector, both at the institutional and technical level (in close cooperation with MoGFSS) and at the community level; in particular, the project enhanced the gender awareness at FENAKA and MWSC and their efforts to engage women. Considerable attention also paid to risk management and the implementation of environmental and social safeguards; major negative and social impacts were avoided, and the minor grievances and complaints received in relation to the construction work were addressed.

211. To remain relevant in the context of a profound policy shift, where GoM committed to provide RO-based piped water supply to all households on every inhabited island instead of RWH systems with communal water collection points, the project had to redesign a central component of the project, the construction of RWH infrastructure. Contracts for the construction of RWH systems had at that time already been awarded, but the RWH systems were redesigned, so that they could be integrated with RO plants constructed by MNPHI on the islands. Another major element of the project was the installation of four solar powered IWRM systems in northern atolls, which integrated RO and

RWH and served the dual purpose of supplying piped water to households on the four islands while also being hubs for providing emergency water in a timely and cost-effective manner to other islands during recurring periods of water scarcity. This model of IRWM supply systems, which integrate RO and RWH, include filtration and treatment of rainwater, are solar powered and recharge excess water to the groundwater, was adopted by GoM and is being rolled out across all inhabited islands. Thereby, the project contributed to improving the cost-effectiveness of the national provision of water to communities as well as to reducing the environmental impact and carbon footprint and to improving the groundwater status.

212. Moreover, the project supported MECCT in the formulation of acts and regulations, thereby improving the legal and regulatory framework for water supply and sewerage and groundwater management and protection. In particular, the IWRM model of the project was adopted in the Water and Sewerage Act, which was passed in 2020. A considerable contribution was also made to enhanced institutional and individual capacities vis-à-vis water supply, sewerage, and groundwater management with a range of trainings for staff from ministries, agencies, and utilities, and also for key island stakeholders, including island councils. Of particular importance is the development of national certificate technical training courses, which have been adopted by MNU and the utilities; thereby providing the basis for ensuring access to qualified staff in the future and thus for effective water and sewerage service delivery. Groundwater assessments were carried out for 37 islands providing the foundation for taking groundwater into account in future land use planning and island-specific designs for aquifer recharge were prepared for future investment.

213. The project also made a contribution towards improving the effectiveness and reducing the costs of emergency water during periods of water scarcity; the IWRM systems were intended to also serve as water hubs for the northern atolls, the forecasting and information sharing capacities of MMS were improved (with weather stations, training, and an upgrade to the Moosun app), and the Potable Water Security Plan (PWSP) was adopted by MECCT.

214. Overall, by combining investment at scale in water infrastructure with support for improving the regulatory framework and institutional and individual capacities, and through considerable stakeholder engagement, the project had a considerable influence on water supply at the sector level, and the project's IWRM water supply approach is already being upscaled to national coverage. The stakeholder ownership, the changes to the regulatory framework, and the adoption by national institutions of the training modules developed by the project are conducive for post-project sustainability. Thus, a tangible contribution was made to a paradigm shift by addressing the main barriers towards the provision of year-round water access, and thereby to the achievement of GCF fund-level impact A2.0 "*increased resilience of health and well-being, and food and water security*".

215. **Weaknesses:** At the time of the FE, the project had not fully achieved any of its targets. First and foremost, the number of beneficiaries enjoying improved access to water

was significantly below target, since the RWH systems are confirmed not to be operational on 14 islands (and are unlikely to be operational on the remaining 11 RWH islands).

216. The RWH systems and parts of the IWRM systems are not operational due to a combination of issues, which in general are minor and relatively easy to fix. Some issues are related to the infrastructure itself, such as inadequate quality of some of the construction work (partly due to rushed implementation to complete work after COVID-19), some design shortcomings (e.g. vis-à-vis the lift wells), and issues with the quality of some of the small parts used. Other issues are related to institutional and human resource constraints, such as: the supervision not adequately identifying quality issues with the water supply systems, extended period of dormancy of the systems after construction was completed, incorrect operation and maintenance due to insufficient knowledge of the system (partly related to insufficient training being provided), and, on some islands, lack of proactiveness vis-à-vis fixing relatively minor problems. Another constraint delaying repairs and improvements is confusion about the ownership of the water supply systems and decision-making authority, in part stemming from the decision to hand over the water infrastructure to the utilities since the island councils do not have the capacity to operate the systems although they by law should be the owners. Some operators were waiting for formal approval from MECCT to undertake certain works, although such decisions could be taken on the islands together with the island councils. Many island councils are unsure about their role and frustrated about this unclarity given the systems were handed over the utilities, despite the law stipulating the island councils being the owners.

217. There is little evidence of the project having contributed to an improved emergency water response. Island interlocutors reported that the delivery of emergency water still took considerable time in 2023. Moreover, the actual supply of emergency water to additional northern atoll islands remains to be seen. The MNPHI installed IWRM systems will become operational on all islands within the next few years, so there will be little need for emergency water hubs. In cases, where an island needs water, it could come from any island in the vicinity, not necessarily one of the four project IWRM islands.

218. In principle, the water supply would serve all households on the islands, including the most vulnerable. However, by law, every household has to send an application to be connected. On the IWRM islands, the operators were not provided with extra parts and have been unable to connect households that have applied after the construction was completed. While concerted effort was made to engage women, on some islands, they were difficult to mobilise due to island-specific dynamics, and female participation was thus low. On some islands, mobilisation of both women and men was difficult. In relation to the environment, there is small inherent risk associated with the release of brine from the RO systems, which calls for conscientious monitoring and maintenance of the installed RO system to ensure that there are no spills, e.g. due to bursting or leaking outfall pipes. Furthermore, the plastic casing for the backwash filters in the RO systems may be

unable to withstand high pressure over time and could thus be a safety hazard for operator staff.

219. The financial sustainability of the project, and of the IWRM-based water supply in general, is an area of some concern. Overall, GOM's strategy of installing RO plants and piped household water supply on numerous small islands with small populations does not seem cost-effective, and achieving full cost recovery while maintaining affordable tariffs is unfeasible. Considerably increasing the operational costs in a sector that is already subsidised by GoM could create future challenges vis-à-vis operation and maintenance. Moreover, project has so far been unable to influence the water supply tariff setting. The use of the tariff model developed would require additional political support. The cost reductions that are achieved through RO-RWH integration and the use of solar power will not affect the tariffs, since there is a uniform national tariff and with utility budgets being subsidised by GoM, cost savings cannot be transferred to the consumers. Overall, GoM's strategy of installing RO-based piped water supply on all inhabited islands and tariffs are political decisions stemming from GoM's commitment to provide clean water to all communities to meet a basic need even if this requires large subsidies.

220. Moreover, since the RO systems in principle can provide all the water needed by the islands and the cost savings associated with supplementing with rainwater are modest and not transferred to the islands, there is probably limited incentive to invest time and resources in maintaining the RWH component, even if a formal requirement. Moreover, rainwater is widely viewed by island stakeholders as a free resource that should not be charged for and thus should not be integrated with RO. Furthermore, there is a certain lack of confidence in the cleanliness of the water from public rooftops, despite the filtration and treatment of the water, water testing would be a means to build confidence, but currently, the water is not tested on many islands since the operators do not have sufficient knowledge of how to use the equipment provided.

221. The targets vis-à-vis improved groundwater status were unrealistic since it takes several years for measurable improvements to emerge. Moreover, the project mainly invested in improving the regulatory framework and knowledge base as a foundation for future action. The policy recommendation in the "*Groundwater Resource Management and Aquifer Protection in Maldives, Recommendations on Policy and Regulatory Framework*" to clear natural forest (incl. large trees) on abandoned lands to protect groundwater appears problematic from a nature- and biodiversity conservation perspective.

222. GoM's decision to provide piped water on all islands was a major policy shift that took place mid-implementation, which had far-reaching implications for the added value, efficiency, effectiveness, and impact potential of the project's infrastructure component, compared to the policy context when the project was designed and during the early years of implementation. With RO systems on all islands, the RWH systems will no longer be essential for water security, even if they do contribute to reduced costs and reduced release of brine and can serve as backup systems (on some islands, there are two RO lines and thus little need for a backup system). Moreover, there will be little need for

emergency water, and many islands would be able provide water to islands that may require an emergency supply.

223. GoM's transfer of the mandate for the water supply civil works from MECCT to MNPHI also affected the infrastructure component of the project, with both ministries carrying parallel (but generally coordinated) implementation of RWM and RO systems on the same islands. While MECCT is committed to ensuring all RWH systems become operational and has committed to cover the costs of operation and maintenance for five years, this lies outside MECCT's mandate and staff and financial resources available for this are thus limited.

224. The cost-effectiveness of the investment in infrastructure could have been better, had a geographic division of labour been agreed with MNPHI with the contractors under the project installing full IWRM plants on fewer islands instead of 25 RWH systems. The remaining islands could then have been fully handed over to MNPHI. While this on paper would have reduced the number of direct beneficiaries, the number of beneficiaries of the combined GCF-GoM investments would have been the same. Alternatively, the responsibility for the project's civil works contracts could have been handed over to MNPHI to be implemented in sync with GoM's overall investment in water supply, whereas the soft components and overall project coordination could have remained with MECCT and the PMU.

225. Alternatively, a decrease in the number of RWH systems to 15-20 systems could have made it easier to ensure the functionality of the RWH systems and released considerable resources for the soft components of the project, while maintaining the demonstration value. Since GoM is fully committed to providing IWRM to all islands, the remaining island would still have received water supply infrastructure, so from an island community perspective, the difference would have been little, if any. An increase in the resources for engagement in policy and regulation, addressing institutional bottlenecks, capacity development at the island level, tariff structure and cost recovery, and groundwater quality, could arguably have further increased the transformative role and contribution to the intended paradigm shift.

226. Given the far-reaching implications of the GoM strategy change for the project's added value, efficiency, effectiveness and impact potential, a profound redesign of the project including the objective, outcome and outputs would have been fully justified – even if it would have required negotiating major changes to the infrastructure contracts (or perhaps even cancellation of the contracts and compensation to the contractors).

227. **Performance rating:** The performance ratings are summarised in table 5.2.1 for GCF evaluation criteria, Annex 15 provides an overview of the finding against each GCF criterion. Table 5.2.2 provides the ratings for UNDP evaluation criteria. Overall, the FE rates the project's performance as **moderately satisfactory**. The primary reasons for the project not achieving rating of satisfactory are a) the considerable limiting effect that GoM's decision to provided piped water on all islands had on the added value and impact po-

tential of the project's large investment in infrastructure, and b) the current lack of functionality of RWH infrastructure.

Table 5.2.1: Project performance rating – GCF criteria	
Criterion	**Rating***
(i) Relevance, effectiveness, efficiency, impact and sustainability of projects and programmes	
Relevance	Moderately satisfactory
Effectiveness	Moderately satisfactory
Efficiency	Moderately satisfactory
Impact	Moderately unsatisfactory
Sustainability	Moderately likely
Overall relevance, effectiveness, efficiency, impact, and sustainability	**Moderately satisfactory**
(ii) Coherence in climate finance delivery with other multilateral entities	
Coherence	**Satisfactory**
(iii) Gender equity	
Gender equity	**Satisfactory**
(iv) Country ownership of project	
Country Ownership	**Highly satisfactory**
(v) Innovativeness in result areas	
Innovativeness	Satisfactory
Paradigm shift towards low-emission and climate-resilient development pathways	Satisfactory
Overall innovativeness	**Satisfactory**
(vi) Replication and scalability	
Upscaling in other locations in the Maldives	Satisfactory
Replication in other countries	Satisfactory
Overall replication and scalability	**Satisfactory**
(vii) Unexpected results, both positive and negative	
Unexpected positive results	Satisfactory
Unexpected negative results	Moderately unsatisfactory
Overall unexpected results	**Moderately satisfactory**
Overall performance	**Moderately satisfactory**
**See annex 7 for the rating scale applied*	

Table 5.2.2: Project performance rating – UNDP criteria	
Criterion	**Rating***
Monitoring and evaluation (M&E)	
- M&E design at entry	Highly satisfactory
- M&E plan implementation	Moderately satisfactory
Overall quality of M&E	**Satisfactory**
Implementation/oversight and execution	
- Quality of UNDP implementation/oversight	Highly Satisfactory
- Quality of implementing partner execution	Satisfactory
Overall quality of implementation/oversight and execution	**Satisfactory**
Assessment of outcomes	
- Outcomes	Moderately unsatisfactory

- Relevance	Moderately satisfactory
- Effectiveness	Moderately satisfactory
- Efficiency	Moderately satisfactory
Overall project outcome	**Moderately satisfactory**
Sustainability	
- Financial	Moderately unlikely
- Socio-political	Likely
- Institutional framework and governance	Moderately likely
- Environmental	Moderately likely
Overall likelihood of sustainability	**Moderately likely**
Overall performance	**Moderately satisfactory**
**See annex 7 for the rating scale applied*	

5.3 Lessons Learned

228. The project has generated the following lessons, which are of relevance to other GCF, UNDP, and GoM projects.

229. Through the combination of infrastructure investment, support for improving the legal and regulatory framework, and delivering a strategic institutional and personnel capacity development package, the project was able to have considerable influence on the sector and GoM's investment, despite a low level of functionality of the infrastructure constructed. Nonetheless, the influence could arguably have been larger, if the infrastructure component had been at a somewhat lower scale so that more resources could have been directed towards addressing regulatory and institutional bottlenecks.
Lesson 1: **A combination of infrastructure investments with policy, regulatory and institutional strengthening can be a powerful package vis-à-vis achieving transformational change, but care should be taken to ensure sufficient attention is given to the soft components.**

230. The project relied on international contractors and consultants for the design, construction, and supervision of the water infrastructure since the domestic availability of expertise is limited and in high demand. However, the international contractors and consultants had little experience with the unique atoll hydrology and operational challenges when working on numerous scattered islands. Hence, some features of the infrastructure were not entirely suited for the Maldives.
Lesson 2: **A good understanding of the Maldivian context is critical for successful delivery of quality water infrastructure, and Maldivian experts or experts with considerable experience from the Maldives should play a prominent role in all stages of infrastructure investments from design to completion; this should carefully be factored into procurement requirements.**

231. While the project had several layers of supervision of the infrastructure construction, there were shortcomings in relation to design appropriateness and construction and material quality which were not fully captured and rectified, and the RWH systems are not operational, although they have been commissioned. The hurry to complete works after

COVID-19 caused several delays contributed to rushed implementation. The atoll geography and COVID-19 made supervision challenging.
Lesson 3: **Careful attention should be paid to the setup of quality control mechanisms, samples of small parts should be tested prior to full-scale installation, systems should be carefully and thoroughly tested to ensure the operationality before commissioning, and a second functionality control should be made some time after commissioning but before the warranty expires.**

232. Several of the objective and outcome indicators related to groundwater improvements were overambitious and focused on long-term change, which the project could only contribute to by laying the foundation for future action. As such, the lack of achievement of these targets was not due to poor project performance.
Lesson 4: **Indicators and targets at output at outcome level should be realistic and attributable to project interventions.**

233. Through adaptive management and close dialogue with stakeholders applied by the PMU/MECCT, with support from UNDP and flexibility from GCF, the project was able to reorient the project, implement the planned activities, and exert considerably influence on policy and the regulatory framework, despite being implemented in a highly complex and changing context with several major external challenges.
Lesson 5: **When the context is challenging and dynamic, adaptive management and close dialogue with stakeholders are essential for successful project delivery and achievement of results.**

234. With GoM's decision to invest in the provision of piped water on all islands, RWH systems will no longer be essential for water security and there will be little need for hubs for emergency water. This significantly reduced the scope for a major climate resilience impact through the project's overall infrastructure strategy, despite meaningful adjustments made to align the project's RWH investment with the new reality.
Lesson 6: **When there is a major shift in policy or context which could undermine a project's added value and impact potential, a profound redesign may be necessary to maintain the impact potential, even if this may be complicated, time-consuming, and have some contractual and financial implications.**

5.4 Recommendations

Recommendation 1: Ensure that all RWH and IWRM systems become fully operational and of good quality and serving all households on the islands

Rationale: Most, if not, all the RWH systems, the RWH components of all IWRM systems, and the RO component of one IWRM system are currently not operating. Most, if not all, systems appear to have issues with the functionality of some elements, due to design-related issues, construction quality, and/or issues with the quality of some small parts. Operation is not always done entirely correctly. Water quality testing is not carried out. In general, the individual issues are relatively minor and easy to fix. Parts to connect the remaining households are not available on the IWRM islands. Decisions that could be taken on the islands are often not taken

due to unclarity about formal ownership and authority. MECCT has capacity constraints vis-à-vis follow up after the project has ended and the PMU has closed.

Possible actions include:

- Hand over the operationalisation of the RWH infrastructure to MNPHI, so it can be carried out jointly with the integration with the ongoing RO system installation and RO-RWH integration carried out by MNPHI – if necessary, transfer GoM's committed co-financing for operation and maintenance to MNPHI
- Analyse the operational status of all 29 systems and identify problems that need to be fixed
- For systems where the defects liability period has not yet expired, raise claims to the contractors and/or supervision consultant to carry out necessary repairs and part replacements
- Urgently replace the backwash filters in the four IWRM systems
- Clarify which of the identified issues FENAKA and STELCO island staff can rectify themselves – if necessary, provide the required parts
- Repair structures, machinery and components that are damaged or poorly constructed
- Replace all parts that are not working or not working properly in all 29 systems
- Provide in cooperation with FENAKA and STELCO the necessary parts for connection of the remaining unconnected households on the four IWRM islands to the island councils and utility island branches
- Make sure that FENAKA and STELCO island branches and island councils have access to technical specifications, technical drawings and operation manuals and are aware of where they are located
- Provide follow-up training to FENAKA and STELCO island branch staff to ensure they a) know how to correctly operate and maintain the water supply systems, and b) are able to use the testing equipment and carry out water quality tests
- Ensure that island councils and FENAKA and STELCO staff on the 29 islands have a clear understanding of formal water supply systems ownership and their roles, responsibilities, and decision-making authority – as per current legal provisions

Responsible: MECCT, FENAKA, STELCO, MNPHI, UNDP

Timeframe: September 2023 – June 2024

Recommendation 2: Implement follow-up actions aimed at strengthening water sector governance and addressing remaining bottlenecks after the project

Rationale: The project made a significant contribution towards improving the regulatory framework and building institutional capacities. However, some important gaps remain, in particular vis-à-vis tariff setting and cost recovery and island stakeholder capacities. URA is a newly established authority with a key mandate in the sector. Island councils do not have the capacity to fulfil their enhanced role in the context of the ongoing decentralisation process. Moreover, the regulatory and information foundation for improved groundwater management and protection, but there is limited implementation capacity at island level. While the project paid considerable effort to engage community and women, broad participation, especially of women, was difficult on some islands.

Possible actions include:

- Engage with key sector stakeholders at central and island level to discuss the gaps, priorities and options vis-à-vis strengthening water sector governance
- Engage in dialogue at the political level and mobilise political support vis-à-vis cost recovery for water supply operation and maintenance, tariff setting (incl. use of the tariff model), and economic incentives for RO-RWH integration and maintaining RWH systems
- Provide institutional development support for URA as a new authority
- Make sure that island councils on the 37 islands receive and understand the groundwater assessments and how they can be used in relation to land use planning
- Support island councils in utilising groundwater assessments, implementing the Water Resource Protection Regulation and the Dewatering Regulation, and piloting the managed aquifer recharge designs developed by the project
- Test in cooperation with island councils, WDCs and civil society innovative approaches to mobilise communities and in particular women to engage in the water sector
- Mobilise funding for the implementation of a water sector governance project addressing the above and other key constraints identified by stakeholders

Responsible: UNDP, MECCT, URA, LGA, MoGFSS

Timeframe: September 2023 – July 2025