



**GREEN  
CLIMATE  
FUND**

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# Consideration of funding proposals – Addendum XIII

## Independent Technical Advisory Panel’s assessment

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### **Summary**

This addendum contains the independent Technical Advisory Panel’s assessments of funding proposals (FP038-FP046) submitted for the Board’s consideration at its sixteenth meeting.

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## Independent Technical Advisory Panel's review of FP038

Proposal name:	GEEREF NeXt
Accredited entity:	European Investment Bank
Project/programme size:	Large

### I. Assessment of the independent Technical Advisory Panel

#### 1.1 Impact potential *Scale: High*

1. In order to meet the goal of holding the average global temperature rise at below 2°C above pre-industrial levels, Bloomberg New Energy Finance forecasts an investment requirement of USD 7.7 trillion for new renewable energy (RE) generating capacity over the next 25 years, of which USD 5.4 trillion is needed for non-member countries of the Organisation for Economic Co-operation and Development (OECD). In December 2016, Bloomberg New Energy Finance published its third annual Climate scope report analysing clean energy investment trends in 58 developing countries in Africa, Asia and Latin America and the Caribbean. Key conclusions relevant to this assessment that were reached in the report include that the global centre of gravity for clean energy has shifted from OECD to developing countries as investment in clean energy capacity additions are growing faster in these developing countries than in OECD countries. Despite this good regional development, a more detailed analysis reveals that there continues to be a large variation between countries, with investors crowding into a limited number of jurisdictions: China, Brazil, India, South Africa, Mexico, Chile, Indonesia, Uruguay, Peru and Kenya. At the other end of the spectrum, many other developing countries in Africa, Asia and Latin America and the Caribbean either did not attract clean energy investment or attracted only a very marginal level of clean energy investment.

2. Among other factors, a key one for this disparity in the flow of funds into many developing countries has been identified as the unwillingness of private sector investors to provide funds for investment in clean energy projects in these countries due to their perception of the high risk of such investments. GEEREF NeXt has been designed by the European Investment Bank (EIB) to target such countries to mobilize investment to help them to meet their clean energy targets and reduce the risk perception of international private investors concerning investment in clean energy infrastructures in those countries. The GEEREF NeXt design is different from a previous intervention, which was recently approved for GCF funding, in that while the latter targets the development of the capacity of local financial institutions to catalyse clean energy investment in developing countries, GEEREF NeXt utilizes the fund of funds approach (pioneers from the pilot phase as well as Greenfield) to achieve a multiplier effect even after the end of the intervention. GEEREF NeXt believes that this type of catalyst will be needed to enable the investment level in RE and energy efficiency (EE) projects in these countries to be achieved more quickly.

3. GEEREF NeXt has been designed as a USD 750 million target investment-pooling mechanism, aimed at developing, building and operating RE/EE projects across countries eligible for GCF funding. Such eligible participating countries are expected to give a letter of no objection for their participation in the programme. GEEREF NeXt investable countries must also offer the following minimum conditions: the ability to set up an enabling regulatory environment or to already have it in place by the time of selection; a suitable fund manager already in place or, if not, existing personnel with complimentary ability in fund management

whose capacity could be built to serve as a fund manager for RE/EE investment in the eligible country or region; a tangible project proposal covering RE/EE projects in the selected countries; and an investable political/economic environment context.

4. GEEREF NeXt will invest directly up to USD 30 million in identified RE/EE projects in eligible countries and invest in the range of USD 20–50 million in selected funds existing in eligible countries or in regions, especially those with an average target size of USD 250 million and an expected maximum size of USD 750 million where GEEREF NeXt can make a sizeable catalytic first close commitment. Eligible funds must invest such funds in RE/EE beneficiary projects with capital expenditure requirements in the range of USD 20–250 million. Climate adaptation considerations are expected to be fully integrated into the GEEREF NeXt environmental and social risk management approach from the earliest stage of project implementation. GEEREF NeXt's request to the GCF is a contribution of USD 250 million as A-tier capital (A shares) and a USD 15 million grant. Private sector investor funds will be raised by the EIB Group for a B-tier capital fund of up to USD 500 million. The aim of this two-tier capital structure is to help to catalyse private sector capital towards beneficial projects in countries that are otherwise not attractive to commercially minded investors.

5. Within this framework, the accredited entity (AE), EIB, expects to be able to catalyse up to 18 GW of clean energy capacity, generate more than 56,600 GWh per year of electricity annually and create energy savings to the tune of 1,300 GWh per year. This will be expected to achieve a reduction in emissions of over 38 million tonnes of carbon dioxide equivalent (t CO<sub>2</sub> eq) per annum and provide clean electricity to about 41 million households.

6. Accordingly, the impact potential of the proposed framework is assessed to be “High”.

## 1.2 Paradigm shift potential

*Scale: High*

7. As stated in section 1, a key barrier to investment in RE/EE projects in many of the countries eligible for GCF funding is financing, especially the ability to mobilize funding from international and local sources into such projects in a market that is considered risky. Key paradigm shift potentials of this AE proposed scheme will include the elements set out below.

8. Through the involvement of GCF concessional equity finance in the scheme, private equity funds will be mobilized to play a role in the perceived risky market, thereby enhancing the investment opportunities of this asset class (RE/EE) to international investors.

9. The concessional fund from the GCF, coupled with the funds that will be raised by the AE from private sources, will enable the financial and economic viability of these projects, thus demonstrating the bankability of the projects, creating a track record and educating the market.

10. The perception of risk on the part of private investors regarding RE/EE projects in the eligible countries covered in this scheme could eventually change. This would also open opportunities for other countries not covered for eventual replicability of the scheme.

11. The potential for scalability of the intervention has been demonstrated by the pilot scheme (Global Energy Efficiency and Renewable Energy Fund (GEEREF)) implemented by the AE, which has been judged as successful. It is therefore expected that GEEREF NeXt will scale up the pilot scheme by about 3.4 times and eventually mobilize about USD 30 billion as a result of the proposed scheme in projects financing for RE/EE (both equity and debt financing) from local and international financing institutions.

12. Develop the capacity of local and regional funds, especially where they were not in existence in these countries.

13. Create the potential to replicate this intervention (the investment model) in other sectors.
14. Accordingly, the independent Technical Advisory Panel (TAP) views the paradigm shift potential of the proposed facility as conditionally “High” if the fund sourcing campaign by the AE that has been built into the design of the scheme is successful.

### 1.3 Sustainable development potential

*Scale: Medium*

15. Environmental, social and economic co-benefits, including gender-sensitive development impacts, will be associated with the successful implementation of this project.

#### **Environmental co-benefits**

##### *Reducing air pollution*

16. In some of the countries where the RE/EE projects will take place, especially where they will displace more carbon-intensive facilities, a reduction in air pollution can be expected. The displacement of high-carbon fuels in power generation by RE power systems will result in a significant reduction of noxious emissions (sulphur dioxide, nitrogen oxides, particulates, volatile organic compounds, etc.) when the combustion of hydrocarbon fuel is replaced by generation from the clean power that will be introduced by a successful GEEREF NeXt programme.

#### **Social co-benefits**

##### *Improvement of enabling environment needed to catalyse private investment in RE/EE projects*

17. Apart from the solution to the access to capital that a successful GEEREF NeXt will bring to the development of RE/EE in many of the target countries, it will be essential that a legislative and regulative environment be developed that can attract funding. Such legislative and regulatory schemes tend to reduce the risk aversion of international and local fund managers to put money into such projects in such countries. Therefore a social co-benefit expected to be brought to the table in these countries by the GEEREF NeXt programme is an improvement to legislation to support clean energy.

##### *Enhance participation of both men and women in decision-making*

18. Perhaps as a result of gender mainstreaming into the design of the GEEREF NeXt scheme, the AE in its funding proposal (FP) submission has also identified this as a social co-benefit that is likely to be enhanced by the proposed GEEREF NeXt intervention.

#### **Economic co-benefits**

19. Key economic co-benefits will include the following: the creation of temporary and permanent jobs during the construction and operations of the facility. This will have a positive impact on disposable income, which will in turn be an economic co-benefit; in participating countries where the RE/EE investment will lead to the displacement of fossil fuels, and where such fuels are imported, the need to import fossil fuels will be reduced with a significant effect on the balance of payment of such countries; contribution to the local public budgets where RE/EE facilities are implemented from tax payments from the participating entities; and an increase in the energy security of the country/region where the RE/EE assets are implemented and operating.

#### **Gender-sensitive economic impact**

20. The gender mainstreaming component of GEEREF NeXt will encourage the creation of female employment and encourage active participation in the decision-making process

21. Given the fact that many of these effects are predicted and it is not known whether they will be achieved with a 100 per cent success rate, TAP is of the opinion that a strong measurement, reporting and verification process, which would cover all the components of the implementation of this scheme, should be an important component of the implementation agreement that will be drawn between the GCF and EIB once a decision to fund is made. Given the co-benefits discussed above, TAP sees the sustainable development potential of the proposed facility as “Medium”.

#### 1.4 Needs of the recipient

*Scale: High*

22. The following characteristics of the GEEREF NeXt programme when implemented successfully will determine the extent to which the needs of the recipients are taken into consideration in the design of the intervention:

- (a) Targets the countries for GCF funding, which are often disproportionately affected by climate risks;
- (b) Provides resources for long-term financing of RE and EE where they currently do not exist or are insufficient;
- (c) Alters risk perception of investments in RE and EE and crowds in private investments to address the financing gap; and
- (d) Contributes to the economic development of target countries through increased employment, tax base and gender inclusion.

23. These are critical needs of these countries, which may never have been able to attract financing for RE/EE projects in the absence of the GEEREF NeXt intervention. TAP believes that the needs of recipients will be largely covered if these characteristics are met; therefore, it has rated this metric as "High".

#### 1.5 Country ownership

*Scale: High*

24. The key country ownership metrics will include:

- (a) The project makes a contribution to the recipient countries' meeting their nationally determined contribution (NDC) targets, as virtually every country eligible for GCF funding has climate mitigation targets;
- (b) It helps countries to close up the energy demand–supply gap with clean energy;
- (c) Participating countries are in agreement with the project design and it is in line with their country ownership, which can be inferred from the fact that each of the eligible countries included in the current submission have provided a letter of no objection; and
- (d) Concerning engagement with national designated authorities, civil society organizations and other relevant stakeholders, there is evidence that there will be various stages of engagement with relevant stakeholders in each of the countries. For example, it is stated on page 44 of the FP that: "All the investment that GEEREF NeXt and its portfolio will make shall be done in close cooperation with and support from local and national authorities of the respective GCF eligible countries. These authorities (local stakeholders) will be involved with each project throughout the development cycle of the project". Involving the stakeholders as stated will ensure that country ownership is built into the design of the scheme.

25. Given the various considerations above, TAP has concluded that the country ownership of the proposed framework by the executing authority is "High".

## 1.6 Efficiency and effectiveness

*Scale: High*

26. The efficiency and effectiveness of the GEEREF NeXt intervention can be measured along the following lines:

- (a) Each USD 1 contributed by the GCF to GEEREF NeXt is expected to unlock up to USD 2 of private finance at the GEEREF NeXt level;
- (b) Each USD 1 invested by GEEREF NeXt into a fund is expected to unlock up to USD 7 from a combination of public and private sources;
- (c) Each USD 1 invested by a GEEREF NeXt investee fund into a project is expected to mobilize up to USD 7 in project finance from a combination of public and private sources;
- (d) Given the above, in total, each USD 1 invested by GEEREF NeXt is expected to catalyze up to USD 50 of investment into beneficiary projects on the ground that is a leverage factor of 50X; and
- (e) The expected cost of abatement is USD 39 per t CO<sub>2</sub> eq for RE and USD 68 per t CO<sub>2</sub> eq for EE projects.

27. Given the description above, TAP views the efficiency and effectiveness of the proposed framework as "High".

## II. Overall remarks from the independent Technical Advisory Panel

28. The framework for implementing this project as suggested in the funding proposal is considered by TAP as effective to promote the development of the GEEREF NeXt scheme. The GCF component fund (USD 250 million as junior equity and USD 15 million as grant) will encourage the crowd sourcing of equity financing from private sector partners as well as debt financing from other sources by EIB (including EIB's own resources). These funds would not have flowed into the project in the absence of GCF financing. The success of this framework has the potential to deliver paradigm shift to the sector, which has not been successful in getting such funds to promote RE/EE projects in the countries. The promotion of private sector investment in this RE/EE project is in line with many of the participating countries' policies and strategies.

29. TAP supports and recommends that the Board consider the proposed framework with the recommendations set out below.

30. In order to be able to measure the mitigative performance of GEEREF NeXt, it is important that the AE provide some baseline information on likely projects that will be implemented under GEEREF NeXt. It is expected that this list will be consistent with national documents such as: a participating country's energy policy documents; and/or documents such as the NDC or the intended nationally determined contribution. The AE has provided information to the Board through the Secretariat covering the types of project that will be pursued by two regional funds and their greenhouse gas (GHG) emission reduction implications in the GEEREF NeXt as an example of the required baseline information, with the examples developed from follow-up projects (to GEEREF) that will be funded by GEEREF NeXt. The information provided by the AE has adequately illustrated project expectation at the FP approval stage by the Board. TAP recommends that the AE shall submit evidence of the projects

and their GHG emission implications annually in respect of potential pipeline that has been identified and will be funded by GEEREF NeXt through investee funds and direct investment.

31. The success of GEEREF NeXt is heavily dependent on EIB being able to fundraise USD 500 million from private and public equity and debt fund sources once the GCF agrees to provide the junior equity fund of USD 250 million requested. Not being able to source the fund by EIB will have a negative impact on the success of the programme and thus constitute a risk to the funds provided from the GCF. To mitigate this risk, TAP recommends that:

- (a) By the final closing of each underlying fund, GEEREF NeXt shall hold no more than 49 per cent of the equity and debt interest in such funds unless the GCF otherwise consents (which consent shall not be unreasonably withheld in the case of funds invested in small island developing States and the least developed countries); and
- (b) Prior to each disbursement by the GCF other than the first, the AE shall submit evidence of progress to achieving the targets set out in (a) above, in a form and substance satisfactory to the Secretariat.



## Independent Technical Advisory Panel's review of FP039

Proposal name:	GCF-EBRD Egypt renewable energy financing framework
Accredited entity:	European Bank for Reconstruction and Development (EBRD)
Project/programme size:	Large

### I. Assessment of the independent Technical Advisory Panel

#### 1.1 Impact potential

*Scale: Medium/high*

1. Egypt represents one of the largest economies in Africa and is ranked as the fourteenth largest greenhouse gas emitter in 1990-2012. Egypt's electricity demand has grown at a compound rate of 4 per cent per year in 2004-2014. The country currently relies on gas or heavy fuel oil/diesel for 90 per cent of its power generation with the remaining from hydro (8 per cent) and renewables (2 per cent). The country is equipped with a power generation capacity of 30 GW. However, because the majority of power plants are inefficient and aging and due to their poor maintenance, the actual available capacity was reportedly 22-24 GW which was less than the summer peak demand of 27 GW in 2014. The shortage of power generation was magnified due to the shortage of local natural gas production and forced the government to depend on heavy fuel oil and diesel power generation, which is expensive and inefficient. As a result, the government had to lease and install two floating storage and regasification units to import and supply liquid natural gas to gas-fired power generation. The importation of liquid natural gas further affected the government balance of payments.

2. In order to address the power generation shortage in a sustainable manner in the long run, Egypt has launched ambitious programmes to improve its energy mix by accelerating the development of renewable energy with private sector participation. The Renewable Energy Law together with a feed-in-tariff (FIT) decision announced in December 2014 established a critical foundation for the government regulatory framework for renewables. The Sustainable Energy Strategy to 2035 was subsequently announced which emphasizes the importance of renewable power generation and reaffirms the target to generate 20 per cent of the country's energy from renewable sources by 2022.

3. Despite government efforts, there has been limited progress so far towards the renewable energy target. In the first round of the FIT scheme, only one project has, reportedly, secured long-term commercial financing on a project finance basis so far. The second round of the FIT scheme was announced in September 2016. The proposed framework is proposed to support private sector investors who are keen to develop and implement renewable energy projects within the new regulatory framework.

4. With the framework, the accredited entity (AE) plans to support private sector investors to realize 600 MW of new generating capacity, from which 1.4 GWh of clean electricity will be delivered to the country annually. Because of the lack of suitable sites, Egypt will have difficulty in constructing new hydropower plants in the future. Therefore, it is projected that the option to expand power generation capacity is limited: gas/diesel power generation (presently 90 per cent) or renewables (presently 2 per cent). Applying a grid emission factor of 581 kilograms of carbon dioxide per megawatt-hour (kg CO<sub>2</sub> per MWh), the AE envisions that a new generating capacity of 600 MW will contribute to reducing emissions by 793,971 t CO<sub>2</sub> eq

annually, and approximately 19 million t CO<sub>2</sub> eq during its life. The 600 MW of generation capacity can provide electricity to satisfy the demand of around 800,000 people in Egypt.

5. The proposed framework is considered effective to promote the development of 600 MW of renewable energy generation by directly offering long-term financing to private sector investors so as to implement renewable generation.

6. Accordingly, the impact potential of the proposed framework is assessed to be “Medium/High”.

## 1.2 Paradigm shift potential

*Scale: High*

7. Egypt receives some of the highest solar radiation in the world and has an abundant wind resource in the Suez Gulf area. In Egypt's intended nationally determined contribution (INDC), the government recognized the importance of renewable energy in reducing Egypt's greenhouse gas emissions as part of the five key strategic policies for tackling climate change mitigation. Based on this, the Renewable Energy Law and two FIT decisions in 2014 as well as the Cabinet of Ministers' Decree in 2016 have been implemented. Nevertheless, despite the progress made by the government in developing the framework for renewables, there has been limited progress so far towards the renewable energy target due to a lack of long term financing and issues relating to implementation. Accordingly the initial target set up in October 2014 of 2,000 MW of wind capacity and 2,300 MW of solar photovoltaic capacity has not been met. In fact, no projects under this scheme have yet entered into operation.

8. The framework is proposed to accelerate the early-stage development of Egypt's renewable generation market, by realizing 600 MW of private sector-driven generation projects and the necessary strengthening of the regulatory context. Therefore, the proposed framework has the potential to promote changes in the sector, which has been public sector driven and heavily relies on fossil fuel fired power generation. The 600 MW of private sector renewable power generation projects should showcase and encourage private sector investments in the power generation sector once implemented. It has been broadly observed in other regions/countries that once the first batch of private sector projects are implemented successfully, the investors see the risk of investment to be substantially reduced. Therefore, it is clear that the proposed framework has paradigm shift potential.

9. According to the financial model and calculation prepared by the AE, it remains challenging for renewable transactions to be structured as bankable even with the participation of the AE and other international financial institutions and without GCF finance. No transactions can become commercially viable if financed only by commercial banks because of shorter tenor and higher pricing. Accordingly, close monitoring and coordination with the government is required to ensure that additional renewable energy generation can be financed and implemented by the private sector following the implementation of the 600 MW renewable generation capacity. The proposed Technical Assistance should be instrumental in enhancing dialogue and assisting the government in this regard.

10. Accordingly the views of the independent Technical Advisory Panel (TAP), the paradigm shift potential of the proposed facility is “High”.

## 1.3 Sustainable development potential

*Scale: Medium/high*

11. As a result of declining domestic gas production, the country experienced a power shortage in 2013-2014. While the government has eased the power shortage by importing gas and diesel, the shortage in power generation capacity remains, which continuously hinders the country's economic and social development unless resolved. The proposed facility aims to assist

the government in building a critical power generation capacity with private sector participation in an environmentally and sustainable manner to meet the national power demands. The facility will contribute to improving access to power. The 600 MW of renewable power generation can feed electricity to 400,000 consumers in the country.

12. The proposed facility will offer long-term debt, which is critically needed by the private sector to promote the construction and operation of 600 MW of renewable energy generation. During construction and operation of the 600 MW power generation, it is envisioned that 4,000 short-term jobs and 200 long-term jobs will be generated. As the country's initial efforts to promote renewable energy are focused on the south of the country, the economic development and job creation impact could be significant in underdeveloped regions. The contribution of the facility in job creation could be noticeable.

13. The facility will enhance private sector development in renewable generation, a new and critical sector for Egypt to pursue economic and social development. The sector has been dominated by the public sector and private sector involvement has been limited primarily to construction. Private sector investment in electricity in Egypt was around USD 1 billion in 1990-2015, which is far below that in telecommunication (USD 21 billion) in the same period. The facility is expected to open its doors to private sector investment in one of the critical infrastructure sectors of the country.

14. The AE commits to exploring partnership with vocational/training schools to enhance young women's access to developing relevant technical skills. The AE also considers working closely with eligible private sector developers in order to ensure women have equal access opportunities in work supported by the facility.

15. Accordingly, the TAP sees the sustainable development potential of the proposed facility to be "Medium/High".

#### 1.4 Needs of the recipient

*Scale: High*

16. The power sector in Egypt has been suffering from a lack of capital for a long time. In the last few years, Egypt's power demand has grown by 6-7 per cent. The power generation capacity could not meet the growing demand resulting in widespread load-shedding. Hence, the additional generation capacity of 600 MW that the framework proposed to develop and finance is critically needed for the economic and social development of the country.

17. Due to a shortage of capital, the government has been subsidizing the power sector for a long time. The country's fiscal deficits are reportedly due in part to energy subsidies. The proposed framework is expected to mobilize a large sum of private sector capital so that the government budget can be applied for other critical social requirements such as health and education.

18. The access to long-term financing is presently challenging as the country's economy has been struggling since 2011. The private sector investors in renewable energy requires 70-80 per cent of the total project cost to be funded with a long term financing at a competitive cost in order to stretch the project's cash outflow and to keep power tariffs competitive. Currently, the funding available from local commercial banks is expensive and their tenor is short therefore it does not meet the requirements of private sector investors. Lending from international commercial banks for renewable power transactions is limited given the nation's credit standing and the sector being new. The proposed framework aims to provide private sector developers and the long term financing currently unavailable in the market but critically needed by the private sector investors.

19. The TAP believes the need of recipient is "High".

## 1.5 Country ownership

*Scale: High*

20. Egypt's INDC prescribes, as one of the countries' climate change mitigation policy's pillars, the "increased use of renewable energy as an alternative to non-renewable energy". The framework is in line with the country's strategy to generate 20 per cent of its electricity from renewable sources by 2020.

21. The government intends to achieve the 20 per cent target by promoting private sector investment in renewable power generation based on the Renewable Energy Law (2014), which determines policies and procedures. The proposed framework is structured to support the government in overcoming the financial and technical barriers identified during the first round of bidding and to realize 4,300 MW of renewable energy generation by 2020. Accordingly, the framework is well aligned with the government's strategy.

22. The AE has extensive investment track records in renewable energy projects. Since 2006, it has built up a portfolio of renewable energy projects of 4.54 GW and investment of EUR 1.75 billion achieving greenhouse gas reduction of 12.4 million t CO<sub>2</sub> eq. The projects include all technologies, and in particular wind, hydro and solar.

23. The AE has already received a no-objection letter issued by the national designated authority of Egypt. The letter confirms the government's endorsement of the approach contemplated by the AE, and reaffirms the government's support for the proposed framework.

24. Overall, the TAP considers the country ownership of the proposed framework to be "High".

## 1.6 Efficiency and effectiveness

*Scale: Medium/high*

25. The total amount of greenhouse gas emission reduction during the project life cycle will reach 19 million tons CO<sub>2</sub> eq in total. Considering the total project cost of USD 1 billion and GCF investment of USD 150 million, the cost per is projected to be USD 52 per t CO<sub>2</sub> eq and USD 7.9 per t CO<sub>2</sub> eq, respectively, which are both considered to be efficient. The cost-efficiency of the proposed framework in Egypt is therefore high.

26. The GCF loan will have a maturity of up to 18 years with a grace period of up to 5 years. Its pricing will be determined on a case-by-case basis for each borrower subject to predetermined floor price. The loan from the AE will be priced based on the market but its repayment profile (including tenor) will be structured *pari passu* to that of the GCF.

27. The AE presents various cases in financing renewable energy generation projects. Based on the tenor of Power Purchase Agreement (20-25 years), the proposed tenor of GCF financing of up to 18 years (with a grace period of 5 years) could be considered rather long, but justifiable given the technology adopted and the availability of the government guarantee on tariff payments. Final GCF pricing will be concessional and based on the AE pricing. Given the difficulties in attracting financing for a country of macroeconomic challenges, the requirement for concessional financing to kick-start the renewable power generation programme can be justified.

28. The framework will support the development and construction of renewable energy projects totalling USD 1 billion with an expected debt to equity ratio of 3 to 1. The GCF financial contribution of USD 150 million for subproject financing will account for up to 15 per cent of the total financing required to deliver the projects (USD 1 billion) and represent 20 per cent of the debt needs (USD 750 million). The AE together with other co-financiers will provide a debt financing of USD 600 million of which the AE provides USD 350 million from its own resources, representing up to 35 per cent of the project costs and 47 per cent of the total debt requirement.

The GCF leverage ratio to other debt finance will be 1:5.7 and that to the total project cost will be 1:6.7. The expected leverage ratios are reasonably high.

29. With respect to the GCF provision of USD 4.7 million for technical assistance, the AE will arrange USD 2.3 million from its bilateral and multilateral donors. The GCF contribution represents 67 per cent of the total technical assistance budget.

30. Overall, the TAP views the efficiency and effectiveness of the proposed framework to be "Medium/High".

## II. Overall remarks of the independent Technical Advisory Panel

31. The proposed framework is considered to be effective to promote the development of 600 MW of renewable energy generation by directly offering long-term financing to private sector investors in order to implement renewable generation critically needed for Egypt. It has potential to deliver a paradigm shift to the sector, which has been public sector driven and heavily relies on fossil fuel fired power generation. The promotion of private sector investment in renewable energy projects is in line with government policies and strategies to generate 20 per cent of the country's electricity from renewable sources by 2022. Egypt's INDC states that the "increased use of renewable energy as an alternative to non-renewable energy", as one of the country's climate change mitigation policy pillar. The proposed framework supports the government in achieving its commitments. With a USD 150 million financing, the GCF will mobilize debt and equity of USD 850 million in total. A leverage ratio of 1:5.7 to other debt financing and 1:6.7 to the total project cost is projected and considered efficient.

32. The TAP supports and recommends the Board to consider the proposed framework with the following condition to be inserted as a covenant in the legal document:

*"The AE, during the implementation of the technical assistance, shall develop and submit a study, including recommendations on an action plan for the government on how the government can promote the development of 3,700 MW of renewable power generation without GCF participation as per the government's plan in addition to the implementation of 600 MW the assistance of the proposed framework."*

33. The proposed condition aims to enhance dialogue and to assist the Government of Egypt to continue promoting sustainable energy development with private sector investments following the implementation of 600 MW of renewable power generation projects by the proposed framework with GCF financing.

## Independent Technical Advisory Panel's review of FP040

Proposal name:	Tajikistan: Scaling up hydropower sector climate resilience
Accredited entity:	EBRD
Project/programme size:	Medium

### I. Assessment of the independent Technical Advisory Panel

#### 1.1 Impact potential *Scale: Medium*

1. The funding proposal considers the adaptation of the hydropower sector to the increasing variability of climatic and hydrological parameters caused by climate change. An additional effect of the proposal is the mitigation of greenhouse gases.
2. The project consists of two phases with the following three main components in phase II, for which GCF support is requested:
  - (a) A technology transfer component facilitating the transfer and implementation of best international practices in the assessment and management of climate change risks to hydropower operations;
  - (b) Strengthening national/local institutional capacities and structures and transboundary cooperation, which is needed to ensure effective management of hydropower cascades located on transboundary rivers in order to ensure the sustainability of the climate-resilient hydropower operation; and
  - (c) Demonstration of the results of the above-mentioned two components through the rehabilitation and upgrade of one of the strategic hydropower plants (HPPs) of the Qairokkum HPP.
3. The impact potential of this project on Tajikistan's energy sector development and security (long-term sustainability) is expected to be high but because of the high uncertainty of the project's mitigation potential it is rated as medium. In particular, at this stage, it is uncertain which type of carbon-intensive fuel or grid electricity will be replaced by additional power generated by the project. Therefore, at the later stage of the project operation the accredited entity (AE) should monitor and report back to the GCF on the actual fuel replacement and emission reduction. Based on this report, the additional impact of the project could be assessed. Different types of impact are expected from this project: adaptation, mitigation, development, regional cooperation and socioeconomic impacts.
4. Adaptation impact. Taking into consideration the current situation in the country's power supply sector, the project has potential to significantly improve the sector management capacity through the transfer of modern technology and knowledge needed for the sustainable management of HPPs and, in particular, the transboundary cascade of HPPs; and avoid future flood events through increasing the spillway capacity of old, dilapidated HPPs with dangerously eroded dams.
5. The social impact of the project will be the supply of power to approximately 50 per cent of the local population of Sughd province (more than 25 per cent of the country's population lives in this province), where current electricity availability is for only 4–5 hours a day. It is

possible that the large share of this electricity will be used for heating purposes by the province population, replacing recently consumed wood and coal.

6. Mitigation impact. Mitigation impact of this project considered as additional benefit because reliable assessment of emission reductions couldn't be done at this stage. The baseline situation of the project is a low-efficiency HPP supplying power to the regional sub-grid, with a permanent electricity deficit after the breaking up of the Central Asia grid established during the Soviet era. As a result of the project implementation, additional electricity will be provided to the grid for supplying at least 50 per cent (1.2 million) of Sughd province residents and industry. There is high uncertainty on final beneficiaries of this additional power supplied to the grid and therefore mitigation impact could be assessed only after the HPP is in operation.

7. The social and mitigation impact of the project, at this stage, is highly uncertain with regard to the reliable assessment of the final results but as set out in the funding proposal the impact potential should be medium to high.

8. The knowledge and technology transfer component accompanied by strong capacity-building at the national level should have a high impact potential.

9. Transboundary cooperation in the management of the river watershed and cascade of HPPs is the key component of the proposal. Recently this cooperation has been limited. Sharing/exchange of meteorological and climatic parameters is not a continuous and sustainable process. Technology transfer could be successful only if transboundary cooperation is strengthened and becomes more sustainable during the project implementation.

## 1.2 Paradigm shift potential

*Scale: High*

10. The project concept is among the few exceptions focusing on the assessment of the impact of climate change on the hydropower sector. Despite the fact that the design and maintenance of HPPs require long-term monitoring of river run-off and climatic parameters as well as climate change related and geological extreme events (such as landslides, mudflows and floods), drastic changes in the intensity and frequency of these events are not always taken into consideration, weakening the operation risks management and putting at risk the lives of the population settled nearby.

11. The first two of the project's three components – technology transfer to increase the resilience of the hydropower sector to climate change and transboundary cooperation in the management of the river catchment and hydropower dam cascade – are pathways for a paradigm shift in addressing climate change. The successful implementation of these two components and the involvement of the European Bank for Reconstruction and Development (EBRD), working in many countries in the same sector, would bring added value to the strengthening of the paradigm shift component and make it possible to meet the requirements for GCF funding.

## 1.3 Sustainable development potential

*Scale: High*

12. The intended nationally determined contribution (INDC) of Tajikistan highlights that the country adheres to the policy of sustainable development. Since independence, fundamental regulatory and legal instruments, national strategies and programmes have been adopted and the key environmental international conventions and agreements have been ratified, serving the preservation of the natural environment and preventing ecological disasters. With the assistance of the international institutions, measures are being developed and implemented to fulfill the commitments which have been made in accordance with the United Nations environmental conventions, and the relevant institutional structures have been established.

13. The whole ideology of this project concerns the implementation of the sustainable development concept, including technology/knowledge transfer, climate change risks (flooding and land erosion) reduction in hydropower sector and increase the sustainability of this sector, increase the access to clean energy and facilitate transboundary cooperation in the water sector and management of hydropower dam cascades.
14. More specifically, the project proposal provides the following indicators:
- (a) Development and implementation of an environmental and social management system in line with International Organization for Standardization 14001 to improve company operational approaches;
  - (b) Installation of oil-free Kaplan turbines (only water used for turbine control to minimize environmental risk downstream);
  - (c) Installation of a low fish mortality turbine design to protect aquatic life;
  - (d) Real-time disclosure of flow and hydrological information in place to enable more integrated management of the resource through the cascade; and
  - (e) Reduction in the number of households in the Sughd region relying on coal and wood by 50 per cent.

#### 1.4 Needs of the recipient

*Scale: High*

15. Tajikistan is a mountainous and landlocked country in Central Asia with a developing economy characterized by a low level of growth and low per capita gross domestic product (GDP), with a 40 per cent poverty level. For these reasons, it is necessary to reduce significantly the financing costs to the Tajik authorities, water companies and households by blending the loan finance with a larger amount of grant finance.
16. Tajikistan adheres strictly to International Monetary Fund (IMF) restrictions on foreign borrowing and has enshrined this in law. These require that each funding package must consist of a grant element of at least 35 per cent, calculated using the IMF methodology for blending the loan finance with a larger amount of grant finance. EBRD confirmed that an appropriate blend of loan and grant resources is needed owing to Tajikistan's low-income status and the severe affordability constraints experienced by very many of Tajikistan's communities and households. The use of some loan finance in this project's components is justified by EBRD as a basis for the incentivization of appropriate commercialization, cost recovery and financial sustainability.
17. According to the information provided in the INDC, the government's concern is that for several reasons the State programmes and strategies supporting planned and approved sustainable development are not fully implemented owing to the lack of financial resources. The government's position is that in the future, it will be important to ensure the mobilization of additional external resources and enhancement of scientific and technical assistance to ensure the fully-fledged implementation of this and other important programmes. The Government of Tajikistan believes that the international support of the intentions of Tajikistan with respect to the reduction of greenhouse gas emissions and the full-scale implementation of climate adaptation and resilience measures will enable the country to be strongly on track to a green economy and climate-resilient development.
18. For Tajikistan, the basic priority of climate change measures lies in adaptation because of the high dependence of a considerable part of the population and of the branches of the economy on climatic conditions, and in view of the key role of the country's mountain ecosystems in water resources generation and biological diversity for Central Asia.



19. Increasing the climate change resilience of ecosystems and the country's economy is a priority of Tajikistan along with its contribution to the global mitigation process. In particular, monitoring of the glaciers and water resources in the run-off formation zones under the conditions of climate warming is highlighted as the first priority. Hydropower is Tajikistan's only traditional energy resource.

20. Tajikistan's INDC considers as a priority assistance area "The reduction of vulnerability to the impacts of climate change by means of full-scale integration of the climate resilience and adaptation measures into the planning and development of the green infrastructure in the following sectors:

- (a) Agriculture, irrigation and water systems; and
- (b) Power engineering and industrial facilities

21. Disaster risk reduction is also among the priorities identified by the country.

22. As set out in Tajikistan's Poverty Reduction Strategy (2001), hydropower provides approximately 98 per cent of Tajikistan's electricity, making it fundamentally important for the country's economy and development, and for the resilient livelihoods and well-being of its population. Tajikistan's winter electricity demand is unusually high. The Tajik population relies mainly on electricity for heating, rather than natural gas and coal, which is why the residential sector accounts for such a large share of total electricity demand (44 per cent). This is owing to limited heating options and relatively low electricity prices. Unfortunately, the high electricity demand in winter coincides with the minimum availability of electricity generation from hydropower due to hydrological conditions.

23. The above-mentioned information from the INDC and the funding proposal demonstrates the considerable needs of Tajikistan with regard to this type of project supporting the government in sustainable development.

## 1.5 Country ownership

*Scale: High*

24. Tajikistan's INDC states that Tajikistan is a participating country of the international Pilot Program for Climate Resilience (PPCR). At the time of preparation of the INDC, the main efforts of the PPCR in Tajikistan are focused on the hydropower industry, the development of other renewable sources of energy, agriculture and forestry, adequate response to and reduction of risk associated with natural disasters and the provision of hydrometeorological services, as well as measures to raise public awareness.

25. The Government of Tajikistan has had intensive consultations with IMF, EBRD and other financial institutions with a view to obtaining support for this HPP risk reduction project. The government has already committed to improve the regulation of the energy sector, including a tariff increase of 30 per cent in order to increase the sustainability of the energy sector.

26. The project executing entity is the Ministry of Finance of Tajikistan. The Ministry of Finance will pass on the funds for project implementation under subsidiary financing agreements to Barki Tojik. Open Stock Holding Company Barki Tojik is a public enterprise incorporated in Tajikistan, under the Ministry of Energy and Water Resources. Barki Tojik is a state-owned vertically integrated power utility, responsible for the generation, transmission and distribution of electricity in the entire country except 1 per cent. Such direct involvement of governmental structures in the project on the one hand demonstrates the high level of country ownership but on the other hand there might be some risk regarding commercialization of the sector and ensuring sustainability.

27. Tajikistan's INDC also states that the potential for reducing greenhouse gas emissions in the country to achieve a target of 65–75 per cent of the 1990 level by 2030, which amounts to 1.2–1.7 tonnes of carbon dioxide equivalent per capita, will be possible in the case of implementation of investment projects and national programmes in the sphere of the power industry, transport, agriculture and forestry and water resources management, risk reduction in natural disasters, promotion and diversification of renewable energy sources and reduction of energy losses, as well as modernization, the introduction of new technologies and development of the sectors.

28. From these listed priorities the funding proposal contributes to climate change risks reduction through knowledge and technology transfer, and the modernization of old, outdated and obsolete HPPs.

## 1.6 Efficiency and effectiveness

*Scale: N/A*

29. The USD 50 million GCF contribution (USD 27 million loan; USD 23 million grant), which is 24 per cent of total project costs of USD 208 million, will be fully utilized for the rehabilitation of the dam and upgrading of turbines. The efficient implementation of these activities is easy to monitor and assess from the financial perspective but from the GCF perspective, where the final beneficiaries is a key indicator, it could be actually assessed only later when the system is in operation. Though the funding proposal claims more than 1.2 million poor people will benefit from this increased clean grid electricity, there is still some reservation and the risk that industry has higher chances in this competition despite the project stating that industry is within the so called “red zone” and does not have a significant power deficit. Therefore, only post implementation monitoring and reporting of the results could demonstrate the rate of efficiency.

30. The anticipated effect of the entire project depends on the success of cross-boundary cooperation and data sharing as well as measures implemented by upstream HPPs outside the country's boundary. In the case of successful implementation of this particular sub-component of strengthening cross-boundary cooperation the overall effect will be high and will have a minimum of regional scale.

31. The development effect of the funding proposal is expected to be medium to high (additional and more reliable clean electricity will be supplied to one of the poorest provinces of Tajikistan, energy sector regulations will be improved, contributing to increasing the sustainability of the energy and industry sectors). At present, approximately 70 per cent of the Tajik population suffers from extensive electricity shortages during the winter. Electricity shortages in winter impose economic losses of approximately USD 200 million per year, or 3 per cent of GDP. The frequent outages and the poor quality of electricity is considered the main obstacle to doing business in Tajikistan.

32. The social effect of the project is expected to be medium to low, depending on the actual direct and indirect beneficiaries of the project from the poor Sughd province. Because of the high uncertainty of the social and mitigation effects of the funding proposal, actual results should be monitored by the AE and reported after the project implementation. One of the social effects is reducing the number of children affected by a lack of night-time lighting, which can impair educational activities.

33. The adaptation effect of increasing the climate resilience of the hydropower sector against the changes observed in the range of hydrological variability and flood risks is considered as high.

34. The technical efficiency of HPPs will be significantly increased and will be sustainable after the project implementation; however, the forecast increasing evapotranspiration could reduce the plant's technical efficiency to low in the summer season.
35. Cost efficiency of the funding proposal very much depends on the social and mitigation impact, which could increase the efficiency rate from medium to high, depending on the results of a post-implementation survey of direct and indirect beneficiaries.

## **II. Overall remarks from the independent Technical Advisory Panel**

36. The independent Technical Advisory Panel recommends the funding proposal for approval by the Board and recommends that the completion report to be submitted by the AE shall contain the findings of a survey to be conducted by the AE on the direct and indirect beneficiaries that benefit from the enhanced access to energy in the targeted province as a result of this project.

## Independent Technical Advisory Panel's review of FP041

Proposal name:	Simiyu climate resilience project
Accredited entity:	KfW
Project/programme size:	Medium

### I. Assessment of the independent Technical Advisory Panel

#### 1.1 Impact potential

*Scale: Medium*

1. Simiyu is a semi-arid region in Tanzania, already facing significant climate variability and change (CV&CC). With rising temperatures, the degree of aridity has been rising resulting in higher levels of moisture loss from both top soils and water storages. Which in turn has been affecting per capita water availability in the backdrop of an already deteriorating water supply - the latter being aggravated by a number of factors including the increased non-reliability of sourcing bulk water for drinking from surface water reservoirs and depleting ground water sources, lack of both finance and adequate management capacity of concerned authorities. Meanwhile, higher evapotranspiration and the extent of drought has been making small holder agriculture particularly vulnerable. Maize and cotton production have been experiencing crop failures, while livestock production has been suffering losses. The lives and livelihoods of about 1.5 million women and men in the Simiyu region have to be protected against climate change induced adverse impacts.

2. On behalf of Tanzania, an accredited entity (AE), Kreditanstalt fur Wiederaufbau (KfW), submitted a funding proposal with the aim of supporting water access and the resilience of agriculture-based livelihoods that are threatened by climate change in the Simiyu region. The programme, as proposed, has three major components, which are as follows: (1) improved water supply and sanitation services, (2) climate-smart agricultural practices, and (3) strategic support and programme management.

3. The funding proposal requests a fully concessional GCF financing of EUR 102.7 million of an estimated total of a EUR 143.4 million programme budget (i.e, 72 per cent of the total). KfW proposes that the Ministry of Finance and Planning will be the executing entity (EE) together with the Ministry of Water and Irrigation as the key implementing partner – both representing the Government of Tanzania (GOT). The programme is set to be implemented in five years.

4. Almost a third of the population of the region, some 495,000 people will directly benefit through the implementation of the first two programmes as above, while the last programme has the potential to enhance the various capacities of relevant institutions, which might benefit a significantly higher number of the population across the country. Since water supply and sanitation services will be improved, women in the region will be benefitting the most. Moreover, strengthening agriculture-based livelihoods and food security will tend to benefit both women and men in smallholder communities across the region.

5. Although the number of direct beneficiaries targeted represents only 1 per cent of Tanzania's total population, the expected impacts of the project can be quite profound on almost half a million target beneficiaries. Both water supply and sanitation and the climate-smart agriculture can have significant impact potential, which is however subject to successful delivery by national institutions that are not particularly known as excellent service providers.

Therefore, the extent of the impact potential will largely depend on the success of the third component, which aims to significantly strengthen institutional and management capacities of relevant institutions. A lot will depend on the resultant effective capacity of these EEs and their field level service provisioning wings, primarily in the Simiyu region, and also beyond the target region.

## 1.2 Paradigm shift potential

*Scale: Low/medium*

6. The water supply and sanitation component offers low paradigm shift potential. The proposed intervention is indeed a standard approach to solve an already underperforming water supply and rudimentary sanitation service provisioning, with or without climate change. There is no innovation as such. The water supply intervention is designed so that an expansion is possible beyond the current scope of the programme; however there exists uncertainties regarding the additional capital financing needed to implement such future expansion. The design around sanitation provisioning is poorly conceived in view of the removal of sludge from pits using trucks. The capital intensive project should have analysed alternative technological solutions regarding sludge removal and management, the absence of which may pose health risks for the population of the Simiyu region.

7. A moderate paradigm shift potential exists in climate-smart agricultural promotion, however, the relevant extension services must have alternative hazard-tolerant crop varieties for their promotion and a healthy collaboration with institutions which generally develop such varieties. Farmers' training on advanced agronomic practices would generally help, however they must not be limited to a single delivery of such training. An institutional strengthening appears to be a prerequisite in terms of both human resources and budgetary allocation so that an adequate number of trained field workers may continue to engage with climate-affected farmers, even beyond the project cycle. A long-term commitment from the relevant EE, expressed through budgetary allocation and adequate changes in the policy regime, is necessary.

8. As indicated above, a thorough institutional strengthening involving the relevant institutions and authorities is a necessity for the project, which has to embrace the challenge of bringing a paradigm shift in the work ethics and culture of officials and workers.

9. There exists ample learning potential, which might have a positive impact on the operation of utilities in other regions of Tanzania. An annual utility performance assessment will be established, which will generate ample knowledge and experience for the improvement of future operation and maintenance (O&M) of the utilities of the region and also cross learning potential of similar utilities beyond the target region. If such assessment processes accommodate end-users' views and evaluations with sincerity and complete transparency and good performances are recognized and remunerated, a healthy service delivery culture might emerge from such exercises.

10. On a similar note, the participatory elements in the agricultural interventions have some community-driven approaches, which is an essential building block to deliver extension involving smallholder farmers. Again, this offers learning opportunity for other regions, even beyond Tanzania. However, there is an element of risk in focusing heavily on rice intensification programme (RIP). Rice being among the poorest performers in irrigated agriculture, the said promotion of RIP in a semi-arid region is destined for much higher evaporative loss under a climate change regime – a lesson which nobody need to learn by committing to very high wastage of water.

11. Farmers' behavioural change is more likely to respond to fellow farmers' successes, on the ground. Incentive must be provided to those front runners who dare to commit to the

prescribed change. Exchange visits and direct sharing with fellow farmers work well, in addition to relentless communication to the farmers from extension service providers. In order to facilitate such promotional processes, the proposed information and communication technology based dissemination platform can potentially play a role. However, if the Internet coverage is poor and access is unreliable, its effectiveness will remain questionable. In such cases, other dissemination formats must also be given due priority. A sensitivity test among alternative dissemination modalities could have been carried out before committing to such trendy modality.

### 1.3 Sustainable development potential

*Scale: High/medium*

12. The project promises to contribute to various sustainable development goals (SDGs). The following table provides an overview of the project’s likely contributions to achieving SDGs in Tanzania. Considering targeting SDG as a criterion for approval, the project does have winning potential.

**Table 1: Sustainable development goals**

<i>Project directly contributing to SDGs</i>	<i>Project indirectly contributing to SDGs</i>
<b>SDG-6: Clean water and sanitation</b>	<b>SDG-2: Zero hunger</b> - by improving the food security of smallholders
<b>SDG-3: Good health and well-being</b> - particularly reducing the burden of pollution-related diseases	<b>SDG-1: No poverty</b> - by contributing to both the economic empowerment of poor regional inhabitants and bringing significant social co-benefits
<b>SDG-5: Gender equality</b> - provisioning of a reliable water supply will have profound beneficial impacts to achieve the goal	
<b>SDG-13: Climate action</b>	

13. The potential to bring environmental harmony is also notable. The project will enable the authority to cease the mining of groundwater resources, use surface water sources as a viable alternative, and thereby contributed to intergenerational equity. By strengthening locally tested Ngitili agrosilvipastoral vegetation cover will allow increased moisture retention capacity and infiltration, thereby positively contributing to environmental conditions. It will also have distinct economic co-benefits arising from the availability of increased amounts of fodder and fuel wood – both contributing to economic gains through livestock management.

14. The smallholder farmers are likely to gain from the project intervention, by sheer increase in access to reliable irrigation schemes. Their food security, currently threatened by climate variability, will be strengthened.

15. While reliable water supply and improved sanitation offer improvements in the health condition of the users, these outcomes also have both social and economic co-benefits (for instance, savings in the form of ‘disability-adjusted life year’ related to health costs). Farmers will directly be benefiting from resilient agriculture, while the proposed enhancement of aforementioned Ngitili pastures for the increased availability of fodder will offer an increased opportunity for livestock management under a severely stretched agro-silvipastoral system.

16. The project has a strong commitment to addressing gender-sensitivity. Over 50 per cent of the beneficiaries are women. Moreover, target women will benefit directly from reducing the burden of drudgery, one of the most torturous responsibilities women faced in dry lands in order to collect fresh water for drinking purposes. The promised water supply will relieve women of the Simiyu region from such a stressful condition.

17. However, the promises will never be realized if 'business as usual' service delivery is somehow maintained. Unlike the earlier investment in developing supply systems, the entire institutional management issue must be challenged, adequate capacity enhancement is put in place (the project has a component) and is delivered, and the work ethics of officials and field personnel is duly incentivized and simultaneously, punitive measures are imposed. A strong and accountable O&M unit will be a must, followed up by a strong supervision by means of monitoring and evaluation (M&E) towards the long-term sustenance of the capital intensive water supply and sanitation component. Otherwise, the investment will be wasted.

18. The relevant EEs and regulatory bodies should actively consider the imposition of a tariff and commit to budgetary allocations so that recurring costs are recovered and O&M may continuously be financed beyond the life-time of the project implementation. The necessary commitment letters need to be provided by the relevant authorities and periodic monitoring and evaluation reports must be made public under the measurement, reporting and verification regime.

#### 1.4 Needs of the recipient

*Scale: High*

19. In view of increasing demand and decreasing availability of drinking water in the Simiyu region, the project appears relevant to respond to the water needs of the recipients. Due to low rainfall and high evapotranspiration in the backdrop of high rainfall variability, an ensured supply of water is justified in responding to climate change related challenges. The potential recipients are indeed among the most vulnerable to climate change and are also poor, which justifies the needs of the recipient. The agricultural interventions are targeted at subsistence level producers, including a high proportion of female headed households (i.e. 38 per cent), which are also justified.

20. Since the new regional administration has a lack of capacity in dealing with complexities regarding climate change, the relevant institutions deserve capacity-building support in order for them to tackle climate change.

21. Tanzania is a least developed country, which deserves preferential treatment in seeking adaptation finances under the United Nations Framework Convention on Climate Change. In the absence of GCF support, the country might become increasingly indebted, which justifies GCF support. Moreover, the finance is primarily sought for generating non-revenue livelihood benefits for the end-recipients, which is why fully concessional financing (i.e. a grant) is also justified.

22. There is matching grant support from the German Government towards implementation of the project. Moreover, GOT is also committed to mobilizing its own resources as co-financing in a bid to predominantly cover operation, project management and land compensation costs. Although there is a fairly large contingency allocation proposed in the budget, given the inflation in the region, such a large contingency can also be somewhat justified.

#### 1.5 Country ownership

*Scale: High*

23. The programme is designed in coherence with the priorities set forth by a number of noteworthy national policies, strategies and programmes dealing with climate change and the overall development of the country. The objectives of a national poverty reduction strategy, national climate change strategy and intended nationally determined contribution to global climate change response find alignment with the project components. Agriculture-related components are in alignment with sectoral strategies, the Agriculture Climate Resilience Plan, the Water Resources Management and Strategic Interventions, and the Action Plan for Climate

Change Adaptation. Therefore, there is no shortage of policy coherence to exhibit that there is adequate country ownership in support of the project.

24. The AE has adequate experience in implementing water supply and agriculture projects in Africa. The AE has also been engaged in collaborative programmes with GOT on water supply, sanitation and irrigation. This project is likely to benefit from past collaborative engagements between GOT and the AE.

25. The Ministry of Water and Irrigation (MOWI) has exhibited a high degree of country ownership by investing its own resources in the development of the feasibility studies. In the past, MOWI has gathered experience in implementing similar water pipeline projects, transporting water from Lake Victoria to Kahama and Shinyanga. MOWI has fostered inter-institutional partnerships in the implementation of the project, as evident from the organogram of the proposed project.

26. Various stakeholders have been engaged and consulted, both at the national and regional levels, in the process of developing the project proposal. Civil society organizations have also been consulted to document their views and concerns. A further effort will be needed to detail a gender action plan and an operational manual detailing how communities will be engaged in the course of project implementation. It is expected that, under the supervision of the AE, technical back stoppage consultancy services will be ensured in order to fill in capacity gaps.

## 1.6 Efficiency and effectiveness

*Scale: Low/medium*

27. This proposal demands a considerable amount of fully-concessional GCF financing (EUR 102.7 million of GCF grants, of an estimated total of EUR 143.4 million programme budget) for a drinking water project. The GCF requested amount is high, which is due to high management and strategic support costs. The unit cost per person or household for potable water delivery is relatively high. However, local conditions and project conditions may justify these costs.

28. Since no revenue will be generated from the project as such, the full concessional nature of GCF finance (as grant) may be justified. Despite the fact that the project is not viable in financial terms (financial internal rate of return being -1.9 per cent), however economically viable (economic internal rate of return being 10.9 per cent) due to auxiliary social (particularly health) benefits. It is anticipated that block tariffs would be put in place to ensure the affordability of water to all end users.

29. The economic analysis suggests that the water supply system would be highly sensitive to the rate of connection at household levels, which refers to a strong linkage between the economic performance of the project and its smooth management. The expected tariffs for a rural and urban population (estimated to be in the order of EUR 0.5 per m<sup>3</sup> and EUR 0.65 per m<sup>3</sup>, respectively) would cover only the O&M expenses from the third year onwards. It is expected that in the public-private partnership framework, differential tariff rates will be proposed so that poor households in both rural and urban areas receive positively discriminated tariff rates compared to their rich neighbours (who are likely to use higher levels of water per capita per day).

30. The participation of GCF finance makes the investment viable and it ensures that the post-heavily indebted poor country would not incur excessive debts, yet it enables the country to borrow towards supporting the intended infrastructure and the (sectoral) development plans. The grant from the GCF will not displace private investment nor introduce economic distortions, since the proposal claims that the water supply tariff structure will be kept at an affordable level for beneficiaries under the proposed public-private partnership framework.



31. The costs of infrastructure, as presented, are comparable with similar projects. The estimated costs for project management and consultant-driven strategic support appear to be high, representing about 13 per cent of the total budget. Taking into consideration inadequate local capacities, the relatively high costs are somewhat justified. The contingency amount is also relatively high at 12.5 per cent of the total, although somewhat comparable with the standards of the AE, which has a large portfolio for the same sector in Tanzania.
32. Cost-benefit ratios (taking into account economic returns due to health benefits and time saved in handling water, among other issues) for these types of interventions (drinking water projects) in East Africa are on average 11.5 (i.e. for every USD 1 invested, on average, USD 11.50 are returned in economic benefits), even in a pessimistic scenario (highest costs of intervention and lowest returns), the cost-benefit ratio has been estimated at 1.75.<sup>1</sup> Therefore, even if the unit cost per person were high, the expected returns would be favourable.
33. The agriculture component of the project appears to be economically viable with an economic internal rate of return of 19 per cent and net present value (NPV) of EUR 11 million. The analysis benefited from the assumption that agricultural production will be ensured from three major streams: (1) 1,320 households (increased by 15 per cent per annum after the first 6 years) will continue to produce using rain-fed irrigation; (2) 600 households will produce crops in semi-arid conditions by means of new irrigated technology from the project; and (3) a total of 7,200 Ngitili vegetation will continue to produce fodder and fuelwood. The economic performance of the agricultural component appears to be robust and resilient. On the one hand, for NPV to become 0, the benefits must be declined by an unrealistic 40 per cent. On the other hand, even an increase in project cost by 10 per cent would only be able to reduce the internal rate of return by 2 per centage points, with a corresponding decline in NPV to EUR 10 million (from an estimated EUR 11 million). Since the irrigation water is meant to address climate variability and climate change induced increased evapotranspiration, the economic performance of the agricultural component makes the project particularly interesting.
34. While it is envisaged that the poor farmers will offer an upfront cash or in-kind contribution towards initiating climate-smart agriculture and to mobilizing GCF finance, effort must be made to make sure that this will not become a barrier to the most vulnerable groups, including women-headed households, towards accessing project-related supports.
35. The AE ensures significant government co-financing of about EUR 13.1 million. Even then the project proposal requests the GCF to contribute an overwhelming majority (some 72 per cent) of the budgeted amount, which makes a co-financing ratio of 0.39 times. The effectiveness of the programme lies on the overall management by the executing entity, where political guidance, inter-agency coordination, strong operation and maintenance with due accountability and transparency and during and post-implementation monitoring and evaluation will largely determine how best the project will accrue benefits for the vulnerable people.

## II. Overall remarks of the independent Technical Advisory Panel

36. The independent Technical Advisory Panel recommends the Board approve the project with the following conditions:
- (a) Prior to signing of works contracts, delivery by the accredited entity of the relevant Resettlement Action Plan, which shall include—among other aspects—details on the identified lands where the project will be implemented, affected individuals and the

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<sup>1</sup> World Health Organization, 2004. "Evaluation of the Costs and Benefits of Water and Sanitation Improvements at the Global Level", WHO: Geneva.

- compensation matrix, following the resettlement policy framework and in line with IFC performance standards. Further, there shall be no acquisition and resettlement activities prior to the delivery of the RAP;
- (b) Prior to first disbursement, delivery by the accredited entity of a gender action plan in form and substance satisfactory to the GCF Secretariat;
  - (c) Within 6 months after the first disbursement, the accredited entity shall ensure the completion of an operational manual/engagement plan detailing how communities are to be engaged. The accredited entity shall also endeavour to update the engagement plan to reflect any changes in the communities;
  - (d) In the first annual progress report (APR), the accredited entity shall provide updated analysis on the tariff structure, affordability, demand, and assessment of the financial viability of the urban and rural water supply;
  - (e) The accredited entity shall ensure and report in the APRs that the exit strategy is strengthened and adjusted as applicable during implementation, particularly on the sanitation-related activities; and
  - (f) The accredited entity ensures that operations and maintenance plans for the small earth and Charco dams, small-scale irrigation, and other infrastructure related to the agriculture component are developed by the communities prior to their implementation.
37. The independent Technical Advisory Panel recommends the following:
- (a) For the agriculture activities, in-kind contributions should not be a barrier to accessing support for the most vulnerable groups;
  - (b) The AE establishes procedures that guarantee that in rural and peri-urban areas, the participation of women at the board of director or at the senior management level of water organizations is at least of 50 per cent;
  - (c) During the programme implementation, efforts shall be made to foster synergies and enhanced coordination with other development initiatives in water and agriculture, particularly in exploring complementarity in financing for activities such as waste water management;
  - (d) The AE provides the monitoring of outcomes quarterly as the project progresses and annually, after the project is completed. The outcomes of particular interest to the GCF are:
    - (i) The number of households and people receiving drinking water and paying regularly for it as per established tariffs;
    - (ii) The percentage of O&M costs covered by tariffs collected;
    - (iii) The percentage collection of billing;
    - (iv) The average volume of water produced and the average volume of water delivered per household;
    - (v) The number of public latrines implemented which are fully operational;
    - (vi) The number of users per public latrine; and
    - (vii) The percentage of women belonging to boards or in senior management positions in the water utilities involved.

## Independent Technical Advisory Panel's review of FP042

Proposal name:	Irrigation development and adaptation of irrigated agriculture to climate change in semi-arid Morocco
Accredited entity:	AFD
Project/programme size:	Medium

### I. Assessment of the independent Technical Advisory Panel

#### 1.1 Impact potential *Scale: Medium/high*

##### ***Impacts of climate change on a semi-arid ecosystem***

1. In the semi-arid Boudnib Plain, Morocco, climate variability has already caused a change in rainfall patterns in the backdrop of rising aridity, while increased evapotranspiration is anticipated in the future under climate change. The traditional oasis areas of the region have been the home of smallholder farmers, where subsistence agriculture has been practiced for centuries and the Bedouins have been offering marketing services for the agricultural produce of the oasis farmers. In recent decades, erratic rainfall and rising aridity have been adversely affecting smallholders' agricultural productivity, while their water sources have been deteriorating in terms of both quality and quantity. The available rainfall has declined by 30 per cent since 1970.

##### ***Saved underground water aquifer in a semi-arid ecosystem through the adoption of the resource-efficient management approach***

2. In spite of the semi-arid region being hit hard by climate variability, the Government of Morocco has decided to exploit the irrigated agricultural potential further by inspiring date farmers to expand commercial date palm farming coverage in the extension areas of oases. Having such policy support, the commercial date farmers have been pushing for expansion with new high-value date plantations and exploiting groundwater to unsustainable limits, thereby undermining both the long-term sustainability of the critically important resource and the future potential of smallholders inside oasis areas.

##### ***Improved irrigation infrastructure in semi-arid ecosystem***

##### ***Improved drinking water supply***

3. In this complex backdrop, the project aims to exploit surface water by building a dam (the Kaddoussa Dam), transporting water to seven oasis sites and neighbouring existing date farming areas through a network of pipelines and other irrigation infrastructure so that irrigated agriculture can not only thrive but can also be sustained in the long term by the substitution of groundwater with available surface water collected from the Guir Wadi River. By making 10 million m<sup>3</sup> of water available, the existing 700 ha of oasis farmlands and an additional 4,000 ha outside oases 'extension' areas can be partially supported with irrigation in a bid to address a likely increase in evapotranspiration under climate change. The project requests EUR 20 million (some 32 per cent of the estimated project value) from the GCF as grant finance, so that almost 90 per cent of the annual irrigation demand of 10.6 million m<sup>3</sup> in existing oasis areas can be met by providing 10 million m<sup>3</sup> of water, 10 per cent of which is expected to be consumed by the inhabitants of the oasis areas as drinking water. The outside oasis

'extension' farmlands will also be receiving 20 million m<sup>3</sup> of water, 10 per cent of which is for drinking purposes and the rest is for irrigation.

### ***Major impact story-lines of the project***

4. Although the supply of irrigation water is the primary focus of the project, which will have tremendous adaptation impact in about 5,000 ha farmlands, a total of 5,500 people living in semi-arid conditions (about 1,000 of them are women) will be served with quality drinking water. Indirectly, a total of about 10,000 people will receive beneficial services from the project. While the numbers of direct beneficiaries appear to be modest, the apparently small beneficiary pool will have significant water services towards the improvement of their economic, social and environmental conditions.

### ***Increased climate change resilience of smallholder poor households living in the semi-arid ecosystem***

5. In addition to the supply of irrigation and drinking water from surface sources, the project will help smallholder farmers to adopt a host of improved agronomic practices (such as crop rotation, plant breeding, organic fertilization techniques, etc.) and the promotion of oasis-based farm produce and by-products (such as cumin, henna, dates, olive oil and product storage). The results of these assistances will expand the adaptive capacity of the farmers. A significant saving in foreign currencies might be realized by Morocco if the locally produced high-value dates (madjhool variety) reduce import expenditure for the same. Moreover, overall agricultural improvement in the area is likely to create 7,500 job opportunities.

6. The proposal promises a holistic approach to overall economic development in the area to be adopted by means of institutional capacity-building and the coordination of institutional stakeholders, which is expected to inspire the horizontal expansion of project ideas and good practices in other climate change affected regions of Morocco.

## **1.2 Paradigm shift potential**

*Scale: Medium*

### ***Creating and securing self-regulated institutions, in which users take responsibility for the management of a common-pool resource***

7. In terms of irrigation water supply, the project offers a paradigm shift: forcing the conservation of groundwater and replacing it with surface water for irrigation. The holistic approach through institutional capacity-building and coordination may also offer a much needed paradigm shift in the institutional mechanism towards continued adaptive capacity-building in complex hydro-geophysical, economic and social contexts elsewhere in Morocco. Local-level water associations are envisaged to play a major role in the governance of the water systems. Learning from such experiences will also be useful in countries with similar realities under respective country's climate change regime.

### ***Introducing aquifer contracts to users***

8. The project is likely to enforce Water Law, thereby forcing future farmers to acquire water entitlement before committing to agricultural expansion in semi-arid conditions. This will bring in behavioural paradigm shift, especially forcing farmers to attach increased importance to the value of water and its conservation. However, its realization would require significant efforts in enforcing such legal and regulatory provisions with a high degree of accountability and transparency, for which a much improved governance system must be nurtured through the involvement of political masters and administrators alike.

9. It is perhaps unavoidable that large-scale finances for irrigated agriculture in semi-arid conditions are likely to be locked-in, since the Government of Morocco has decided to promote

the future expansion of high-value date production. It is also unavoidable that, with this expansion of irrigated date farming, a large portion of water will also be committed for irrigation, which might put groundwater aquifers under significant stress if adequate surface water schemes are not put in place before the inevitable agricultural expansion. Therefore, the dependence on both external financing for further irrigation development and groundwater resources are likely to continue – the latter having a devastating effect on future agricultural potential in semi-arid conditions in Morocco.

### ***Involvement of the private sector***

10. The project envisages promoting an enabling environment for the private sector to take advantage of irrigated agriculture. Given the limitation of water resources and the high potential evaporative losses under climate change, potential risks regarding the sustainability of water resources must be weighed against the expansion of irrigation. Much will depend on the enforcement of water law. Moreover, the proposed aquifer monitoring can become a tool in decision-making on the conservation of water, if such decision-making practices are done judiciously.

## **1.3 Sustainable development potential**

*Scale: Medium/high*

11. The project promises to contribute to various sustainable development goals (SDGs), although the coverage is very low compared to the entire country. The following table provides an overview of the project’s likely contributions to achieving the SDGs in Morocco. If one considers that targeting SDGs to be a criterion for approval, the project does have some potential to contribute.

**Table 1: Sustainable development goals**

<b><i>Project directly contributing to SDGs</i></b>	<b><i>Project indirectly contributing to SDGs</i></b>
<b>SDG-1: No poverty</b> - by contributing to the economic empowerment of poor oasis farmers	<b>SDG-2: Zero hunger</b> - by improving the food security of smallholders
<b>SDG-6: Clean water and sanitation</b> - to be supplied for drinking purposes	<b>SDG-15: Life on land</b> - contributing to reverse land degradation
<b>SDG-3: Good health and well-being</b> - particularly reducing the burden of pollution-related diseases	
<b>SDG-5: Gender equality</b> - provisioning of a reliable water supply will have profound beneficial impacts to achieve the goal	
<b>SDG-13: Climate action</b>	

12. The idea of developing irrigated agriculture is to economically gain from the production of export-earning high value dates, and partly to increase the sustainability of water resources by conserving groundwater. The former promises significant economic potential: not only will commercial and other farmers make money, the production of about 40,000 tonnes of dates per annum is likely to generate an estimated gain of about USD 400 million worth of produce. The auxiliary but direct gains from oasis-based agriculture, though not estimated and/or weighed against such large economic gains, will also be useful for subsistence farmers. Participation in date value chain and assured harvests despite climate change will bring economic benefits for smallholders. Moreover, flood ameliorating infrastructural adaptation would accrue saved costs, which might also be useful for the smallholder farmers.

13. The economic potential is also significant if one considers the production of dates worth USD 400 million and the creation of about 6,000 full-time jobs arising out of enhanced agricultural activities in the target areas. If inter-institutional collaboration and coordination is

replicated horizontally, especially towards the improvement of climate-smart agronomic practices, the overall stimulation effect on the local economy will be commendable.

14. As indicated above, while the project itself will contribute heavily to conserve already depleted groundwater resources, unless immediate similar investments are made to make more surface water available for irrigation, the apparent gains in water resources will likely to be eroded by future expansion in commercial date producing agricultural activities. Without committing to increased amounts of irrigation, future expansion in irrigated agriculture in semi-arid conditions will not be possible – with or without climate change.

15. There can be a potential risk of maladaptation, if strong institutional oversight and monitoring cannot be implemented simultaneously with the project. The occurrence of maladaptation might stem from the provisioning of a reliable source of irrigation water, which may convert rain-fed lands into irrigated land and eventually satisfy the suppressed irrigation demand in the area – the latter may lead to malpractices regarding exploitation of groundwater. Even though such risks exist, irrigation efficiency gains of about 15 per cent under higher evapotranspiration and soil conservation through improved agronomic practices offer moderate medium-term environmental co-benefits.

16. The social co-benefits of the project are expected to be high. Not only women in the oases and beyond will be relieved of stressful water collection duties, the quality drinking water services will have positive health benefits. The project claims that about 1,000 women will benefit from the project outcomes. The overall oasis development plans, if implemented as proposed, will have significant positive social and environmental co-benefits.

17. The project has a strong cultural co-benefit potential, which stems from restoration and subsequent strengthening of oasis-based ecosystems – the latter gradually deteriorating in the wake of an increased degree of aridity and subsequent non-viability of smallholders' livelihoods in oasis ecosystems.

#### 1.4 Needs of the recipient

*Scale: Medium/high*

18. In the backdrop of frequent crop losses due to exacerbated droughts, the oasis smallholders have been out-migrating in search of viable livelihoods. The project therefore is needed to safeguard livelihoods by reducing the sensitivity of semi-arid farmlands to increased evapotranspiration. The intermittent availability of water from surrounding rivers can no longer be reliable in the wake of climate change and the indiscriminate extraction of groundwater sources cannot be sustainable for long periods. The game changing intervention by the project, as envisaged, is therefore justified.

19. The promotion of climate-smart agriculture through an array of small-scale interventions is also needed in order to make oasis-based agriculture sustainable. The community-based agronomic interventions is also likely to contribute farm productivity for oasis population. Perhaps the most immediate gains will be realized by making quality drinking water available for about 5,500 people, both inside and outside the target oasis.

20. The proposed institutional strengthening through capacity-building and subsequent coordination mechanisms and embarking upon a new public-private partnership (PPP) framework for the management of the pipelines/infrastructure and water tariff imposition for the commercial farms are also justified steps towards the establishment of a holistic institutional mechanism. However, the existing institutions must grab this opportunity to go beyond 'business as usual' and engage in the horizontal expansion of inter-agency collaboration and coordination, in order to replicate good practices of the initiative elsewhere. The emerging tariff regime must be fully realized through greater institutional commitment, otherwise operation and maintenance beyond the project lifetime will not succeed. The project leaves

ample room for benefiting from consultancy and technical assistance services. The executing entities must grab this opportunity to enhance human capacities so that knowledge and skill transfer takes place and dependence on external services is significantly reduced.

## 1.5 Country ownership

*Scale: High*

21. The issue of provisioning irrigation water has been a key feature of a number of policies of Morocco, which include the National Water Strategy, Plan Maroc Vert, the National Climate Change Policy and Morocco's Intended Nationally Determined Contribution towards combating climate change. Therefore, the project is found to be completely aligned with the existing policy regime in relation to the provisioning of irrigation water, (ground)water conservation, increased use of surface water, reducing water-related vulnerabilities and risks of flooding and capacity development for the preservation of the cultural heritage of oasis communities.

22. The project aims to support the irrigation of existing commercial farms outside oasis areas; however in doing so, the project indirectly assists the proliferation of new commercial date farms in the area as it has been envisaged by the national agricultural development and state economic development policies. The project will also provide a platform from which to enforce Water Law, where future agricultural expansions will be guided and regulated with water entitlement.

23. The project has been conceived through the participation of relevant national institutions, most notably the national designated authority and the two executing entities. An effort will be made to embark upon a PPP arrangement to facilitate water infrastructural management and tariff realization for the sustenance of future operation and maintenance activities beyond the project timeline. A much needed inter-institutional coordination mechanism is promised, which will ensure the ownership of existing institutions.

24. The accredited entity (AE) has been working with the Government of Morocco since decades, having a rather large portfolio of EUR 2.5 billion. The AE has been supporting irrigation development for more than two decades; the experience could be of great help in the successful implementation of the project. The project builds practically on Agence Francaise de Developpement's co-financing for the building of a water retention dam, without which water supply could not be designed. There is significant co-financing committed through the participation of the government as well as local communities – although the participation of the latter would not have deterred the project from receiving GCF financing.

25. The institutional structure proposed for the smooth implementation of the project activities appears justified. Project management functions have been delegated to the Office Regional de Mise en Valeur Agricole du Tafilalet, which will be strengthened through technical assistance under component 3.1. The PPP framework, if expedited before the halfway point of the implementation of the project, will pave the way for the private sector to take over and deliver infrastructure management functions, under the guidance of relevant agencies.

26. The project has gone through stakeholder participation processes, including consultations. Civil society organizations have been engaged to share their views, although the extent of such consultations could not be ascertained from submitted documentation. It is claimed that a total of 16 consultations involving men, women, herders and youth groups have been held in developing the project. It is anticipated that, if approved, a more detailed stakeholder engagement plan will be developed before designing the specific aspects of delivery of the project components.

## 1.6 Efficiency and effectiveness

*Scale: Medium*

27. The AE requests for a contribution of EUR 20 million from the GCF as grant. The proposed grant amount is 26 per cent of the total budgeted amount, while at least one third of the supplied water will be provided to most vulnerable smallholders living in oasis areas, for their resilience building to non-revenue agriculture-based livelihoods. Although the project will also benefit commercial date farmers, the grant request is fully justified considering the project's overall paradigm shift and sustainable development potential. The GCF support will enable Morocco to initiate a holistic approach in delivering resilience building services involving national institutions. GCF support will leverage 3.8 times co-financing.

28. The financial analysis suggests that the project is financially attractive, exhibiting a 20 per cent internal rate of return (IRR) and a net present value (NPV) of EUR 55 million. The underlying assumptions are: the project will help to irrigate 825 ha of small oasis areas, 471 - 756 ha of medium scale plantations and 2,000 - 3,845 ha of palm tree farms per year. The sensitivity analysis suggests that the financial performances are highly sensitive to: (1) an increase in surface coverage by palm trees, and (2) the rate of water consumption by the palm trees.

29. Every percentage point reduction in the expansion of anticipated palm tree coverage (set at 3.5 per cent) would decrease IRR by 4 per cent (from 20 per cent to 16 per cent), with a corresponding decrease in NPV to EUR 32 million (down from EUR 55 million). It is found that the project viability is determined largely by the timing of reaching a threshold coverage increase of irrigated date palm plantation up to 3,845 ha per year. The sooner the irrigation starts to support such plantations, the greater NPV may be attained. On the other hand, if it takes more than 20 years to reach the said threshold, the project will no longer be financially attractive.

30. If the irrigated water consumption rate escalates in the plantations, the financial viability of the project declines significantly. A 28 per cent increase in water consumption from the projected rate of 20 m<sup>3</sup> per ha leads to 0 NPV. However, it is assumed that the consumption rate might be in the order of 15,500 m<sup>3</sup> per ha, which enhances the IRR from 20 per cent to 31 per cent with a corresponding NPV of EUR 98 million. Since the efficiency of the project is dependent on how soon the irrigated development can be ensured and how efficient the rate of consumption of irrigated water will be, a lot will depend on the timely completion of the dam and associated water infrastructure as well as the strict implementation of water contracts.

## II. Overall remarks from the independent Technical Advisory Panel

31. The independent Technical Advisory Panel recommends the project to be supported with EUR 20 million in GCF grant finance, provided the following conditions are met.

- (a) The Accredited Entity delivers a certificate before the first disbursement, in a form and substance satisfactory to the GCF Secretariat, confirming that the expropriation process of identified lands that might be necessary for the implementation of the project has been lawfully completed;
- (b) The Accredited Entity delivers a Land Acquisition and Compensation Plan comprising the implementation of the water transmission corridor, before the first disbursement of funds, ensuring that this plan includes a detailed account of identified lands and a matrix of affected individuals and compensation package, in a form and substance satisfactory to the GCF Secretariat;
- (c) The Accredited Entity shall, in collaboration with the relevant Executing Entity, develop and submit a detailed groundwater monitoring plan including tools to be used for such



monitoring, in a form and substance satisfactory to the Secretariat, before the signing of the contract; and

- (d) The accredited entity shall:
- (i) Initiate the PPP framework to be developed as soon the project is approved;
  - (ii) Communicate a fully developed work programme for PPP development in a form and substance satisfactory to the GCF Secretariat before the signing of the contract; and
  - (iii) Submit a PPP framework in a form and substance satisfactory to the GCF Secretariat before the commencement of mid-term review of the project.

## Independent Technical Advisory Panel's review of FP043

Proposal name:	Saïss water conservation project
Accredited entity:	EBRD
Project/programme size:	Medium

### I. Assessment of the independent Technical Advisory Panel

#### 1.1 Impact potential *Scale: Medium*

1. Water scarcity is becoming one of the main threats in Morocco, since water availability per capita has dropped from 3,500 m<sup>3</sup> in 1960 to 1,000 m<sup>3</sup> in 2000. The demand for water will increase as the country's population does and the risk of climate change will amplify this vulnerability.
2. The objective of the project is to improve the climate resilience of agricultural systems of the Saïss Plain that represents 11 per cent of Morocco's annual water endowment by financing a bulk water transfer scheme from the M'Dez Dam to the Saïss Plain in northern Morocco, including a public-private partnership (PPP) to provide irrigation facilities to the water users.
3. The project is expected to reach 350,000 direct beneficiaries and around 1.8 million indirect beneficiaries covering around 2,849 farms and 21,600 ha.
4. In terms of climate change adaptation, the project will support the adoption of efficient drip-irrigation techniques, improving efficiency rates from 59 per cent to 69 per cent with an annual water saving of 11.2 million m<sup>3</sup>.
5. The project will also reduce pressure on highly overexploited groundwater resources by enabling the transfer of 90 to 110 m<sup>3</sup> per year.
6. However, the project has very little information on the M'Dez Dam and its basin, and the implications of climate change for future water availability scenarios. There could be some elements of maladaptation as the project is not taking a closer look at water basin management, but assumes that water supply will remain sufficient under climate change scenarios.
7. Furthermore, the project as it stands is a pure infrastructure project that will take at least four years to provide irrigation facilities to the farmers, mainly through private sector investment. Therefore, adaptation impacts will be delayed until the project infrastructure is developed. And even then, providing water will not be the sole solution for adaptation. Other considerations include the management of pesticides and fertilizers, crop resilience, waste management, etc.

#### 1.2 Paradigm shift potential *Scale: Medium*

8. The project has three key phases, including implementation (2017-2021), repayment (2017-2035) and operation (2022-2052). The complementary components of the project involve:

- (a) Component 1: increasing the climate resilience of irrigation infrastructure through the development of technical and institutional capacities and investment in a strategic water transfer scheme in the Saïss Plain;
- (b) Component 2: promoting effective community involvement in water governance and the awareness of climate resilience; and
- (c) Component 3: scaling up private sector involvement in the design, implementation, operation and maintenance of the irrigation infrastructure.

9. The project is not innovative, as water transfer systems and irrigation systems have been developed around the world, but it could be relevant in solving a water scarcity problem in this specific region. There is also the question of how it will benefit the most vulnerable communities in the region, as they will be able to use the irrigation infrastructure only if the tariff system accounts for their capacity to pay and if there are additional benefits in increased knowledge, climate change awareness and an increase in agricultural productivity.

10. The scalability of the proposal depends more on the success of the water infrastructure facility and the ability to involve more water users in an efficient manner as well as the ability to find private partners willing to invest and manage the irrigation facility.

11. The proposal will involve the community in the governance and awareness of climate change. However, it is not clear that this type of involvement will start at an early stage, as the infrastructural work will take at least four years and that it will be maintained by future private sector actors involved in the PPP. Moreover, this component will be delayed as the completion of the dam is expected by 2021.

12. The proposal sustainability will also be real only if the private sector is involved and there is an evident willingness to pay for water by the end users. The project states that the water tariff system has functioned in Morocco since 1969 and that the last increase in the volumetric fee dates from 2009. However, during consultations only a few farmers were involved and there is no evidence that there is a solid study on the tariff system and willingness to pay to eventually cover the investment.

13. If the project is approved, the GCF will need to have a covenant on the future management, maintenance and involvement of communities by prospective private sector actors, as they will be the ones ensuring community involvement and efficient management of the system.

14. On the other hand, it is important to ensure enhanced coordination and knowledge-sharing, including climate change understanding among the different projects dealing with water systems in the country.

### 1.3 Sustainable development potential

*Scale: Medium*

15. The project environmental, social and economic indirect benefits are not evident in the proposal. In fact, benefits will be feasible only if the whole infrastructure is developed and becomes functional under the PPP arrangement. The arrangement can be described in general as the culmination of the development of a framework, the appetite of private sectors to take part and the incentive structures within the PPP; and the realization of tariffs through an agreed tariff regime.

16. The project does not speak about the Sebou basin, which provides the water for the dam and eventually for the Saïss system. It is of critical importance to ensure that the water basin is well-managed and that the ecosystem in general is conserved to enable the provision of water as an ecosystem service under future climate change scenarios.

17. The proposal also provides very limited information on the management of the Saïss aquifer. In fact, the whole system will reduce the pressure for its overexploitation, but it does not say anything about the eventual possibility of recharging it and managing it in terms of pollutants from chemicals and fertilizers.

18. Therefore, if the proposal only limits its vision to the efficient management of groundwater that comes from a different basin, it will lose the real environmental dimension of interlinking two water basins and its ecosystem integral dimensions.

19. In terms of social co-benefits, the project will supply water to around 2,900 farms in the basin that will be more prepared to cope with climate change and ensure agricultural productions that sustain their livelihoods. However, the project is unclear in the sense that with drip irrigation systems they will increase their efficiency only by 10 percentage points (from 59 per cent to 69 per cent) which is marginal compared to the amount of the investment.

20. In terms of economic co-benefits, depending on the tariffs and maintenance of the system, in the absence of a real study, it is difficult to know if farmers will be able to pay for the water and irrigation systems and will be able to pay for more expensive prices for water.

21. In terms of social co-benefits, the project is expected to support existing small farmers in changing their practices to more sustainable and economically viable models, contributing to poverty reduction. However, since the timetable of the project depends on the development of infrastructure, social co-benefits will only happen when all the infrastructure is ready, and that is when the GCF will have a phase out. In that respect, this component will be in the hands of the accredited entity, the European Bank for Reconstruction and Development (EBRD), and the Moroccan Government.

22. In terms of gender perspective, the project has undertaken extensive background work on the importance of a gender perspective describing several expected outcomes, including a training of trainers on technical aspects of sustainable agriculture for women's cooperatives in the Saïss Plain, training for 350 women and new programmes for women-led micro-, small- and medium-sized enterprises, increasing their turnover and productivity.

#### 1.4 Needs of the recipient

*Scale: High*

23. Morocco is a country with evident vulnerability to climate change, especially in terms of water stress. The country has devoted resources to build 135 dams throughout the country as a mean to ensure water availability. However, when climate change intensifies, as well as the population increases, the escalation of water demand and subsequent stress on water resources will be more evident.

24. Over 82 per cent of the water of the Saïss Plain is used for agriculture. Most of the water is pumped illegally from the aquifer without paying water fees. One of the main purposes of the project is to legalize users providing irrigation services, adding climate change to the rationale. Efficient irrigation systems are needed to use the water in a much more efficient manner. Besides providing water, there is a need to support livelihoods and enterprises to promote economic growth as 10 per cent of Morocco's 13.4 million rural residents lived below the poverty line in 2011.

25. The project's success partly depends on structuring an accurate tariff system that enables the smaller farmers to use the irrigation services with a fair tariff compared to medium and large farmers. This is correlated to land tenure as 50 per cent of the land is in the hands of private owners, with around 13 per cent of less than 5 ha, around 75 per cent of the land with an average of 5 to 15 ha and 13 per cent with more than 15 ha. There is also a great proportion of public ownership through two models: (1) agrarian cooperatives (close to 25 per cent) where

land has been divided into small lots of 5 ha and given to sharecroppers; and, (2) large-scale public farms (14 per cent) previously owned by state companies and now allocated to private investors through PPP contracts.

26. The project will strengthen institutional and implementation capacity. Special attention should be given to the capacity of Ministry of Agriculture and Maritime Fisheries (MAMF) to manage PPPs, basin management and involve communities in their projects.

## 1.5 Country ownership

*Scale: High*

27. The Government of Morocco strongly supports the proposed project which aims to rationalize the use of water resources for irrigation. Morocco has been part of the climate change negotiations and developed its national plan of action against climate change in 2009 which was presented at the fifteenth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change. The climate change plan is supported by a set of climate change strategies such as the Morocco green plan, the National Waste Recovery Programme and the National Liquid Sanitation and Wastewater Treatment Programme (NSP).

28. Since agriculture accounts for 92 per cent of water consumption in the country and is central to Morocco's climate resilience, MAMF is putting in place incentives, investments and institutional reforms in the agriculture sector to ensure greater returns at the farm level.

29. The National Plan for Saving Water in Irrigation promotes more productive water use by introducing efficient irrigation technologies (mainly drip irrigation) on 555,000 ha of the country's irrigated land by 2020, rather than pumping water with diesel alternatives.

30. Morocco has set clear targets in its nationally determined contribution, including the substitution of water withdrawal from overexploited aquifers by withdrawals from surface water (the expected outcome of the project); and an increase of the current area under drip irrigation from 154,000 ha at present to 555,000 ha. The project is therefore aligned with the nationally determined contribution commitments.

31. The accredited entity has a track record in financing water infrastructure projects in several countries. However, based on the clarifications provided by EBRD, the independent Technical Advisory Panel (TAP) remains concerned about the capacity of EBRD to manage water infrastructure projects with the additionality of ensuring climate change adaptation of the most vulnerable communities.

32. The executing entity, Ministry of Agriculture and Maritime Fisheries -MAMF, is the lead government authority on irrigation projects, has relevant experience on the execution of water transfer projects and PPPs and is working under the framework of the Morocco Green Plan that aims to double the agriculture sector value added and the national plan for saving water in irrigation.

33. Stakeholder consultation was undertaken but on a very limited scale. However, to the questions raised by the TAP on this matter, EBRD answers that consultations under the Public Participation Programme will be an important component in enhancing farmers' participation. The programme will include the facilitation of a dialogue between end users of water services, the service provider and, MAMF and seek to ensure geographically equitable participation, including the participation of water users' associations, farmers and women. An advisory committee will be established to discuss price setting, infrastructural maintenance, consumer complaints, the affordability of tariffs and social hardship caused by the implementation of the project, of the PPP, and of institutional changes.

## 1.6 Efficiency and effectiveness

*Scale: Low*

34. The total project cost amounts to EUR 206.67 million, of which the GCF grant accounts for of EUR 31.97 million, representing 15 per cent of the total project. EBRD will provide a EUR 120.88 million loan and the Government of Morocco will leverage EUR 53.82 million.

35. According to the proposal, the irrigation system investment is totally dependent on subsidies. The preliminary financial model shows that the PPP scheme includes public subsidies of EUR 112 million and an increase in the average tariff to MAD 1.8 m<sup>-3</sup>, which is the cost of drawing water from the basin. Without public subsidies, the average tariff would have to be set at MAD 3.9 m<sup>-3</sup>, which will breach the affordability constraints of the farmers.

36. The project will only be operational when the water transfer and irrigation system is completed in 2021, and only then will the possible PPP process be ready for bidding. The expected cost of the irrigation system is estimated to be EUR 140 million to be financed by public-private sector partners as a parallel financing scheme to the project.

37. With the investment, an additional 3,100 ha will result in 21,600 ha with irrigation services compared to 18,500 ha without the project. That is, an additional irrigation system will cost an average of (USD 213 million divided by 3,100 hectares) USD 67.74 per every additional hectare. The investment is therefore large, compared to the number of expected increased irrigated lands.

38. The economic internal rate of return is between 7.11 per cent and 8.37 per cent, and the cost/benefit ratio is between 1.11 and 1.18. The project proves economic feasibility, but the financial feasibility is negative, demonstrating that the project needs public funding aside private finance.

39. Payment of the investment through the PPP facility will depend on the level of intake by water users. Farmers will be free to decide whether they want to avail themselves of the service or not and they will not be adversely impacted by continuing to use their current source of water. Therefore, the future PPP operator will need to set tariffs that are designed to stimulate demand for the provision of the services.

40. In general, there is a question on the need of a grant arrangement by the GCF rather than a concessional grant. The country could borrow the entire amount of the project based on the current credit rating and level of indebtedness. The grant could be justified on the grounds of lowering the costs to ensure that the adaptation component is well addressed and involves real community engagement and governmental intake and knowledge of the climate change risks.

## II. Overall remarks from the independent Technical Advisory Panel

41. The TAP is concerned that this project may end up being a pure infrastructural project without addressing the real climate change needs of the most vulnerable communities of the Saïss Plain. Because of the time frame of the infrastructure development, GCF involvement may end early, much sooner than the infrastructure irrigation system is ready to be used. In case this happens, the GCF may be left without the means to monitor the engagement of communities and their ability to adapt to climate change.

42. The TAP will therefore recommend that this project is approved subject to fulfilling the conditions presented by the secretariat and will add the following conditions:

43. Before the first disbursement:

(a) Present an action plan to start promoting community involvement in water governance and improved awareness of climate change issues for the duration of GCF involvement

and after the completion of the infrastructure irrigation works for the duration of EBRD involvement;

- (b) Present an overall management scheme satisfactory to the Secretariat to preserve the Sebou and Saïss water basins under current and projected climate change scenarios with an ecosystem-based approach, including a hydrological study and a sustainability (economic, sociological and environmental) study of the overall implications of the water transfer within the basin and sub basin; and
  - (c) Present a matrix of climate change indicators (water conservation, community involvement, etc.) that could be monitored during EBRD involvement in the project, ensuring that the Secretariat retains opportunities to ensure that communities are duly integrated and climate change dimensions are considered through an adequate measurement, reporting and verification regime.
44. Conditions prior to the launch of the PPP bidding process:
- (a) Present a projected conditions scheme of the overall PPP bidding process, including possible tariff schemes ensuring special considerations for vulnerable groups and management and monitoring arrangements that take into consideration water governance and efficiencies under projected climate change scenarios.

## Independent Technical Advisory Panel's review of FP044

Proposal name:	Tina River Hydropower Development Project
Accredited entity:	World Bank
Project/programme size:	Medium

### I. Assessment of the independent Technical Advisory Panel

#### 1.1 Impact potential

*Scale: High*

1. Solomon Islands, a small island developing State in the Pacific region, has put in place a very strong plan to shift its power generation infrastructure from its current dominant reliance on diesel fuel to one that is dominated by renewable power generation. Diesel power generation currently constitutes about 97 per cent of all generation to the main grid of Solomon Islands. Universal supply of reliable grid-connected electricity is a great challenge in Solomon Islands where its population is scattered across 90 inhabited islands. Although the national electrification rate is reported to be 45 per cent, much of this is supplied only by small photovoltaic (PV) panels typically of 20 Wp. The percentage of households supplied by the Solomon Islands Electricity Authority (SIEA), the state-owned power utility, is merely 12 per cent nationally. The National Development Strategy (NDS) of Solomon Islands recognizes the need to extend the electricity supply to the many islands that are currently not connected to the national grid through properly conceptualized and implemented rural electrification programmes; it places equal importance on ensuring a reliable and affordable power supply in all urban centres by promoting the use of renewable energy, opening the market to independent power producers, developing appropriate prepaid tariff structures and ensuring that SIEA has sound technical and managerial expertise for an efficient and effective state-owned enterprise.

2. Another key consideration in the development of this project is the fact that even those customers connected to the Solomon Islands grid (the Honiara grid) face one of the highest electricity tariffs in the Pacific region and one of the highest in the world, averaging USD 0.82/KWh. The result is that many grid-connected households consume less than 50 KWh/month. It has also been estimated that about 180,000 people who live in households connected to the Honiara grid, of whom 87,300 are women, will benefit from access to low-emission energy, reduced cost of electricity and improved air quality (in Honiara).

3. In this project the AE plans to implement a hydropower project with an installed capacity of 15 MW, which will annually generate 78.5 GWh of clean electricity delivered to the Honiara grid. When the project is commissioned this will generate 65 per cent of the 120 GWh demand in Honiara projected for 2022. Furthermore, it will shift the diesel generation from a contribution of 97 per cent before the project to about 33 per cent by the commissioning of the project. It has also been estimated that the levelized cost of sale of electricity (LCOSE) from the project company to Solomon power (a public utility owned by the Solomon Island Government) will be USD 0.22/KWh. We are aware that Solomon Power will still add its own margin to this LCOSE to arrive at the average retail tariff to customers who are connected and will be connected to the Honiara grid. We conclude that the eventual retail tariff that will be available to the connected customers will be much less than the average retail tariff of USD 0.82/KWh. This is based on the information that the pricing of the IDA credit for the equity participation of SIEC will not be greater than 4% with a tenor of 34 years. The project will also yield a new



greenhouse gas (GHG) emission reduction of 49,500 tonnes of carbon dioxide equivalent (tCO<sub>2</sub>eq) a year and a total of 2.48 million tCO<sub>2</sub>eq over the 50-year life of the project. The annual GHG emission reduction potential of the project is more than two and a half times higher than the Solomon Islands Government's commitment in the intended nationally determined contribution (INDC) to reduce emissions by 18,800 tCO<sub>2</sub>eq/year by 2025, and 60 per cent higher than the target reduction of 31,125 tCO<sub>2</sub>eq/year by 2030 with appropriate international assistance. Accordingly, the impact potential of the proposed framework for implementing the project is assessed as high.

## 1.2 Paradigm shift potential

*Scale: High*

4. As stated in section 1, the main grid of Solomon Islands is dominated by a diesel-fuelled power system, up to 97 per cent, with the balance of 3 per cent being renewable energy (RE). Implementation of this hydropower project will shift the renewable composition of the supply to the Honiara grid to mainly RE systems (67 per cent). In addition to this, since the project will be implemented with a sizeable reservoir, which will serve as a power storage system, the implementation and integration of the usually variable RE systems (solar and wind) into the Honiara grid will be more achievable as these RE systems can be implemented and grid-integrated without the need of the very expensive energy storage batteries used to address the intermittency of the system. The hydropower project when commissioned will provide this electricity storage system.

5. Solomon Islands' National Development Strategy (NDS) document and many of the related climate change policy documents (e.g. INDC) showed that the government recognized the importance of renewable energy in reducing Solomon Islands' GHG emissions as a strategic policy for tackling climate change mitigation. However, previous estimates of net GHG emission reduction envisaged will be dwarfed by the targets that will be achieved by this hydropower project when commissioned, as stated in section 1. The implementation of the project will also make the planning and execution of more RE power projects, especially the ones with intermittency characteristics (solar and wind), to be more viable without the need for the inclusion of electricity storage batteries. This will fast-track the inclusion of more RE power systems in the Honiara grid.

6. This will alter the picture of, for example, solar power implementation, for which a pilot project financed by external funding with an installed capacity of 1 MW of solar PV capacity was recently connected to the Honiara grid. In addition, the fact that the implementation of the project will lead to the achievement of a not more than USD 0.22/KWh tariff for electricity purchase from the hydropower plant by SIEA, which, if adequately passed on to the final consumers, especially the residential consumers, will ensure that the currently high price of electricity to these consumers (USD 0.82/KWh) is brought down to more affordable levels. Information from the AE and articulated in a section of the funding proposal showed that the old tariff system has just been revised to ensure that the benefits of a reduced wholesale tariff that will be made possible by the concessional financing available for this project are passed on to end users.

7. This project will also achieve a few 'first's in Solomon Islands: it will be the first utility-scale hydropower facility in the country; and the first privately invested Build, Own, Operate and Transfer (BOOT) transaction in the country. These are clear indications that the proposed framework has paradigm shift potential. Accordingly, the independent Technical Advisory Panel (iTAP) views the paradigm shift potential of the proposed facility as high.

### 1.3 Sustainable development potential

*Scale: Medium*

8. Environmental, social and economic co-benefits, including gender-sensitive development impacts, will be associated with the successful implementation of this project, as shown below.

#### ***Environmental co-benefits***

(a) Reducing air pollution

The displacement of diesel fuel for power generation to the grid by this project will lead to a significant reduction in noxious emissions (sulphur dioxide, nitrogen oxides, particulates, volatile organic compounds, etc.) when the combustion of this hydrocarbon fuel is replaced by generation from clean hydropower. While measurement data are unavailable, it is known that emissions from diesel generators have an adverse impact on the ambient air quality, especially when the efficiency of the system is low. In particular, emissions from the Lungga Power Station's three generators with low efficiencies have a significant negative impact on the ambient air quality around Honiara. Wind data from Honiara International Airport indicate that the winds predominantly occur from the east-northeast direction, so the emissions are believed to directly affect the population of Honiara. Implementation of the project will eliminate these noxious emissions and have a positive impact on the health of the population of Honiara;

(b) Reducing noise pollution and soil and water contamination

Diesel generators have higher noise pollution compared with hydropower stations. Utilization and handling of diesel fuel pose risks of contaminating the soil and water through spillage during transportation, storage and operation. Reduction of diesel generation resulting from the project will reduce such risks; and

(c) Watershed management

Solomon Islands has abundant pristine forests, but they are being destroyed rapidly owing to uncontrolled logging. The project has prompted active discussions on protecting the upstream reaches of the Tina River watershed, because the natural water retention capacity of the watershed is dependent on preserving the forest, and rich vegetation prevents soil erosion and landslides which may increase inflow of sediments into the project's reservoir. The need to construct an access road may contribute negatively to this effect, especially for the portion that is a greenfield site. It is therefore important that the construction of the road is carried out taking into account the need to preserve forests wherever possible.

#### ***Social co-benefits***

(a) Stable and more affordable electricity

The tariff methodology approach used by SIEA over the years allowed the utility to pass on the variable cost of fuel to consumers. The implication of this is that consumers connected to the grid are exposed to the variability of the crude oil market. The tariff system has recently been revised in anticipation of the implementation of this hydropower project with the new tariff regime built into the fixed power purchase agreement price, which will provide customers with a more stable, low tariff throughout the concession period. After the BOOT period when the hydropower facility is handed over to SEIA, it is expected that the benefit of the lower tariff will continue as the capital cost of the power plant would have been paid off, leaving only the minimal operations and maintenance cost of the system;

(b) Lower cost of water supply

The Solomon Islands Water Authority is the largest customer of SIEA, and since its water tariff is linked to the electricity tariff, the reduction in the latter will benefit the population in Honiara with a reduced water tariff; and

(c) Community development

According to the information contained in the submission of the accredited entity (AE), a unique benefit-sharing fund will be established, which will direct a portion of the net benefit of the project to the Tina River communities, providing them with direct management responsibility for the funds and the ability to invest according to the evolving needs of the communities. The Japan Social Development Fund (JSDF), administered by the World Bank, is expected to provide seed money to prepare the communities to manage the funds, and also to implement benefit-sharing activities prior to the generation of revenue from the project, including job training, electrification and rural water supply projects as requested by the communities.

***Economic co-benefits***

9. Economic co-benefits will include: creation of jobs during the construction and operations of the facility – it has been estimated that the construction will create about 300 jobs for the local construction industry, with preference given to job seekers local to the Tina River area; the lower tariff will have a positive impact on the disposable income of the consumers as less specific expenditure is needed for electricity, leaving more disposable income for other consumption, thus having a positive impact on the economy; the need to import diesel fuel will be drastically reduced with a significant effect on the balance of payments of Solomon Islands, bearing in mind that the oil price shock in 2008 and the high prices during 2011–2014 have severely eroded the country’s balance of payments; the dam that will be built will provide a level of protection for the riparian communities from the frequent flash floods that are reported to occur in the Tina River basin. Honiara is located in the pathways of tropical cyclones and is frequently affected by flooding. The devastating floods of April 2014 affected 52,000 people and left more than 10,000 people in evacuation shelters.

***Gender-sensitive economic impact***

10. This includes:

(a) **Land Acquisition and Livelihood Restoration Plan (LALRP), which will be used to mainstream gender under this project.** The Project Office has held separate smaller consultation meetings for women and youth to empower them to speak their minds. From such meetings, specific livelihood restoration activities that benefit women were formulated; the LALRP and the Gender Action Plan (GAP) will ensure that women are provided with job training and opportunities created by the project, and that women receive equal pay for equal work. The implementation of the LALRP and GAP will be independently monitored by consultants commissioned by the Project Office under component 4 of the project; and

(b) **Small-scale community infrastructure.** Through public consultations, including consultations for the preparation of the GAP, it was found that affected women prioritized access to water supplies and job training. In particular, the supply of clean water was the priority of many women since they currently spend a significant amount of time fetching from the streams. The pilot benefit-sharing mechanism JSDF project intends to invest in developing community water supply systems to relieve women from this drudgery as well as providing jobs training and working with SIEA to extend its distribution network.

11. Given the fact that many of these effects are predicted and it is not known whether they will be achieved 100 per cent, accordingly, TAP sees the sustainable development potential of the proposed facility as medium.

#### 1.4 Needs of the recipient

*Scale: High*

12. In line with the country policy, the Ministry of Mines, Energy and Rural Electrification (MMERE) has recently launched an initiative to double the number of households supplied by SIEA from 15,500 to 30,000 by 2021. This is an indication that the government recognizes the need for better power supplies to the people and as such it can be concluded that this hydropower project is one of the priority needs of Solomon Islands.

13. As it is a known fact that many areas of Solomon Islands and especially the areas close to the site of the power plant (Honiara) are very prone to flooding, components of the project (the power plant facilities, the access roads, the transmission lines) have been developed with a climate-proof design, causing a higher level of capital cost for the project. This is necessary to strengthen the climate resilience of the area. In addition, the construction of the dam will provide a level of protection to some of the areas within the project area in Honiara, which suffered devastating effects of flooding in April 2014.

14. The fact that the power sector of Solomon Islands is very heavily dependent on imported diesel fuel, with a devastating negative impact on the country's balance of trade, is also a crucial factor in the need to diversify power generation from dependence on imported fuel to the use of local resources, which will be achieved with the implementation of this project. The inability to attract international funds to infrastructure projects in Solomon Island has been the bane of development, especially in the power sector. The scheme that will be put together will result in concessional funding for this project, which will have an impact on the future ability of the country to attract funding since the success of this intervention will create a condition precedence needed to attract future flows of finance. It is certain that without this scheme, funding for such projects may have been impossible; therefore, this current intervention is a critical need of Solomon Islands.

15. The intervention proposed by the AE also has institutional strengthening components, which will be funded by grant money. Such capacity-building is needed in the positive development of the country.

16. TAP believes the need of the recipient is high.

#### 1.5 Country ownership

*Scale: High*

17. Country ownership of this project is described according to the following metrics:

*Existence of a national climate strategy and coherence with existing plans and policies*

18. Solomon Islands is a small island developing State with very insignificant GHG emissions but at the receiving end of the impacts of climate change, particularly the rising sea level. As a result, the Solomon Islands National Climate Change Policy (NCCP) plan (2012–2017) places greater focus on the country's adaptation policy but also stresses its commitment to strengthen the capacity of the government, private sector and other relevant institutions to develop and implement renewable energy strategies. It is therefore correct to conclude that the hydropower technology adopted in this project is aligned with the needs of the country as established in the NCCP. In addition, Solomon Islands' conditional contribution (with international assistance) in its recently submitted INDC aims to reduce emissions by 18,800 t CO<sub>2</sub> eq annually by 2025 below the 2015 level, and by 31,125 t CO<sub>2</sub> eq annually by 2030, of which 39 per cent of the

reduction will be from the power sector. Starting from the year 2020, this equates to a total reduction of 218,500 t CO<sub>2</sub> eq by 2030. The INDC lists this hydropower project as the one with by far the largest mitigation option with a potential reduction of 319,355 t CO<sub>2</sub> eq by 2030, which is 150 per cent of the total reduction target. The cumulative net GHG emission reduction potential up to 2030 in the INDC has been calculated using a much larger amount of energy being generated by the project. The estimate of the net cumulative GHG emission reduction included in the funding proposal for this project is quoted as 60 per cent higher than the target reduction in the INDC of 31,125 t CO<sub>2</sub> eq/year by 2030 achievable through appropriate international assistance. It is important to note that a static baseline was used in the FP calculation. In fact, it is likely to be lower than the estimate because a dynamic baseline should be used. This is because when the project is commissioned and connected to the grid, the project will start to displace grid consumption, but with a lower tariff, consumers that are not connected to the Honiara grid will start to connect to the grid, hence the baseline will no longer be grid displacement but a combination of grid and off-grid consumption will be displaced by the clean electricity from the project. Nevertheless it is likely that net GHG emission reduction from this project will constitute a high percentage of future GHG emission reduction in Solomon Islands. Given that the project from conceptualization through design has taken into consideration the goals articulated by the Government of Solomon Islands in the INDC, country ownership can be said to have been taken into consideration. The Solomon Islands National Energy Policy (SINEP) is another existing policy plan that is aligned with the target of the hydropower project. SINEP establishes a target to “increase the use of renewable energy sources for power generation in urban and rural areas to 50 per cent by 2020.” The project’s 15 MW installed capacity will generate 78.35 GWh per annum, which is 65 per cent of the 120 GWh demand projected for 2022 when the project is scheduled to come on line. The implementation of this project will facilitate the achievement of the goal of SINEP, another good metric for country ownership.

*Experience and track record of the AE and executing entities with respect to the activities that they are expected to undertake in the proposed project/programme*

19. The World Bank is the AE for this project. The key experience and track record of the AE can be summarized as follows: the World Bank, through its International Development Association operations, has a proven track record in the energy sector of Solomon Islands through the following past interventions: since 2008, through the ongoing Sustainable Energy Project (originally for USD 4 million equivalent) for which additional financing was approved in 2013 for USD 13 million equivalent, the AE has been providing assistance to SIEA, the focal electricity utility in Solomon Islands; the World Bank also recently approved in July 2016 the Electricity Access Expansion Project (USD 2.5 million from the Global Partnership on Output-based Aid), which aims to provide targeted subsidies to help the low-income households to pay the one-off upfront initial connection fees; with regard to Tina River project, the World Bank has been supporting the project and the Government of Solomon Islands since its identification in 2006 through the utilization of financial support from development partners such as the Government of Australia and the European Investment Bank, for the preparation of a bankable feasibility study, selection of an investor through a transparent and competitive bidding procedure, the preparation of safeguards documents, the facilitation of the arrangement of concessional finance and ensuring that international best practices are adopted in all aspects of the project. The consortium of the Korea Water Resources Corporation (K-Water) and Hyundai Engineering & Construction (HEC) is the preferred project sponsor responsible for securing financing, development and operation over the concession period, and HEC is also the preferred engineering, procurement and construction contractor. K-Water was founded in 1967 and operates 16 multi-purpose dams and integrated regional water supply systems in the Republic of Korea. It is also the leader in renewable energy and operates 25 per cent (1,335 MW) of all domestic renewable energy installments. Since 1994, K-Water has also

aggressively advanced its overseas business, and is now engaged in 32 overseas projects in 21 countries. The K-Water–HEC consortium not only has development and systems operations experience in hydropower projects but also is a leader in RE project space, thus having ample experience as an executing agent for this project. SIEA is the project off-taker and will also invest in the transmission line to distribute power from the project. It is also the body authorized, under the Electricity Act, to issue licences to third parties to generate electricity. As the executing entity of the transmission line component, SIEA has substantial experience in developing and operating transmission lines, which is a critical component of the success of this hydropower project.

*Engagement with national designated authorities, civil society organizations and other relevant stakeholders*

20. The Government of Solomon Islands as a key stakeholder has been a frontline supporter of this hydropower project. A Project Office was set up in MMERE at the inception of the project in 2010. Since then the process has been adequately supported by succeeding governments up to the present, in terms of both fiscal and financial support. Since its inception, the Project Office has had an active programme of stakeholder engagement that informs them regularly on project developments and the way in which the project will affect them. The Project Office also conducts consultations with local and international non-governmental organizations with a presence in Solomon Islands. In 2012, the Project Office prepared a Stakeholder Engagement Plan (submitted as part of this proposal), which laid out specific actions for engaging with each stakeholder group, including the form (i.e. meetings, radio, etc.) and frequency of the activities. This plan has provided a guide for stakeholder engagement over the few years since it was developed. Targeted consultations and interviews have also been conducted for various studies, including the feasibility study, social assessment, environmental assessment, land identification and acquisition and gender assessment.

21. Given the various considerations mentioned above, TAP has concluded that the country ownership of the proposed framework by the AE is high.

## 1.6 Efficiency and effectiveness

*Scale: High*

22. The total amount of GHG emission reduction during the project life of 50 years will reach up to 2.48 Mt CO<sub>2</sub> eq in total based on the static baseline emission factor of diesel utilized. Considering the total project cost of USD 233.98 million and GCF investment of USD 86 million (split into USD 70 million as loan at 0 per cent interest rate and USD 16 million as grant), the cost per t CO<sub>2</sub> eq is projected to be USD 94.54/t CO<sub>2</sub> eq for the overall funding cost and USD 34.75/t CO<sub>2</sub> eq for the GCF funding, which are both considered efficient.

23. The AE presented in its submission a financial calculation that showed that the levelized cost of supply of electricity (LCOSE) from the project company to Solomon Power for a successful project should not be more than USD 0.22/KWh. Using this LCOE number it also carried out a project financial calculation that showed the level of private financing that will be needed to ensure that the average tariff available to consumers connected to the grid is kept below the current high level of about USD 0.82/KWh and that a concessional rate of 0 per cent for the GCF loan is achievable. Sensitivity analyses on various counterpart funding were also carried out to test the impact of these funding scenarios on the tariff. The baseline case showed that an LCOSE of not more than USD 0.22/KWh can be achieved.

24. The framework will support the development and construction of the hydropower project, the access road, the power transmission and capacity-building of key stakeholders in Solomon Islands, at a total cost of USD 233.98 million. The capital cost of the hydropower plant alone (excluding cost of the access road, transmission line and cost of capacity building) will be

USD 181.16 million (covering the EPC + tax; contingency; development costs; MIGA premium and insurance during construction and interest during construction) with an expected debt to equity ratio of 3 to 1. The GCF financial contribution of USD 86 million (including USD 16 million grant for part financing the access road project) for subprojects financing will account for up to 36.9 per cent of the total financing required to deliver the projects (USD 233.96 million) and represent 51.5 per cent of the debt needs (USD 135.87million).

25. Overall, TAP views the efficiency and effectiveness of the proposed framework as high.

## II. Overall remarks from the independent Technical Advisory Panel

26. The framework for implementing this project as suggested in the funding proposal is considered by TAP as effective to promote the development of the 15 MW hydropower generation as well as the other three components of the programme– the access road; the transmission line; and the technical assistance. This will be done through the direct offer of long-term concessional financing (0 per cent interest rate), which will encourage the ‘crowd sourcing’ of equity financing from a private sector partner as well as debt financing from other sources, which would not have flowed into the project in the absence of GCF financing. The success of this framework has the potential to deliver a paradigm shift to the sector, which has been historically public sector driven and heavily reliant on fossil fuel fired power generation. The promotion of private sector investment in this hydropower project is in line with government policies and strategies, including the NCCP plan (2012–2017) and the recently submitted INDC.

27. TAP supports the proposed framework and advises that the Board consider it for approval.

28. TAP recommends that the Board request the AE to undertake the suggestion below:

The AE prepares and presents a report that will elaborate an approach to determine the true dynamic GHG emission baseline for the calculation of project emission reduction instead of the static emission factor presented in the funding proposal that will be utilized over the project life. A static GHG emission baseline, which is the emission factor of the Honiara grid (97 per cent diesel generation) was used to estimate the net GHG emission reduction reported in the funding proposal. While this baseline may be valid for a short period of time in that the project electricity will displace mainly diesel-generated electricity on the grid, TAP is of the opinion that this will change with time after the commissioning of the project. This is because as cheaper and more reliable electricity is available on this grid and as SIEC extends its distribution facilities to off-grid consumers, these consumers are likely to connect to this grid, therefore changing the baseline mix of electricity displaced by the project power (diesel on the grid, diesel off-grid, off-grid PV, etc.). This will require system data collection post commissioning and use of these data to establish whether or not the assumption that the static emission factor is still valid or the establishment of the dynamic baseline for the project must be utilized for GHG emission reduction estimation for the project. Therefore, it is recommended that after the commissioning, the AE train the Ministry of mines, energy and rural electrification (MMERE) to utilize a model for GHG emission reduction calculation, which MMERE will apply to estimate the GHG emission reductions. The GHG emission reduction estimated by the model will be reported as part of its achievement of emissions reductions targets, or through another sustainable means of reporting outside of the limited project reporting period. The training will take place during a period of not more than 1 year after commissioning and report on emissions reductions as part of its achievement of emissions reductions targets, must be submitted by the AE annually thereafter.

## Independent Technical Advisory Panel's review of FP045

Proposal name:	Ground water recharge and solar micro irrigation to ensure food security and enhance resilience in the vulnerable tribal areas of Odisha
Accredited entity:	NABARD
Project/programme size:	Medium

### I. Assessment of the independent Technical Advisory Panel

#### 1.1 Impact potential

*Scale: High*

##### Mitigation impact

1. As a result of adopting 1,000 solar powered pumps instead of traditional diesel pumps (as would be the baseline practice), the project estimates to reduce approximately 2,600 t CO<sub>e</sub>/year.<sup>1</sup>

##### Adaptation impact

2. The proposal set direct beneficiaries at 5.19 million people and indirect beneficiaries at 10.78 million people. Nevertheless, the calculations and assumptions made for these estimations are not clearly described in the proposal.<sup>2</sup>

3. Project activities are expected to result in a groundwater recharge of 131,040 hectare meter of groundwater per year and positively influenced a total area of 250,000 ha.<sup>3</sup> The calculation of this area, which is described on the proposal as “within a 500 m radius of the tank”, was actually calculated on the assumption that the area of influence of each tank was a 500 m<sup>2</sup>, independently of the size of the tank, and taking into account 10,000 tanks. Under this area of influence, the proposal calculates a rise on the groundwater level of 4.17m. However, the estimated groundwater recharge is based on rough calculations and is likely to differ from reality.<sup>4</sup>

4. There is almost no experience with solar pumps in the region and potential users are quite skeptical on the performance of this technology. Also, this is the first implementation of the proposed groundwater recharge system on a large scale. Because of these, the potential impact of the project is moderately uncertain.

5. The proposal is specifically focused on a vulnerable population. Eligibility criteria for tanks, groundwater recharge system (GWRS), and solar pumps beneficiaries put emphasis on giving preference to indigenous people, small and marginal farmers and women-headed households.<sup>5</sup>

<sup>1</sup> Funding proposal, paragraph 26.

<sup>2</sup> Funding proposal, paragraph 81.

<sup>3</sup> Funding proposal, paragraph 30.

<sup>4</sup> Annex 2 – Integrated Financial Model, page “Technical assessment”.

<sup>5</sup> Revised Feasibility Report, annex 1, pp. 18 and 19.



6. Regarding the strengthening of institutional and regulatory frameworks, component C6 -knowledge management- includes the preparation of policy briefs, knowledge products and workshops, and seeks to integrate project learning into the water policy framework.<sup>6</sup>

7. The proposal does not include activities related to enhancing climate information availability. Given the scope of the project, it is recommended that it includes the evaluation and/or necessary improvement of the existing meteorological data gathering system. We assume that having, at least, a reliable source of precipitation data would improve the application of the “water quality and dynamic ground water modeling tool” to be developed under subcomponent 5.2.

8. By improving the access to water for irrigation for millions of farmers, the proposed project will significantly reduce the exposure of their livelihoods to the effects of climate change on rain patterns and temperature rise.

## 1.2 Paradigm shift potential

*Scale: High*

### **Potential for knowledge and learning**

9. The proposal dedicated an individual component to quality management and monitoring (C5) and another to knowledge management (C6), which includes sharing lessons learned.

10. Monitoring will be carried out on various levels. At the village level: groundwater recharge, water quality and pump functioning will be monitored periodically. An independent consultant will develop a satellite-based monitoring system to be used by the directorate of groundwater survey and investigation to assess the performance of the recharge system. Lastly, a project monitoring cell will be responsible for calculating the relevant indicators, designed to assess the efficiency of project activities.<sup>7</sup>

### **Contribution to the creation of an enabling environment**

11. Project features that contribute to the creation of an enabling environment include the implementation of capacity-building activities such as the training of 500 engineers and 20,000 jal sathis, and the development of the solar pump market.<sup>8</sup>

12. The improved access to irrigation is expected to increase livelihoods, therefore facilitating user associations to recover the operation and maintenance costs of tanks, recharge structures and pumps.

### **Contribution to the regulatory framework and policies**

13. The knowledge component of the project aims to integrate project learning into state water policy, groundwater legislation, the Pani Panchayat Act and renewable energy policy.<sup>9</sup>

### **Potential for scaling up and replication**

14. There is a high potential for more diesel pumps to be replaced by solar pumps. The proposal estimates a potential replacement of 0.4 million pumps. The installation of these 1,000 pumps and other additional activities under component C3 will prepare the market for solar pumps, therefore contributing to potential scalability.<sup>10</sup>

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<sup>6</sup> Funding proposal, p. 18.

<sup>7</sup> Funding proposal, p. 69.

<sup>8</sup> Funding proposal, paragraph 45.

<sup>9</sup> Funding proposal, paragraph 100.

<sup>10</sup> Funding proposal, paragraph 39.

15. The integration of project learning into state water policy, groundwater legislation, the Pani Panchayat Act and renewable energy policy, and the implementation of some capacity-building activities such as the training of 500 engineers and 20,000 jal sathis, are expected to improve the scalability potential of the project.

### 1.3 Sustainable development potential

*Scale: High*

#### **Environmental co-benefits**

16. Although the proposal describes environmental co-benefits such as improved air quality, soil quality and biodiversity,<sup>11</sup> these are not considered to be significant. In fact, there are no specific activities aimed at improving biodiversity in the catchment areas. Soil quality will be partially improved only on agricultural land due to higher water availability for irrigation. Air quality will be improved because of the 1,000 pumps that will be powered by solar energy, instead of traditional diesel motors.

17. Contamination of groundwater with pesticides and fertilizers will be addressed by the promotion of integrated pest management and nutrient management strategies in the catchment areas of the tanks (which involve reduction in the use of pesticides and fertilizers).<sup>12</sup> Nevertheless, the proposal does not explain how and to what extent this will be done. Groundwater obtained from the tanks or from dug wells from the upper unconfined aquifer on tank command areas will not only be used for irrigation purposes but also for domestic use. This makes the matter of water quality a major issue. For this reason, project design should give more importance to this matter. The contamination of the upper aquifer with black water should also be taken into account on the project.

18. With the objective of reducing aquifer contamination with pesticides and herbicides, the bottom of the recharge shafts will be filled using a filter pack comprising of sand, charcoal, pebbles and gravel.

#### **Social co-benefits**

19. Water scarcity is increasingly creating conflicts among villagers.<sup>13</sup> Improving access to water will consequently reduce social conflicts.

20. Other expected social co-benefits include avoided livelihood disruption, and improved water and food security.

#### **Economic co-benefits**

21. Since agriculture is the main economic activity of the benefited population, the expected improvement of productivity will have a significant positive impact on local and state economy.

22. Project activities are expected to create 1 million jobs in the agriculture sector in a four year period in the 15 benefited districts.

23. The avoidance of diesel use by solar pumps is estimated to generate opportunity cost savings of USD 3.6 million and another USD 1.8 million from reduced diesel subsidies in 20 years.<sup>14</sup>

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<sup>11</sup> Funding proposal, paragraph 106.

<sup>12</sup> Funding proposal, page 58.

<sup>13</sup> Funding proposal, paragraph 23.

<sup>14</sup> Funding proposal, p. 69.

### **Gender-sensitive development impact**

24. Solar pumps will be given to at least, one third of the women-headed households.<sup>15</sup>
25. Training on off-farm activities such as mushroom cultivation, backyard poultry and fishery will be given to 150,000 women and landless persons.<sup>16</sup>
26. It is estimated that 50.1 per cent of the vulnerable population directly benefiting from the project are women.<sup>17</sup>

## **1.4 Needs of the recipient**

*Scale: High*

### **Vulnerability of the country**

27. India has 30 per cent of its population living below the poverty line and about 1.77 million homeless. Food insecurity in India reaches 250 million people.
28. At the national level, even though drought and flood events are expected to be more frequent due to climate change, average rainfall is projected to increase by 10 per cent by 2070.<sup>18</sup> The proposal also gives projections of the average annual temperature increase which varies from 3 °C to 4.5 °C by 2100 throughout the selected districts. However, the source of these climate change projections is not identified on the proposal, but is just mentioned as the “A2 scenario” of the State Action Plan on Climate Change (2015-2020).
29. The criteria used to select the 15 beneficiary districts prioritized the ones having high poverty and a high proportion of indigenous communities and significant climate stress. Concerning food security, the 15 chosen districts are between moderately insecure and extremely insecure (Hunger Atlas of Odish, World Food Programme).<sup>19</sup>

### **Vulnerable groups and gender aspects**

30. The proposal is clearly focused on supporting vulnerable groups, including small and marginal farmers, landless population and indigenous groups and has a reasonable gender-sensitive approach. Most components of the proposal include mechanisms to guarantee the increased participation of women.<sup>20</sup>

### **Economic and social development level of the country and the affected population**

31. Fiscal deficit in India was around 4 per cent of the gross domestic product for 2014-2015 and one fifth of fiscal revenue is spent for national debt repayment, which was of almost 64 per cent of the country’s gross domestic product on 2016.
32. Odisha, together with Madhya Pradesh, has the highest percentage of rural poor in the country (Odisha Economic Survey, 2013–2014). In the state, there are approximately 3.85 million agricultural labourers, of which approximately 75 per cent are below the poverty line.

### **Absence of alternative source of financing**

33. The main reason for the absence of alternative sources of financing is clearly explained in the proposal:

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<sup>15</sup> Revised feasibility report, annex 1, p. 19.

<sup>16</sup> Funding proposal, paragraph 45.

<sup>17</sup> Funding proposal, paragraph 81.

<sup>18</sup> Funding proposal, paragraph 108.

<sup>19</sup> Funding proposal, p. 41, figure 5.

<sup>20</sup> Funding proposal, paragraph 152.

“A study by Xavier University Bhubaneswar has estimated that with each 1 per cent rise of debt ratio, primary deficit ratio is estimated to rise by 1.71 per cent in Odisha. Hence, more borrowing to finance such large scale public investment projects is likely to widen primary deficit and also the fiscal deficit in the long run because of disproportionate growth between the revenue and expenditure in the recent past.”<sup>21</sup>

34. Also, it is important to note that project activities will not result in direct cash flow to service the debt.

### **Need for strengthening institutions and implementation capacity**

35. There is a great need for institutional strengthening at all levels regarding water resources and solar energy.

36. There are water pricing, allocation and water rights issues to be addressed through a consistent development of water institutions and the improvement of the regulatory framework. Local water institutions are still in its infancy.

37. The traditional water sharing system known as “waarabandi” has decayed over the years giving place to an increase of water-related conflicts. The rights and obligations of the farmers and pani panchayats (water-user associations) have not yet been fully understood by the revenue officials, who were earlier responsible for water tax collection.<sup>22</sup>

## **1.5 Country ownership**

*Scale: High*

### **Alignment with priorities in the country’s national climate strategy**

38. Project proposal was developed in consideration of India’s intended nationally determined contribution (INDC), the Water Mission under the National Action Plan for Climate Change, the State Action Plan on Climate Change (SAPCC), the provisions of the Pani Panchayat Act of Odisha, and the plan of the Central Ground Water Board to enhance groundwater recharge through a series of structural measures. This alignment is detailed on the proposal.<sup>23</sup>

### **Capacity of accredited or executing entities to deliver**

39. The National Bank for Agriculture and Rural Development (NABARD) is the accredited entity for this project and is considered to be fully capable to fulfil its role. The description of the expertise of NABARD is described on the proposal.<sup>24</sup>

40. The executing entity is the Groundwater Division of the Department of Water Resources of the Government of Odisha. As described on the proposal, this governmental institution is well-experienced in the field.<sup>25</sup>

### **Engagement with civil society organizations and other relevant stakeholders**

41. The Department of Water Resources held a series of consultations and workshops during the inception of the project in order to discuss relevant issues related to weather variability, social needs and potential adaptive measures. These meetings involved small and marginal farmers, landless labourers, non-governmental organizations (NGOs) and community-based organizations (CBOs).<sup>26</sup>

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<sup>21</sup> Funding proposal, paragraph 22.

<sup>22</sup> Revised Feasibility Report, annex 1, pp. 15 and 16.

<sup>23</sup> Funding proposal, paragraph 6.

<sup>24</sup> Funding proposal, paragraph 122.

<sup>25</sup> Funding proposal, paragraph 56.

<sup>26</sup> Annex 9 to Stakeholders Consultation Report

## 1.6 Efficiency and effectiveness

*Scale: High*

### **Cost-effectiveness and efficiency**

42. As an ex ante assessment, financial structure seems adequate to achieve project outcomes. However, 73 per cent of GCF financing will be used for the construction of the recharge structure on the 10,000 tanks. The cost of this component is based on a rough estimation, and the baseline study and actual design of the recharge structures are included under the same component. This means that the actual construction costs may differ from the proposal estimation.

43. The specific emission reduction cost from the use of solar pumps instead of diesel pumps was estimated at 194 USD/t CO<sub>2</sub> e.

### **Financial viability**

44. The project internal return rate was calculated at approximately 17 per cent.

45. Under all considered scenarios, including the one with 25 per cent deficit rainfall every year and increase in cost of capital up to 15 per cent the benefit to cost ratio of the project remains around 1.

46. It is expected that operation and maintenance (O&M) costs will be recovered by user organizations. On the actual scheme, people are already accustomed to paying for water use and the proposal states that “It has been established during consultation that people are willing to pay higher tariff if the supply is assured in right volume at the time they need”.<sup>27</sup>

### **Application of best practices**

47. The application of best practices on the development of the project took into consideration the experience gained on the implementation of other related projects such as the Odisha Tribal Empowerment and Livelihood Programme and the Western Odisha Livelihood Programme, and the Odisha Community Tank Management Project Phase 1.

48. It is recommended that the project proponent evaluates the potential of implementing climate-smart agricultural (CSA) practices that include tree planting to enhance climate change resilience.

49. Although the proposal speaks about promoting microirrigation (and the name of the proposal even contains the word microirrigation), it fails to describe the technology, the way in which it is expected to be promoted and the estimated implementation costs of these systems (which are not covered by the project).

## **II. Overall remarks from the independent Technical Advisory Panel**

50. Based on the findings of this assessment, the independent Technical Advisory Panel recommends that the Board approves this project, conditional on the project proponents including, under component 4 of the funding proposal, specific training be provided by NABARD for local farmers on organic farming, integrated pest management, agroforestry systems and small-scale wastewater treatment. This condition should be met prior to document execution.

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<sup>27</sup> Funding proposal, paragraph 100.

## Independent Technical Advisory Panel's review of FP046

Proposal name:	Responding to the increasing risk of drought: building gender-responsive resilience of the most vulnerable communities
Accredited entity:	UNDP
Project/programme size:	Medium

### I. Assessment of the independent Technical Advisory Panel

#### 1.1 Impact potential

*Scale: Low*

1. Ethiopia, with a population of over 90 million people, is one of the least developed countries with a landscape with over 60 per cent of the country characterized as dryland. For Ethiopia, climate change has already severely impacted the country with unpredictable droughts that affect the very vulnerable population. Currently 10 per cent of the population is suffering from severe food shortages.
2. On the other hand, Ethiopia is one of the world's fastest growing economies with an annual economic growth rate of 10.8 per cent per year between 2003/2004 and 2011/2012. However, rural communities continue to rely on agriculture for subsistence, with increased shortage in water, energy and food securities.
3. The project aims to develop an integral assistance for 1.2 million people (over 50 per cent being women) of the most vulnerable population of Ethiopia in 22 "woredas" (regions) by improving their access to water and food, promoting alternative livelihoods, empowering women, improving health and wellbeing, improving their access to climate information, improving the resilience of ecosystems and the availability of ecosystem services, and introducing improved and climate-smart technologies.
4. The project is presented as an adaptation project, justifying that with a diverse number of interventions, the communities will be more resilient to climate change. The project presents an extensive list of activities and impacts that range from agricultural productivity, reduced deforestation, the rehabilitation of degraded lands, increased participation in community planning, growth in private sector activities, and the increased availability of proper financial services, among other impacts. However, the project is so broad that in reality it is difficult to assess concrete adaptation expected results.
5. In terms of mitigation, the project presents an overall GHG emission reduction target of 22.516 million tonnes of carbon dioxide equivalent over the project's lifetime (15 years). The estimate is based on reductions in the forest, agriculture and livestock, and energy sectors, the latter being mainly related to the replacement of diesel generation with the adoption of photovoltaic solar systems.
6. The extent to which the project will present adaptation and mitigation impacts will depend on the ability to implement interventions in an aggregated and integral manner.

## 1.2 Paradigm shift potential

*Scale: Low*

7. The project has three components and each component comprises several activities.

8. The first component is to provide technologies and infrastructural solutions for resilient livelihoods in order to increase the overall productivity of the direct project beneficiaries with gender responsive interventions, including to enhance agricultural (short maturing crops) and livestock productivity (cattle, goats and sheep) using irrigation and improved inputs, as well as improving the ability of farmers to access appropriate finance and training. The project will also provide groundwater sources to supply water for drinking purposes with solar pump systems. The project will also ensure soil and water conservation activities through tree planting, terracing, water harvesting, area closure and bamboo planting and implies that by improving natural resource management (reforestation and rangeland management) soil erosion will be reduced and agricultural productivity will increase.

9. The second component will promote livelihood diversification and protection to secure the long term sustainability of landscape ecosystems.

10. The third component to “enable environment” has been designed to increase cross-linkages among the various thematic activities and to develop appropriate governance mechanisms to reinforce project sustainability and to extract valuable lessons that will help to replicate the project in other woredas.

11. In general, the paradigm shift, where presented, in the project is rather weak. It gives an extensive list of actions to improve rural development in a very conventional manner and without addressing real innovative solutions and techniques in any of the expected activities. Even though the project implies that an integral approach is needed for adaptation, in reality the project is adding individual activities from different sectorial ministries in the selected woredas without establishing a cause-effect logic.

12. The theory of change presented is somehow disconnected from the information in the project, and the expected long-term changes are weak, including a lack of long-term impacts and sustainability after project completion.

13. There is little scope for innovation. For example, the reforestation component is not described at all, but implies that pure reforestation activities will be carried out in different locations in a disconnected manner. It is advisable that for example a payment for ecosystem services scheme is thought about or even a REDD-plus scheme involving an ecosystem approach. In general, the monitoring arrangements and maintenance of all the activities after project completion is crucial.

14. On the component to provide technologies and infrastructural solutions, it is important to provide the type of technologies and to aggregate interventions as occurred in the case of the solar pump systems. The extent to which the project will create new markets for lower income farmers and business activities that will drive the economy and improve the life of the communities is difficult to measure. In general, disperse activities will not necessarily improve the adaptive capacity of communities to climate change, unless they are undertaken with a cause-effect relationship, aggregating impacts.

15. The scalability of the project is not evident. In Ethiopia, there are 670 rural woredas and 100 urban woredas. The project is only targeting 22 woredas, implying that around 7 million will be invested per woreda in an array of different activities. Moreover, expecting so many activities at the woreda level without aggregating or prioritizing elements of change seems ineffective. The project also loses the perspective of ecosystem-based adaptation as the activities are more related to the logic of sectoral administrative regimes (woredas or kereles (subdistricts)).

16. The potential for learning and transferring knowledge is also considered weak. Only one person will have the integral vision at the woreda level, coordinating the activities that are expected to happen, under the direction of different national ministries. The explanation of how knowledge-sharing will be undertaken is not evident in the proposal. It depends on the ability to establish partnerships and to develop a concrete knowledge strategy that involves the different stakeholders in the project.

### 1.3 Sustainable development potential

*Scale: Medium*

17. The environmental co-benefits could be potentially significant but the degree will depend on the level of aggregated deliverables resulting in the short-, medium- and long-term implementation of the project. Regenerating landscapes and their ecosystem services requires important orchestrated long-term interventions. Depending on the activities that end up resulting in each of the woredas, ecosystem conservation and regeneration could happen in different formats.

18. The status of the aquifers and possible solutions to recharge them is not presented by the proponent, even though the project relies on pumping more water with solar systems that could end up affecting the hydrology of the regions. In this regard, it is advisable that a hydrological study is undertaken to ensure clear long-term water solutions.

19. In terms of social co-benefits, the project expects to improve the provision of water, food and nutrition, but again, it will depend on the degree of implementation of the aggregated activities.

20. In terms of economic co-benefits, the project will increase the foreign currency reserve and will make resources available through the national ministerial system. However, the resources could end up being allocated to disperse activities without achieving concrete aggregated results that will result in economic benefits for the communities, and falling low in terms of co-benefits.

21. The project explains the burden of rural development for women's livelihoods and has stressed the fact that the policies in Ethiopia are gender-sensitive. However, the real gender perspective will depend again on mainstreaming women's participation in the selected activities and ensuring smart investments that will improve their quality of life.

### 1.4 Needs of the recipient

*Scale: Medium*

22. Ethiopia is a vulnerable country and 29 per cent of the population remains poor with exacerbating problems like chronic malnutrition that is being increasingly affected by climate change.

23. The project makes a detailed analysis of the current economic and social status and needs of the 22 woredas in the diverse components proposed by the project. The level of detail shows that an extensive consultation process and field work was undertaken involving the communities. However, the list of needs is presented in a sectoral manner, listing everything from the status of water pumping systems, degraded hectares of land, current seed availability, etc., but not presenting an integral socioeconomic analysis that enables the project proponents to prioritize interventions in a holistic manner.

24. On the other hand, bilateral and multilateral institutions have already invested in projects targeting rural agriculture development in Ethiopia. However, there is little evidence of the lessons learned and how this new investment will build on previous interventions.



25. The project will rely on hiring people at the national ministries, and at the woreda- and kerele-related governmental levels. The project does not present any evidence that a programme is in place to strengthen the capacity of the different ministries involved or the regional governmental institutions to cope with climate change adaptation and to deliver climate-smart programmes. Moreover, there is a big question mark on the sustainability of the different interventions after project completion by the different ministries involved, as it will depend on the availability of new grant resources to maintain the activities.

## 1.5 Country ownership

*Scale: High*

26. Ethiopia has a national adaptation plan of action that dates from 2007, and more recently presented its second communication on climate change and in 2015 its nationally determined contribution.

27. The country has developed a climate-resilient green economy strategy (CRGE facility) that is mobilizing resources for sectors and institutions towards its objectives, including the proposed project. The project is deeply rooted in the national system, having the ministry of finance as the main executing entity that will manage the resources through the existing mechanisms to coordinate and transfer resources to sectoral ministries and regional woredas and kereles.

28. MOFEC (Ministry of Finance and Economic Cooperation) and the other ministries including the Ministry of Agriculture and Natural Resources and the Ministry of Water, Irrigation and Electricity have replica structures at the woreda and kerele levels. The project depends on the availability of public institutions to coordinate expected activities and actions on the ground with an integral vision.

29. MOFEC has a track record in managing projects at the national level as it is responsible for driving the economic policy of Ethiopia and providing oversight on national financial management, national development planning, and development programme implementation. However, even though MOFEC has established sector involvement and advocacy mechanisms, and has Bureaus of Finance and Economic Development situated in the regional capitals of Ethiopia, it seems that the project will rely mostly on hiring additional personnel to oversee the different expected activities at the woreda and kerele levels.

30. The United Nations Development Programme (UNDP) as the accredited entity has experience in development projects and has been a reliable institution working in Ethiopia. UNDP financed and coordinated the development of the CRGE facility and has been helping the country to mobilize resources and projects on climate change. However, the size of the proposed project is bigger than any other project managed on climate resilience by the UNDP office, and the complexity of interventions could be difficult to oversee.

31. The project developed extensive consultations, taking a sectoral approach for consulting agricultural, water and forestry-related activities. Two missions took place to visit each of the 22 woredas assessing needs and consulting with local authorities.

## 1.6 Efficiency and effectiveness

*Scale: Low*

32. The project presents a USD 100 million grant investment arrangement for a five-year disbursement period. The most relevant question to this proposal is precisely the efficiency and effectiveness of developing so many different activities at the woreda and kerele levels, that to the eyes of the independent Technical Advisory Panel (TAP) looks more like a diverse list of needs rather than an integral programme approach to climate change adaptation at the landscape level.

33. The proposed project presents a very detailed project budget, and understands effectiveness as the ability to invest resources in the different activities in an effective manner.
34. The scale of expected in-kind contributions is presented, but lacks consistency in the funding proposal as it presents different figures. The government is expected to transfer additional resources to co-finance activities at the woreda level. However, it is difficult to understand if the resources will be additional to the normal allocations given to sectors and territories.
35. The project has a very complex institutional arrangement involving the CRGE facility, including Project Coordination Units for all of the responsible parties involved in sectoral activities at the national level and similar structures at the woreda level. In each woreda there will be one expert and one finance officer monitoring and coordinating woreda activities. In each of the targeted 176 project kereles, a Community Facilitator will be hired by the project. Several institutions – such as the Disaster Risk Management Commission, the National Meteorological Agency, federal and regional agricultural research institutions, as well as private sector entities and civil society organizations – will also be expected partners assisting the project delivery entities at all levels.
36. It seems that a big portion of the resources of the governance component will end up being allocated to pay several layers of employees at the national, woreda and kerele levels, and not effectively being transferred to the expected targeted communities.
37. Sustainability of the proposal is of critical importance. As it is, there will be so many activities happening at the territorial level that it is difficult to ensure that they will remain after project completion. Moreover, the integral dimension and sustainability of isolated activities is of great concern. It is therefore recommended that the project prioritizes activities that could prove to be effective to support rural livelihoods with concrete market dimensions and sustainability aggregated criteria. Value for money is critical as are its implications for ensuring the upscaling of solutions to other regions.

## II. Overall remarks from the independent Technical Advisory Panel

38. The TAP understands that Ethiopia is a very vulnerable country with increased climate change adaptation needs.
39. After reviewing the project, the TAP recommends that this project is not approved in its current format.
40. Revision of the proposal could benefit from the following recommendations:
- (a) Focus on water infrastructure and management interventions. Water-related adaptation is of critical importance in the geographic area of the project. Therefore, prioritize water-related activities and develop a hydrological study to justify interventions, including the management and maintenance of the aquifer and the long-term sustainability of water basins under climate change scenarios.
41. Prioritize other sectoral and landscape interventions, maybe dividing the investment in different coordinated interlinked projects and further elaborating on the overall impacts of the proposed interventions. In this context:
- (a) Prioritize technologies and solutions that will help rural communities to adapt to climate change by examining economies of scale and developing market studies that prove socioeconomic viability;



- (b) Elaborate on the regeneration of ecosystems through forest and soil conservation activities, with innovative solutions that could include payment for ecosystem services, REDD-plus schemes or other solutions that involve the rural communities;
  - (c) Elaborate on the management, maintenance and appropriation of the climate information system;
  - (d) Develop a knowledge-sharing strategy at the national, woreda and kerele levels;
  - (e) Develop a sustainability strategy, including sources of co-financing, options for monitoring and maintenance of the selected activities and overall sustainability dimensions of the different activities; and
  - (f) Elaborate on the availability of national institutions to support and build capacity to undertake the different interventions of the project.
-