MANAGEMENT RESPONSE TO REQUEST FOR INSPECTION PANEL REVIEW OF THE LEBANON: WATER SUPPLY AUGMENTATION PROJECT (P125184); GREATER BEIRUT WATER SUPPLY (P103063) AND ITS ADDITIONAL FINANCING (P165711)

Management has reviewed the Request for Inspection of the Lebanon: Water Supply Augmentation Project (P125184); Greater Beirut Water Supply (P103063) and its Additional Financing (P165711), received by the Inspection Panel on August 6, 2018 and registered on September 12, 2018 (RQ18/05). Management has prepared the following response.

October 12, 2018

CONTENTS

Map

Annexes

ABBREVIATIONS AND ACRONYMS

AF GBWSP	Additional Financing Greater Beirut Water Supply
AC	Appeal Committee
BAP	Biodiversity Action Plan
BMLWE	Beirut Mount Lebanon Water Establishment
CDR	Council for Development and Reconstruction
CESMP	Construction Environmental and Social Management Plan
CSO	Civil Society Organizations
DGA	Directorate General of Antiquities and Museums
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EC	Expropriation Committee
GHG	Greenhouse Gas
GoL	Government of Lebanon
GBWSP	Greater Beirut Water Supply
GBML	Greater Beirut Mount Lebanon area
GRM	Grievance Redress Mechanism
GRS	World Bank Grievance Redress Service
ICOLD	International Commission on Large Dams
MCE	Maximum Credible Earthquake
MoE	Ministry of Environment
MoEW	Ministry of Energy and Water
Mw	Moment Magnitude (earthquake measurement)
NPMPLT	National Physical Master Plan of the Lebanese Territory
NWSS	National Water Sector Strategy
NGO	Non-governmental Organizations
OBE	Operating Basis Earthquake
PAPs	Project Affected Persons
PMU	Project Management Unit
RAP	Resettlement Action Plan
RTE	Reservoir-Triggered Earthquake
SEE	Safety Evaluation Earthquake
TTL	Task Team Leader
UfW	Unaccounted for Water
WSAP	Water Supply Augmentation Project

EXECUTIVE SUMMARY

i. On September 12, 2018, the Inspection Panel registered a Request for Inspection, IPN Request RQ 18/05 (the Request), concerning the Lebanon - Water Supply Augmentation Project (P125184) (Bisri Dam Project or WSAP); Greater Beirut Water Supply (P103063) (GBWSP) and its Additional Financing (P165711) (AF GBWSP) financed by the International Bank for Reconstruction and Development (the World Bank or the Bank).

Inspection Panel Request and Background

ii. ***For decades, the Lebanese population has been subject to severe water supply shortages, often receiving access to only 1-3 hours of water per day, due to the country's limited water resources, infrastructure deficit, and suboptimal water resources management.*** The population thus relies on expensive bottled and tanker water, which disproportionately affects the poor. Lebanon is a water-scarce country with uncertain bulk water supply sources. Groundwater is exploited at unsustainable levels, and the coastal aquifers suffer from seawater intrusion. The total number of licensed individual private wells is estimated at 20,000 wells in the Greater Beirut Mount Lebanon area (GBML). Further, there are an estimated additional 60,000 illegal wells. Surface water storage capacity is very low in Lebanon, with only 6 percent of total resources being stored compared to the regional average of 85 percent (Middle East and North Africa).

iii. ***The Government of Lebanon (GoL) has declared the reform of the water sector a national priority and in 2012 completed the National Water Sector Strategy (2012 NWSS), the implementation of which aims to mitigate the worsening supply and quality of water across the GBML, where more than 40 percent of the Lebanese population reside.*** The 2012 NWSS was consulted upon and discussed with stakeholders. The ensuing World Bank Country Water Sector Assistance Strategy confirmed the findings of the NWSS and indicates that "the NWSS is a relevant program. Implementation will require breaking the NWSS down into 'bite-sized pieces' and phasing its implementation according to priority and funding availability." Based on current estimates, no single source can cover the required additional volume of bulk water in the GBML; thus, diversification of sources (various dams and non-dam alternatives) is required for the water security of the GBML. The 2012 NWSS identified the dam to be constructed on the Awali/Bisri River (Bisri Dam) as an essential part of water supply infrastructure to address the problems faced by the people living in the GBML.

iv. ***The GoL is implementing the institutional actions identified in the 2012 NWSS, simultaneously with infrastructure investments, to meet the 345 million m^3 of water deficit in the GBML by 2035.*** In 2000, the Parliament approved Water Law 221 on the organization of the water sector and on September 17, 2017, ratified the Water Code, which was a significant milestone for the country's water sector. The GoL also supports institutional aspects of the water supply provider for the GBML, the Beirut Mount Lebanon

Water Establishment (BMLWE). BMLWE is moving from intermittent to continuous water supply and is implementing activities related to water conservation, among others.

v. ***The Request raises concerns related to the Bisri Dam Project.*** This Project aims to alleviate the impact of water scarcity in the GBML areas. It will secure a critical source of bulk water to contribute to reliable and affordable water services to GBML residents.

vi. ***The Requesters allege that the Bisri Dam Project construction*** will: (i) inundate a unique riparian ecosystem; (ii) destroy a productive local economy; (iii) threaten the safety of the local community; (iv) affect an exceptional archaeological complex; and (v) occur in an area that is not geologically adequate.

Management's Response

vii. ***Management has carefully reviewed the concerns of the Requesters regarding the potential impacts that might arise from the Bisri Dam Project.*** These concerns were carefully analyzed during Project preparation as part of the Bank's due diligence and adequate mitigation measures were identified to address any residual negative impacts and are currently being implemented.

viii. ***The preparation of the Bisri Dam Project included an analysis of the alternatives, environmental and social impacts, and archaeology of the site.*** Sixteen public consultations with more than 400 participants were conducted for the Environmental and Social Impact Assessment (ESIA), the Resettlement Action Plan (RAP), and the Environmental and Social Management Plan (ESMP); these consultations informed the Project design. Two hundred landowners participated in the consultations and another 109 were interviewed individually. Comprehensive monitoring of the ESMP and RAP, together with continued stakeholder consultation, is helping to ensure that identified mitigation measures are implemented and any new issues that arise are addressed.

ix. ***Since May 2017, the Project team has had extensive communications with the Requesters' representatives on the issues raised in the Request.*** The team has engaged in detailed email communication, holding four face-to-face meetings, and facilitating three meetings between the Requesters and the Bisri Dam Project's Independent Panel of Experts on Dam Safety (Dam Safety Panel), and the Independent Panel of Experts on Environmental and Social Aspects (Environmental and Social Panel).

x. ***Management believes that the Bisri Dam Project is technically sound with its design based on scientific studies.*** The GoL undertook prefeasibility studies and field investigations, in 1954, 1974 and the early 1980s. From June 1994 to April 1995, the GoL prepared a feasibility study and investigations for the Bisri Dam Project. In 2011, the feasibility study was updated based on newly available hydrologic data and new market prices to determine the construction cost of the dam. Several additional dam safety studies were also satisfactorily prepared, namely: (i) Construction Supervision and Quality Control Plan; (ii) Instrumentation Plan; (iii) Preliminary Operation and Maintenance Plan; and (iv) Framework of Emergency Preparedness Plan.

xi. ***For the Bisri Dam Project, the GoL established the Dam Safety Panel and the Environmental and Social Panel, which are composed of internationally recognized experts.*** The Dam Safety Panel provided specific recommendations on the updated design in November 2013, and again in March and June 2014. It has confirmed the overall technical feasibility, the safety of the design, cost estimates, and dam safety plans. The detailed design and bidding documents have incorporated the Dam Safety Panel's recommendations on hydrologic, geotechnical, and seismic aspects. The Environmental and Social Panel assists in monitoring the implementation of the ESMP and the RAP in line with best practice international standards and Bank safeguards policies.

xii. ***In Management's view, the Bisri Dam Project stakeholders have been informed and consulted through information outreach and consultations (Annex 6).*** In addition to the consultations, the Project team routinely consults individual Project Affected Persons (PAPs) during supervision missions. The Project team has responded to inquiries from the PAPs and nongovernmental organizations (NGOs) (Annex 8). Management, however, recognizes and will pursue opportunities to further strengthen and enhance the consultation process.

xiii. ***Management believes that the Bank has made every effort to apply its policies and procedures and to pursue its mission statement in the context of the Project. Construction on the Bisri Dam Project has not started.*** Management will continue to monitor the implementation of the Bisri Dam Project and is committed to maintaining an open and inclusive dialogue with all stakeholders during Project implementation, both before and during the construction of Bisri dam. Actions going forward include the following:

- ***To further strengthen the consultation process, the Project team will sustain a high frequency of supervision missions and site visits, continue to engage with relevant stakeholders, especially women, and ensure that progress on the various action plans described below is documented and made publicly available.***

- ***The ESIA's ecological compensation plan will be completed before the Contractor starts the Bisri Dam construction, which is expected to last from mid-2019 to 2024.*** Prior to Project approval, the Ministry of Environment and the World Bank approved the ESIA. The ESIA includes a series of plans and actions that need to be executed during the Project implementation period. Some plans and actions are to be completed prior to construction, some during, and some after construction of the dam. The Council for Development and Reconstruction (CDR) has commenced the pre-construction action items of the Biodiversity Action Plan (BAP), which include preparing a well-defined and detailed ecological compensation plan. The ecological compensation plan will ensure that there will be no net loss of habitat through adequate compensation for habitats lost in the reservoir area.

- ***A Catchment and Reservoir Shoreline Master Plan will be developed and is expected to be completed by 2020.*** This master plan is based on the ESIA recommendations and will integrate all ESMP measures related to the upper

catchment area and shoreline of the future Bisri reservoir, including reforestation requirements, measures for protecting water quality and management of induced development.

- ***The construction and operation requirements are part of the Contractor's obligations contained in the tender documents and will be included in the Construction Environmental and Social Management Plan (CESMP).*** The Bank will clear the Contractor's CESMP before the commencement of any works, currently expected in the second or third quarter of 2019.

- ***Early archaeological investigations have been completed. An additional detailed archaeological investigation is already underway and preservation efforts will be completed before reservoir filling.*** The detailed archaeological investigation will be based on the information from the ESIA and from the two geomorphological surveys.[1] The detailed investigation is planned for the Project implementation period and has been included in the scope of works and in the budget of the Bisri Dam construction contract.

- ***The two independent panels of experts, the Dam Safety Panel and the Environment and Social Panel, will continue to provide additional advice and oversight of the Project.*** An independent monitoring consultant will also continue to assess RAP implementation, and the supervising engineer will monitor ESMP implementation. The Bank will continue to monitor the functioning of the grievance redress mechanism (GRM).

[1] One survey was conducted in June 2018 and the next survey is planned in February 2019.

I. INTRODUCTION

1. On September 12, 2018, the Inspection Panel registered a Request for Inspection, IPN Request RQ 18/05 (the Request), concerning the Lebanon: Water Supply Augmentation Project (P125184) (the Bisri Dam Project or WSAP); Greater Beirut Water Supply (P103063) (GBWSP) and its Additional Financing (P165711) (AF GBWSP) financed by the International Bank for Reconstruction and Development (the World Bank or the Bank).

2. ***Structure of the Text.*** The document contains the following sections: Section II presents the Request; Section III provides background on the Projects; and Section IV presents Management's Response. Annex 1 presents the Requesters' claims, together with Management's detailed responses, in table format. Annex 2 is a map indicating the location of environmentally sensitive areas and large water infrastructure in Lebanon; Annex 3 is the Lebanese Law No. 37 for cultural properties; Annex 4 is the Environmental and Social Impact Assessment (ESIA) summary table of dam and non-dam alternatives; Annex 5 contains an extract from the 2014 Assessment of Groundwater Resources of Lebanon; Annex 6 provides a summary of consultations conducted as part of preparation and implementation of the Projects; Annex 7 is the Borrower's Project Information Booklet on the Grievance Redress Mechanism; and Annex 8 is a summary of the communications of the Project team and Project implementing agency with nongovernmental organizations (NGOs).

II. THE REQUEST

3. The Request for Inspection was submitted by Lebanon Eco Movement, a network of 60 environmental NGOs, representing 42 local inhabitants, workers and community members (hereafter referred to as the "Requesters"). The Requesters asked for confidentiality and authorized Lebanon Eco Movement to represent them. The Request also has several attachments, listed below:

- 1: *"Debunking the Myths of Groundwater in Lebanon-Is Lebanon's Groundwater Budget Really Depleted?"*
- 2: Local Petitions (in Arabic)
- 3: Online Petitions
- 4: Bisri Dam Project from the geological and seismological perspectives- Dr. Tony Nemer
- 5: *"Regarding the reservoir induced seismicity effect of the Bisri Dam"* by Dr. Tony Nemer

- 6: Review of the Bisri Dam Project Addressed to the World Bank- Lebanon Eco Movement-July 2017

- 7: Review of the Bisri Dam Project- Reservoir Induced Seismicity Risk- Lebanon Eco Movement- August 2017

- 8: World Bank Response

- 9: Notes on IMF meeting of 12-1-2018

- 10: Notes on Geological Deficiencies During the World Bank Meeting-12/01/2018 and Other important Questions- M. Khawlie

- 11: Extracts from Strategic Environmental Assessment for the new water sector strategy for Lebanon

- 12: Recommendations of CNRS

- 13: Water Policies and Politics in Lebanon: Where is the Groundwater?

4. While the Request has been registered against three projects, as listed in paragraph 1, the Requesters are concerned about a variety of potential impacts that could result from the construction of a dam on the Awali/Bisri River, which is Project P125184. As the allegations listed in the Request focus on the activities under the Bisri Dam Project, Management's response is also focused on that Project (P125184), and not on the other two projects (P103063 and P165711).

5. The nine concerns in the Request can be organized into five categories:

- *Environmental aspects.* The Request alleges (i) potential harm to natural habitats, forests, agriculture, global climate, and water sources; and (ii) incomplete ESIA (environmental cost-benefit analysis, mitigation measures, environmental offsetting, biodiversity survey, quarries, violation of the 2015 Strategic Environmental Assessment.)

- *Archaeology and cultural heritage aspect.:* The Request alleges potential harm to (i) archaeological, historical, religious and aesthetic sites; and (ii) the protection status of these sites.

- *Social aspects.* The Request alleges: (i) lack of efficient consultation and participation; and (ii) undervalued compensation for agricultural resources.

- *Analysis of alternatives and water balance.* The Request alleges incomplete analysis of alternatives with intentional use of inaccurate groundwater numbers.

- *Geological and seismological aspects.* The Request alleges (i) risk of seismic activities; (ii) need for more studies on karst.

6. Since May 2017, the Project team has met with the Requesters four times, facilitated three meetings between the Requesters and both the Dam Safety Panel and the Environmental and Social Panel for the Project, and responded to the Requesters' queries.

III. PROJECT BACKGROUND

Water Sector

7. ***Lebanon is water-stressed and does not deliver the level of service expected of similar economies, especially in the summertime. Because of the water deficit, rationing is common for residents of the Greater Beirut Mount Lebanon area (GBML) during the six-month summertime. The overall cost to households for water provision is high due to the expensive alternatives, and the poor are the most affected.*** Groundwater is exploited at unsustainable levels, and the coastal aquifers suffer from seawater intrusion. There is a high number of wells in the GBML, about 20,000 licensed individual private wells and 60,000 illegal wells. Some areas of the GBML, where more than 40 percent of the Lebanese population lives, receive only three hours of water supply per day during summer, which pushes residents to buy expensive tanker or bottled water. The average household is paying between 1 and 13 percent of its income on water depending on the season and water shortages, which is a burden for the 30 percent of the population in the GBML living under the national poverty line of US$4 per person per day.

8. ***Recognizing the need for urgent action, the Government of Lebanon (GoL) developed and approved the 2012 National Water Sector Strategy (2012 NWSS) with the objective to develop a comprehensive, multi-sectoral plan to improve water services and resources management across Lebanon.*** In March 2012, the Council of Ministers approved the 2012 NWSS, which outlines national priorities in the water sector. The 2012 NWSS was consulted upon and discussed with stakeholders. The World Bank Country Water Sector Assistance Strategy indicates *"the NWSS is a relevant program. Implementation will require breaking the NWSS down into 'bite-sized pieces' and phasing its implementation according to priority and funding availability."*[2] The 2012 NWSS identified the dam to be constructed on the Awali/Bisri River as an essential part of water supply infrastructure to address the problems faced by the more than 1.6 million people living in the GBML.

9. ***The GoL has made reform of the water sector a national priority, and without the implementation of the 2012 NWSS the residents of the GBML will continue to be deprived of access to a continuous and good quality water supply. An additional bulk water supply of 345 million m^3 per year by 2035 is required to achieve GBML water security.*** The GoL has completed several studies[3] assessing infrastructure and institutional actions and is implementing the 2012 NWSS. Based on current estimates, no single source can cover this additional volume of bulk water needed for the GBML; thus, diversification

[2] Lebanon Country Water Sector Assistance Strategy (2012-2016). 2012. Report No. 68313-LB. The World Bank. https://hubs.worldbank.org/docs/imagebank/Pages/docProfile.aspx?nodeid=16561274

[3] 2012 NWSS, the 2014 Groundwater Assessment, and the Bisri Dam Alternative Analysis.

of sources (various dams, and various non-dam alternatives) and institutional actions are required for the water security of the GBML. In assessing the non-dam alternatives, the GoL found that the volume was insufficient to meet the deficit. The ESIA's analysis of alternatives considered four dams – Bisri, Janneh, Damour East and Damour West. The volumes for Bisri and Janneh are 125 and 95 million m^3, respectively. At the time of preparation of the ESIA, the studies of the Damour Dams were not completed; hence, the range of volumes for these dams, depending on the sources, varies from 42 to 155 million m^3. The combined amount of water provided by the four dams would be close to meeting the 345 million m^3 water deficit for the GBML (Annex 4). Janneh Dam is under construction, and Bisri Dam Project construction is expected to begin in a few months; the Damour sites are at the study stage.

10. ***The institutional actions described in the 2012 NWSS need to be implemented simultaneously with the infrastructure actions, to ensure that the GBML satisfies its water deficit.*** In 2000, the Parliament approved the Water Law 221 on the organization of the water sector, and on September 17, 2017, ratified the Water Code, which was a significant milestone for the country's water sector. The Water Law 221/2000 was enacted to: (i) clarify the respective obligations and rights of public agencies for the delivery of water services; (ii) empower the newly created Regional Water Establishments to increase service and improve sustainability; and (iii) create reciprocal accountability between customers and the Regional Water Establishments. Currently, the GoL supports the GBML water supply provider, the Beirut Mount Lebanon Water Establishment (BMLWE) in institutional aspects, supporting its move from intermittent to continuous water supply. The BMLWE is implementing activities such as (i) installation of water meters; (ii) monitoring and managing the increasing water sources; (iii) building partnerships with the private sector based on performance targets, for example, leakage reduction; and (iv) undertaking innovative private sector contracting, such as Design Build Operate to prepare for a future Design Build Operate Transfer approach, as provided for by the Water Code. The World Bank and other partners are supporting the GoL and the water supply providers to increase the efficiency of water services for the Lebanese population.

The Projects

11. ***GBWSP and AF GBWSP.*** The development objective of the GBWSP and the AF GBWSP is to increase the provision of potable water to the residents in the Project area within the GBML, including those in the low-income neighborhoods of Southern Beirut, and to strengthen the capacity of the BMLWE in utility operations. The GBWSP will transfer bulk water from the Joun Reservoir, which is a mix of water from the Awali/Bisri River, Litani River, Anane Lake and several springs. A water treatment plant, storage reservoirs and distribution infrastructure are currently under implementation under these projects. The GBWSP and the AF GBWSP also include strengthening the operation and financial performance of the BMLWE, and a transition to continuous water supply service in targeted areas accompanied by a leakage reduction performance-based program. Although the Request for inspection cited these projects, the Requesters have not made any allegations against the GBWSP and the AF GBWSP.

12. ***The Bisri Dam Project.*** The Project's development objective is to increase the volume of water available to the GBML. The analysis of alternatives commissioned by the GoL, which was included in the environmental and social assessment (ESIA), [4] recommended the Bisri Dam Project as the immediate next step to secure bulk water for the GBML. The Project[5] includes the construction and supervision of a 125 million m^3 water supply dam on the Awali/Bisri. The water stored in the reservoir that the Project will build will be conveyed to the Joun Reservoir through an underground tunnel (see Map). Thus, the Bisri Dam Project and GBWSP projects, although not directly associated with one another, are complementary and will both support securing bulk water, reliable access and affordable[6] water for GBML residents, particularly in the dry summer months when it is the most needed. The Bisri Dam Project is expected to have a significant positive impact by providing increased access to potable water to the people in the GBML.

13. ***Environmental and Social Safeguards.*** The Bisri Dam Project has been placed in Environmental Assessment Category A. The ESIA informed Project design and accompanying mitigation measures. The ESIA was prepared as per the Ministry of Environment's 2012 Decree on Environment Impact Assessment, which requires an ESIA for all Category A projects. The following safeguard policies are applicable: Environmental Assessment (OP/BP 4.01); Natural Habitats (OP/BP 4.04); Physical Cultural Resources (OP/BP 4.11); Forests (OP/BP 4.36); Involuntary Resettlement (OP/BP 4.12), and Safety of Dams (OP/BP 4.37). The Bank reviewed and approved the comprehensive ESIA, which includes an Environmental and Social Management Plan (ESMP), a Resettlement Action Plan (RAP), and Dam Safety Plans. The ESIA undertook an analysis of alternatives of nine dam and non-dam options (Annex 4).

14. ***The Bisri Dam Project implementing agency, the Council for Development and Reconstruction (CDR), conducted consultations and followed a disclosure process.*** The Ministry of Environment, which approved the Bisri Dam Project ESIA in June 2014, remains involved in implementing and monitoring the ESMP. The pre-construction Biodiversity Action Plan (BAP) is under implementation. As part of the implementation of the ESIA/ESMP, in June 2018, the Bank cleared the terms of reference for the master plan of the Bisri Dam Project's catchment and shoreline development, and the CDR will launch the expression of interest in the next quarter. The Bisri Dam Project has a well-functioning grievance redress mechanism (GRM), which was established in June 2014 and received its first complaint in early 2016 when expropriation began.[7] The CDR also established two

---

[4] ESIA for the Bisri Dam Project Dated May 2014, Section 7, p. 105.

[5] The Islamic Development Bank finances some activities such as the construction of the hydropower plant and the expansion of the Wardanieh Water Treatment, as a parallel financing of the World Bank Bisri Dam Project.

[6] The secured bulk water will allow people to rely on the public water network and reduce household expenditures in water as a result of curtailing the cost burden of purchasing water from private tankers or expensive bottled water.

[7] The CDR maintains a GRM log, which is shared with the Project team via email. The Project team also reviews the log during supervision missions. The log contains information on the plot number, cadastral area, date of complaint, registration, date of consultation, subject of complaint, answer/corrections, date of answer, and date of CDR resolution.

Independent Panels of Experts: one on Dam Safety (Dam Safety Panel), and the other on Environment and Social Aspects (Environmental and Social Panel).

15. ***Status of the Projects:***

- *GBWSP.* The World Bank Board of Executive Directors approved the US$200 million GBWSP loan on December 16, 2010; and its US$90 million Additional Financing on June 15, 2018. The GBWSP loan became effective on December 4, 2012. The AF GBWSP loan is not effective yet. The closing date for the loan and the Additional Financing is November 30, 2020. The disbursement to date account for 45.17 percent.

- *Bisri Dam Project.* The World Bank Board of Executive Directors approved the US$474 million Bisri Dam Project loan on September 30, 2014. The loan became effective on December 15, 2015. The closing date is June 30, 2024, and the disbursement rate is 35.96 percent. The construction of the Bisri Dam has not started yet.

IV. SPECIAL ISSUES

Previous Request for Inspection

16. ***Previous Request for Inspection – GBWSP.*** On November 4, 2010, the Panel received a Request for Inspection relating to the then proposed GBWSP. The Requesters alleged concerns were about: (i) water quality, (ii) increase in water tariffs; and (iii) water availability. Management submitted its response on December 13, 2010. Following additional studies undertaken by Management, the Inspection Panel submitted its Report and Recommendation not to investigate, which the Board of Directors approved on April 8, 2013. The Report recommends, and Management committed to, monitoring and providing adequate resources for GBWSP implementation. GBWSP implementation and progress towards achievement of development objectives are moderately satisfactory. The Project team conducts frequent supervision (i.e., on average every two months).

17. None of the concerns raised in the current Request is linked to the previous Inspection Panel (case no. 71).

18. ***Although the Request for Inspection also cites GBWSP and AF GBWSP, the concerns raised in the Request are focused on the Bisri Dam Project.*** Management further notes that none of the Requesters' concerns have a direct link to the GBWSP and the AF GBWSP.

V. MANAGEMENT'S RESPONSE

19. ***Management has carefully reviewed the concerns of the Requesters regarding the potential impacts that might arise from the Bisri Dam Project and confirms that these were carefully analyzed during Project preparation, in line with Bank policies and due diligence procedures. In Management's view, possible Project impacts are appropriately addressed as part of the ESIA, ESMP, and RAP, which were widely consulted, comprehensive and monitored. Several mitigation measures are already under implementation and others will be implemented once Bisri Dam construction begins.*** The preparation of the Bisri Dam Project included an analysis of the alternatives, assessments of environmental and social impacts, and of the archaeology of the site. The ESIA and RAP consultations informed the design of the Project and the mitigation measures. The results of the consultations also led to the development of a Benefit Sharing Program.[8]

20. ***Over the past 18 months (i.e., since May 2017), the Project team has had extensive communications with the Requesters' representatives on the issues raised in the Request, engaging in detailed email communication and face-to-face meetings (Annex 8).*** The Project team, with advice and support from the Bank's Grievance Redress Service (GRS), engaged with the Requesters and responded to their queries. Project team and GRS staff met with the Requesters on multiple occasions in Lebanon, and undertook site visits to review on the ground the issues raised by the Requesters. The Bank provided access to and facilitated interaction of the Requesters with Bank experts and both the Dam Safety Panel and the Environmental and Social Panel for the Bisri Dam Project. The Bank also made relevant reports and studies available to the Requesters' representatives.

21. ***Management confirms that the Bisri Dam Project has been designed based on scientific studies undertaken by world-class international and local experts and reviewed by both Panels of Experts as well as World Bank experts.*** The GoL undertook several prefeasibility studies and field investigations, in 1954, 1974 and the early 1980s. From June 1994 to April 1995, the GoL prepared a feasibility study and investigations for the Bisri Dam Project. In 2011, the feasibility study was updated in light of newly available hydrologic data; it also took into account new market prices to determine the construction cost of the dam. Four dam safety studies have been satisfactorily prepared, namely: (i) Construction Supervision and Quality Control Plan; (ii) Instrumentation Plan; (iii) Preliminary Operation and Maintenance Plan; and (iv) Framework of Emergency Preparedness Plan.

22. ***The Dam Safety Panel was established for the Bisri Dam Project and is composed of world-class experts. The Dam Safety Panel looked in detail at (i) embankment/foundation design; (ii) geology; (iii) seismology; and (iv) hydrology.*** The

[8] The Benefit Sharing Program will ensure that local people in the surrounding communities (i.e., landowners in the valley whose land will be inundated and the villages in the surrounding hills) receive adequate benefits from the Project construction and operation. The objective of the program is to share the benefits of the Bisri Dam reservoir beyond water supply consumers in the GBML. More specifically, the program will help: (i) improve community services and social welfare throughout the areas impacted by construction and inundation; (ii) ensure the surrounding communities share the benefits from subsequent development of the reservoir shoreline and adjacent areas; and (iii) promote employment opportunities.

Dam Safety Panel provided specific recommendations on the updated design in November 2013, and again in March and June 2014. It has confirmed the overall technical feasibility and safety of the design, as well as cost estimates and dam safety plans. The detailed design and bidding documents have incorporated the Dam Safety Panel's recommendations. Also, both the Dam Safety Panel and the Bank have thoroughly reviewed and approved the design and dam safety plans.

23. ***The Environmental and Social Panel is composed of experts in their respective fields and looked in detail at (i) environment; (ii) social; and (iii) archaeology aspects.*** The Environmental and Social Panel assists in monitoring the implementation of the ESMP and RAP in line with best practice international standards and Bank safeguards policies.

24. ***Management notes that a lawsuit contesting the Bisri Dam Project has been filed.*** Some Project Affected Persons (PAPs) filed a lawsuit in 2015 before the Shoura Council challenging the compliance with Lebanese law of the GOL's Decree to Expropriate the Bisri Dam Project area.[9] The Shoura Council is the highest administrative court in Lebanon.[10] The plaintiffs' main claim was that the environmental impacts had not been appropriately studied for the Bisri Dam Project area, as required by the law. The Shoura Council is now tasked with reviewing whether the 2015 Decree to Expropriate the Bisri Dam Project area conforms with the requirements of Lebanese law. Management was informed that the Shoura Council will issue its decision on the case in the coming months. This is a national judiciary matter that Management is closely monitoring.

25. The Requesters' claims, accompanied by Management's detailed responses, are provided in Annex 1. Specific issues are discussed below.

Environmental Aspects

ESIA

26. ***Management's view is that the ESIA contains the results of biodiversity surveys that were undertaken, includes several viable alternatives, and an environmental cost-benefit analysis. The ESIA also includes a detailed ESMP with specific mitigation measures to address the identified potential impacts.*** The World Bank and the GoL's Ministry of Environment approved the ESIA on June 2, 2014.

Biodiversity

27. ***The ESIA's biodiversity surveys,[11] described below, concluded that the Bisri Dam Project "would not cause significant conversion to critical natural habitats."[12] The***

[9] Expropriation Decree No. 2066, published in the Official Gazette on June 4, 2015 (Decree to Expropriate).

[10] The Shoura Council is mandated to assist in drafting and reviewing of the legislation to be promulgated by the Legislature, and to serve as the highest administrative court in charge of reviewing the decisions of the lower first degree administrative courts.

[11] The survey identified 11 flora species, three fish and macro-invertebrates' species, three amphibians and reptiles species, four bird species and five mammal species of conservation value and special attention.

[12] ESIA – Annex G, p. 9.

ecological assessment was done in two phases (see below for a description of the surveys and methodology). The first phase in 2012 characterized the baseline ecological conditions of the Bisri Dam Project area and was designed to be repeated during the post-construction surveys following the same and other updated methodology. The second phase in August 2013 included a more detailed assessment, as well as consultation on and completion of the BAP. A team of specialists, including a mammologist, a plant ecologist, a freshwater ecologist, a herpetologist, and an ornithologist, carried out the surveys. The detailed ecological assessment covered an area of 5 kilometers[13] surrounding the footprint of the future Bisri Dam, and included detailed surveys as follows:

- *Flora and vegetation survey (including habitat mapping),* which was carried out by walking on pre-identified transects to acquire an understanding of the vegetation communities in the area, to identify community boundaries, to record species present, and to determine the potential distribution of threatened species;

- *Fish and Macroinvertebrates surveys*, which were carried out through electrofishing (a common method used for catching fish for surveying and monitoring purposes);

- *Reptile and amphibian surveys,* which were carried out through study and observation of active animals on two intervals of days and nights, focusing on the water bodies, the riparian habitats and their peripheries;

- *Ornithology survey,* which was carried out using the 20-minute point-count method, whereby all species noted during this time period were recorded at different places and different times in the most characteristic habitats of a given area; and

- *Mammal survey,* which was carried out through indirect and direct approaches. The indirect approach was conducted during daytime through walking surveys, where secondary signs such as tracks were recorded. Caves and dens were also inspected. The direct approach was conducted in two ways: night surveys with a vehicle and spotlight, and camera-trap surveys, with cameras sited to cover a combination of habitat types and locations within the study area.

28. ***The BAP included the mitigation measures to translocate some species, to minimize impacts through Bisri Dam construction timing or sequencing selections, and to compensate for habitats that cannot be saved. The GoL consulted on, budgeted for, and disclosed the BAP, which is part of the ESIA.*** The mitigation measures fall under the following two categories: (i) the CDR will undertake further studies, conduct monitoring activities, organize the translocation of some species, and ensure provisions for environmental flow; and (ii) actions the Contractor needs to take as included in the contract and to be further detailed in the Construction Environmental and Social Management Plan (CESMP).

[13] ESIA – Annex G, p.10.

Picture 1: Site of planned Bisri Dam reservoir

Picture 2: Site of planned Bisri Dam reservoir

Cost-benefit analysis

29. ***In addition to the Project's overall cost-benefit analysis, the ESIA includes an environmental cost-benefit analysis, which assesses the health costs resulting from water supply shortages to the Project beneficiaries against the expected environmental impacts of the Project.*** The analysis also addresses: (i) the loss of ecosystem benefits (wood food products, non-wood food products, grazing, recreation, hunting, carbon sequestration, and biodiversity) caused by the Project; (ii) developments around the reservoir, and (iii) the impacts on downstream areas. The ESIA concluded that the benefits from the provision of good quality water supply to the growing population of Beirut is significantly higher than the costs associated with building the Bisri Dam, especially in view of the mitigation measure that are planned and under implementation.

Reforestation

30. ***The ESMP details several activities to mitigate the environmental and social impacts of the Project, including the planting of trees.*** These measures cover water quality monitoring, biodiversity management and protection, and the construction of a sewerage network in the upper catchment villages. With regard to trees, based on the detailed ecological assessment and social survey, the ESIA estimates that 82 ha of forest area will be lost. The RAP estimates that 110,814 trees (38,147 forest trees, mainly pine and oak, and the remainder crop trees) will need to be cut.[14] The ESIA includes measures to minimize the number of trees cut, and to conserve others (even in construction sites). The ESIA recommends reforestation, as part of the Bisri Dam Project Catchment and Reservoir Shoreline Master Plan, both to control sediment loading to the reservoir and as a compensatory measure for lost habitat. The Project team cleared the terms of reference of this master plan in July 2018, the CDR will launch the procurement process by December 2018, and the plan is expected to be completed by the end of 2020.

Management of quarries

31. ***The ESIA addresses the potential environmental and social risks and impacts of quarries and provides adequate mitigation measures.*** About 80 percent of the dam construction material will be sourced from within the reservoir area, significantly reducing reliance on external quarries and subsequently minimizing the negative environmental impacts associated with the construction of new quarries or use of existing commercial quarries. The ESIA assesses the potential impacts of excavation and sourcing of materials from the reservoir area and includes mitigation measures to minimize these impacts. Should any new quarry be needed, the ESIA provides a framework of rules and principles for assessing the impacts, the analysis of alternatives, and the mitigation measures that should be followed by the Contractor.

32. The Contractor's commitments include preparing a detailed ESIA for possible new quarries, should it be needed, which the Bank would clear before use of any new quarry. The ESIA contains an extensive monitoring program of the identified mitigation measures.

[14] Project Appraisal Document, page 40 of 94.

There is a layered approach to supervising the implementation of the mitigation measures: the supervision consultant will provide daily supervision of the contractor, the implementing agency will oversee contract management, the Environment and Social Panel will supervise the process and provide quality control, and the Project team will provide overall supervision of the ESMP.

Archaeology and Cultural Heritage Aspects

33. ***None of the cultural heritage sites located in the impact area of the Project are protected under either the Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) of 1972, the 2003 Convention for Safeguarding Intangible Cultural Heritage or Lebanese Law No. 37 for Cultural Properties.***

34. ***The Bisri Dam Project has been prepared to meet the requirements of Bank policies, including OP/BP 4.11. An extensive and systematic archaeological survey is a requirement of the Bisri Dam Project, to be carried out during Project implementation. The ESIA provides information on studies and surveys conducted in the past within the impact area of the Project.*** Based on these pre-existing surveys, the ESIA determined that the area had evidence of habitation spanning centuries, justifying a systematic survey, which is a requirement of the Project and is provided for in the Project budget. To build consensus on methodology and interventions, the Project team engaged various stakeholders, including the Directorate General of Antiquities and Museums (DGA), which is the cultural heritage authority of Lebanon, and recognized scholars, and held extensive community consultations.

35. ***The Bisri Dam Project also provides for an archaeological survey, test excavation to examine, document, and evaluate the archaeological remains in the impact area of the Bisri Dam Project.*** This will specifically include examination of the four granite columns which are located inside the planned reservoir and which possibly are remains of a Roman era temple (see picture 3).

36. ***The Mar Moussa Church was identified during Project preparation as a religious site, and the RAP determined that the structure and its associated history, activities and traditions were of high value to its community of worshipers (see Picture 4).*** Accordingly, in consultation with the affected religious community, the Project will finance the moving of the Church and the associated remains of an earlier structure to a higher ground. During the July 2017 supervision mission, the Project team met with the Maronite bishop, who stated that he and the concerned community agreed on the move and were finalizing the location of the site to which the Church and associated remains would be moved with the support of the CDR.

Picture 3: Granite columns from the Roman era

Picture 4: Mar Moussa Church

Social Aspects

Consultations and stakeholder engagement

37. ***The Bisri Dam Project has made significant efforts to address local communities' concerns. The CDR carried out consultations on the ESIA and RAP during preparation, in line with Bank policies, in which a wide range of stakeholders participated, including but not limited to, landowners, local community members, and civil society organizations (CSOs). The consultations have been sustained during Project implementation to date (Annex 6).*** Regarding *consultations during preparation,* consultations were carried out with various stakeholders, such as PAPs, local communities, NGOs and CSOs, as part of preparation of the Project ESIA and RAP. Notification of public consultation sessions was advertised in local newspapers two weeks in advance of each of the 16 consultation sessions. More than 400 people attended these sessions. Also, 109 landowners were interviewed individually and a survey of 1,200 households was undertaken and informed Project design. *Consultations have continued during implementation*: the GoL carried out 12 sessions in different municipalities since Project implementation began.

38. ***The Project team attended selected consultations sessions as an observer.*** Relevant material such as the draft ESIA and RAP were disclosed in-country, in English and in Arabic, and at the InfoShop on June 2, 2014. All safeguard instruments are also accessible on the CDR website.[15] In addition to the ESIA and RAP, a booklet[16] on the GRM (Annex 7) was distributed on November 30, 2016, to all six villages that are in the vicinity of the Project area, and later during site visits to other municipalities and villages on December 12 and 22, 2016. This booklet is also available, in Arabic, on the CDR website. Further information and short video clips are available on the Bank's Project website.[17] The GRM is in operation. In addition to the CDR's consultations, the Project team consulted individual PAPs (selected at random) during supervision missions (Annex 8). The PAPs did not bring any additional concerns or issues during these consultations as compared to the information from the GRM and the external monitoring.

39. ***The Project has put in place additional mechanisms to facilitate stakeholder engagement and consultation throughout Project implementation.*** This engagement includes an independent external monitoring mechanism, the GRM, and targeted Project information dissemination:

- *Independent external monitoring mechanism* – The CDR hired an independent external monitoring consultant to monitor RAP implementation. The consultant carried out additional consultations through surveys. To date, two sample surveys of external monitoring have been carried out. Based on these surveys the majority of the PAPs are in favor of the Project. The first survey covers the PAPs from the dam footprint area, 70 percent of this sample were in favor of the Project, 20 percent were opposed, and 10 percent were neutral. The second survey covers the PAPs from the reservoir area, 57 percent of this sample were in favor of the Bisri Dam

[15] http://www.cdr.gov.lb/eng/bisri.asp this booklet was disclosed on CDR website on November 25, 2016.
[16] http://www.cdr.gov.lb/study/bisri/Booklet-GBWSAP.pdf
[17] http://projects.worldbank.org/P125184?lang=en

and 42 percent were opposed. The first survey was carried out in the third quarter of 2017, and the second survey in the first quarter of 2018. The difference in results can be partly attributed to the difference in the location of the sample. The external monitoring consultant will review the findings from the next survey and attempt to identify any additional the reason for these variations. In the meantime, the CDR has strengthened its communication and outreach program to identify and address citizens' concerns.

- *The GRM has been established and is functioning well.* The CDR maintains the GRM and shares the complaint log with the Project team via email for review. The Project team also reviews the log during supervision missions. The log contains information on the plot number, cadastral area, date of complaint, registration, date of consultation, subject of complaint, answer/corrections, date of answer, and date of CDR resolution. Most of the complaints are related to the accuracy of the plot size, the number of trees, and the correct names of landowners. To date there have been 180 complaints, all of which were resolved.

- *Project information dissemination* – Project information is well disseminated, as noted in earlier paragraphs. The ESIA and RAP were disclosed and are publicly available. There is a presentation about the Project before each consultation session, and the Project Information Booklet was distributed in the Project area and uploaded on the CDR website (see Annex 7).

40. ***Specific concerns raised during consultations have been documented and addressed through targeted mitigation measures.*** Such concerns included: (i) access to drinking water in the area of Bisri; (ii) ensuring access to jobs and other opportunities for tourism; (iii) need to preserve archaeological, historical and cultural heritage sites, such as Mar Moussa Church and other historical ruins; (iv) need to access productive land upstream and downstream of the dam; (v) improved water supply for people living in the vicinity of the dam, and not just Beirut residents; (vi) means of compensation for land take and fairness of compensation for expropriated lands; (vii) returns of the Project for local residents in economic and employment terms; (viii) issues of wastewater before and after dam construction; and (ix) protection of environment from pollution. The measures to address the concerns are included in the ESMP and RAP, and include the Benefit Sharing Program, compensation for affected assets at full replacement cost, support for livelihood rehabilitation in addition to cash compensation, and provision of job opportunities to local people. Project implementation is estimated to create more than 1,000 job opportunities. The consultation summary is presented in Annex 6.

41. ***In Management's view, significant efforts were made to include women, landowners and NGOs in the consultations.***

- *With regard to women* – consultation documentation indicates that a total of 42 women attended the 16 consultation sessions for the RAP and ESIA preparation. According to the RAP, consultations were carried out with due consideration for gender and specific efforts were made to identify and include women in consultation sessions. For instance, as part of the RAP preparation, individual

interviews were carried out with 109 landowners in addition to the public consultation, 15 of whom were women. In addition, gender disaggregated data was collected from the survey of 1,200 households to inform the Bisri Dam Project preparation.

- On *consultations with landowners* – there are 861 landowners affected by the Project,[18] As noted earlier, over 400 participants attended the public consultation sessions, half of whom were landowners. Taking into consideration both public meetings and 109 individual interviews, more than 35 percent of affected landowners were covered by the consultations. About 30 percent of landowners are absentees, which means that more than 50 percent of non-absentee landowner participated in the consultations.

- *On consultation with NGOs/CSOs* – all public consultations were publicly announced through local newspapers and open to all NGOs/CSOs. Various NGO/CSO representatives attended the consultations (Annex 6).

42. ***Management confirms that local PAPs were consulted during Project preparation and implementation. The Project undertook efforts to ensure that information on the consultations was publicly available to affected people and that they had the opportunity to express their concerns:***

- *Venue and time of consultation* – the public consultation sessions were held in different venues, for institutional stakeholders, local PAPs in the village near the proposed Bisri Dam, and Greater Beirut residents. The village consultation sessions were scheduled on weekends and for Beirut water consumers early on weekday evenings to allow the maximum number of interested people to attend.

- *Process of consultation* – all public consultation sessions were announced in local newspapers two weeks in advance of each consultation session. The consultation sessions were open to all interested parties. The process was transparent, and all consultation findings were documented and publicly disclosed. More importantly, consultations are a continuous process and will continue during Project implementation. People can also send their concerns through the GRM.

- There is a *continuous process of citizen engagement*. The GRM is in operation. The GRM is open not only to PAPs but also to all the people of the villages in the Project area and the public. There have been no complaints received concerning marginalization of affected people or other stakeholders, either through the GRM or the opinion survey carried out by the independent external monitoring consultant for the Project. During each supervision mission, the Bank team reviews the GRM Complaint Log. The implementing agency also shares the file of the GRM Complaint log via email with the Bank team. The log contains information on the plot number, cadastral area, date of complaint request, registration, date of

[18] The census survey covered all landowners. Absentee landowners were notified through local newspaper. Some of them retained lawyers to represent them in this process.

consultation, subject of complaint, answer/corrections, date of answer, and date of CDR resolution.

Compensation for land acquisition

43. ***The Bisri Dam Project involves the physical relocation of 49 households (six landowners and 43 tenants) and the expropriation of around 570 ha of land containing 999 plots.*** Some residential properties are affected, but there are no commercial or industrial sites and no significant public infrastructure or community facilities within the Project area. Expropriation is advanced; the Expropriation Committee (EC) has made compensation decisions for 993 of 999 plots. Since the preparation of the original RAP, there have been some minor changes in the number of lots, landowners, workers and tenants, and absentee and non-absentee landowners, as well as available evidence showing a decrease in the market price of land in the Project area since the RAP land valuation. The CDR will update the RAP in an addendum to document these changes.

44. ***There is no unified methodology for compensation valuation in Lebanon.*** The EC, which is independent of the CDR, decides the compensation rates based on many factors, such as the consultation with PAPs, listed prices, recent transactions, location, and land use. The EC unit compensation rates varied from the RAP rates. The RAP includes 11 categories of land with compensation rates ranging from US$13.33 to US$33.33 per square meter, while the EC's land categorization is different, and the compensation rates range from US$20.00 to US$26.66 per square meter.

45. ***The available evidence demonstrates that the compensation valuation is above the market prices of the affected assets, which reflects the full replacement cost as the RAP requires.*** The Bank requested the CDR to provide evidence that compensation rates were above the market price of affected assets.[19] The external monitoring consultant hired an independent real estate appraiser who evaluated one randomly selected plot[20] of land in the Project area. The CDR provided information showing that the EC rates were higher than the market price of land in the Project area by 15-20 percent on average. The Project team, through a consultant, saw that sales price of recent land transactions are US$5 to 10 per square meter, which is lower than the EC's compensation rates. The team hired another independent real estate appraiser to evaluate more plots of land in the Project area and the report will be finalized at the latest in the first quarter of 2019.

46. ***Despite the available evidence that compensation rates are above the market price, appeals have been submitted to the Appeal Committee (AC) as per the process outlined in the RAP.*** It is worth noting that the appeal process is at no cost to the PAPs and allows them the opportunity to obtain higher compensation. As of September 24, 2018, out of 999 plots, 598 plots had been appealed by landowners; and the AC has made decisions on 339 of those. The appeal process is working well, the processed decisions

[19] The Project team requested the CDR to (i) provide a selection of documented cases of recent land transactions in the Project area; and (ii) ask the external monitoring consultant to collect information on the current market price of land in the Project area.

[20] The independent monitoring of the RAP included the evaluation of one plot at the request of the Project team, to demonstrate that the compensation value determined by the EC reflects the replacement cost.

have so far been favorable to the PAPs, and all people interviewed expressed that they will follow the decision of the AC.

Water Balance and Analysis of Alternatives

Water balance

47. ***The 2014 Assessment of Groundwater Resources of Lebanon (to which the Request refers) confirmed a groundwater deficit of about 150 million m^3 in the GBML (Annex 5) and an associated decline in groundwater quality there.*** The Request cites the range of 4,728 and 7,263 million m^3 as the recharge amount (i.e., gross storage) in the 2014 assessment. However, the 2014 assessment goes on to clarify that this estimated range does "***not account for losses to the sea and deep percolation.***" Thus, the net groundwater storage (i.e., groundwater amount that is usable and can be extracted) is smaller since losses to the sea and to deep percolation are deducted from the recharge amount.

Analysis of alternatives

48. ***The analysis of alternatives provides a wide range of alternative scenarios, including nine scenarios of dam and non-dam options.*** The analysis found that the non-dam alternatives would augment water supplies but cannot cover the additional volume of 345 million m^3 of bulk water needed in the GBML by 2035. Diversification of sources is required for the water security of the GBML and to serve the GBML's projected population of 3.5 million people by 2035. The four dams considered in the ESIA's analysis of alternatives are Bisri, Janneh, Damour East and Damour West. The volumes for Bisri and Janneh are 120 and 95 million m^3, respectively. At the time of preparation of the ESIA, the studies of the Damour Dams were not completed; hence, the range of volumes for the Damour dams, depending on the sources, varies from about 42 to 153 million m^3. Thus, the total volume provided by these dams (Bisri, Janneh, Damour East, and Damour West) is close to satisfying the 345 million m^3 deficit (see Annex 4). Janneh Dam is under construction, Bisri Dam construction is expected to begin in few months, and the Damour sites are at the study stage.

49. The analysis of alternatives concluded that the Bisri Dam site presented several important advantages: (i) the site can meet the high storage volume requirements of the GBML to 2035 or longer; (ii) the reservoir floor is underlain by low permeability deposits; (iii) it will have little or no pumping costs; and (iv) it can deliver the lowest cost per unit volume to the GBML. Given its size and cost effectiveness, the Bisri Dam was considered the priority option, and the site was assessed as acceptable from an environmental, social, technical, economic and financial perspective.

50. ***The information available on the potential capture of the submarine springs is for the north of Lebanon[21] (i.e., Chekka springs), with various estimates of available volumes, some as low as 34 million m^3 and 68 million m^3, which are insufficient to meet***

[21] These springs are in North Lebanon far from the GBML and would require complex infrastructure to bring the water to the GBML.

the 345 million m^3 water deficit noted earlier. In addition, a complex infrastructure would be required to transport the water from the submarine springs, which are located far from the GBML, where the water is most needed. The flow in the submarine springs also varies by season and the water can have a high saline content. These springs are charged through coastal aquifers and are at risk of over-exploitation and contamination from river discharges.

Geological Aspects and potential Seismological Impacts

51. ***Management considers that the dam design follows international best practice on safety measures, and is based on appropriate seismic hazard assessments, which has been confirmed by the Dam Safety Panel's findings.*** The GoL undertook seismic hazard assessments during Project preparation to define the characteristics of potential earthquakes that the dam would need to be able to resist. These assessments were done using state-of-the-art probabilistic and deterministic approaches, including the assessment of the neo-tectonic setting of the Bisri Dam site and nearby seismic sources.

52. ***The Bisri Dam Project has been designed to withstand the ground motion that would result from a Maximum Credible Earthquake (MCE) event.*** Based on the results of the seismic hazard assessments, the designer conducted numerical dynamic analyses of the dam to estimate the magnitude of crest settlement, displacements and shear distortions, and confirmed the safety of the dam against an Operating Basis Earthquake (OBE) and Safety Evaluation Earthquake (SEE), according to the seismic design guidelines of the International Commission on Large Dams (ICOLD). The seismic hazard assessments covered all historical seismic event data, including the two most recent destructive earthquakes around the Roum Fault in 1837 and 1956. The SEE ground motion is defined based on the largest reasonably conceivable earthquake along the recognized fault, or around 10,000 years return period, which is much more severe than earthquakes of the more recent past. The Bisri Dam has been designed for the SEE ground motion that would result from the MCE event on the Roum Fault, which is a Mw7 strike-slip earthquake. The assessment reports were reviewed and confirmed by the Dam Safety Panel.

53. ***The Bisri Dam Project is designed according to state-of-the-art seismic design requirements, to withstand Reservoir-Triggered Earthquakes (RTE), whereby the dam must safely withstand ground motions caused by the SEE.*** The added weight of the impounded reservoir will not substantially increase any seismic energy release. The increase of the energy potential due to the impounded reservoir is practically insignificant in view of the size of the actual seismic energy that would be released.[22] RTEs have occurred on dams with heights over 100 m (while Bisri Dam will be 70 m high) and are suspected to have occurred on reservoir capacity exceeding 1 billion m^3 (more than 10

[22] Based on current knowledge, the Bisri reservoir is not large enough to possibly trigger an earthquake. It would need, on average, 900 years to develop adequate seismic strain to trigger a Mw7 earthquake on the Roum Fault.

times larger than that of the Bisri Dam).[23;24] The ICOLD Bulletin 137 on Reservoir and Seismicity – State of Knowledge, notes that the seismicity triggered in an RTE is a physical response of a crustal region to impounding when certain specific conditions are fulfilled. Impounding can trigger seismic activity only where the necessary natural preconditions already exist. This means that the causative fault that can produce earthquake energy releases is already in near failure conditions. This definition asserts that triggering due to impounding cannot change the underlying tectonic processes and the seismic hazard at a dam site. Any RTE is also likely to be relatively insignificant due to the limited height (70 m) and the relatively small reservoir capacity (0.125 billion m^3) of Bisri Dam. In any case, the Bisri Dam is designed to stay intact for the SEE ground motion that would result from the MCE event of Mw7 strike-slip earthquake on the Roum Fault.

Conclusion and Actions Going Forward

54. ***54. Management believes that the Bank has made every effort to apply its policies and procedures and to pursue its mission statement in the context of the Project.*** As a result, Management believes that the Requesters' rights or interests have not been, nor are likely to be, directly and adversely affected by an action or omission of the Bank as a result of a failure of the Bank to follow its operational policies and procedures with respect to the design, appraisal and/or implementation of the Bisri Dam Project.

55. ***Construction on the Bisri Dam Project has not started.*** Management will continue to monitor implementation of the Bisri Dam Project and is committed to maintaining an open and inclusive dialogue with all stakeholders during Project implementation, both before and during the construction of Bisri dam. ***Actions going forward include the following:***

- ***To further strengthen the consultation process, the Project team will sustain a high frequency of supervision missions and site visits,[25] continue to engage with relevant stakeholders and ensure that progress on the various action plans described below is documented on the public project website every quarter.*** Additional efforts will be made to further increase women's participation in the consultations.

- ***The ESIA's ecological compensation plan will be completed before the Contractor starts the Bisri Dam construction, which is expected to last from mid-***

[23] Although claimed to be an RTE case, it is highly disputed whether the May 12, 2008 Mw7.9 Wenchuan earthquake in China was influenced by the impoundment of the nearby Zipingpu Dam. The Zipingpu reservoir has a volume of 1.12 billion m^3 and lies within a seismically very active, compressive tectonic environment.

[24] The maximum RTE magnitude was Mw6.3, at the Koyna gravity dam in India in 1967. The Koyna dam is 103 m high, and the reservoir capacity is 2.8 billion m^3 (more than 20 times larger than the Bisri reservoir).

[25] For the past 18 months, supervision missions have been conducted every two months. The co-TTL has been based in Lebanon since September 2015, where the TTL relocated as of July 9, 2018. This increased presence on the ground will further strengthen Bank supervision and oversight through more frequent site visits and direct contact with counterparts during and in between supervision missions. Also, two out of the three safeguard staff and all the procurement and financial management team members are based in Beirut or neighboring countries.

2019 to 2014. Prior to Project approval, the Ministry of Environment and the World Bank approved the ESIA. The ESIA includes a series of plans and actions that need to be executed during the Project implementation period. Some plans and actions are to be completed prior to construction, some during, and some after construction of the dam. The CDR has commenced the pre-construction action items of the BAP, which include preparing a well-defined and detailed ecological compensation plan. The ecological compensation plan will ensure that there will be no net loss of habitat and that adequate compensation is made for habitats lost in the reservoir area.

- ***A Catchment and Reservoir Shoreline Master Plan[26] will be developed and is expected to be completed by 2020.*** This master plan is one of the ESIA recommendations and will integrate all the ESMP measures related to the upper catchment area and shoreline of the Bisri reservoir, including reforestation requirements, measures for protecting water quality and management of induced development. The first buffer zone is the 15 meters from the highest water level, which has already been expropriated. This first buffer zone is meant to secure the area of the reservoir and a small road /side walk surrounding it. The master plan will also identify additional and different types of buffer zones based on the characteristics of the basin and will provide the land use zoning around the shoreline and the 15-m first buffer zone.

- ***The construction and operation requirements are part of the Contractor's obligations contained in the tender documents and will be included in the CESMP.*** The Bank will clear the Contractor's CESMP before the commencement of any works, currently expected in the second or third quarter of 2019.

- ***Early archaeological investigations have been completed. An additional detailed archaeological investigation is already underway and preservation efforts will be completed before reservoir filling.*** The Contractor, jointly with the DGA, will conduct a detailed archaeological investigation based on the information from the ESIA and from the two geomorphological surveys, which are the first phase of this detailed archaeological investigation.[27] The detailed investigation is planned for the Project implementation period and has been included in the scope of works and in the budget of the Bisri Dam construction contract.

- ***The two independent panels of experts, the Dam Safety Panel and the Environment and Social Panel, will continue to provide additional advice and oversight of the Project.*** An independent monitoring consultant will also continue to assess RAP implementation, and the supervising engineer will monitor ESMP implementation.

---

[26] The Project team cleared the terms of reference in July 2018 and the Plan is expected to be completed by the end of 2020.

[27] One survey was conducted in June 2018 and the next survey is planned in February 2019.

ANNEX 1
CLAIMS AND RESPONSES

No.	Claim/Issue	Response
1.	**General:** While the project is based on an insufficient understanding of the water balance in Lebanon and an incomplete consideration of alternatives, it will result in the dismantling of an exceptional archaeological complex and the inundation of a unique riparian ecosystem. It will destroy a productive local economy and threaten the safety of local communities. It will be built in an area that, according to several studies, is not geologically convenient. Following outcry among locals and NGOs, we wish to draw the Inspection Panel's attention to the project's catastrophic harms that outweigh the claimed benefits, and to urge the Panel to take actions to withdraw all support for the dam. On top of the violations of the Lebanese regulations that govern such development plans, the project does not comply with the Bank's goals of fighting poverty, mitigating Climate Change and promoting sustainable development. Furthermore, the dam does not abide by the Bank's Safeguard Policies, the 2030 Agenda, and the Social and Environmental Framework.	***The Bank has a long history of engagement in Lebanon and has worked closely with all stakeholders to collect the required evidence to inform Project design. The Project retains two Independent Panels of Experts, an Independent Panel of Experts on Dam Safety (Dam Safety Panel), and an Independent Panel of Experts on Environment and Social Aspects (Environmental and Social Panel) to ensure high quality in Project preparation and implementation.*** *Extreme shortages of water in Lebanon. Lebanon's population has been suffering for decades from inadequate water supply services due to the country's extreme water shortage and lack of infrastructure and water resources management.* Groundwater is overexploited, and the coastal aquifers suffer from seawater intrusion. There are about 20,000 licensed individual private wells in the GBML, and another 60,000 illegal wells. Surface water storage capacity is very low in Lebanon, with only 6 percent of total resources being stored compared to the Middle East/North Africa average of 85 percent, and seasonal rains are not captured. The inadequate water supply service, with some GBML areas receiving only three hours of water supply per day during summer, pushes residents to buy expensive bottled or tanker water. The cost of these alternatives to the average household is between 1 and 13 percent of their income, depending on the season and the water shortages, which is a burden for the 30 percent of the population in the GBML that live under the national poverty line of US$4 per person per day. The Bisri Dam Project will augment water supply sources to address the water deficit in the GBML, reducing the economic stress to the poorest. *The Bisri Dam Project ESIA is rigorous and adequately covers archaeology and biodiversity aspects.* It includes: (a) thorough information on the archaeology aspects, such as the 2004 and 2005 survey conducted by the Polish-Lebanese survey team from the Institute for Archaeology, the Polish Centre for Archaeology at the University of Warsaw and the DGA. The survey covered the Bisri valley and surrounding hills for archaeological remains. Further, the Bisri Dam Project will finance additional archaeological surveys and exploratory excavations, which will provide an opportunity to better understand the pre-history and history of this area;

No.	Claim/Issue	Response
		(b) detailed Ecological Assessment covering all major taxa, which concluded that the Bisri Dam Project "would not cause significant conversion to critical habitats;" (c) mitigation measures to minimize impacts and ensure that there will be no net loss of existing habitats. *The Bisri Dam Project presents several benefits.* It will support socio-economic development and the Bank's goal of poverty reduction by providing improved access to water supply for more than 1.6 million residents in the GBML. It will bring about a reduction in costs to supplement currently lacking public water services. Upgraded roads for construction and operational traffic in the Project area will allow for better access to adjacent settlements, which in turn will lead to improved accessibility to health care, social services, education and employment, thus enhancing the overall quality of life of the local population. *The geological conditions of the Bisri site are incorporated in the Bisri Dam design.* As per World Bank OP 4.37, the GoL established an Independent Panel of Experts on Dam Safety, also known as the Dam Safety Panel,[1] which reviewed and provided recommendations on the detailed design report, including an early warning system and dam safety studies, and confirmed the technical feasibility and safety of the dam. It is worth noting that the seismic hazard and the karstic nature of the site were considered in the design of the dam, in accordance with state-of the art standards and the seismic design guidelines of the ICOLD. See also Items 20-21. *2030 Agenda and ESF.* For the reasons stated above, Management strongly believes that the Project's objectives and design are consistent with the 2030 Agenda. Management notes that the Bank's new Environmental and Social Framework does not apply to this Project; however, the Project has been prepared to meet applicable Bank policy requirements.

[1] The Independent Panel of Experts on Dam Safety is responsible for reviewing all technical and safety aspects of the design of the dam. Unless the Panel approves the design, the Bank will not finance construction of the dam. The Panel consists of four experts covering four aspects: (i) embankment /foundation design; (ii) geology; (iii) seismology; and (iv) hydrology. These are internationally renowned technical experts who have worked on dams including those located in high seismic and karstic regions. The Panel met and reviewed the consultant's proposed design in November 2013, and March and June 2014. The Panel has confirmed the technical feasibility and safety of the design, as well as cost estimates and dam safety plans.

No.	Claim/Issue	Response
		The detailed responses below will provide further clarifications on the issues raised in the Request.
	Threats to Natural Habitats and Forests	
2.	The National Physical Master Plan of the Lebanese Territory (NPMPLT 2005) classifies Bisri Valley as one of the most important Landscapes in Lebanon and a part of a Natural Regional Park. Unfortunately, the ecological value of the valley is strikingly underestimated in the ESIA of Bisri Dam, and the project does not comply with the World Bank's OP/BP 4.04 on Natural Habitats as well as with OP/BP 4.36 on Forests. *"The conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development."* (OP 4.04) The Bisri River Valley encompasses a variety of natural habitats including a unique pine woodland. With its widespread shallow water, the valley is an important habitat for migratory birds, especially the Black Stork, the Sparrow White, the Crane, the White Swan, the White Pelican (all protected by the AEWA Agreement signed by Lebanon) and the Dalmatian Pelican (Near Threatened species according to IUCN). Bisri Valley is an important resting and feeding area for shorebirds and water birds that is only comparable to the Ammik wetlands in western Bekaa. The loss of this unique landscape located on the western migration line cannot be compensated elsewhere. There must be other birds of interest	***Management considers that the ESIA for the Project took into consideration the landscape, forests and biodiversity present in the area, assessed the impacts and proposed mitigation measures as appropriate.*** The National Physical Master Plan of the Lebanese Territory (NPMPLT 2005) noted that the Bisri Dam was among several dam projects planned by the Ministry of Energy and Water (MoEW),[2] and that it was among the medium priority investments.[3] The Ministry of Environment (MoE), responsible for protection of natural sites in Lebanon, approved the ESIA in June 2014. Project preparation took account of the requirements of OP 4.04 on natural habitats. The ESIA's detailed survey concluded "the project would not cause significant conversion to critical natural habitats." *Natural Habitats and Biodiversity.* The surveys undertaken for the natural habitats of the Bisri Dam Project area as part of the ESIA are described in detail below: • *Flora and vegetation survey (including habitat mapping)* was carried out by walking on pre-identified transects to acquire an understanding of the vegetation communities in the area, to identify community boundaries, to record species present, and to determine the potential distribution of threatened species; • *Fish and Macroinvertebrates surveys* were carried out through electrofishing (a common method used for catching fish for surveying and monitoring purposes); • *Reptile and amphibian surveys* were carried out through study and observation of active animals on two intervals of days and nights, focusing on the water bodies, the riparian habitats and their peripheries; • *Ornithology survey* was carried out using the 20-minute point-count method, whereby all species noted during this period were recorded at different places and

[2] NPMPLT 2005: pp. IV – 71, Table 23 and pp. VI-11.
[3] NPMPLT 2005: pp IV- 74, Table 25.

No.	Claim/Issue	Response
	in this area, but this requires a detailed study that extends over a full year and includes the four seasons, which was never done. It is important to mention that Lebanon lies on the second most important flyway for migrating birds in the World. The biodiversity survey in the ESIA was far from accurate with very little data gathered. The ESIA states that the biodiversity assessment was "rapid" and based on "short visits", which makes the listed numbers incomplete and inconclusive. Nevertheless, even the provided data was not well exploited: 37% of the reported reptiles and amphibians are considered rare, 50% of the fish require attention, 5 of the mammals are rare, etc.	different times in the most characteristic habitats of a given area; • *Mammal survey* was carried out through indirect and direct approaches. The indirect approach was conducted during day time through walking surveys, where observations of secondary signs such as tracks, footprints, fur and scat were recorded. Caves and dens were inspected for bats, animal signs, and animal remains. The direct approach was conducted in two ways: night surveys using a 4x4 vehicle and a powerful spotlight to illuminate animals at two different times, before or after midnight; and camera-trap surveys, for which 18 camera traps were placed within the study area, at least 100 meters from one another. The cameras were sited to cover a combination of habitat types and location within the study area. The ecological assessment conducted as part of the ESIA identified 11 flora species, three fish and macroinvertebrates species, three amphibians and reptile species, four bird species and five mammal species of conservation value and special attention. Adequate mitigation measures are in place to translocate some species and minimize impacts on the others through the selection of timing or sequencing of construction of Bisri Dam. Habitats that cannot be saved will be compensated for as, according to the distribution of the above species per the ESIA. The assessment did highlight that the Freshwater Blenny Fish – which is, "*according to the IUCN, not currently considered threatened around the Mediterranean Sea*" – has a special conservation value because it has disappeared from most rivers in Lebanon and seems to be confined to the lower parts of the Awali and Damour Rivers near the estuaries. The ESIA therefore recommended maintaining the environmental flow and utilizing fish passing technologies to effectively mitigate the corresponding impacts (ESIA, p. 19). A detailed BAP was included in the ESIA to "*set out the proposed actions to be undertaken for the habitats and species of conservation value identified above with the aim of achieving 'no net loss' to biodiversity.*" The Action Plan included 14 action items to be carried out before and during construction, and then during operation of the Bisri Dam. The CDR has already commenced the pre-construction action item, as further illustrated in the response to Item 3 below, the construction and operation items are part of the

No.	Claim/Issue	Response
		Contractor's commitments in the tender documents and will be demonstrated when the Contractor prepares the CESMP. The Bank will clear the CESMP before the commencement of any works. *Birds.* The Strategic Environmental Assessment of the NWSS does not include the Bisri area or river as environmentally sensitive sites (see Annex 2). The impacts on birds are well assessed in the ESIA. The assessment included both literature review and field observations using the methodologies indicated above. The bird assessment included all resident and migrant bird species passing by the Project area. The ESIA confirmed that the Bisri area is not considered critical to the migratory routes of threatened bird species. Among the bird species in the Project area, the ESIA identified that "*Four are threatened (White storks, Lesser Spotted Eagle, White Pelicans that are of passage only, and Short-toed Eagle that is of wide range of action within and beyond the limits of the site).*" However, the ESIA indicated that "*their conservation depends on areas other than Bisri Site.*" *Forests.* The ESIA estimates that 82 ha of forest area will be lost. The RAP estimated that 110,814 trees (38,147 forest trees, mainly pine and oak, and the remainder crop trees) will need to be cut. The ESIA includes measures to minimize the number of trees cut and to conserve others (even in construction sites). The ESIA recommends reforestation, as part of the Bisri Dam Project Catchment and Reservoir Shoreline Master Plan, both to control sediment loading to the reservoir and as a compensatory measure for lost habitat, as further detailed in Item 3 below. The Project team cleared the terms of reference of this master plan in July 2018; and the CDR will launch the expression of interest for the master plan in the coming quarter. The plan is expected to be completed by end of 2020. For clarification, the "rapid assessment" and "short visits" referred to in the Ecological Assessment of the ESIA concerned *only* the first phase of the assessment in 2012, which was undertaken to characterize the baseline ecological conditions of the Project area and "*was designed to be repeated during the post-construction surveys following the same and other updated methodology.*" In August 2013, a detailed phase of ecological assessment was undertaken, during which the BAP was consulted upon and finalized.

No.	Claim/Issue	Response
3.	On top of the ESIA's neglect of the ecosystem services, no cost-benefit analysis was conducted. Additionally, The ESIA did not provide an appropriate strategy for Environmental Offset. We believe that the vague proposals of planting trees somewhere else, or establishing an ecologically similar protected area, are not reasonable, since the valley's biodiversity is proven irreplaceable. The dam's impact will reach way beyond its direct boundaries, affecting the ecosystem of the whole river stretch and the surrounding woodlands, let alone the impact on the estuary's ecosystem. Recently, following the second Environmental and Social Panel's request, the borrower initiated a series of meetings with few local representatives to discuss the conservation of an "equivalent" natural habitat, prior to having a thorough understanding of the Bisri Valley's natural habitats, their specific ecological functions and their costs. This is an additional violation of the World Bank's OP 4.04 that insists on conducting *"analyses of any major natural habitat issues, including identification of important natural habitat sites, the ecological functions they perform, the degree of threat to the sites, priorities for conservation, and associated recurrent-funding and capacity- building needs".* The borrower, regardless of a claimed World Bank monitoring, did not abide by any of the above-mentioned recommendations. As a result of this project's devaluation of the ecological significance of Bisri Valley, the local	***The Project ESIA was prepared per the requirements of Bank policy. It includes an environmental cost-benefit analysis, and an assessment of the area's biodiversity and ecosystem services.*** *The ESIA assesses the health costs resulting from water supply shortages to the Project beneficiaries against the environmental impacts of the Project.* The analysis also addresses: (i) the loss of ecosystem benefits (wood food products, non-wood food products, grazing, recreation, hunting, carbon sequestration and biodiversity) caused by the Project; (ii) developments around the reservoir, and (iii) the impacts on downstream areas. The ESIA concludes that the benefits of good quality water supply to the growing population of Beirut is significantly higher than the costs associated with building the Bisri Dam, especially in view of the mitigation measure that are planned and under implementation. *The construction of the dam has not started yet and based on detailed and comprehensive surveys conducted through the ESIA, the Project "would not cause significant conversion to critical natural habitats."* *The ESIA recommends certain standards and criteria for reforestation, and the CDR shared the initial plan containing different alternatives with the MoE and Ministry of Agriculture.* On this basis, a well-defined and detailed ecological compensation plan will be completed during the first quarter of 2019. Consultations were held during July/August 2018, and comprised meetings with different national authorities, management bodies of protected areas, academia and research institutions, local authorities and NGOs, including representatives of the Lebanon Eco-Movement. The first round of consultations aimed at including the views of stakeholders on the methodologies that will be used for developing the plan. *The ESIA, Chapter 8.2, addresses impacts outside the Project's footprint.* It includes the impacts on the upper catchment area, areas downstream of the dam, impacts on the estuary environment (including estimation of the minimum environmental flow to maintain the estuary ecological system), impacts to groundwater, temporary impacts during construction (including offsite impacts),

No.	Claim/Issue	Response
	community will bear the burden of the degradation of their livelihood conditions.	greenhouse gas (GHG) emissions and impacts on local climate.[4] Based on the survey conducted by the independent external monitoring consultant of the RAP for the expropriation process,[5] out of a sample of 56 non-absentee landowners, agriculture represents 18 percent on average of household income; in another survey,[6] out of 46 non-absentee landowners, agriculture accounts for 12 percent of household income on average. It is worth noting, however, that agricultural income is generated from all lands owned by the household and not only from expropriated plots.
4.	Besides, The ESIA mentioned the potential local climate changes but disregarded the impact of dam constructions on the Global Climate Change. Studies have demonstrated that dams play a negative role in the global carbon cycle and consequently affect Earth's climate, not to mention the high amounts of methane emissions they generate.	***Potential impacts on climate change are addressed in the ESIA.*** The ESIA includes a chapter on Climate Change and Water Resources (ESIA, pp. 57–63) and the potential impacts on local climate change were also included in the ESIA (ESIA, p. 163). The ESIA describes well the climate impacts and potential generation of GHGs, including methane and carbon dioxide. The ESIA discusses the mechanisms whereby GHGs could be released from the reservoir, including release of dissolved gases during rainfall and wind, drawdown zone vegetation, upper catchment inputs (especially from sewage and runoff), decay of inundated soil and biomass, growth and decay of aquatic plants, methane bubbles (due to lower hydrostatic pressure), plankton growth and decay, degassing at turbine outlet, and lower catchment emissions. The ESIA includes clear measures to minimize GHG emissions from the reservoir, including investing US$23 million in sanitation projects in the upper catchment area, clearance of vegetation and organic soil before filling the reservoir, providing mechanical mixing of water to prevent stratification and monitoring water quality. With such measures the release of GHGs will be minimized. Even for the small hydropower plant that will be installed, the ESIA estimates the carbon footprint to be 5-15g CO_2 eq/kwh, which is less than any thermal power plant in Lebanon by far, and, accordingly, this could be regarded as clean energy. The benefits of clean energy production by the Project

[4] ESIA – Chapter 8.2.
[5] External Monitoring and Evaluation of Resettlement Action Plan Implementation for the Greater Beirut Water Supply Augmentation Project, Final Report Wave II, September 5 2018.
[6] External Monitoring and Evaluation of Resettlement Action Plan Implementation for the Greater Beirut Water Supply Augmentation Project, Final Report Wave I, April 24, 2018.

No.	Claim/Issue	Response
		hydropower facilities have been estimated in the Project Appraisal Document at 29,000 tons CO_2 eq/year.[7]
5.	**Threats to the Cultural Heritage.** The project of Bisri Dam is very far from complying with the World Bank's OP/BP 4.11. In fact, the value of the physical cultural heritage was severely underestimated in the ESIA. Historically, given its unique geographic position, Bisri Valley used to connect the Mediterranean with the Bekaa plain in Lebanon. This made Bisri Valley very important for military, socio-economic and cultural purposes, which explains the valley's abundance with sites that have archaeological, historical, architectural, religious and aesthetic values (83 sites upstream and 29 downstream). The archaeological remains date back to the Bronze Age, Persian, Hellenistic, Roman, Byzantine, Mamluk and Ottoman Periods. Studies conducted by the Polish-Lebanese survey team of the University of Warsaw and DGA; Wissam Khalil of the Lebanese University; and a Spanish epigraphic survey, all confirmed the exceptional historic value of the valley. These studies also recognized the potential for future discoveries, with most of the remains still underground. The sites to be further studied include historic trails, a village, a temple complex, a roman bridge, tombs, a convent, houses and others. The old Mar Moussa Church, set to be dismantled, has been a centre for socio-cultural practices and a meeting	***The Bisri Dam Project has been prepared to meet the requirements of Bank policies. An extensive and systematic archaeological survey is a requirement of the Project, to be carried out during Project implementation.*** *Survey.* The ESIA provides information on the existing surveys and studies conducted in the impact area of the Bisri Dam Project; and based on these surveys, the ESIA determined that the area had evidence of habitation spanning centuries, justifying a systematic survey, which is a requirement of the Project and is provided for in the Project budget. The Project team has interviewed and consulted several archaeologists familiar with the Bisri valley and coordinated with the DGA, the cultural heritage authority in Lebanon, and no one has expressed opposition to, or disagreement with, the way the Project is planning to conduct the archaeological investigations in the impact area of the Bisri Dam Project. The objective of the archaeological survey and test excavation provided for under the Project is to examine, document and evaluate the archaeological remains in the impact area of the Bisri Dam Project. This will specifically include the four black granite columns which possibly are remains of a Roman era temple. Based on the visible archaeological and structural remains and the previous archaeological surveys in the impact area of the Bisri Dam Project, the Bank and the GoL agreed on a comprehensive investigation, excavation in the area of the four granite columns, and relocation of the Mar Moussa Church with its associated remains. The CDR and the Directorate General of Antiquities and Museums (DGA) contracted an international archaeological research center who started the detailed archaeological investigation[8]. The Contractor, for the construction of the Bisri Dam, jointly with the DGA, will continue the detailed archaeological investigation. The detailed investigation is included in the scope of works and in the budget of the Bisri Dam construction contract. The ESIA requires that the detailed archaeological investigation and preservation is started after

[7] ESIA -Chapter 8.2.3.4.

[8] The detailed archaeological investigation started with the geomorphological surveys; one survey was conducted in June 2018 and the next survey is planned in February 2019.

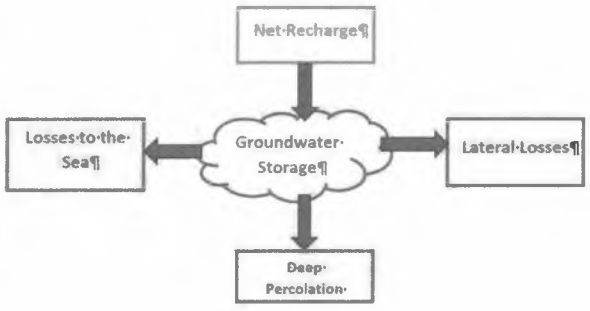
No.	Claim/Issue	Response
	place for different communities in the region. Many of these sites are protected under the Lebanese Law (Law n. 37) and UNESCO conventions. *"When the project is likely to have adverse impacts on physical cultural resources, the borrower identifies appropriate measures for avoiding or mitigating these impacts as part of the EA process. These measures may range from full site protection to selective mitigation, including salvage and documentation, in cases where a portion or all of the physical cultural resources may be lost."* (OP 4.11) *"The Bank reviews, and discusses with the borrower, the findings and recommendations related to the physical cultural resources aspects of the EA, and determines whether they provide an adequate basis for processing the project for Bank financing."* (OP 4.11). We believe that the value of the physical cultural heritage in Bisri Valley, and the associated intangible cultural heritage are worthy of a full site protection as per OP 4.11. A comprehensive survey of the physical cultural heritage should precede - not follow - the decision of building a massive structure in the area. The World Bank's choice of financing the dam prior to gaining an insight into the historic value of the valley was a shocking news to the NGOs and local community. Dismantling the historic village, temple and remains out of their contextual value cannot, in the case of the cultural landscape of Bisri, compensate for the losses.	Project approval and completed during the construction of the dam but before the filling of the reservoir. *Mar Moussa Church.* The Mar Moussa Church was identified during extensive community-based consultation in the preparation phase of the Project and the RAP determined that the structure and its associated history, activities and traditions were of high value to its community of worshipers. Accordingly, in consultation with the affected religious community, the Project budgeted to move the Church and the associated remains of an earlier structure to higher ground. During the July 2017 supervision mission, the Project team met with the Maronite bishop, who stated that he and the concerned community agreed on the move and were finalizing the location of the site to which the Church and associated remains would be moved with the support of the CDR. The cultural heritage sites located in the impact area of the Project are not protected under either the Convention concerning the Protection of the World Cultural and Natural Heritage (the World Heritage Convention) of 1972, the 2003 Convention for Safeguarding Intangible Cultural Heritage, or the Lebanese Law No. 37 for Cultural Properties. The Bisri Dam Project is not dismantling a historic village. Management considers that actions undertaken under the Project to address physical cultural heritage are in line with OP 4.11.
6.	**Harms to Agriculture.** The geographic characteristics of Bisri Valley, especially its altitude, morphology and proximity	***Management notes that of the 570 ha to be expropriated for the Project, agricultural land constitutes 26.7 percent, or approximately 150 ha. The annual revenue generated***

No.	Claim/Issue	Response
	to the coast make it suitable for an extensive agricultural practice, with a variety of fruits and vegetables that cannot be cultivated in Lebanon's renowned Bekaa Valley. Agricultural activities are prevalent throughout the area of the Bisri Reservoir, upstream and downstream, and on the adjacent hillsides. They include open fields variously tilled, cropped, lying fallow or under polytunnels. In fact, 57% of the impacted area holds a productive agricultural activity. An estimated 125 million USD is the annual revenue of agriculture in the area. As for the cash compensations to the owners, the ESIA estimated the aging pine trees at 330 USD, while the price of a 75-year-old pine tree in the market is between 4000 and 9000 USD, not to mention the costs of the associated ecosystem resources and the annual fruit yield. This is one example of many that show the unacceptable undervaluation of the agricultural resources, aiming to relieve the stakeholders from accountability.	***from agricultural land is far below US$125 million, according to FAO's statistics.*** *Land use and revenue from agricultural land.* A total of 6,580 km^2 of land is considered as agricultural land in Lebanon (World Bank 2014). The ESIA analyses land utilization. Agricultural land constitutes only 26.7 percent of the 570 ha to be expropriated. It includes open fields (26 percent) and another 0.7 percent that is cropped, covered with poly tunnel or fallow (ESIA section 6.9, p.86). According to the FAO statistics, the agriculture sector generates about 3.5 percent of GDP in Lebanon. Based on the 2017 GDP, 150 ha of agricultural land would contribute only US$0.4 million to GDP on average. Thus, the annual revenue generated from the agricultural land in the Project area is far below US$125 million. *Valuation of pine trees.* The ESIA recognizes the high economic value of pine trees. It mentions, *"Pine trees have high economic value because of its edible pine nuts. A single tree of stone pine can produce about 40 kg of cones. One ha of stone pine forests comprises 200 to 260 trees, from which 8,000 kg of cones are produced and 320 kg of edible pine nuts are extracted, sold at $70/kg."* (ESIA: section 8.7.3, p. 214). The actual compensation rate determined by the Expropriation Committee, which is independent from the CDR, is between US$200-667 per tree depending on the maturity. Informal discussion with the Syndicate of Pine Production in Lebanon, indicates the Expropriation Committee compensation values seem adequate.
7.	**Insufficient Study of Alternatives.** The United Nations World Water Development Report (2018) made it clear that nature-based solutions, as opposed to dams, are essential to meet the Goal 6 of 2030 Agenda for Sustainable Development. The report emphasized on the need for water management solutions that deliver co-benefits beyond just hydrological outcomes. Such co-benefits include ensuring food security, reducing disaster risks, and boosting decent work. The report provided clear evidence that the costs of nature-based solutions can compare	***The Project undertook an extensive analysis of alternatives as part of the ESIA, including nine scenarios of dam and non-dam options.*** A detailed analysis of alternatives was conducted for the Project. The analysis examined dams (Bisri, Janneh, Damour East, and Damour West) and non-dam alternatives (desalination, groundwater recharge, rainwater harvesting, network leak reduction and wastewater reuse) (see below Item 8, Annex 4, and ESIA, Chapter 7, pp. 105–130). These analyses were reviewed by the Bank, which examined the technical, social, environmental and economic aspects of each site, and proceeded with several site visits and meetings with government officials, technical consultants and NGOs.

No.	Claim/Issue	Response
	favourably with alternative grey-infrastructure options. Many of these alternatives, though completely relevant to our case, have not been studied at all in the Environmental Impact Assessment of Bisri Dam, while other alternatives were studied insufficiently. *"The Bank does not support projects involving the significant conversion of natural habitats unless there are no feasible alternatives for the project and its siting"* (OP 4.04)	There were six stakeholder consultations on the analysis of alternatives section of the ESIA (Annex 6). The analysis of alternatives found that no single source is sufficient to supply the growing demand of the GBML and fill the gap of 345 million m^3 until 2035. The analysis of alternatives indicates that the GBML's long-term water sustainability required the implementation of a program of coordinated investments and reforms. This program involves non-dam activities as well as the development of new water sources through a phased approach of dam construction. The construction of a dam on the Bisri River was recommended as the immediate next step to secure bulk water for the GBML. The GoL is also implementing the institutional arrangements described in the 2012 NWSS, simultaneously with the infrastructure actions, to meet the water deficit in the GBML by 2035. The Water Law 221 was approved in 2000 and, on September 17, 2017, the Parliament ratified the Water Code, which was a major milestone for the country's water sector. The GoL is also supporting the water supply provider, BMLWE, in institutional aspects. BMLWE is moving from intermittent to continuous water supply and is implementing activities such as: (i) installation of water meters, (ii) monitoring and managing the increasing water sources, (iii) building partnerships with the private sector based on performance targets, for example, leakage reduction, and (iv) innovative private sector contracting, such as Design Build Operate to prepare for a future Design Build Operate Transfer approach, as provided for by the Water Code. The World Bank and other partners are supporting the GoL and the water supply providers to increase the efficiency of basic water services for the Lebanese population.
8.	**Insufficient Study of Alternatives – Groundwater.** The Social and Environmental Impact Assessment of Bisri Dam (2014) claims that "The last national groundwater assessment study dates back to 1970". Accordingly, it adopts the old assumption that the annual natural recharge rate of ground water is 500 MCM, and the groundwater extraction nationwide, from these	***Management finds no evidence to support the allegation of dismissal of information from the 2014 Assessment of Groundwater Resources of Lebanon. The 2014 Assessment of Groundwater Resources of Lebanon study confirmed that there is a 150 million m^3 groundwater deficit in the GBML (Annex 5), and an associated decline in groundwater quality there. There is no conflict between the conclusion of this assessment and the decision on whether to construct the Bisri Dam. Because of the deficit in the groundwater, the analysis of alternatives looked at additional non-dam and dam options.***

No.	Claim/Issue	Response
	wells, totals 705 MCM, resulting hence in 205 MCM yearly deficits. In fact, the last national groundwater assessment study was published in the same year of the SEIA, 2014, by the United Nations Development Program in partnership with the Ministry of Energy. The detailed assessment revealed groundbreaking results regarding Lebanon's water balance and groundwater budget. It made it clear that "there is an overall surplus in the groundwater budget" (attachment 1). According to the new assessment, Lebanon's groundwater natural recharge amounts to 53% of the total renewable water resources, varying between 4,728 and 7,263 MCM. While the groundwater discharge through streams, springs and extraction is estimated to be around 2,588 MCM, the water balance in the budget is positive, varying between 2,140 MCM for the dry year to 4,675 MCM for the wet year. The assessment added that most of the groundwater basins are not under stress, and that the values reported in the old study of the UNDP in 1970 are underestimated. These findings challenge the numbers on which the Analysis of Alternatives of Bisri Dam was founded. It is important to note that the numbers of the UNDP 2014 study were already available for the borrower since 2013,	The Project ESIA uses the 2012 NWSS, which looked comprehensively at the challenges and opportunities in the water sector and confirmed that the Bisri Dam Project, which was identified in the 1950s, continues to be a priority investment to secure and supply additional water to the GBML. The 2012 NWSS confirmed that water deficits across Lebanon were high and partially compensated by the over-extraction of 200 million m^3 of groundwater. The 2012 NWSS and the 2014 Assessment of Groundwater Resources of Lebanon study[9] confirm that there is a significant decrease in the groundwater levels compared to the 1970 levels. This decrease is attributed to the over-exploitation of noncoastal aquifers. The coastal aquifers showed similar groundwater levels (compared to 1970s levels) because of seawater intrusion that compensates for the over-pumped groundwater. Other non-dam options are described below: *Unaccounted for Water (UfW):* The 2012 NWSS estimates that the UfW or Non-Revenue Water in the GBML is at 40 percent, which includes commercial and physical losses. Only a fraction of this represents water loss. The volume available would be at most 40 million m,[3 10] which is insufficient to meet the GBML's deficit of 345 million m^3 of water by 2035. *Rainwater Harvesting:* Rainwater harvesting is not sufficient to cover the water gaps during the dry season (i.e., limited rainfall), which can extend up to 6–7 months. Even the most optimistic, and perhaps unrealistic assumptions, estimate the total water available[11] through rainwater harvested to be between 50 million m^3 and 120 million m^3, which is insufficient to meet the GBML's deficit. *Desalination:*[12] Energy requirements for desalination are extremely high, potentially 30 to 130 MW per year depending on the technology used (multistage flash distillation or reverse osmosis). Lebanon already has a major shortage in energy, and thus it would be difficult to secure

[9] UNDP conducted the assessment on behalf of the MoEW.
[10] This number is an overestimate because it assumes an UfW of nil, while in reality worldwide, the best performance systems are around 5 to 10 percent UfW.
[11] The space required to provide storage for rainwater in the GBML so that it can be used during the dry season is unrealistic due to the level of urbanization.
[12] There is also an environmental aspect to desalination as it produces high volumes of brine, which would need to be disposed of in the Mediterranean Sea.

No.	Claim/Issue	Response
	while the ESIA of Bisri Dam, paradoxically, referred to the same study when mentioning the numbers of unlicensed wells in Lebanon. It is therefore clear that the new findings regarding the national water balance were intentionally dismissed, favoring the option of the dam.	this additional energy requirement given the current energy gap in the country. *Wastewater reuse for potable water*: This requires energy, storage, infrastructure for tertiary treatment, and networks. It also requires that people accept treated wastewater for drinking purposes. Global experience shows that social acceptance of this option is difficult. Nevertheless, even with all its requirements, the ESIA estimates that wastewater reuse would yield at most 125 million m^3, which is insufficient to meet the 345 million m^3 deficit. *Groundwater:* The 2014 Assessment of Groundwater Resources of Lebanon,[13] estimates the deficit of the Beirut and Mount Lebanon aquifers to be 150 million m^3. Hence, the groundwater option is currently *not* able to secure the water needs of the GBML and will remain insufficient to meet the future needs in 2035; i.e., 345 million m^3. The Request cites the range of 4,728 and 7,263 million m^3 as the recharge amount (i.e., gross storage) in the 2014 assessment. However, the 2014 assessment goes on to clarify that this estimated range does "***not account for losses to the sea and deep percolation.***" Thus, the net groundwater storage (i.e., groundwater amount that is usable and can be extracted) is smaller, as it is equal to the recharge amount minus (i) lateral losses, (ii) losses to the sea, and (iii) deep percolation losses (the figure below illustrates the difference between net recharge and groundwater storage). 

[13] The 2014 assessment updated the 1970 comprehensive national groundwater assessment, indicating a significant decrease in the groundwater levels compared to 1970. It also makes note of the degraded quality of coastal aquifers due to seawater intrusion, including in the highly urbanized GBML.

No.	Claim/Issue	Response
		The dam options under the analysis of alternatives are presented in Annex 4. The volumes for Bisri and Janneh are 120 and 95 million m^3, respectively. At the time of preparation of the ESIA, the studies of the Damour Dams were not completed; hence, the range of volumes for these dams, depending on the sources, varies from about 42 to 155 million m^3. The combined volume provided by these dams, if all are built, (Bisri, Janneh, Damour East, and Damour West) is close to meeting the 345 million m^3 deficit (see Annex 4). Janneh Dam is under construction, and Bisri Dam construction is expected to begin in a few months; the Damour dams are at the study stage.
9.	**Insufficient Study of Alternatives – Submarine Springs.** Lebanon has a significant number of freshwater submarine springs still unexploited. The ESIA of Bisri Dam (2014), however, did not study this option. The Strategic Environmental Assessment for the New Water Sector Strategy for Lebanon (2015) proposed this alternative as a viable option to consider. Qualitative and quantitative analysis of some of these springs have already been conducted by the National Centre for Scientific Research in Lebanon (CNRS) and yielded very positive results. According to the Strategic Environmental Assessment, onshore exploitation of submarine springs is economically feasible for several tested scenarios (different flows and depths).	***The analysis of alternatives studied nine options, which provided a wide range of alternative scenarios. The Strategic Environmental Assessment (2015) for the NWSS highlights that the potential capture of submarine springs is complex and volumes are uncertain, as low as 34 to 68 million m^3 in some references.*** The information available on submarine springs is for the north of Lebanon[14] (i.e., Chekka springs), with various estimates of available volumes, some as low as 34 million m^3 and 68 million m^3, which is insufficient to meet the 345 million m^3 water deficit in the GBML by 2035. The flow in the submarine springs also varies by season and the water can have a high saline content. These springs are charged through coastal aquifers and are at risk of over-exploitation and contamination from river discharges. In addition, a complex infrastructure would be required to transport the water from the submarine springs, which are located far from the GBML where the water is most needed.
10.	**Violation of the Strategic Environmental Impact Assessment (SEIA) of the National Water Sector Strategy (NWSS).** Since the Bisri Dam project is an integral part of the National Water Sector Strategy (NWSS) approved in 2012, we believe that the impact and efficiency of the	***Management's view is that the Strategic Environmental Assessment of the NWSS and the Project ESIA are aligned.*** Both documents identify the environmental impacts of dams (including land expropriation needs, land use and landscape impacts, inundation of forests and riparian ecosystems and reservoir-related impacts and the need for buffer zone management) and acknowledge that such impacts should be taken into consideration while planning future dams. These

[14] These springs are in North Lebanon far from the GBML and will require complex infrastructure to bring the water to GBML.

No.	Claim/Issue	Response
	project must be viewed in light of this particular framework. It is therefore important to mention that a Strategic Environmental Impact Assessment (SEIA) for the National Water Sector Strategy (NWSS) was conducted in 2015, funded by the World Bank. It was followed by a Ministry of Environment (MoE) certificate of approval stating that it should be respected and applied. The Strategic Environmental Impact Assessment (SEIA) recommended the scaling-back of the dams' program considering its social, economic, and environmental constraints. It specifically described Bisri Dam as "land greedy" and criticized its unrealistic amount of resource exploitation. Additionally, the assessment regarded the proposed dams as "highest-regret" measures on the sensitivity-to-uncertainty scale, given Lebanon's hydrogeological conditions and the "inevitable" risks of water losses by seepage. The assessment proposed alternatives to minimize the risk and cost of maladaptation. Although the World Bank-funded assessment was prepared in compliance with Lebanon's Decree 8213/2012, the Ministry of Energy and Water refrained from accepting the recommendations or even commenting on them. However, considering that the Strategic Environmental and Social Assessments are essential in the World Bank's environmental and social framework, we believe that the recommendations of the SEIA of the National Water Sector Strategy (NWSS) should be respected. We also	impacts have been addressed in the Project ESIA for the Bisri Dam Project and adequate mitigation measures have been put in place. The Strategic Environmental Assessment highlights the fact that Lebanon is facing a severe water shortage, such that even the "no action alternative" entails completion of nine dams (including the Bisri Dam): *"It is clear [...] that even under conservative demand scenarios, Lebanon would be in danger of facing severe water shortages in the near future, particularly if rainfall is low. In summary, a realistic No-Action Alternative would entail completing the ongoing initiatives that are already in advanced planning and the construction that is already underway, provided there are no outstanding environmental issues of major significance to Lebanon's ecology and natural heritage, but holding off on new investment*". Use of the term "land greedy" in the Strategic Environmental Assessment was contained in a general description of the impacts of dams compared to other water supply sources, the Bisri Dam Project was not singled out but was used as an illustration of the need for expropriation of private plots in dam construction. These concerns in the Strategic Environmental Assessment are addressed by the Project ESIA, as the dam design includes an adequate emergency plan, extensive public consultations have been carried out and the ESMP has been approved by the MoE.

No.	Claim/Issue	Response
	believe that the adoption of the EIA of Bisri Dam (2014) alone, bypassing the SEIA (2015) of the overarching NWSS strategy, contradicts the World Bank's vision for sustainable development, where the Bank *"works with Borrowers to identify strategic initiatives and goals to address national development priorities [...]".*	
	Violation of the Sustainable Development Goals and the Social Protection Strategy.	
11.	The World Bank Group is deeply engaged with the United Nations in helping to achieve the 2030 Agenda and the Sustainable Development goals. The vision for water set out in the SDGs and the Paris Agreement is aligned with the World Bank's mission to end extreme poverty and to "build shared prosperity in a sustainable manner". The Bisri Dam project, however, violates these conditions by focusing on one specific goal at the expense of many others.	***The World Bank is committed to contributing to the SDGs through the operations it supports. It is worth noting, however, that the SDGs do not constitute Bank policy requirements and are not subject to a compliance review by the Panel. Management considers that the Project will help Lebanon in achieving goals of poverty reduction and support for shared prosperity.*** By providing increased access to potable water in the GBML region, including to the Southern Beirut neighborhoods where over 460,000 people (ca. 30 percent of the population of the GBML) live on less than US$4 per day, the Project contributes to closing the high levels of disparity that exist in the Project beneficiary zones. Providing access to water to the low-income population will directly and positively strengthen Lebanon's ability to reduce poverty while also boosting shared prosperity. The ESIA provides mitigation measures on the identified impacts on the environment, agricultural land, and water quality to minimize those impacts to the extent possible. Management notes that the GoL's MoE approved the ESIA on June 5, 2014, subject to inclusion of its comments, which were considered in the ESMP.[15]
12.	**Target 6.6: "By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes".** While dam projects can work in some contexts, our small country's	***The World Bank is committed to contributing to the SDGs through the operations it supports. It is worth noting, however, that the SDGs do not constitute Bank policy requirements and are not subject to a compliance review by the Panel.***

[15] ESIA, Chapter 8.

No.	Claim/Issue	Response
	ecological problems are reaching alarming levels, and the need to protect and enhance the remaining ecosystem assets is a must. Building a massive dam in one of the only remaining and most important natural areas exacerbates the country's environmental degradation.	
13.	**Target 2.4: "By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality".** Bisri Dam will inundate much needed 150ha of productive land, resulting in external costs to Lebanon's soil fertility bank. When asked about this issue in our meeting the WB staff in July 2017, they shockingly neglected the agricultural value of Bisri Valley, saying that "You can plant your vegetables in the Bekaa Valley instead". We believe that this statement contradicts the global trend for decentralized agricultural services, and underestimates the fact that Lebanon ranks very low in the agricultural land per capita index, which means that the country is in much need of augmenting its agricultural lands instead of destroying them.	***The World Bank is committed to contributing to the SDGs through the operations it supports. It is worth noting, however, that the SDGs do not constitute Bank policy requirements and are not subject to a compliance review by the Panel.***
14.	**Goal 15: "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss".** Bisri Valley is one	***The World Bank is committed to contributing to the SDGs through the operations it supports. It is worth noting, however, that the SDGs do not constitute Bank policy requirements and are not subject to a compliance review by the Panel.*** On deforestation, please see response to Item 2.

No.	Claim/Issue	Response
	of the least vulnerable areas to desertification in Lebanon (NPMPLT 2005), making it a strategic ecological zone that needs to be preserved. However, the environmental impact assessment of Bisri Dam only mentions desertification as a potential cause of precipitation decrease and uses it as an argument for building the dam. However, The EIA doesn't pay attention to the multiple dimensions of the issue, particularly the impact of deforestation and ecosystem destruction on aggravating desertification.	
15.	Finally, the Dam is also not in line with the World Bank's Social Protection Strategy that *"takes into account the importance of "having well-functioning social safety nets and promotes effective policies for productive employment which help people gain access to labour markets and accumulate skills, both during recovery from economic crisis and in normal times"*. The Bisri Dam will cause the loss of jobs of several locals.	The Social Protection and Labor Strategy is a vision document published by the Bank in 2012. It outlines the World Bank's strategy in the area of social protection and labor. It underpins the work of the Bank in the countries it supports. Management believes that the impact of this Project is consistent with the goals outlined in the strategy. ***The strategy, however, does not constitute Bank policy requirements and is not subject to a compliance review by the Panel.***
	Lack of Efficient Consultation and Participation	
16.	According to the World Bank's social and environmental framework, the engagement of stakeholders, including communities, people affected by proposed projects, and other interested parties, is a requirement for financing the project. However, in the Bisri Dam ESIA's public consultation records, the overall attitude of all four consulted audiences (localities of Amatour, Mazraat El Chouf, Bisri and Mazraat El	***The CRD carried out consultations on the ESIA and RAP during preparation with a wide range of stakeholders, such as landowners, local community members, and CSOs. Consultation have been sustained during Project implementation to date. The concerns raised during consultations are being addressed.*** *Extensive consultations during preparation*. Consultations were carried out with a wide range of stakeholders, such as PAPs, local communities, NGOs and CSOs, as part of preparation of the Project ESIA and RAP. Sixteen public consultation sessions were held in various locations for

<table>
<tr><th>No.</th><th>Claim/Issue</th><th>Response</th></tr>
<tr><td></td><td>Dahr) was strongly opposed to the construction of Bisri Dam. People expressed disapproval of the compensation rates, the loss of biodiversity, the loss of jobs and production lands, and others.</td><td>preparation of the ESIA and RAP (see table 1). Notification of public consultation sessions was advertised in local newspapers two weeks in advance of each consultation session. More than 400 people attended these sessions, half of whom were landowners. In addition, 109 landowners were interviewed individually and a survey of 1,200 households was carried out.

Table 1. Public Consultations for Bisri Dam Project during preparation phase (2012-2014)
<table><tr><th>No.</th><th>Date of consultation</th><th>Location</th><th>Date notification announced</th><th>Number of participants</th></tr><tr><td>1</td><td>3 April, 2012</td><td>CDR Central Beirut</td><td>27-29 March, 2012</td><td>16</td></tr><tr><td>2</td><td>10 April, 2012</td><td>Mazraat El Dahr Municipality</td><td>27-29 March, 2012</td><td>23</td></tr><tr><td>3</td><td>12 April, 2012</td><td>Dmit Municipality</td><td>27-29 March, 2012</td><td>46</td></tr><tr><td>4</td><td>21 April, 2012</td><td>Qartaba Municipality</td><td>27-29 March, 2012</td><td>28</td></tr><tr><td>5</td><td>24 April, 2012</td><td>Hadath Municipality</td><td>27-29 March, 2012</td><td>25</td></tr><tr><td>6</td><td>5 May, 2012</td><td>Beirut Municipality</td><td>1, 3-4 May, 2012</td><td>43</td></tr><tr><td>7</td><td>30 January 2013</td><td>CDR, Central Beirut</td><td>26, 28-29 January 2013</td><td>13</td></tr><tr><td>8</td><td>2 February 2013</td><td>Midane Municipality</td><td>26, 28-29 January 2013</td><td>36</td></tr><tr><td>9</td><td>2 February 2013</td><td>Mazra'ated Dahr Municipality</td><td>26, 28-29 January 2013</td><td>15</td></tr><tr><td>10</td><td>6 February 2013</td><td>Hadath Municipality</td><td>26, 28-29 January 2013</td><td>10</td></tr><tr><td>11</td><td>9 February 2013</td><td>Aamatour Municipality</td><td>26, 28-29 January 2013</td><td>28</td></tr><tr><td>12</td><td>9 February 2013</td><td>Mazra'at Echouf Municipality</td><td>26, 28-29 January 2013</td><td>35</td></tr><tr><td>13</td><td>25 April 2014</td><td>Aamatour Municipality</td><td>16-18 April 2014</td><td>15</td></tr><tr><td>14</td><td>25 April 2014</td><td>Mazra'at Echouf Municipality</td><td>16-18 April 2014</td><td>28</td></tr><tr><td>15</td><td>26 April 2014</td><td>Bisri Church Hall</td><td>16-18 April 2014</td><td>43</td></tr><tr><td>16</td><td>26 April 2014</td><td>Mazra'ated Dahr Municipality</td><td>16-18 April 2014</td><td>10</td></tr></table>
Consultations during implementation. Consultations have continued during implementation. Twelve consultation sessions have been carried out by the GoL in different municipalities (see table 2).</td></tr>
</table>

No.	Claim/Issue	Response
		Table2. List of meetings between the CDR and the Public (2016-2017)

Date	Location/Attendees	Subject	Number of participants
9/11/2016	Haref and Mazraat Daher	Public meeting	5
11/11/2016	Mazraat Chouf and Kherbit Bisri	Public meeting	15
15/12/2016	Mazraat Chouf and Aamatour	Meeting at CDR Offices	3
19/12/2016	Mazraat El Chouf and Aamatour	Booklet & Poster Distribution	5
22/12/2016	Bisri, Haref, Midan and Deir El Moukhalis Monastery	Booklet & Poster Distribution	6
31/01/2017	Mazraat Chouf, Bsaba, Bisri and Haref	Public meeting	25
22/02/2017	Mazraat Daher and Kherbit Bisri	Public meeting	9
22/02/2017	Prlest of Sayda Caza	Mar Moussa Church relocation	2
22/03/2017	Chouf reserve	Environmental Meeting (ESP presence)	3
29/03/2017	Aamatour	Public meeting	12
18/03/2017	Mazraat Daher and the Priest	Mar Moussa Church relocation	1 Meeting with the priest
22/05/2017	Union of Jezzine Municipalities - Midan, Haref, Bisri, Bhanine, and Binwati	Public meeting	21
28/9/2017	Kherbit Bisri – Bisri – Midan	Public meeting	10

No.	Claim/Issue	Response
		<table><tr><td>**6/12/2017**</td><td>Kherbit Bisri</td><td>Meeting with the Moukhtar</td><td>2</td></tr><tr><td>**26/6/2018**</td><td>Deir El Moukhalis Monastery</td><td>Meeting PAPs with ESP</td><td>2</td></tr></table> The main topics of concern discussed during the above-listed consultations included impacts to existing archaeology, seismic risks, environmental degradation, impacts to biodiversity and analysis of alternatives. *Independent external monitoring mechanism*. An independent external monitoring consultant was hired to monitor RAP implementation. Additional consultations have been carried out by the consultant through surveys. The first survey covers the PAPs from the dam footprint area, 70 percent of this sample were in favor of the Project, 20 percent were opposed, and 10 percent were neutral. The second survey covers the PAPs from the reservoir area, 57 percent of this sample were in favor of the Bisri Dam and 42 percent were opposed. The first survey was carried out in the third quarter of 2017, and the second survey in the first quarter of 2018. The difference in results can be attributed in part to a difference in the location. The external monitoring consultant will review the findings from the next survey and attempt to identify any additional the reason for variations. In the meantime, the CDR has strengthened its communication program *Grievance redress mechanism*. The GRM has been established and is in operation. During each supervision mission, the Bank team reviews the GRM complaint log that is maintained by the CDR. The CDR also shares the log via email with the Bank team. The log contains information on the plot number, cadastral area, date of complaint, registration, date of consultation, subject of complaint, answer/corrections, date of answer, and date of CDR resolution. To date there have been 180 complaints, all of which were resolved. The majority of the complaints are related to accuracy of plot size, number of trees, and correct names of landowners. *Project information dissemination*. Project information is well disseminated. The ESIA and RAP were disclosed and publicly available (see table 3). There is a presentation about the Project before each consultation session. The Project Information Booklet was distributed in all municipalities in

<table>
<tr><th>No.</th><th>Claim/Issue</th><th>Response</th></tr>
<tr><td></td><td></td><td>
the Project area and uploaded on the CDR website (see Annex 7: Project Information Booklet).

Table 3. ESIA and RAP study preparations and disclosure
<table>
<tr><th>Report</th><th>Submission date</th><th>Comment</th></tr>
<tr><td>Preparation of ESIA study report (CDR/ESIA, May 2014)</td><td>May, 2014</td><td>The MoE cleared the Project ESIA and will remain involved in the implementation and monitoring of the ESMP, as described in the ESIA.

The ESIA/ESMP were disclosed in country and at the InfoShop on June 2, 2014. All safeguard instruments are also accessible on the CDR's website</td></tr>
<tr><td>Preparation of RAP study report (CDR/ESIA, May 2014)</td><td>May, 2014</td><td>A RAP has been prepared in close consultation with PAPs.

The RAP was disclosed in country and at the Infoshop on June 2, 2014. All safeguard instruments are also accessible on the CDR's website</td></tr>
</table>

Concerns raised. The main concerns raised during the consultations included: (i) access to drinking water in the area of Bisri; (ii) ensuring access to jobs and other opportunities for tourism; (iii) need to preserve archaeological, historical and cultural heritage sites, such as Mar Moussa Church and other historical ruins; (iv) need to access productive land upstream and downstream of the dam; (v) benefit for people living in the vicinity of the dam, and not just Beirut residents; (vi) means of compensation for land take and fairness of compensation for expropriated lands; (vii) returns of the Project for local residents in economic and employment terms; (viii) issues of wastewater before and after dam construction; and (ix) protection of environment from pollution.

Measures addressing the concerns. The Project has addressed these concerns with measures included in the ESMP and RAP, such as the Benefit Sharing Program, compensation for affected assets at full replacement cost (see paragraphs 44-46 in main text), support for livelihood rehabilitation in addition to cash compensation, and provision of job opportunities to local people. Project
</td></tr>
</table>

No.	Claim/Issue	Response
		implementation is estimated to create more than 1,000 job opportunities. *Consultation summary*. All consultations are well documented and summarized (see Annex 6)
17.	Besides, there was an alarming gender inequality among the attendees, with only 6 women attending the sessions in total. Moreover, Environmental NGOs were not invited to the meetings, even though the dam is planned to be built in a protected area, inundating important natural habitats. Environmental NGOs were invited to previous EIAs of other dams and expressed concerns about the environmental impact of these projects, which explains the intentional marginalization of environmental NGOs in the public consultation of this EIA. All in all, only 0.083% of the total population of the region and 5.69% of the total number of land owners attended the sessions.	***In Management's view, significant efforts were made to include women, landowners and NGOs in the consultations.*** *With regard to women*, consultation documentation indicates that a total of 42 women attended the 16 consultation sessions for the RAP and ESIA preparation. According to the RAP, consultations were carried out with due consideration for gender and specific efforts were made to identify and include women in consultation sessions. For instance, as part of the RAP preparation, individual interviews were carried out with 109 landowners in addition to the public consultation, 15 of whom were women. In addition, gender disaggregated data was collected from the survey of 1,200 households to inform the Bisri Dam Project preparation. *Consultations with landowners*. There are 861 landowners affected by the Project. As indicated in the responses above, over 400 participants attended the public consultation sessions, half of whom were landowners. Taking into consideration both public consultations and 109 individual interviews, more than 35 percent of landowners were covered by the consultations. About 30 percent of landowners are absentees, which means that more than 50 percent of non-absentee landowners participated in the consultations. *Consultation with NGOs/CSOs*. All public consultations were publicly announced through local newspapers and open to all NGOs/CSOs. Various NGO/CSO representatives attended the consultations (see Annex 6).
18.	The world bank team in charge of the project claimed that meetings were notified to the public via some newspapers. However, they could not explain why the turnout of the sessions was extremely low. According to the World Bank's EA Sourcebook and Operation Manuals, borrowers are required to ensure stakeholders are involved in the	***Management is of the view that there has been adequate participation of local people in the consultations during Project preparation and implementation. The Project undertook efforts to ensure that information on the consultations was publicly available to affected people and that they had the opportunity to express their concerns*** – *Venue and time of consultation* – the public consultation sessions were held in different venues, for institutional stakeholder, local PAPs in the village near the proposed

No.	Claim/Issue	Response
	planning and designing as efficiently as possible, and to use a variety of consultation techniques to reach a diverse audience. It also emphasizes the importance of contacting targeted groups and notifying them how, when, and where they can participate, using more than one medium to reach them. Around 1500 residents of the impacted villages NAMES REDACTED contested their marginalization, and expressed their opposition to the construction of the dam by signing a petition (attachment 2). Additionally, an online petition was signed by different citizens from Lebanon and around the world (attachment 3).	Bisri Dam Project, and Greater Beirut residents. The village consultation sessions were scheduled on weekends and for Beirut water consumers early on weekday evenings to allow the maximum number of interested people to attend. - *Process of consultation* – all public consultation sessions were announced in local newspapers two weeks in advance of each consultation session. The consultation sessions were open to all interested parties. The process was transparent, and all consultation findings were documented and publicly disclosed. More importantly, consultations are a continuous process and will continue during Project implementation. People can also send their concerns through the GRM. - There is a *continuous process of citizen engagement*. The GRM is in operation. The GRM is open not only to PAPs but also to all the people of the villages in the Project area and the public. There have been no complaints received concerning marginalization of affected people or other stakeholders, either through the GRM or the opinion survey carried out by the independent external monitoring consultant for the Project.
	Concerns Related to Geology and Seismology	
19.	<u>Recommendations of the National Council for Scientific Research (CNRS):</u> CNRS is the central public institution in charge of scientific research and policy-making in Lebanon. the National Centre for Geophysical Research, a department of the CNRS, issued several recommendations about dam construction in the region of Mount-Lebanon that includes Bisri Valley. The recommendations stated that all dam projects in the karst-dominated Mount-Lebanon require extensive scientific studies spread over a long time (a minimum of 10 years) and	***Management considers that the dam design follows international best practice in terms of safety measures, and is based on appropriate seismic hazard assessments, which has been confirmed by the Dam Safety Panel.*** The GoL undertook seismic hazard assessments during Project preparation to define the characteristics of potential earthquakes that the dam would need to be able to resist. These assessments were done using state-of-the-art probabilistic and deterministic approaches, including the assessment of the neo-tectonic setting of the Bisri Dam Project site and nearby seismic sources. Based on the results of seismic hazard assessments, the designer conducted numerical dynamic analyses of the dam to estimate the magnitude of crest settlement, displacements and shear distortions, and confirmed the

No.	Claim/Issue	Response
	should receive the scientific guarantee of the best specialists of the karst. In this respect the CNRS urged the Government to defer any project of this type not having received this deposit. CNRS confirmed that the drying up of the Mount-Lebanon valleys has the most pernicious effects on the coastal environment which receives less and less fresh water: rising salinity and sea water temperature, impoverishment Oxygen content, depletion of marine biomass, climate change in coastal areas. The combination of deep seismic activity and water flow in faults and surface fractures is, according to CNRS, a source of seismic sequences concentrated in time and around valleys. The impoundment of dam reservoirs the context of Mount-Lebanon produces an entirely new seismic activity on the area. Also, CNRS It is possible to consider alternative solutions for the transport of fresh water to Beirut.	safety of the dam against the OBE and SEE, according to the seismic design guidelines of the ICOLD. The seismic hazard assessments covered all historical seismic event data, including the two most recent destructive earthquakes around the Roum Fault in 1837 and 1956. The SEE ground motion is defined based on the largest reasonably conceivable earthquake along the recognized fault, or around 10,000 years return period, which is much more severe than earthquakes of the more recent past. The Bisri Dam Project has been designed for the SEE ground motion that would result from the Maximum Credible Earthquake (MCE) event on the Roum Fault, which is a Mw7 strike-slip earthquake. The assessment reports were reviewed and confirmed by the Dam Safety Panel, which is composed of world-class experts. With regard to the statement "*The impoundment of dam reservoirs in the context of Mount-Lebanon produces an entirely new seismic activity on the area,*" see detailed response to Item 20 below.
20.	<u>Dangers of Infiltration and Reservoir-Induced Seismicity:</u> The Bisri Dam and corresponding lake will directly overly a major active fault, Bisri Fault, which can pose a serious problem from the seismic point of view. According to several experts, the dam's water infiltration into the subsurface through the Bisri Fault is inevitable and will naturally induce a seismic activity. Prof. Tony Nemer, Geologist, says that the Bisri Fault is interconnected with the active Roum Fault that caused the destructive 1956's earthquake, and that any induced seismicity will change the delicate stress regimes around the	As noted above, ***Management considers that the dam design follows international best practice in terms of safety measures, and is based on appropriate seismic hazard assessments, which has been confirmed by the Dam Safety Panel.*** Per the ICOLD Bulletin 137 on Reservoir and Seismicity – State of Knowledge, understanding of RTEs has been substantially clarified and consensus reached that the seismicity triggered in an RTE is a physical response of a crustal region to reservoir impounding when certain specific conditions are fulfilled. Impounding can trigger seismic activity only where the necessary natural preconditions already exist. This means that the causative fault that can produce earthquake energy releases is already in near failure conditions, so that added stresses and pore pressure

No.	Claim/Issue	Response
	latter, which can lead to a swarm of seismic activity that cannot be predicted neither in extent nor in magnitude. The weight of the water column of the future lake can have similar effects as well. With what has preceded, any future water body behind the planned Bisri Dam can potentially lead to the generation of a major earthquake similar to those reported in the historical record of Lebanon. Separate document that elaborate on the geological and seismological issue is attached to this request (attachments 4,5).	propagation due to reservoir impounding can trigger the seismic energy release. This definition asserts that triggering due to impounding cannot change the underlying tectonic processes and the seismic hazard at a dam site. The added weight of the impounded reservoir **will not** substantially increase any seismic energy release, because the increase of energy potential due to impounding is practically insignificant in view of the size of the actual seismic energy release. Since the Bisri Dam Project has been designed according to state-of-the-art seismic design requirements, whereby the dam must safely withstand ground motions caused by the SEE, this means that it is also designed to withstand the effects of the largest RTE, as the maximum RTE would not be stronger than the SEE. Throughout the world, around 60,000 large dams have been constructed and are under operation as per the ICOLD. Taking into account the many large reservoirs in operation, overall, a very small number of possible RTE cases have been reported. As per ICOLD Bulletin 137, 39 cases of RTE are indicated, out of which four are major RTE events with a magnitude over 6.0 as follows: • Koyna gravity dam (103 m in height and 2,780 million m^3 in reservoir capacity) in India (Mw=6.3); • Kremasta embankment dam (120 m in height and 4,750 million m^3 in reservoir capacity) in Greece (Mw=6.3); • Hsinfengkiang buttress dam (105 m in height and 13,896 million m^3 in reservoir capacity) in China(Mw=6.1); • Kariba arch dam (122 m in height and 160,368 million m^3 in reservoir capacity) at the border between Zambia and Zimbabwe (Mw=6.25). Based on the review of the mechanisms for RTE and worldwide experience with dams experiencing RTE, the following conclusions can be drawn: 1. RTE cases are very few compared to the total number of large reservoirs in the world. 2. Two types of earthquakes associated with reservoirs must be distinguished: • The non-tectonic earthquakes linked to karst caves, mine pits, and stress readjustment at the shallow surface layer, usually with magnitudes less than 3-4, and • Tectonic earthquakes linked to nearby causative faults with existing stresses close to failure and

No.	Claim/Issue	Response
		triggered by the water in the reservoir, with magnitudes not exceeding that of spontaneous earthquakes. The upper bound magnitude for RTE events observed so far is 6.3. 3. The Bisri Dam is 70m in height and has 125 million m^3 in reservoir capacity. RTEs have occurred on dams with heights over 100 m and are suspected to have occurred where reservoir capacity exceeded 1 billion m3 (more than 10 times larger than the reservoir for the Bisri Dam Project). [16;17]
	Other Concerns	
21.	Access to Potable water: "Providing potable water for Beirut" is a wording that is being used by CDR and the World Project team to promote the project. However, based on information from the CDR, the treatment plant at "Wardaniyeh" will be equipped to just treat wastewater pollution, without a special equipment to reach potable water level nor to treat the contamination of the Qaraoun dam water that will be mixed with the water of Bisri Dam. Unlike the current situation where potable water is provided from the natural Spring of Jeita, the Greater Beirut area will never have potable water from Bisri.	***Management is confident that the Project will help increase the volume of water available for the GBML.*** Management wishes to point out that the water treatment plant at Wardaniyeh is equipped to treat water from the Joun reservoir and not to treat wastewater pollution. The Inspection Panel case, p. 71, addressed the water quality topic and concluded that "water from Joun Reservoir is of sufficient quality such that conventional water treatment technologies can produce potable water meeting Lebanese and international health- and aesthetic-based standards and guidelines."
22.	Quarries: The Bisri Dam's Rip rap material is expected to be sourced from quarries outside the immediate project area. The ESIA of Bisri Dam did not provide sufficient details on the location and environmental impacts of these quarries that add to the already substantial ecological costs of the dam.	***The construction of the dam has not started yet and the ESIA includes provisions for the quarries.*** The ESIA indicates that *"an estimated 80% of the dam construction material (estimated at 6 million m3 of fill) will be sourced from within the reservoir area, significantly reducing reliance on external quarries and subsequently minimizing the negative environmental impacts associated with the construction of new quarries or use of existing*

[16] Although being claimed as an RTE case, it is highly disputed whether the May 12, 2008 Mw7.9 Wenchuan earthquake in China was influenced by the impoundment of nearby Zipingpu Dam. Zipingpu reservoir, in Sichuan, China has a volume of 1.12 billion m3, a height of 156 m, and lies within a seismically very active, compressive tectonic environment.

[17] In 1967, the maximum reservoir-triggered earthquake magnitude is only Mw6.3 in Koyna gravity dam (India) (1967). The Konya dam is 103 m high, and the reservoir capacity is 2.8 billion m3 (more than 20 times larger than the Bisri dam reservoir).

No.	Claim/Issue	Response
	The ESIA assumes that the rocks will "most likely be sourced from an existing commercial quarry located near the Saida area, approximately 15 Km from the dam site." Recently, it appears that a new quarry is set to be approved in the localities of Kfarfalous and Marous near Bisri, partly for the construction of the dam. The quarry will destroy around 2 million square meters of virgin woodlands and scenic landscapes, with all the ecosystem services they provide.	*commercial quarries*". The ESIA assesses the potential impacts of excavation and sourcing of materials from the reservoir area and includes mitigation measures to minimize those impacts. The CESMP (which is part of the Contractor's commitments) will define in detail how and by whom those measures will be implemented. It was not confirmed during the preparation of the ESIA whether the Contractor will use existing quarries or will need to open a new quarry. Therefore, Annex M of the ESIA takes a framework approach for the environmental assessment of quarries, providing the rules and principles for assessing the impacts of a new quarry, should it be needed, the analysis of alternatives that should be carried out and the mitigation measures that should be followed. The ESIA highlights that "*To ensure these are addressed for any opening or re-opening of quarries for the construction of Bisri Dam, the contractor will take this framework document and produce an Environmental Impact Assessment (EIA) incorporating and Environmental Management Plan (EMP) tailored to his specific site, quarry plan, method of working, and after-use Plan*". The requirements for preparing this ESIA, should it be needed, are well defined in the Contractor's commitments and this ESIA will be reviewed and cleared by the World Bank before the Contractor is allowed to use it.
	Previous Complaints	
23.	As mentioned earlier, we have made a lot of effort to complain to Bank staff: - We initiated contact with the Bank staff in May 2017. - We sent several studies and reports that support our cause in June 2017. - We met with the Bank staff in July 5th, 2017 and followed up by sending additional comments in July and August 2017 (attachments 6,7). - The WB staff's response (attachment 8) to our concerns was unsatisfactory: • It stated that an analysis of	***Management is of the view that the Bank has made a comprehensive effort to respond to the concerns of the Requesters.*** Since May 2017, the Project team has had several meetings with NGOs, including the Requesters. The Project team provided detailed responses to the NGOs' concerns and presented them during the in-person meeting, in the presence of the experts who contributed to the responses, including environmental, social, dam safety, communication, hydrology, hydrogeology/groundwater management, water quality, climate change, and leakage reduction specialists. All details are in Annex 8.

No.	Claim/Issue	Response
	alternatives was done in the ESIA. This, however, doesn't answer our concern that the analysis of alternatives was incomprehensive as proved by the Strategic Environmental Assessment of the National Water Sector Strategy in 2015. • The answer to our concerns regarding the flaws in the Biodiversity Action Plan was general and evasive. • The answer regarding the physical cultural heritage was mainly focused on "documenting historic evidences". • The answer on the Sustainable Development Goals was very selective, as if water is a separate product in the environment. • The part on reservoir-induced seismicity did not answer our main concerns. There was no answer on the violations of local regulations, the failures of different dams built by the same borrower, the recommendations of the CNRS, the Desertification issue, and many others.	
24.	Upon our request, virtual meetings with the Environmental and Social Panel of Experts were held in the Beirut World Bank Office on January 12, February 23 and May 25. However, the outcome of the discussions was unsatisfactory for the following reasons: - The approval of the Dam by the CDR and the World Bank's Panel of	***Management wishes to clarify that the Project team facilitated the meetings between the Requesters and both independent panels, including access to the video conference facility at the World Bank office in Beirut, translation to ensure there was no impediment to communication and provision of all the documentation presented by the NGOs to the both Panels ahead of the meetings.*** (Information on the meetings is provided in Annex 8).

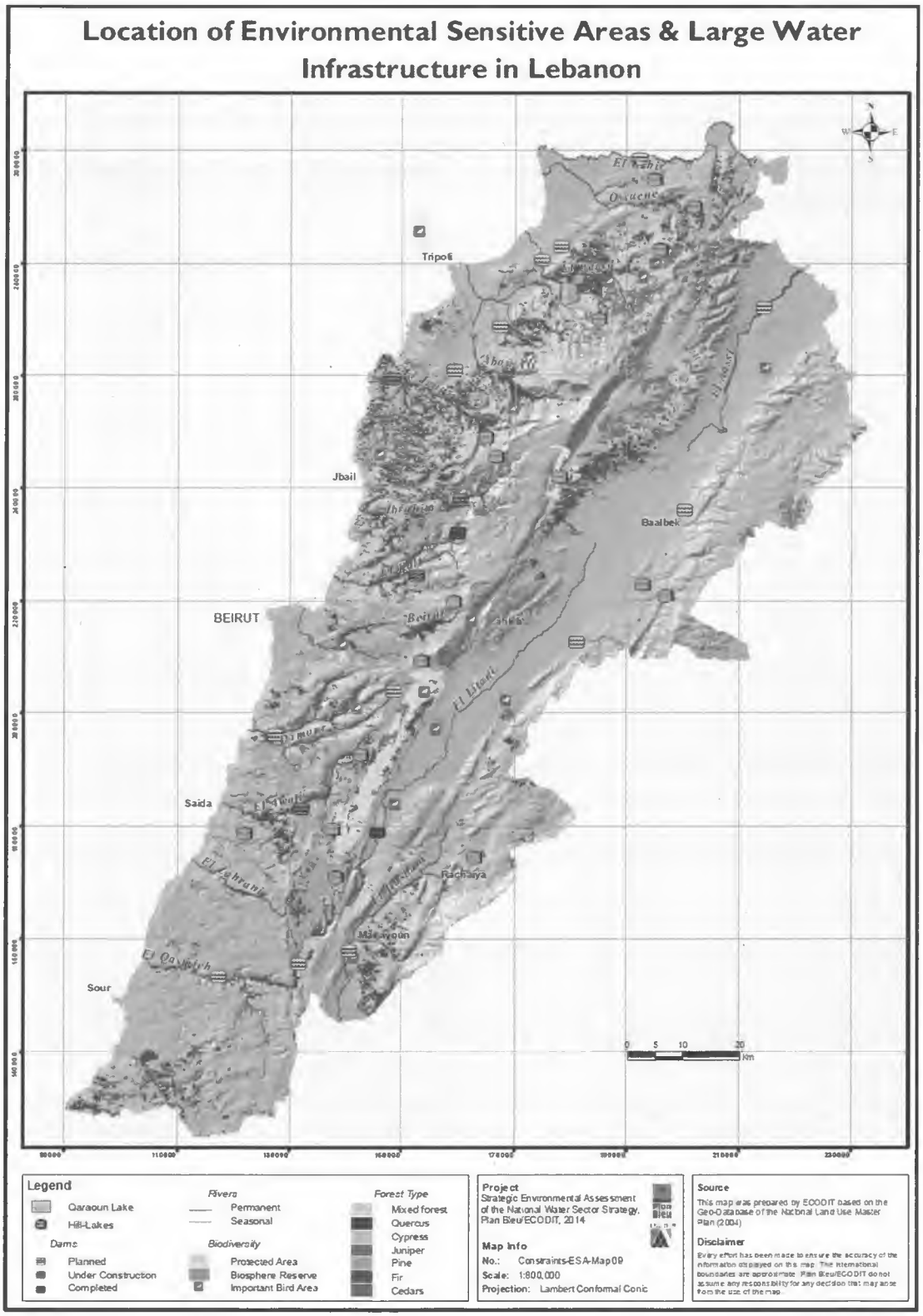
No.	Claim/Issue	Response
	Experts were largely based on the "Report on the Assessment of the Neo-Tectonic Setting and Seismic Sources for the Seismic Hazard Assessment of the Bisri Dam Site, Elias Ata, May 2014" with very little notice made to the rest of the geological and seismological studies of the region. The report declared that Roum and Bisri Faults are not connected. This claim contradicts all previous studies (Dubertret, 1945; Hajjar 1956; Daeron 2005) and is based on just a few months of study in office and very few visits to site in May 2014. - The Panel's focus sounded to be on the safety of the dam as a structure, regardless of where it is located (i.e. at the intersection of 2 active faults) and what can result from having a dam and a corresponding lake in that specific area. - The Panel did not sound very aware of the geological, seismological, and structural challenges of the area as follows {more in attachments 9,10): • One expert thought that the Bisri Fault underneath the proposed dam is not active. Such a wrong declaration and lack of knowledge of a simple geological and seismological fact were shocking. • The Panel reference's to (Nemer & Megraoui 2006) publication was out of context and showed a non-adequate understanding of the referred material, which required an explanatory answer from the author, T. Nemer, who is part	*Dam Safety.* The CDR established the Dam Safety Panel. The Panel held six meetings and a number of field visits to review various geological/geotechnical investigation reports, seismic hazard assessment report, detailed design reports, bidding documents, dam safety plans, etc. The members of the Dam Safety Panel are all recognized as world-class experts in their respective fields, including more than 30 years of professional experience, previous service on other dam safety review panels and teaching at well-regarded universities. The Dam Safety Panel fully recognized that the Bisri Dam Project site is a challenging one; geologically, seismologically and geotechnically. Therefore, it has guided the CDR and the designer to undertake comprehensive analyses and assessments to select the most appropriate dam type and design for this site. The Panel confirmed that comprehensive analyses and assessments including for geological, seismological, and geotechnical aspects, have been completed for the Bisri Dam Project. Based on these, the most appropriate dam type and design for this site has been selected, and the Panel considers the Bisri Dam Project design to be safe. A summary of the points is below: - A rockfill type embankment dam with very gentle upstream and downstream slopes and wide stabilizing berms has been selected. Rockfill dams are generally considered to be inherently stable under extreme earthquake loading, and represent desirable types of dams in highly seismic areas (USCOLD, 2000); - Large freeboard (difference between dam crest elevation and reservoir water level) has been provided to prevent overtopping even during extreme floods and extreme earthquakes; - The dam rock abutments and the quaternary overburden in the valley are to be treated to prevent local instability, to control seepage and to prevent erosion (e.g., piping) from occurring. See further comments below under Item A. - The foundation material is not prone to liquefaction during earthquake shaking due to high fines and clay content. However, as a precautionary measure, the liquefaction resistance is further increased by installing

No.	Claim/Issue	Response
	of the Lebanon Eco Movement's team of experts. • The Panel did not sound appreciative of the fact that the valley's lithologies will definitely cause the lake water to infiltrate and contaminate the water table of the region.	gravel and stone columns, and deep drains in the foundation. - Since the Bisri Dam Project has been designed per state-of-the-art seismic design requiring the dam to safely withstand the ground motions caused by SEE, it would also be able to withstand the effects of the largest RTE (see also discussion in Items 19 and 20 above). - The dam is designed and analyzed per state-of-the-art procedures recommended by ICOLD. Two of the Panel members are members of ICOLD's special technical committee on Seismic Aspects of Dam Design. ***Details of Seismic Hazard Assessment and Design*** The Panel reviewed the design earthquakes for the seismic design of the different structures and elements of the large dam project: SEE and OBE. For the earthquake resistant design of the Bisri Dam Project, the SEE-level earthquake, defined as the Median+1 Standard Deviation (84-Percentile) ground motion due to a MCE scenario was considered. For MCE, the following earthquake scenarios were considered: - Mw7.9 strike-slip earthquake on the Yammouneh Fault at 12km from the site. - Mw7.8 thrust (reverse) earthquake on the MLT Ramp at 35km from the site. - Mw7 strike-slip earthquake on the Roum Fault. Among these MCE scenarios, the maximum magnitude (Mw7) earthquake associated with the Roum Fault controls the SEE-level design ground motion for the Bisri Dam Project, with a peak ground acceleration level of 0.7g. The Roum Fault is a strike-slip fault about 65km long. Quaternary geomorphological expressions on the Roum Fault appear to die out before crossing the Awali River. Most of the published literature and additional neo-tectonic investigations by specialists agree with this evaluation. The Panel understands that the fault may become a blind fault in the vicinity of the Bisri Dam and continue some distance to the north of Awali River. However, the conservative seismic design of the Bisri Dam Project will not change whether the Roum Fault crosses the dam axis or not, as explained below. The most recent large earthquake on the Roum Fault took place in 1837. Assuming a single event, the inferred magnitude of the 1837 event is Mw7. The fault rupture

No.	Claim/Issue	Response
		offset has been estimated to be about 1m. Historical data indicated no surface faulting. The fault offsets are generally maximum at the middle of the strike-slip fault rupture and die out parabolically towards the end (i.e., Awali River at the north end will have an offset of about 10 cm at the most). Even if as much as 1 m offset under the dam were assumed, which is extremely unlikely, this offset would take place in the bedrock under a quaternary deposit under the dam that is at least 100 meters thick. If any, the offset will be much smaller at the surface of the quaternary deposit directly under the dam, which due to its inherent ductility can safely absorb such an offset. The earthquake resistant design is based on the 84-percentile ground motion that would result from a Mw7 earthquake at 2 km distance. Again, the design ground motion (PGA=0.7g) will not change whether the Roum Fault crosses the dam axis or not, and the Bisri Dam Project has been designed to safely resist such earthquake loads. ***Seepage and Internal Erosion Control*** The Dam Safety Panel carefully reviewed the permeability issue of the site considering the existence of karstified limestone, and reviewed the measures for securing the required watertightness, including contingency measures. The design has provided comprehensive seepage and internal erosion control measures, including deep diaphragm wall and curtain grouting. Inspection galleries will allow for additional grouting if required, based on geotechnical investigations and geological mapping of the dam and reservoir area, including additional ones guided by the Dam Safety Panel. To address potential leakages through the right side of the valley in the abutment and in the bedrock under the quaternary deposits, the grout curtain has a special design, and additional boreholes can be made in the very early phase of the construction works to provide additional grout curtain if judged to be required. Under the dam, the grout curtain is also designed to be sufficiently deep to address potential leakage, and additional grouting could be applied by the construction of galleries and shafts, if required.

No.	Claim/Issue	Response
		In the left abutment, the cut-off wall, which is proposed in the sandstone that is developed there and, in its extension, will also prevent any tendency to piping. A plastic concrete diaphragm cut-off wall, about 120 m deep, is to be installed through the quaternary deposits on the valley floor. Similar walls have previously been built to about 200 m depth at other dam sites with quaternary deposits and into rock.

ANNEX 2


Location of Environmental Sensitive Areas & Large Water Infrastructure in Lebanon
Tripoli
Jbail
Baalbek
BEIRUT
Saida
Sour
Rachaya
Legend
Qaraoun Lake
Hill-Lakes
Dams
Planned
Under Construction
Completed
Rivers
Permanent
Seasonal
Biodiversity
Protected Area
Biosphere Reserve
Important Bird Area
Forest Type
Mixed forest
Quercus
Cypress
Juniper
Pine
Fir
Cedars
Project
Strategic Environmental Assessment of the National Water Sector Strategy. Plan Bleu/ECODIT, 2014
Map Info
No.: Constraints-ESA-Map09
Scale: 1:800,000
Projection: Lambert Conformal Conic
Source
This map was prepared by ECODIT based on the Geo-Database of the National Land Use Master Plan (2004)
Disclaimer
Every effort has been made to ensure the accuracy of the information displayed on this map. The international boundaries are approximate. Plan Bleu/ECODIT do not assume any responsibility for any decision that may arise from the use of the map.
0 5 10 20
km

ANNEX 3
LEBANESE LAW NO. 37 FOR CULTURAL PROPERTIES

Law Nr. 37 (October 20, 2008) on the *determination, administration and protection of cultural property* can be found here:

https://f-origin.hypotheses.org/wp-content/blogs.dir/2647/files/2015/06/Law-Nr.-37_2008.pdf

ANNEX 4
SUMMARY OF POTENTIAL DAM AND NON-DAM ALTERNATIVE SOURCES

Summary of Potential Dam[18] Alternative Sources

The four dams considered in the ESIA's analysis of alternatives are Bisri, Janneh, Damour East and Damour West. The volumes for the planned dams in Bisri and Janneh are 120 and 95 million m^3, respectively. At the time of preparation of the ESIA, the studies of the Damour Dams were not completed; hence, the range of volumes for these dams, depending on the sources, varies from about 42 to 155 million m^3. The combined volume provided by these dams (Bisri, Janneh, Damour East, and Damour West) is close to meeting the 345 million m^3 deficit. Janneh Dam is under construction, and the Bisri Dam construction is expected to begin in few months; the Damour sites are at the study stage.

Table extracted from the ESIA's Analysis of Alternatives

Scheme	Advantages	Disadvantages	Findings
Bisri	• High storage volume that meets GBML demands to at least 2030 or longer; • Utilizes transmission, treatment and storage facilities at limited additional cost; • Reservoir floor underlain by low permeability deposits; • Little or no pumping costs; • Lowest cost per unit volume delivered to GBML.	• Expropriation of land; Historic and cultural remains; • High sedimentation risks; • Seismic risk to be mitigated.	Bisri Dam is the only site that will supply GBML demand over an appreciable period of time in a cost-effective manner. Additional studies into reservoir geology, dam axis, water tightness, seismic and sedimentation risks have been conducted to inform the final design of the dam.
Damour West	• Land take mostly non-productive; • Favorable dam-site morphology; • Might utilize some GBWSP facilities.	• Small storage capacity; • Unlikely to sustain significant hydropower; • New treatment plant and conveyance required; • Significant pumping costs.	Water storage is substantially less than at Bisri or Damour East, and dam site geology is less favorable. Any dam constructed on this site would have a reduced water level to limit lateral leakage and/or be part of a conjunctive use scheme with ground water.
Damour East	• Dam site geology better than at Damour West; • Favorable dam-site morphology; • High storage volume that meets GBML demands to 2030 or longer.	• High lateral leakage; • New treatment plant and conveyance required; • Significant costs to treat the J6 permeable strata; • Significant pumping costs; • Subject to block collapse from reservoir cliffs.	Notwithstanding the high storage volume and the relatively better site-dam geology than Damour West, this scheme raises serious concerns about the potential excessive lateral leakage.

[18] CDR Greater Beirut Water Supply Augmentation Project, Preliminary ESIA, Phase I, dated October 2013.

Scheme	Advantages	Disadvantages	Findings
Janneh	• High flow rates, reservoir readily replenished each spring; • Favorable dam-site morphology; • High potential of hydropower generation	• Most land take is natural landscape; • Located on highly permeable strata hence leakage likely to be substantial; • New treatment plant and transmission line required; • Highest cost per unit volume delivered to GBML.	As a stand-alone dam Janneh will only meet the GBML short term needs. The Janneh Dam would be best suited to serve the northern areas of the GBML region

Summary of Potential Non-Dam Alternative Sources[19]

The non-dam alternatives provide insufficient volume to address the GBML deficit of 345 million m³ by 2035. *Groundwater* – the 2014 Assessment of Groundwater Resources of Lebanon,[20] estimates the deficit of the Beirut and Mount Lebanon aquifers to be 150 million m³. *Unaccounted for Water* – UfW in GBML is at 40 percent, which includes commercial and physical losses; only a fraction of the 40 percent of UfW represents water loss, and at most the saved volume would be 40 million m³. *Rainwater Harvesting* – rainwater harvesting is not sufficient to cover the water gaps during the dry season (i.e., limited rainfall), which can extend up to 6–7 months. Even with the most optimistic assumptions, the total water available[21] through rainwater harvested is estimated to be between 50 million m³ and 120 million m³. *Desalination.*[22] – the energy requirements estimated at 30 to 130 MW per year – are extremely high, depending on the technology used (multistage flash distillation or reverse osmosis); Lebanon already has a major shortage in energy, and thus it would be difficult to secure this additional energy requirement given the current energy gap in the country. *Wastewater reuse for potable water reuse* – this requires energy, storage, infrastructure for tertiary treatment, and networks; it also requires acceptance by people, whereas global experience shows that accepting to use treated wastewater for drinking purposes is difficult. Nevertheless, even with all these infrastructure and non-infrastructure requirements, the ESIA estimates that wastewater reuse will yield 125 million m³ of potable water, which is insufficient to meet the 345 million m³ water deficit in GBML by 2035.

Table extracted from the ESIA's alternatives analysis

Source	Advantages	Disadvantages	Findings
Desalination	• Plentiful and sustainable resources; • Could supply whole GBML demand; • Technically reliable; Independent of climate.	• Utilizes an industrial process; • Only 40% of intake to supply; • High construction cost; • Substantial coastal land take; • High energy and O&M costs;	Feasible, but very expensive. Currently it is considered the 'Source of Last Resort'

[19] CDR Greater Beirut Water Supply Augmentation Project, Preliminary ESIA, Phase I, dated October 2013.
[20] The 2014 assessment updated the 1970 comprehensive national groundwater assessment, indicating a significant decrease in the groundwater levels compared to 1970. It also makes note of the degraded quality of coastal aquifers due to seawater intrusion, including in the highly urbanized GBML.
[21] The space required to provide storage for rainwater in GBML that it can be used during the dry season is unrealistic due to the urbanized level in GBML.
[22] There is also an environmental aspect to desalination as it produces high volumes of brine, which would need to be disposed in the Mediterranean Sea.

Source	Advantages	Disadvantages	Findings
		• Marine environment damaged by brine	
Ground Water	• Most discharge to supply; • Suitable for conjunctive-use; • Diverse source locations; • Modest carbon footprint.	• Limited future uses due to over-exploitation • Resources currently ill-defined; • Insufficient to supply GBML alone; • Recharge climate-dependent; • Substantial energy costs; • Due to the karstic nature of most Lebanese aquifers, groundwater rapidly reaches the sea and is mostly unavailable during the six dry months.	Resources remain to be quantified but at minimum will significantly contribute to conjunctive use with a dam alternative but with limited volumes to be used in the future.
Rainwater Harvesting	• Basic technology; • Local sources; • Low carbon footprint.	• Short wet season; • Ill-suited for high-rise urban areas; • Climate dependent; • Poor public perception.	At best, contributes to household or compound non-potable water use.
Wastewater Reuse	• Source origin within GBML; • Source generally sustainable; • Majority of technology already required for best management practice.	• High treatment costs; • Lack of technical expertise; Insufficient resources to meet GBML demand; Very poor public perception and religious, cultural objection.	Strong cultural objections. At best can supply substantial quantities of non-potable water for landscape irrigation, etc.
Reduction in UfW	• Optimizes existing system efficiency and cost-recovery; • Promotes Best Management Practice.	• Requires political will, legal reform and judicial support; • Requires public cooperation; • Leakage unlikely to be <25%.	Should be pursued as is economically viable. Will only reduce partial need for new development

ANNEX 5
EXTRACT FROM 2014 "ASSESSMENT OF GROUNDWATER RESOURCES OF LEBANON"[23]

artesian, or a combination of two of these flow types) and geological controlling features (i.e. structural and stratigraphic control/barriers). The categorization of these 81 springs into types is provided in Plate 2 at the end of this report.

The classification of 409 springs with relatively reliable data is based on Meinzer (1923) which categorizes springs according to their discharge magnitude. The minimum average discharge rates of the springs were used for the classification of the. The number of springs in each class is provided in Table 1. Most likely, the majority of the remaining springs (i.e. with no data) would belong to class 5 and below.

For the hydrograph analysis, the method used to analyze the base flow relies on the assessment of the recession behavior representing saturated and non-saturated zones. A total of 45 springs were initially assessed but only 16 springs in 9 different GW-basins had reliable data. The result of these studies showed that all aquifers have similar recession coefficient ranges which, are indicative of the karstic nature of the aquifer. The lower ranges of coefficients obtained in this study are similar to those reported in the UNDP study of 1970. The higher ranges are attributed to the rapid emptying of the aquifer, mostly due to induced human factors.

The assessment of groundwater levels in the various basins, gathered during the one-year monitoring program, shows that groundwater levels rapidly respond to rainfall events, within hours or days, with a rapid increase in groundwater levels of 2 to 12m. Correlation between groundwater level data from this study basins show almost similar groundwater levels as in the 1970 study. The explanation is that the pumped water is being directly compensated by seawater intrusion.

With the exception of just one GW-basin, most of the basins monitored in the Interior Province show a significant decrease in the groundwater levels (from the 1970 levels). Again, this is attributed to the over exploitation from the aquifers. A drop of about 20m is observed in the Litani area in the Southern Bekaa Neogene-Quaternary Basin (Basin 11a).

The hydro-chemical characteristics of the majority of the GW-basins in the interior provinces belong to the carbonate facies with relatively low salt content. This is typical of the karstic nature of the aquifers that has a low retention time; where groundwater flows rapidly. The GW-basins of the coastal provinces that are not directly in contact with the sea show similar facies of carbonate type. Those basins that are in contact with the sea exhibit facies of Sodium-Chloride types which, are indicative of groundwater mixing with sea water. Seawater intrusion in these basins appears to be more pronounced than what it was in the 1970's.

HYDROLOGICAL ASSESSMENT

The hydrology study provides an evaluation of precipitation (rain and snow), evapotranspiration and runoff to estimate natural recharge rates for the country. Due to the limited quality and availability of data, only four (4) hydrological cycles (2008 to 2012) could be used. The data taken into account in the UNDP 1970 study was evaluated using satellite imagery (MODIS). Variations in snow coverage combined with land measurements to determine snow thickness and density over three (3) months (January, February and March) for the four (4) hydrological cycles (2008 to 2012) was used. The yearly water equivalent volumes estimated using this technique range between 1,815 and 2,567 MCM.

The estimated yearly surface runoff for the four (4) hydrological cycles, which does not account for the portion that comes from the discharge of the various springs, varies between 2,151 and 3,807 MCM.

Recharge to groundwater is subsequently calculated as the excess of precipitation over real evapotranspiration and surface runoff. The estimated volumes, which includes both deep percolation and retention in the vadose zone for the four hydrological cycles, vary from 4,116 to 6,651 MCM with an average of about 55 % of the total precipitation.

WATER BUDGET

The groundwater balance is the difference between water recharge and discharge. The recharge (water inflow) includes natural infiltration from rainfall and snowmelt; return flows from irrigation, domestic, industrial and touristic water usages as well as from losses in the water supply network; and groundwater gains from neighboring basins/aquifer. The discharge (water outflow) includes groundwater usage for irrigation, domestic, industrial and tourism; reliable data, such as data related to groundwater gains and losses and more accurate data on spring discharge, become available.

At country level, recharge varies between 4,728 and 7,263 MCM. The discharge is estimated to be around 2,588 MCM. Therefore, the water balance in the budget is estimated to vary from 2,140 MCM for the dry year (2010/2011) to 4,675 MCM for the wet year (2011/2012). These estimates do not account for losses to the sea and deep percolation.

Although there is an overall surplus in water budgets at the national level, it is critical to note that most of the coastal GW-basins which are heavily urbanized show significant deficiencies in the water balance. In some basins such as the North Lebanon Cretaceous Basin (Basin 18), water shortages can reach more than 150 MCM per year in dry years. Other key basins showing shortages include Hadath-Hazmieh Cretaceous Basin (Basin 22) with a deficiency of 7.2 MCM, and Beirut Neogene Quaternary Basin (Basin 26a) with a deficiency of 38.4 MCM.

On the other hand, due to over exploitation for irrigation, the South Bekaa Neogene-Quaternary Basin (Basin 11a) and the North Bekaa Neogene Quaternary Basins (Basin 11b), show deficiencies in their budgets of up to 15.7 MCM and 34.2 MCM respectively.

A map showing the stressed aquifers is provided in Figure 2. A large-scale Hydrogeological map of the entire country, which is provided in Plate 1 at the end of the report, presents all the GW-basins along with some of their characteristics.

[23] Ministry of Energy and Water and UNDP. 2014. Assessment of Groundwater Resources of Lebanon. http://www.lb.undp.org/content/dam/lebanon/docs/Energy%20and%20Environment/Publications/Assessment%20of%20Groundwater%20Resources%20of%20Lebanon.pdf

ANNEX 6
CONSULTATIONS CARRIED OUT FOR THE LEBANON WATER PROJECTS

1- Project Preparation: Consultations carried out by the Project Management Unit (PMU)

Public Consultations for Bisri Dam Project

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
Water Supply Augmentation Project						
3 April, 2012	CDR Central Beirut	27-29 March, 2012	16	For presentation of ESIA scoping stage, the following stakeholders attended: Institutional Stakeholders: -Ministry of Finance -Ministry of Energy and Water - Directorate General of Antiquities -Litani River Authority -CDR -Ministry of Environment -Dar El Handassah -Information International	-**Expropriation**: Would it be possible not to abide by Lebanese land expropriation law? -**Antiquities**: It is advisable to contact the Antiquities Authority if needed -**Project Beneficiaries**: People living in the vicinity of the dam need to benefit as well from the dam water	-Lebanese law applies but may be modified by some gap filling measures as per requirements of funding agencies and these are almost always more stringent -It is standard practice in ESIA studies to contact the Antiquities Authority as necessary -It is noted that people living in the vicinity of the dam need to benefit as well and this will be taken into consideration
10 April, 2012	Mazraat El Dahr Municipali ty	27-29 March, 2012	23	For presentation of ESIA scoping stage findings, the following stakeholders attended: Local authorities and residents in the vicinity of Bisri and Nahr Awali: -Dar El Handassah -Information International -CDR -Midan village -Mazraat El Daher Municipality -Aamatour Municipality -Baba Municipality	-**Antiquities & Cultural Heritage**: Municipality of Mazraat El Daher's main concern is not to inundate the Church of Mar Moussa and other historical ruins; GoL is asked to fund the protection or relocation of the Church in coordination with municipality if necessary -**GHG Emissions**: What are GHG emission as a result of the reservoir? -**Antiquities**: Aamatour municipality asked whether studies have been conducted regarding Roman columns.	-Any impacts and therefore mitigation measures for archaeological ruins / remains will be addressed in the ESIA -GHG from reservoirs has been the subject of studies in several parts of the world. Much depends on efficient project

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
					-**Wastewater**: Disposal of wastewater from Jezzine-Meshrif into the location of the dam will affect the quality of the reservoir -**Project Beneficiaries**: How can we be beneficiaries of this project if the water supply is for Beirut	management, and this will be fully discussed in the ESIA -ESIA was previously conducted and the Consultant is aware of the Roman columns and other historic and cultural remains and will be discussed in the ESIA -Sewerage for the village discharging above the dam site will be a clear recommendation of the ESIA -In most dam projects some allowance is made for local water use
12 April, 2012	Dmit Municipali ty	27-29 March, 2012	46	<u>For presentation of ESIA scoping stage findings, the following stakeholders attended:</u> Local authorities and residents in the vicinity of Damour Dam and Nahr Damour: -Information International -Dmit Municipality -Dar El Handassah -Kfar Fakoud Municipality -Kfar Matta Municipality -CDR -Ministry of Energy and Water -Deir Baba Municipality -Kfarhim Municipality -Ministry of Agriculture	-**Antiquities**: Deir Baba Municipality advised that there is an Antique water mill and a natural cave in the reservoir area not mentioned in the presentation -**Project Beneficiaries**: Progressive Socialist Party and Dmit Municipality asked how the area in the vicinity of the dam will be able to benefit from this Project -**Expropriation**: Will the Expropriation Law be implemented and mandatory compensations paid or will this be left to World Bank based on Municipalities solutions?	-The ESIA consultant will investigate the presence of an antique water mill -The response was that allowances for local services and local water supplies will be provided -Compensation for land and asset take will be in accordance with the laws of Lebanon, primarily the Expropriation Law of 1991 and its later amendments

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
				-Eco Village -PMU Awali Project -Litani River Authority -Bank of Beirut and the Arab Countries -Meshref Municipality -Progressive Socialist Party	- **HEP**: Will there be Hydro Electric Power (HEP)?	and if financed externally, with any particular requirements of the Funding Agency -It is expected that dam site will also supply hydropower
21 April, 2012	Qartaba Municipali ty	27-29 March, 2012	28	<u>For presentation of ESIA scoping stage findings, the following stakeholders attended:</u> Local authorities and residents in the vicinity of Jannah Dam and Nahr Ibrahim: -Information International -Electricite Du Liban -Kartaba Municipality -Dar El Handassah -Kartaba – Mkattaf Company -Yanouh & Hdaine Municipality -Maronite Parish of Jbeil -CDR -Litani River Authority -Lebanese Maronite Monastery Mar Sarkis & Bacchus Monastery -Saraaita Contractor -Ministry of Energy and Water -Kartaba -Karam Trade	-**Geotechnical studies**: Two of the participants raised a concern about the geology of the area and whether it is favourable for storing water -**Environmental impacts**: The environmental and biodiversity impacts of the dam was also raised -**Wastewater**: Head of Municipality of Yanouh and Hdaine raised a concern about the need to treat the wastewater from the villages surrounding the reservoir by suggesting upgrading the system -**Compensations**: Apple orchards will be inundated, and compensation will not be enough - **Cultural/Historical Heritage**: Two of the participants Head of Mar Sarkis and Bacchus Monastery and Kartaba Municipality raised their concern about preserving Nahr Ibrahim and its course which is a path of historical value and it is certain there are cultural monuments there; it is requested to disclose of any archaeological remains to	-This will be addressed in the ESIA -Negative environmental and biodiversity impacts of the dam will be addressed by the ESIA -A major recommendation of the ESIA is likely to be that sewerage schemes for the villages currently discharging into the valley upstream of the dam be prioritized -Compensation for land and asset take will be in accordance with the Expropriation law of Lebanon dated 1991 and its later amendments and if financed externally, with any particular requirements of the Funding Agency

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
					take proper decisions before losing them for good	- A full archaeological historical and cultural heritage survey will be undertaken on the priority site in accordance with the requirements of the DGA.
24 April, 2012	Hadath Municipali ty	27-29 March, 2012	25	For presentation of ESIA scoping stage findings, the following stakeholders attended: Water consumers of Beirut southern and suburbs -Arab World Water Magazine -Information International -Dar El Handassah -PMU Awali Project -CDR -Municipality of Hadath Slomia Co -Furn El Chebback Municipality -Chiah Municipality -Kfarshima Municipality -Litani River Authority -Choueifat Municipality -Hazmieh Municipality	-**Water Quality**: Arab World Water raised a concern about the quality of the water being poor as it is coming from Lake Qaraoun -**Project Beneficiaries**: Arab World Water stated that this people of south are being deprived from getting their water, whereas if the water is obtained from Damour dam this would not be a problem - **Project Implementation**: Litani River Authority enquired about the time frame for the preparation of the ESIA and when implementation would begin	- While Qaraoun water will not be used to supply Greater Beirut, recent and ongoing studies have shown it can be satisfactorily treated by conventional techniques - People from South Lebanon will not be asked to forfeit their rights to water for Beirut residents -The current ESIA project will be completed by the end of September 2012 and implementation will commence with detailed design as soon as funding is made available
5 May, 2012	Beirut Municipali ty	1, 3-4 May, 2012	43	For presentation of ESIA scoping stage findings, the following stakeholders attended: -Water consumers of Central Beirut -Information International -Dar El Handassah -CDR -Directorate General of Antiquities	-**Bisri Dam Project Water Use**: Dar El Nahda Engineering suggested to provide drinking water from Bisri Dam Project. -**Water Quality**: National Women's Union stated that they do not water if it will be polluted -**Water Quantity and Leakages**: A representative	-Provision of drinking water from the Dam is one of the suggestions being studied as per the presentation -It will be the intention of both the Ministry and the Water Establishment to ensure water delivered to

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
				-Universal Equipment -Litani River Authority -Ministry of Energy and Water -Dar El Nahda Engineering -Ministry of Agriculture -World Bank Consultant -Office of MP Bahaa El Dine Itani -DEP NGOS: -Arab World Water Magazine -National Women's Union -Association of the Charity Center -Lebanese University -Beirut Union -Union of Lebanese and Arab Associations -Group of Freedom and Progress -Organization of Isa'af Sha'abi -Social Committee -Beirut Inhabitants Association -National Labour Campaign -Operation Big Blue -Future Pipe	from DEP and Association of the Charity Center raised a concern that the water quantities will diminish after a while due to poor conditions of the household connections which lead to leakage and suggested they need to be rehabilitated at the same time of the project and penalize offenders therefore, increase public awareness of the negative impacts of leakages	consumers' taps meets current environmental health standards and is fit for purpose -It was highlighted that the GBWSP includes major elements of leakage identification and repair and the installation of both bulk meters on the distribution network and household meters to monitor water use and assist with the identification of future leaks; in addition it was stated that one recommendation of the GBSWP ESIA will be the establishment of a hotline via which citizens can report leakages and water use abuse
30 January 2013	CDR, Central Beirut	26, 28-29 January 2013	13	<u>For draft ESIA/RAP findings dissemination, the following stakeholders participated</u>: -Institutional stakeholders: -Dar El Handassah -Directorate of Cadastral Affairs -CDR -Generate Directorate for Administration and	-**Wastewater**: Ministry of Health emphasized the need to construct simultaneously dam and complete sewage networks of the surrounding villages currently discharging into the river -**Construction Materials**: Ministry of Environment asked about the source of dam construction materials	-The government recognizes the problem. Most villages already have sewage collection and the construction of sewage treatment for all those villages within the dam catchment will now be prioritized -All natural materials including rock, sand, gravel, aggregate,

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
				Councils/ -Ministry of Interior and Municipalities -Ministry of Health -Ministry of Environment -Ministry of Agriculture - Directorate General of Antiquities -Litani River Authority		clay are expected to be sourced in the vicinity of the construction site within the reservoir area
2 February 2013	Midane Municipality	26, 28-29 January 2013	36	<u>For draft ESIA/RAP findings dissemination, the following stakeholders participated:</u> Local authorities and residents near the dam site: -Midane Municipality & Mokhtar -Mokhtar of Bhannine -Council of Municipality -Dar El Handassah -CDR -Ministry of Interior -Ministry of Health -Grass Valley Company & Lands owner -Residents -Petit Confort	-**Expropriations**: Mokhtar of Bhannine mentioned that the list of lands to be expropriated is missing some plots -**Antiquities**: Mokhtar of Bhannine also mentioned there are buried archaeological ruins to be dug before commencement of works -**Environmental pollution** issue was raised and what will the mitigation measures be to counter environmental pollution? -**Sewage**: The need to address the issue of discharging sewage into the valley -**Touristic projects**: To give special care to touristic projects -**Bisri Lake pollution prevention**: Who will maintain project after its completion to prevent the pollution of the lake? -**Compensations**: How will land values be estimated?	-The list of expropriations is a work in progress and the Consultant will be pleased to take note of errors if contacted through as indicated in the presentation -The CDR and Consultant are working with DGA to prepare a programme for investigation, excavation and documentation and if feasible for removal -ESIA has proposed a master plan to be prepared to ensure orderly and environmentally responsible development of the surrounding areas. -ESIA calls for prioritizing the establishment of complete sewerage and drainage networks for all villages within the dam catchment.

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
					-**Access Roads**: Mokhtar of Midane stated that access roads to the dam and surrounding villages must be taken into account.	-The ESIA discusses the various touristic opportunities from the development. -The dam and reservoir will be operated by BMLWE. Bisri water is already of a much higher quality than Qaraoun water and the same severity of pollution will not occur. -A Resettlement Action Plan is being prepared and expropriation will follow the Lebanese law. -The Contractor will have to prepare a Traffic Management Plan to ensure their activities do not cause undue delay and congestion.
2 February 2013	Mazra'ate d Dahr Municipali ty	26, 28-29 January 2013	15	<u>For draft ESIA/RAP findings dissemination, the following stakeholders participated:</u> Local authorities and residents near the dam site: -Dar El Handassah; -Ministry of Health -Al Sh'ola Cultural Association -Head of Mazraat El Dahr Municipality -CDR	-**Antiquities and Cultural Heritage**: Head of Mazraat El Dahr stated that the costs associated with relocation of Mar Moussa Church and St. Sophia Monastery must be covered by the project -**Dam Alternatives**: Ministry of Health asked why the possibility of using groundwater resources has not been covered -**Increasing Humidity**: Possibility of increasing humidity levels and proliferation of mosquitos during hot summer months	-All associated costs as necessary will be covered by the project and the budget sum for this work will be included in the RAP -This alternative was studied but whether such potential is sufficient for supplying the quantities needed for GBA is uncertain. In addition, operational costs of pumping water from deep wells may prove

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
						prohibitive even where saving such as in the level of treatment prior to distribution can be made. -Proliferation of mosquitoes is a potential threat to any standing water body and mitigation measures were discussed.
6 February 2013	Hadath Municipality	26, 28-29 January 2013	10	For draft ESIA/RAP findings dissemination, the following stakeholders participated: -Water consumers of Greater Beirut Area: -Dar El Handassah -Haret El Hreik Municipality -Design Engineering Partner -Ministry of Health -Head of Hadath Municipality -Hadath Municipal Council	-**Sewage management**: What measures will be taken to deal with sewage water discharging from surrounding villages -**Water leakages**: the critical issue of water leakages throughout the existing networks must be addressed	-The GoL recognizes this problem and the construction of sewage treatment for all those villages within the dam catchment will now be prioritized -The GBWSP currently enhancing short-term supplies make provision of extensive leak detection and network upgrading
9 February 2013	Aamatour Municipality	26, 28-29 January 2013	28	For draft ESIA/RAP findings dissemination, the following stakeholders participated: Local authorities and residents in the vicinity of the dam site: -Dar El Handassah -Chouf Municipalities Assembly -Haret Jandal Municipality	-**Project Beneficiaries**: What will the project bring to Chouf and Jezzine villages? -**Compensations**: this should be taken into consideration considering owners of inundated lands will lose while those on the shorelines will see their lands values sky rocket. -**Antiquities**: Relocation of archaeological remains is not a simple transfer	-Chouf and Jezzine villages will benefit from improved infrastructure such as sanitation and from economic opportunities -All land expropriations will be undertaken at full prevailing market value as per Lebanese law

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
				-Aamatour Municipality	-**HEP**: Will there be HEP generation?	-Agreed this is a complex process and it is one that is well practiced in many countries providing adequate budgetary allowances are set aside -Bisri Dam Project will include provision to generate hydropower and the maximum possible capacity for the available resources will be installed
9 February 2013	Mazra'at Echouf Municipality	26, 28-29 January 2013	35	For draft ESIA/RAP findings, dissemination the following stakeholders participated: Local authorities and residents in the vicinity of the dam site -Dar El Handassah -Kahlouniyeh municipality -Social Security Bureau -Lebanese Parliament employee -CDR -Mazraat El Chouf residents -Social Progressive Party -Al Ta'adod Association	**Project Beneficiaries**: The project must generate direct benefits to local residents; dam operational staffing should favour local residents and local equipment -**Compensations**: Will the compensations be fair and if not will the owners have the right to appeal? -**Antiquities**: what will happen to Mar Moussa Church? -**HEP**: Will there be any power generation plan to meet at least the needs of local villages ? -**Tourism**: Support to be provided to local villages especially in terms of touristic projects	-The project is expected to afford new economic opportunities; dam operational staffing and equipment will be a matter for the BMLWE -The compensation will be done in accordance with the Lebanese law and its amendments to meet international funding agency requirements. The Right to Appeal is already incorporated in the Lebanese Law -The community has expressed a strong desire to see the Church moved to a new location and the ESIA consultant is recommending that is provided for within the project

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
						-A hydroelectric power plant will be provided at the dam. Its capacity and service area has yet to be determined. -The ESIA/RAP Consultant has recommended the development of a master plan for the shoreline and surrounding area development and these are most likely to be implemented by the private sector.
25 April 2014	Aamatour Municipality	16-18 April 2014	15	For the final consultations the following stakeholders participated: -Landowners -Head of Aamatour Municipality -Ministry of Interior and Municipalities -Staff Municipality	-**Project Beneficiaries**: Aamatour citizens are themselves facing water shortages and are in need of water as much as Beirut -**Project Alternatives**: like desalination could be looked into as citizens are against this project -**Dam Safety**: people are worried about the side effects of the dam -**Compensations**: The issue of compensation rights, the loss of livelihood income was also raised by 3 of the landowners -**Environmental Impacts**: Have the environmental impacts really been studied and has it been approved internationally?	-It is common practice to move water from rural areas with plentiful resources to urban areas that suffer from water shortages; surrounding villages in Chouf and Jezzine will benefit from improved infrastructure such as sanitation and from economic opportunities provided by future development. -Desalination was considered but has many disadvantages since it requires a heavy industrial plant to be located along the coastline, generation of high quantities of saline

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
					-**Access Roads**: Will there be access roads from the villages to the dam area?	brine which impairs seawater quality and it will result in a significant increase in the cost of water to consumers -Dam Safety Plans have been formulated based on Dam break modeling and inundation analysis undertaken by the dam designer. This report includes an Emergency Action Plan with details of implementation. the detailed designs of the dam have also been reviewed by an international panel of experts on dam safety. -Compensation to the landowners will be undertaken according to the Lebanese Law and the provisions of the World Bank Operational Policy 4.12; There will be a grievance redress mechanism in place if the PAP remains unsatisfied; there will be Benefit Sharing Program to share the project benefits with the local communities; it is also expected that the contractors will favor residents with employment opportunities generated

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
						-The ESIA study identifies a wide range of environmental impacts and proposes mitigation measures. Extensive environmental quality monitoring and reporting is proposed and a Biodiversity Management Plan has also been proposed. -There will be a service road to the dam. The need for additional roads will be considered by the Master Plan for the catchment development.
25 April 2014	Mazra'at Echouf Municipality	16-18 April 2014	28	For the final consultations the following stakeholders participated: -Mazraat Al Chouf Municipality -Landowners -Landowners and farmers -Mukhtar -Dar El Handassah	-**Project Beneficiaries**: Numerous participants raised their concern that the proposed dam project should stipulate benefits for the village of Mazraat Al Chouf with water and electricity benefits -**Livelihood impacts and compensations**: The main source of income for framers will be lost by the dam construction and the representatives of landowners from Mazraat Al Chouf and Aamatour should be added to the Expropriation Commission to discuss fair remuneration for the land	-The villages of Chouf and Jezzine will benefit from improved infrastructure such as sanitation and from opportunities provided by future development and a Benefit Sharing Program will also be established and it will also provide generation of hydropower and will deliver it to the national grid -Compensation will be through the Lebanese expropriation law and World Bank

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
					-**Project Alternatives**: Desalination could also be considered or different locations -**Archaeology**: participants asked whether archaeological monuments will be transferred and to take archaeology into consideration as some monuments are still visible from the ground -**New Roads**: The need to create new roads to connect towns and reap economic benefits was raised.	Policy OP 4.12 with restoration of incomes or livelihoods for those persons directly and significantly affected and additional assistance will also be made available. As for the Expropriation Committee, the purpose of the public consultations is to convey all PAPs concerns to the project proponent and to voice their ideas -For desalination this has been considered with numerous side effects and impacts as it will be located along the coastline; the proposed dam location has been studied from all standpoints including geology, seismology water tightness etc. -The Directorate General of Antiquities will be responsible for the rescue archaeology in accordance with their responsibilities under the Lebanese Law -The need for new roads will be considered by the Master Plan for catchment development.

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
26 April 2014	Bisri Church Hall	16-18 April 2014	43	For the final consultations the following stakeholders participated: -Machmouche Moukhtar -Binwati Municipality -Ministry of Telecommunications -Ogero -Al Midane Moukhtar -Bisri Moukhtar -Ministry of Public Works and Transportation -Landowners from Kherbet Bisri, Al Midane, Marj Bisri, Marj Bisri -Al Midane, Aamatour, Bchary, Al Harf	**Seismology/Environment - Humidity/ Archaeology**: The proposed dam is going to be constructed over the Roum fault line, there will be environmental consequences particularly in humidity increases and there are visible archaeological monuments along the banks of the river that will be affected with historical and cultural values -**New Roads**: a public road project connecting Al Midane to the town of Bisri has been studied and planned and a Presidential decree issued as such. The road is 6 km long with 12m established width. This project should be carried out to connect and facilitate access from and to Barj Bisri through Deir Al Mukhales, Joun and the coastal highway to the capital city Beirut. -**Monitoring of dam against pollution**: The study did not stipulate the creation of a body to monitor the protection of the dam from pollution and preservation of fishery resources. -**Sewage**: there are sewer projects in several towns but no treatment plants and this will mostly be discharged into the Bisri river. -**Compensations:** document was prepared by a lawyer at the end of the session and signed on behalf of 25 landowners proposing that a	- Protection against seismic effects have been incorporates into the dam design and a Dam Breach modeling and inundation analysis have been undertaken. The DGA will execute the archaeological rescue plan in accordance with their responsibilities under the Lebanese Law. The ESIA identifies all potential environmental impacts and mitigation measures and monitoring plan. -The need for new roads will be a major element of the proposed Master Plan for the development of the upper catchment area -An Environmental and Social advisory panel will be appointed to provide independent review of and guidance on the treatment of environmental and

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
					law on the construction of the Bisri Dam be issued via a joint-stock company whereby landowners obtain their compensations and entitlements based on shares in the proposed company, allowing them to collect dividends and trade the stock exchange to protect their rights and fair distribution of entitlements resulting from the project	social issues associated with planning, design, construction and operation of Bisri Dam and reservoir from the date of their appointment to a period expected to be not less than 3years into dam operation. -To protect water quality in Bisri Dam, it is intended to fast-track the installation of sewerage and sewage treatment across all villages with the catchment. -The idea for a joint-stock company may have merit but encompasses a range of legal issues that are beyond the scope of the present ESIA and RAP. This comment is noted for further consideration.
26 April 2014	Mazra'ate d Dahr Municipali ty	16-18 April 2014	10	For the final consultations the following stakeholders participated: -Head of Mazraa'at El Dahr Municipality -"Eid" family members -Dar El Handassah	-**Project Beneficiaries**: Some of the participants stated that the Bisri Dam Project should not only supply Greater Beirut with water but also Bisri -**Compensations**: Will compensation apply to Bisri citizens? -**Archaeology**: One of the participants mentioned the need to involve the citizens	-All surrounding villages in Chouf and Jezzine will benefit from improved infrastructure and the Benefit Sharing Program -Those losing land or other assets, or whose livelihoods will be affected by the

Date of consul-tation	Location	Date notify-cation announced	Number of parti-cipants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
					of Mazraat El Dahr for the relocation of the Church.	project will be eligible for compensation as identified in the RAP according to Lebanese Law and the provisions of the World Bank OP. 4.12. -The relocation of Mar Moussa Church has been discussed with the Diocese of Saida which has in turn discussed the issue with the municipality. The relocation was also discussed during public consultation in the municipality whereby the 4 proposed locations have been discussed and the best option recommended based on a multi-criteria analysis.

Public Consultations for Greater Beirut Water Supply – AF

Date of consultation	Location	Date notification announced	Number of participants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
Additional Financing -Greater Beirut Water Supply						
12 April, 2018	Dekwaneh Municipality	1 April, 2018	7	For presentation of project components, potential environmental and social impacts the following participants attended: -Municipality of Jdeideh -Municipality of Fanar	-**Project components**: Are additional networks, reservoirs, or pumping stations available? -**Bisri Dam**: When is Bisri Dam to be completed? -**Water theft**: Does the	-Additional networks reservoirs etc. are not included in the proposed project components. -Works Contract has been signed and expected completion of works is in 2023. -Water theft will be reduced

Date of consultation	Location	Date notification announced	Number of participants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
				-Municipality of Ain Saadeh -Municipality of Roumieh -Municipality of Sin el Fil -Municipality of Biaqout -Municipality of Dekwaneh	possibility of water theft remain? -**Water Leakage**: There is a lot of water leakage, how will this issue be addressed? In general, the outcome of the consultation session was positive with no significant issues of concern.	because each household will now be connected to a water meter as opposed to the previous water meters for buildings and every household will accordingly pay for what they are consuming; any illegal connections will therefore be told to legalize their status; having said this water theft will not completely be eradicated -Leaking detections and repairs are 2 of the main objectives of this proposed project.

Public Consultations for Greater Beirut Water Supply

Date of consultation	Location	Date notification announced	Number of participants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
Greater Beirut Water Supply Project						
12 May 2010	Lebanese University Hadath Campus	Not provided	17	For presentation of project details, potential impacts and mitigations the following stakeholders were invited: Directly affected people, head of Municipalities, Ministry and NGO representatives as well the World	**Retrieval of 3m3/s of water** Concerns were raised regarding type and magnitude of impact that could potentially affect the natural flow of water in the Awali River section downstream	CDR representative pointed out that the impact would be negligible CDR to provide adequate geotechnical reports proving that there will be no direct impacts resulting from the

Date of consultation	Location	Date notification announced	Number of participants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
				Bank's environmental consultant: -Kfarchima Municipality -Ministry of Public Health -Ministry of Energy and Water -CDR -Carmel St. Joseph School -Mokhtar of Al Jmeiliyeh -ELARD -World Bank -Mechref Construction Project	the Joun HEP after retrieval of the required amount of water for the Conveyor Project **Structural impact from TBM** Activity Concerns on adverse impacts on the structural stability of the St. Joseph Carmel School were expressed since the tunnel is passing beneath the school.	tunnel boring activity.
27 July 2010	Not indicated	Not provided	33	<u>To disclose findings of ESIA the following stakeholders were invited</u>: Directly affected people, head of Municipalities, Ministry and NGO representatives as well the World Bank's environmental consultant: -ELARD -CDR -World Bank -Ministry of Energy and Water -Beirut & Mount Lebanon Water Authority -Carmel St. Joseph School	-**Water Supply**: There will be no water supply to areas through which the tunnel will pass -**Water Quantity**: Is the allocated amount of 3m3/s sufficient for the population of Greater Beirut area considering this was done in the 1970s -**Water Quality**: Will the water quality be adequate for drinking purposes -**Tunnel Safety**: The safety of	-The tunnel will have openings all along to allow for future connections to the water networks and supply the areas along the tunnel -The tunnel is designed for 9m3/s and is associated with the Bisri Dam which will meet the requirements of Beirut and other areas -Water will be treated at the Wardanieh wastewater treatment plant -There is no effect on the lands that the tunnel is passed under

Date of consultation	Location	Date notification announced	Number of participants	Topic/Participants / Organizations	Main topics covered	Responses (and follow up)
				-Municipalities of Shiah, Mechref, Kfrarshima, Baabda, Sibline, Barja, Haret Hreik, Borj El Barajneh, Hazmieh, Wadi Shahrour El Sofla, Dekwaneh, Naameh-Haret El Naameh -Ministry of Environment -Litani River Authority -Ministry of Public Works & Transportation -Consultant KREDO -Sukomi -Friends of Ibrahim Abd el Al Organization / Foundation	the tunnel as it passes under the school is a concern -**Explosives use**: Will explosives be used -**Expropriation**: How does the expropriation law work?	because of the depth of the tunnel -Explosives will not be used for the overall project only for the beginning of the tunnel to open the entrance for the Tunnel Boring Machine -A brief explanation of the expropriation law was provided

Public Consultations during Implementation

List of meetings between CDR PMU staff and the Public

Date	Location/Attendees	Subject
9/11/2016	Haref and Mazraat Daher	Public meeting
11/11/2016	Mazraat Chouf and Kherbit Bisri	Public meeting
15/12/2016	Mazraat Chouf and Aamatour	Meeting at CDR Offices
19/12/2016	Mazraat El Chouf and Aamatour	Booklet & Poster Distribution
22/12/2016	Bisri, Haref, Midan and Deir El Moukhalis Monastery	Booklet & Poster Distribution
31/01/2017	Mazraat Chouf, Bsaba, Bisri and Haref	Public meeting
22/02/2017	Mazraat Daher and Kherbit Bisri	Public meeting
22/02/2017	Priest of Sayda Caza	Mar Moussa Church relocation
22/03/2017	Chouf reserve	Environmental Meeting (ESP presence)
29/03/2017	Aamatour	Public meeting
18/03/2017	Mazraat Daher and the Priest	Mar Moussa Church relocation
22/05/2017	Union of Jezzine Municipalities - Midan, Haref, Bisri, Bhanine, and Binwati	Public meeting

ANNEX 7
INFORMATION BOOKLET ON THE GRIEVANCE REDRESS MECHANISM

CDR prepared the **Project Information Booklet** and distributed it on November 30, 2016 (CDR letters no. 4787/1), to all six villages that have municipalities and which are therefore in the vicinity of the Project area and may accordingly be affected by the Project, be it via expropriations or otherwise: Mazraat Daher, Mazraat Chouf, Midan, Aamataour, Aaray, Bater, Bkassin, Bnwati, and Bsaba. CDR also distributed this booklet through site visits to all the municipalities and villages on December 19 and December 22, 2016.The booklet can also be found online at the below link:

http://www.cdr.gov.lb/study/bisri/Booklet-GBWSAP.pdf

ANNEX 8
COMMUNICATION WITH NONGOVERNMENTAL ORGANIZATIONS (NGOS)

Since May 2017, NGOs, namely the "Lebanon Eco-Movement" and the "inhabitants committee in Bisri" sent emails to the Bank Task Team Leader as per the log of communications in the table below. The Project Team responded to each e-mail within 24 hours, with a placeholder e-mail and provided a detailed answer to inquiries for each topic raised.

The topics discussed and answers provided by the Project team between May 23, 2017 and August 19, 2018 are the following:

1- Analysis of alternatives
2- Dam safety
3- Biodiversity
4- Sustainable Development Goals
5- Consultations with stakeholders
6- Cultural heritage and archaeology
7- Climate change

The Bank provided a report responding to the NGOs on August 23, 2017 and August 30, 2017 for the documents and studies that they had shared.

NGOs: E-mail exchanges with the Project team[24]

Description	Date of email	Date of last communication between WB and Requesters [25]	Name of email sender	Type (NGO, personal, gov., journalist, etc.)	Topic
Email #1	Tuesday, May 23, 2017	Wed, July 5, 2017	Lebanon Eco Movement Association	NGO	Meeting request - Bisri Dam Project
Email #2	Monday, July 3, 2017	Mon, July 3, 2017	NGO: Committee on the people and residents of towns (Chouf - Jezzine)	NGO	Meeting Request and Sharing documents and studies on Bisri
Email #3	Monday, July 17, 2017	Wed, August 23, 2017	Lebanon Eco Movement Association	NGO	Sharing documents prepared by the NGO & Petition against Bisri
Email #4	Sunday, August 21, 2107	Wed, September 13, 2017	Mother Nature Association & Lebanon Eco	NGO	Follow up email on the World Bank review of the documents shared for Bisri

[24] This log covers correspondence from May 2017 to August 22, 2018, which is the latest date e-mails were received from NGOs.
[25] This date corresponds to the last e-mail exchange between the WB and the Requesters, while there were a series of interim emails not listed here; the main topic of discussion in these exchanges is described.

Description	Date of email	Date of last communication between WB and Requesters [25]	Name of email sender	Type (NGO, personal, gov., journalist, etc.)	Topic
			Movement Association		
Email #5	Friday, September 15, 2017	Mon, September 18, 2017	Lebanon Eco Movement Association	NGO	Sharing additional documents following the meeting of September 13,2017
Email #6	Friday, January 19, 2018	Fri, January 19, 2018	Ms. N. N.	N/A	Against Financing Bisri Dam Project and asking the WB to stop financing
Email #7	Monday, July 23, 2018	Sat, July 28, 2018	NGO: Committee on the people and residents of towns (Chouf - Jezzine)	NGO	To remove the interview of the Panel of Expert from the WB website. (https://www.worldbank.org/en/news/video/2018/03/22/bisri-dam-is-earthquake-resistant)
Email #8	Saturday, July 28, 2018	Sat, July 28, 2018	Mr. R. N. & Lebanon Eco Movement Association	NGO	Asking the Bank to cancel the consultations that CDR organized in August 2018 on biodiversity
Email #9	Sunday, July 29, 2018	Tuesday, August 14, 2018	Mr. R. N	NGO	Questions about Appendix E of ESIA of the Bisri Dam
Email #10	Sunday, July 29, 2018	Wed, Aug 1, 2018	On behalf of Bisri inhabitants committee / LEM	NGO	Question on ESP Mission reports – Bisri Dam
Email #11	Monday, July 30, 2018 4:16 PM	Thursday, August 09, 2018	On behalf of "Committee of Bisri Inhabitants..." / "LEM")	NGO	Bisri Dam – Questions on the Cultural Heritage
Email #12	Monday, July 30, 2018	Tuesday, July 31, 2018 10:27 AM	On behalf of Bisri Inhabitants committee)	NGO	Request to cancel Bisri Dam – Ecological compensation consultations
Email #13	Saturday, August 18, 2018	Sunday, August 19, 2018	On behalf of "Committee of Bisri Inhabitants..." / "LEM"	NGO	Asking the Bank to cancel the consultations that CDR organized in August 2018 on biodiversity
Email #14	Saturday, August 18, 2018	Sunday, August 19, 2018	On behalf of "Committee of Bisri Inhabitants..." / "LEM"	NGO	Requesting to remove the factsheet published on the Bank Project website

Description	Date of email	Date of last communication between WB and Requesters [25]	Name of email sender	Type (NGO, personal, gov., journalist, etc.)	Topic
Email #15	Wednesday, August 22, 2018	Ongoing	On behalf of "Committee of Bisri Inhabitants..." / "LEM"	NGO	Request to cancel Bisri Dam – Ecological compensation consultations
Email #16	Tuesday August 28, 2018	Wednesday August 29, 2018	On behalf of "Committee of Bisri Inhabitants..."	NOG	Questions on Bisri Dam Safety and requesting the Bank to provide to NGOS the detailed design documents and maps of the Bisri Dams

Further to the correspondence between the Project team and the NGOs as per Table 5, the Project team met four times with the NGOs, and responded to their issues in writing. Four meetings were held with the NGOs and the "representative of Bisri area community" to address their concerns on the following dates:

1. July 5, 2017;
2. July 25, 2017;
3. September 11, 2017;
4. September 13, 2017.

Meetings between the Bank and the NGOs

Date Meeting with NGOs	WB Team	Venue	NGOs List of Attendees
July 5, 2017	TTLs with team members: Lead Water Resources Management Specialist Water Supply and Sanitation Specialist Communication Officer Communication Expert	Lebanon-Eco movement office In Baabda	NGO: Lebanon-Eco movement
July 25, 2017	Meeting with NGOs at the World Bank office: TTLs with team members: Lead Social Development Specialist Senior Social Development Specialist Senior Environmental Specialist Archaeology and Cultural Heritage Specialist, Communication Expert Hydrology Expert Hydrogeology Expert 3 Water Utility Experts	World Bank office	Committee of Bisri Inhabitants, including the following participants: Environmental and social activist specialized in industrial equipment)/Mokhtar of Bsaba town Environmental and social activist Lawyer/legal consultant Mayor of the town of Midan (environmental and civil activist) Civil engineer Geotechnical engineer QS/QC civil activist
September 11, 2017	TTLs with team members: Lead Water Resources Management Specialist 2 Water Supply and Sanitation Specialist Lead Dam Specialist Operations Adviser (GRS)	World Bank office	Committee of Bisri Inhabitants: Lawyer/legal consultant Lawyer Mayor of the town of Midan (environmental and civil activist) QS/QC civil activist

Date Meeting with NGOs	WB Team	Venue	NGOs List of Attendees
	Counsel Lead Social Development Specialist Senior Environmental Specialist Communication Officer		
September 13, 2017	TTLs with team members: Lead Water Resources Management Specialist 2 Water Supply and Sanitation Specialist Lead Dam Specialist Operations Adviser (GRS) Counsel Lead Social Development Specialist Senior Environmental Specialist Communication Officer	World Bank office	NGO: Lebanon-Eco movement

Meetings facilitated by the World Bank between Independent Panel and the NGOs

The Project team took additional measures and facilitated meetings between the NGOs and the two independent Panels of Experts (i.e., Dam safety Panel and the Environment and Social Panel). Three meetings took place as table below:

- One meeting with the Dam Safety Panel was conducted on January 12, 2018; and
- Two meetings with the Environment and Social Panel were conducted on Feb 23, 2018 and May 25, 2018.

Date of meeting between Independent Panel and NGOs	Names of Independent Panel Experts	Attendees NGOs	Remarks
January 12, 2018	**Panel of Experts on Dam Safety**	1. Lebanon-Eco movement NGOs 2. Committee of Bisri Inhabitants	On Friday, February 02, 2018, a note prepared by the Dam Safety Panel was shared after the meeting. The note summarizes that the Dam Safety Panel has confirmed that comprehensive analyses and assessments including for geological, seismological, and geotechnical aspects, have been completed for the Bisri Dam. Based on these, the most appropriate dam type and design for this site has been selected, and the DRB considers the Bisri Dam design to be safe.
February 23, 2018	**Panel of Experts on Environment and Social Aspects**	1. Lebanon-Eco movement NGOs 2. Committee of Bisri Inhabitants	The main concerns raised were about the damages to the biodiversity, the environmental impacts, the seismic risks, sustainable

Date of meeting between Independent Panel and NGOs	Names of Independent Panel Experts	Attendees NGOs	Remarks
			alternatives and archaeological impacts. The independent panel of experts welcomed the NGOs and addressed each of their concerns at depth with reference to the ESIA and RAP and Archaeological mission reports. The NGOs asked for a follow up meeting with the independent panel of experts.
May 25, 2018	**Panel of Experts on Environment and Social Aspects**	1. Lebanon-Eco movement NGOs 2. Committee of Bisri Inhabitants	The concerns raised were similar to the previous meeting with the panel of experts. During this round of meetings, Lebanon Eco Movement leader distributed a pamphlet showing 8 other more 'sustainable' alternatives to the Bisri dam project. The NGOs asked for a face to face meeting with the independent panel of experts when there are in Beirut.

List of Bisri Dam Project meetings the Bank team conducted with the PAPs selected randomly during supervision missions

Note: During the consultations with the PAPs selected randomly during the supervision missions, the main concerns raised were about the timing of compensation for the expropriations, compensation process, Project benefits for the local community, their future livelihoods, dam safety, Project design, environmental impacts, and timeline. The WB team addressed their concerns.

Date of meeting with PAPs during supervision mission	Project team
July 13, 2018	Regional Safeguard Advisor and WB social team
April 25, 2018	Social team meeting arranged by CDR at CDR office
March 6, 2018	Bank team included TTLs, the social safeguards specialist, and the LEGEN at CDR office
March 9, 2018	Project team included TTLs, social safeguards specialist and LEGEN
December 6, 2017	Communication team
September 12, 2017	TTLs, Operation Adviser, Procurement Specialist. Social Specialists, Water Specialists, Counsel, Dam Specialists, Communication Specialists
July 4, 2017	Communication, social team members met with PAP at CDR based on the WB request
May 22, 2017	TTLs, Social Specialists, Environmental Specialists, Cultural Heritage Specialist, Communication Specialists

Date of meeting with PAPs during supervision mission	Project team
May 22, 2017	TTLs, Social Specialists, Environmental Specialists, Cultural Heritage Specialist, Communication Specialists
January 31, 2017	Social Specialists, and Communication Specialists
January 23, 2017	Country Director, Water Senior Director, TTLs, Social Specialists, Environmental Specialists, Communication Specialists
November 8, 2016	Communication Specialist
March 7, 2016	Communication Specialist