



Report Number : ICRR0021517

1. Project Data

Project ID

P074595

Project Name

GZ-North Gaza Emerg. Sewage Treatment

Country

West Bank and Gaza

Practice Area(Lead)

Water

Additional Financing

P091314,P117446,P146065

L/C/TF Number(s)

TF-16501,TF-16844,TF-54208,TF-56186,TF-57109,TF-57595,TF-92196,TF-97081

Closing Date (Original)

31-Dec-2017

Total Project Cost (USD)

42,284,648.47

Bank Approval Date

07-Sep-2004

Closing Date (Actual)

30-Jun-2018

IBRD/IDA (USD)
Grants (USD)

Original Commitment

40,053,776.15

40,053,776.15

Revised Commitment

41,846,749.74

40,043,050.15

Actual

42,284,648.47

42,284,648.47

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2. Project Objectives and Components

a. Objectives

Original Objectives

The project development objective (PDO) as per the Trust Fund Grant Agreement (TF054208-GZ page 12) dated October 27, 2004 was to:



- (i) mitigate the health and environmental safety threats to the communities surrounding the effluent lake at Beit Lahia;
- (ii) implement a scheme to transfer the effluent in the said lake to the newly constructed infiltration basins east of Jabalia and thereby prevent backflows in the sewerage system; and
- (iii) provide a satisfactory long-term solution to the treatment of wastewater for the Northern Government in Gaza.

The Memorandum of the President (MOP) and the Technical Annex dated August 12, 2004 defined a two part PDO by omitting the second element of the three-part Grant Agreement PDO namely “(i) to mitigate the immediate and gathering health and environmental safety threats to the communities surrounding the poorly treated sewage lake at the Beit Lahia Waste Water Treatment Plant (BLWTP) site; and (ii) to provide a satisfactory long-term solution to the treatment of waste water for the Northern Governorate in Gaza” (page 5).

There was no resolution of the difference between these PDOs in the documentation for this project. However, this review notes the following:

1. The second element in the PDO defined in the original Trust Fund Agreement in October 27, 2004 was an input for the first element of the PDO and was therefore not a separate objective but a necessary condition for the first element of the PDO.
2. The Memorandum of the President in August 2004 defined a two-part PDO that made no mention of the second element of the PDO in the Trust Fund Agreement.
3. The formally approved Project Papers for all Additional Financing Proposals and for all Restructuring Proposals used the two-part PDO defined in the Memorandum of the President.

This review concluded that there was no material difference between the three-part PDO used in the original Grant Agreement and the two-part PDO used in the Memorandum of the President and used in all the Project Papers approved by the Bank Board. This review has therefore used the two-part PDO defined in the Memorandum of the President as the PDO against which to assess this project's achievements.

b. Were the project objectives/key associated outcome targets revised during implementation?

Yes

Did the Board approve the revised objectives/key associated outcome targets?

Yes

Date of Board Approval

14-Apr-2014

c. Will a split evaluation be undertaken?

No



d. Components

The project included two parts (Technical Annex paras 38 to 49). Appraisal costs includes contingencies.

Part A. Effluent Transfer (appraisal cost US\$13.15 million, actual cost US\$15.87 million).

Component 1. Beit Lahia-Jabalya Effluent Transfer (appraisal cost US\$12.15 million including provisional items of US\$1.85 million, actual cost US\$14.12 million). The project was expected to finance the construction of: (a) a terminal pumping station with five pumps at Beit Lahia Waste Water Treatment Plant (BLWWTP), (b) a ductile iron sewage pipe to transfer the effluent from the Beit Lahia effluent lake to the infiltration basins, and (c) nine infiltration basins at the planned site of the North Gaza Waste Water Treatment Plant (NGWWTP). In addition, the component would cover the operations and maintenance of the infiltration basins for 24 months including the monitoring of effluent and ground water quality during the construction period of the new plant, and a coordinator for the maintenance of the basins, equipment and materials

Component 2: Technical Assistance for the Implementation of Component 1 Activities (appraisal cost US\$0.9 million, actual cost US\$1.75 million). This component would finance the operation costs of the Project Management Unit (PMU) as well as the costs related to the supervision of the construction works. In addition, this component would also update the Environmental Assessment carried out in 1999, to ensure compliance with Bank's Operational Policy on Environmental Assessment (OP 4.01) and a detailed remedial works study, as well as the costs related to the implementation of the environmental monitoring plan.

Part B: Treatment (appraisal cost US\$29.9 million, actual cost US\$65.68 million).

Component 3. Construction of the North Gaza Wastewater Treatment Plant (appraisal cost US\$28.3 million, actual cost US\$60.68 million). This component would finance: (a) the construction of the phase one of the North Gaza Waste Water Treatment Plant with a capacity of 35,600 cubic meters/day and comprising three treatment modules for secondary biological treatment with nitrogen removal, as well as sludge treatment, digestion, electricity generation, dewatering, drying and storage, including: (a) implementation of remedial works; (b) acquisition of equipment and materials; (c) operation and maintenance of the NGWWTP for two years after the commissioning of this plant, and (d) implementation of the remedial works.

Component 4. Technical Assistance for the Implementation of Component 3 Activities (appraisal cost US\$1.6 million, actual cost US\$5 million). This component would also finance the operating costs of the Project Management Unit (PMU), the supervision of construction works, as well as the implementation of the environmental monitoring plan during construction.

Revised Scope of Components

The first Additional Financing (April 2008) expanded the scope of the project as follows:



- inclusion of additional risk management measures such as: recovery wells, new pumping station, new storage reservoir of about 5000 cubic meters, installation of collection and distribution pipelines; and carrying out water quality monitoring and operational program. This was added in in response to the 2007 rupture of the temporary infiltration basin.

The Restructuring in April 2017, revised the project scope as follows:

- The irrigation reuse scheme was dropped. It was expected to be covered under the Bank's broader water security strategy for Gaza.
- Technical assistance to support the development of operations and maintenance (O&M) arrangements was added. Earlier, the Bank was fully financing O&M costs. The technical assistance to build the capacity for sustainable management and O&M of infrastructure.
- Instead of full remediation of the BLWWTP site, the project would finance only partial remediation i.e., priority works, including cleaning and partial leveling of the effluent lakes. This change was made because full site remediation was possible only after the new wastewater treatment is commissioned and the effluent evacuated.
- Finance the rehabilitation and activation of a power line which had been damaged during the 2014 war, in order to provide a 24-hour source of power to the NGWWTP infrastructure.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project Cost: The actual project cost was US\$81.54 million substantially higher than the appraisal estimate of US\$43.05 million. This was due to: (i) three major outbreaks of severe hostilities; (ii) direct damage to some project investments due to 2014 war was estimated around US\$1 million; (iii) import restrictions; (iv) exchange rate fluctuations; (v) global increases in energy prices; and (vi) need to redesign some parts of the North Gaza Waste Water Treatment Plant.

Financing: The project was financed through a number of tranches from the West Bank & Gaza Multi-donor Trust Fund established at the Bank to finance projects in West Bank and Gaza. In addition, the Bank acted as administrator for trust funds financed by other donors that entered into joint co-financing agreement with the Bank (namely the Belgian, European Commission and Swedish International Development Cooperation Agency Trust Funds) and contributed to the financing of this project.



West Bank & Gaza Multi-donor Trust Fund (MDTF)

The original trust fund (TF-54208) for US\$7.8 million financed by the MDTF was approved in 2004 to fund this project. Three more Additional Financing operations were subsequently used to cover financing gaps, cost overruns, environmental risk mitigation measures and financing for three years of the Operations and Maintenance of the North Gaza Waste Water Treatment Plant:

- The first additional financing (TF-92196) for US\$12.0 million was approved on April 22, 2008 to address cost overruns and finance new activities like the construction of risk management facilities.
- The second additional financing (TF-97081) for US\$7.0 million was approved on August 26, 2010 to address cost overruns and financing gaps.
- The third additional financing TF-16844) for US\$3.0 million was approved on April 14, 2014 to address cost overruns and financing gaps, PDO and PDO indicator changes, reallocation between disbursement categories and change in legal covenants.

The total financing was US\$29.8 million.

World Bank administered Trust Funds

- Directorate General for International Cooperation of Belgium TF-057109 [appraisal amount US\$5.87 million, actual amount US\$7.48 million];
- European Commission TF-057595 [appraisal amount US\$7.94 million, actual amount US\$7.68 million]; and
- Swedish International Development Cooperation Agency TF-056186 [appraisal amount US\$5.77 million, actual amount US\$6.42 million].

Parallel Financing

The project was also parallel financed by the following international institutions:

- European Investment Bank (EIB) [appraisal amount US\$4.73 million, actual amount US\$4.71 million]; and



- French Agency for Development (AFD) [appraisal amount US\$20.66 million, actual amount US\$20.48 million].

Client/Recipient Contribution: The PLO contribution was US\$0.5 million, same as the appraisal amount.

Dates: The project was approved on April 22, 2008. The original closing date was December 31, 2009. The closing date was cumulatively extended to June 30, 2018 by additional financings and restructurings.

- The first additional financing extended the closing date by two years from June 30, 2010 to June 30, 2012.
- The second additional financing extended the closing date by one year from June 30, 2012 to June 30, 2013.
- The first restructuring (December 24, 2013) extended the closing date of selected trust funds – TF-057109 and TF-057595 - until April 7, 2014 and December 31, 2014, respectively.
- The third restructuring (December 2017) extended the closing date to June 30, 2018.

The main reasons for the extended implementation periods related to: (i) a number of conflicts and wars in Gaza (ICR para 73 estimates they added close to 2 years of implementation) and associated needs to repair damages which added additional time; (ii) insolvency of the contractors which led to significant delays; and (iii) significant delays in the import of material (ICR para 74).

3. Relevance of Objectives

Rationale

Alignment with the country's priorities. At appraisal, the three wastewater treatment plants (WWTP) in Gaza were in very poor condition. The plant in Rafah city was essentially a collection pond with only minor treatment capability, and the poorly treated wastewater was discharged into the Mediterranean Sea. The plant serving Gaza City was 50 percent overloaded. The Beit Lahia plant in North Gaza. was heavily overloaded, functioning poorly, and not equipped with any sludge disposal facilities. Because of poorly functioning wastewater treatment plants in Gaza and Israeli restrictions prohibiting the untreated wastewater from being discharged into the sea, the untreated wastewater was seeping into the Coastal Aquifer and contaminating the groundwater, which was the major source of drinking water and exposing the population to waterborne diseases and threat of sewage floods. In response to this challenge, the Palestinian Water



Authority (PWA) had prepared a sewage master plan for Gaza, but the implementation was delayed because of a lack of financing and a deteriorating security situation (ICR, para 4). The project addressed both the urgent needs of the people of Gaza and also the long-term public health needs and environmental threats posed by improper wastewater management.

During implementation, the project objectives remained aligned with the Gaza Regional Waste Water Strategy and the Rolling Schedule of Interventions (2011), which included accelerated completion of the major WWTPs in Gaza, including the North Gaza Waste Water Treatment Plant, currently the only treatment plant in Gaza that provides the potential to generate 13 million cubic meters of reused water annually (ICR, para 37).

At closure, the project objectives were aligned with the PWAs medium-term Water Sector Strategic Development Plan (SDP, 2017–2022). The SDP focuses on improving water security by enhancing the delivery and structure (collection, treatment, and reuse) of water and wastewater services. The project objectives were also aligned with the National Water and Wastewater Strategy and Policy for Palestine 2012-2032, which aims to protect the natural water resources from pollution by wastewater (ICR, para 38).

Alignment with the Bank's strategy. The project objectives were aligned with the third pillar of the Bank's current Country Assistance Strategy (CAS) for West Bank and Gaza (FY18–21) which aimed at "addressing the needs of the vulnerable and strengthening institutions for improved citizen-centered service delivery", including water and sanitation (CAS page 21). The strategy notes that "with major water supply and sanitation infrastructure deficits and inefficiencies, water scarcity is a major concern" (CAS, para 68). Moreover, 96% of water resources are unfit for use by Gaza's 2 million inhabitants due to low levels of treatment of wastewater and sewage, that result in salinity and nitrate concentrations in aquifers that are six times higher than WHO standards for drinking water (ICR, para 39). This poses a severe threat to environmental and public health (CAS, para 71).

Rating

High

4. Achievement of Objectives (Efficacy)

Objective 1 Objective

As noted in Section 2a of this review the objectives against which this project's achievements will be assessed are (i) to mitigate the immediate gathering health and environmental safety threats to the communities surrounding the effluent lake at BLWWTP; and (ii) to provide a satisfactory long-term solution to the treatment of wastewater for the Northern Government in Gaza. The assessment of achievements below will refer to these objectives as Objective 1 and Objective 2.



Objective 1: Mitigate the health and environmental safety threats to the communities surrounding the effluent lake at Beit Lahia.

Rationale

Theory of Change. According to the theory of change presented in the ICR (Figure 1), the project objective to, mitigate the health and environmental safety threats to the communities surrounding the effluent lake at Beit Lahia was expected to be achieved through the drainage of Beit Lahia lake via effluent transfer to new infiltration basins built near the planned North Gaza Waste Water Treatment Plant (NGWWTP) site, as well as additional risk management measures (recovery wells, new storage reservoir, etc.) that were added to the project scope following the rupture of the temporary emergency infiltration basin at the Beit Lahia Waste Water Treatment Plant (BLWWTP) in 2007.

Outputs

- (i) The construction of the Terminal Pumping Station (TPS) at Beit Lahia which was equipped with five pumps (4 in operation and one in standby);
- (ii) The construction of 9 infiltration basins;
- (iii) The installation of a seven km ductile iron 800 mm diameter pressure pipeline; and
- (iv) The construction of nine new infiltration basins to support the transfer of effluent from Beit Lahia to the NGWWTP site.

These four activities were sufficient to transfer the effluent in the Beit Lahia lake to the newly constructed infiltration basins east of Jabalia and thereby prevent backflows in the sewerage system. The scheme was successfully completed in April 2009 to enable successful drainage of the effluent lake.

Plans for decommissioning of the BLWWTP as well as the rehabilitation of the effluent lake, including removing the human made embankments, as well as refilling and leveling of the site, effectively ensuring that the effluent lake cannot pose health and safety threats in the future, were completed. However, the proposed works could not be financed under the project for lack of available resources and late completion of the lake drainage (ICR, para 46).

Following the clogging of the infiltration basins in 2016 (discussed below under "outcome"), two of these were rehabilitated as pilots following a technical feasibility study in December 2017, while the remaining seven are expected to be financed by a project currently under preparation with financing from the French Development Agency (AFD). The two rehabilitated infiltration basins are functioning well and managing the current sewage inflow.



At project closure, 14 out of 28 proposed recovery wells were operational and 5 out of 10 proposed monitoring wells were operational. The remaining recovery and monitoring wells are expected to be installed under parallel AFD financing by 2023.

Outcomes

The project investment assisted in mitigating the health and environmental safety threats to the communities surrounding the effluent lake at Beit Lahia. The effluent lake at Beit Lahia was drained. An assessment of 60 households (totaling 400 beneficiaries), showed that the incidence of the water-borne diseases such as diarrhea, skin diseases and typhoid (especially among children) was reduced. On average, 64% respondents reported a reduction in the incidence of these diseases (Beit Lahia - 70 percent, Jabalia - 70 percent, Jabalia Camp - 70 percent, Beit Hanoun - 60 percent and Omm Al Nasser - 50 percent) (ICR para 50).

For the communities living in Um Al Nassir village (which is adjacent and the closest to the effluent lake), the health data from the local clinic show positive trends in the incidence of most intestinal and skin diseases, especially the most often associated with poor sanitation and environmental conditions – typhoid, diarrhea, and skin rashes (ICR para 51 and 52). The incidence of typhoid and paratyphoid fevers decreased from 44 reported cases in 2017 (when the Beit Lahia lake was full) to 25 reported cases in 2018 (when the lake was drained). During the same period, the incidence of “diarrhea and gastroenteritis of presumed infectious origin” decreased from 266 to 187, and dermatitis from 219 to 109.

The evacuation and drainage of the effluent lake at Beit Lahia was done twice, first in December 2010 and second in March 2016. In addition to the drainage of the effluent lake, which was pumped from Beit Lahia to the infiltration basins, the project additionally pumped extra volumes (25 million cubic meters) of sewage from the old Beit Lahia WWTP to the infiltration basins directly, bypassing the effluent lake. However, due to construction delays of NGWWTP and the poor treatment performance of the BLWWTP, partially treated wastewater eventually clogged the infiltration basins, forcing the Palestinian Water Authority (PWA) to resort back to using part of the effluent lake as a temporary measure in March 2016. The effluent lake was finally drained for a second time in October 2018, with an estimated 2.5 million cubic meters removed after the NGWWTP had become operational (well above the intermediate indicator target of 1.5 million cubic meters removed).

The drainage of Beit Lahia lake via effluent transfer to new infiltration basins built near the planned North Gaza Waste Water Treatment Plant as well as additional risk management measures (recovery wells, new storage reservoir, etc.) substantially reduced the incidence of water borne diseases and helped help mitigate the health and environmental safety threats to the communities surrounding the effluent lake at Beit Lahia.

Rating
Substantial



Objective 2

Objective

Provide a satisfactory long-term solution to the treatment of waste water for the Northern Government in Gaza.

Rationale

Theory of Change. According to the Theory of Change, the construction of the wastewater treatment plant and complementary sustainable practices for its operation and maintenance would provide a long-term solution to the treatment of wastewater for the Northern Government in Gaza.

Outputs

The construction of wastewater treatment plant in North Gaza.

For sustainable operations and maintenance (O&M) of the North Gaza Wastewater Treatment Plant, limited progress was made. A draft Memorandum of Understanding (MOU) defining the roles and responsibilities of key stakeholders was prepared. However, by project closure, the MOU had not been signed. Regarding tariff collection arrangements, the ICR reports that the discussion is still ongoing (ICR para 60).

To build the capacity of the Coastal Municipalities Water Utility (CMWU), a ten-month training program was carried out by the international joint venture contractor (see section 7).

Outcomes

With the completion and operation of the North Gaza Wastewater Treatment Plant, the project investments provided a long-term solution for the treatment of wastewater in Gaza. The target of “quantities of waste water treated and appropriately disposed of” was substantially achieved. By 2018, 33,000 cubic meters/day of waste water was being treated compared to the original target of 35,000 cubic meters/day and revised target of 25,000 cubic meters/day (ICR, page 37).

The waste water is being collected and treated in compliance with the Palestinian Environmental Standards for biological parameters of treated wastewater and is fit for aquifer recharge and unrestricted reuse (ICR, para 56). The target for the indicator “less than 5% increase in salinity and nitrate levels at monitoring wells within project site compared to before commissioning the plant” was achieved (ICR, Annex 1, A1). As per September 2018 groundwater quality sampling results, the levels of nitrates were between 33 and 60 mg/L for the 13 regularly monitored wells. However, elevated nitrates levels (> 200 mg/l) were witnessed in two wells.



Regarding the sustained funding of O&M for the North Gaza Waste Water Treatment Plant, the Ministry of Finance has committed to finance the O&M for the full two-year period (up to end of February 2020). In the meantime, it will continue the dialogue with the Coastal Municipalities Water Utility (CMWU) and the municipalities to determine the post-2020 O&M financing arrangements (see section 7 for details).

Rating
Substantial

Rationale

The project has fully constructed and implemented a scheme which included the Terminal Pumping Station (TPS), infiltration basins, and a seven km ductile iron pressure pipeline to support the transfer of effluent from Beit Lahia to the NGWWTP site to prevent backflows in the sewerage system. The NGWWTP is fully operational. Project activities ensured that the surrounding communities were at no further risk of sewage flooding (and its associated casualties, detrimental health impacts and economic damage) and environmental safety threats.

Overall Efficacy Rating
Substantial

5. Efficiency

Economic Analysis. The project was prepared under the Bank's emergency recovery assistance procedures (OP 8.50) and detailed financial and economic analysis were not required or carried out at appraisal due to limited time and non-availability of economic data (PAD, para 64). The PAD refers to an analysis carried out by SIDA using the Mekorot (Israeli Water Utility) water price and seawater desalination costs. That investment yielded an estimated economic rate of return of 8.7%. No additional information is provided in PAD on how this was calculated. The Bank project team sought additional information from SIDA but none was provided.

During additional financing, economic analysis was also not carried out because, in line with Bank guidelines, it was not required because this operation was aimed at emergency recovery.

At completion, a cost benefit analysis was carried out. Estimated benefits included: (i) the North Gaza Wastewater Treatment Plant O&M cost savings; (ii) the environmental benefits of reducing Biochemical Oxygen Demand (used as an indicator of the degree of organic pollution), and; (iii) the annual expected damage (AED) of further sewage flood events. Regarding the first assumption, the Bank project team explained to IEG that "the alternative scenario in the case the North Gaza Emergency Sewage Treatment



(NGEST) Project does not happen is to outsource the treatment of waste water of 30,000 cubic meters/day to a plant in Israel, which is more costly (US\$ 0.46 per cubic meters) than treating in the NGEST plant (US\$ 0.21 per cubic meters). This gap is counted as O&M cost savings of the project". Moreover, "even when the waste water is treated in the Israeli plant, there were some areas that had not been covered with existing sewerage network before NGEST Project, which results in discharge of polluted waste water to the Mediterranean Sea. The non-market environmental benefit derived from avoided discharge of waste water was calculated using shadow price estimation method". The sensitivity analysis included a 1 in 10-year flood event. According to the ICR (footnote 34), the 'Low scenario' assumes the number of partially destroyed houses as 387 (cited in Jerusalem Post) while the 'High scenario' Sc. 2 assumes affected people as 50,000 and assuming an average of 5.6 people per household indicates a partial destruction as 8,929 houses (the number cited from NY Times). The ERR ranged from 3.3% to 10.6%. The point value was estimated at 7.8% and the net present values (NPV) was US\$9.5 million.

A cost savings analysis with and without the project was also carried out. As noted above, the "with" project scenario included processing the waste water through the North Gaza Waste Water Treatment Plant which generated the benefits enumerated above. The "without" project scenario included the waste water treatment by Israel using the latest Israeli waste water treatment tariff of 1.71 ILS/cubic meter. Both scenarios include the capital expenditures (CAPEX) related to the effluent transfer infrastructure. This resulted a net ERR of 1.3% compared with the counterfactual and a negative NPV of US\$6.6 million using a discount rate of 6%. The "net ERR" of 1.3% obviously indicates a very low impact of the project compared with the cost of waste water treatment by a plant in Israel. A negative "net NPV" is probably caused by the 6% discount rate chosen although this rate is not justified in the ICR.

Cost overruns. The project experienced a cost overrun in 2017 prices of US\$23 million. This was because of: (i) three major outbreaks of severe hostilities; (ii) direct damage to the project due to 2014 war was estimated around US\$1 million; (iii) import restrictions; (iv) exchange rate fluctuations; (v) global increases in energy prices; and (vi) need to redesign some parts of the North Gaza Waste Water Treatment Plant (ICR, paras 73, 90, and 108)

Procurement delays. As discussed in section 10 b, there were procurement delays due to conflict in Gaza and restrictions imposed by Israel on the import of cement and other raw materials. The delays slowed down the completion of the project quite severely.

Time overruns. Throughout project implementation, the conflict situation in Gaza persisted with periods of war (a month- long war in 2008-09; one-week war in 2012; and two-month war in 2014), instances of shootings and security threats to the project. There were several instances when contractors and staff had to be evacuated and therefore stopped work. The ICR estimates that the conflict added around 22 months to the project implementation period (including the time to remobilize contractors and to repair damage due to conflict and wars) (ICR, para 73).

Though delays caused by conflicts, war and import restrictions were not project inefficiencies, they did contribute to the significant cost overrun of US\$23 million and resulted in time overruns.



Financial Viability of NGWWTP. The ICR reports (Annex 4, para 16) that during the first five years of the operation of the plant, is estimated to incur a deficit of US\$9.5 million. This was because CMWU did not have the capacity to efficiently operate and maintain the plant and no financial resources to sustain the O&M costs had been identified.

Overall, project's efficiency is rated modest due to a low estimated rate of return and significant time and cost overruns. In addition, for the first five years, the newly constructed North Gaza Waste Water Treatment Plant is not expected to be financially viable.

Efficiency Rating

Modest

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	8.70	0 <input checked="" type="checkbox"/> Not Applicable
ICR Estimate	✓	7.80	80.00 <input type="checkbox"/> Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

The project's development objectives were highly relevant to country priorities and Bank's strategy for West Bank and Gaza. The achievement of the project's objectives was substantial. First, by draining the effluent lake, the project assisted in mitigating the health and environmental safety threats to the communities surrounding the effluent lake at Beit Lahia. Second, through the construction of the North Gaza Waste Water Treatment Plant, the project the project investments provided a long-term solution for the treatment of waste water in North Gaza. Project efficiency, however, is rated modest due to a relatively low economic rate of return as well as significant time and cost overruns, and for the first five years the newly constructed NGWWTP is not expected to be financially viable with a likely total deficit of US\$9.5 million.

Overall the project had moderate shortcomings and its outcome is therefore rated moderately satisfactory.

a. Outcome Rating

Moderately Satisfactory



7. Risk to Development Outcome

Political Risk: The conflict situation in Gaza and Israeli restrictions pose substantial risks to the sustainability of development outcomes. The conflicts hinder progress in institutional and capacity building and may reverse the progress made under the project.

Financial Risk: The Ministry of Finance (MoF) has committed to finance the operation of the waste water treatment plant for the next two years (until 2020). However, the continued operation of the plant would require sustained commitment from the MoF, Palestinian Water Authority as well as the Palestinian Authority. Moreover, financial resources to cover the O&M costs through a full cost recovery are insufficient. Therefore, the financial risk is substantial.

Operations and Maintenance (O&M) Capacity Risk: Since 2009, the Coastal Municipalities Water Utility (CMWU) has been adequately supervising the O&M of the infiltration basins along with other components of Part A of the project, i.e. the Terminal Pumping Station and the pressure pipeline, with financial contributions from relevant municipalities and support from the Palestinian Water Authority (ICR para 45). CMWU is expected to take over the O&M from the international joint venture contractor at the end of February 2020. The O&M agreement signed between the Palestinian Water Authority and the contractor provides for the training of the CMWU staff for a period of six months. By comparison, the ICR mentions 10 months of training but the information provided to IEG by the Bank task team is that the training period will be for six months without any negative repercussions. The O&M capacity risk is modest.

8. Assessment of Bank Performance

a. Quality-at-Entry

The project preparation was based on the lessons learned from previous emergency operations in the West Bank and Gaza. The lessons related to decentralization of project preparation and implementation, when central systems are unable to function effectively because of the security situation. Another lesson was to include realistic contingency plans to deal with various crises (Technical, Annex para 58). However, despite a realistic contingency plan, two additional financings were needed to cover financial gaps due to conflict.

The implementation arrangements envisaged at appraisal were satisfactory. The PMU, with the core team of a Project Director, two engineers, two supervisors, one administrative assistant and one financial accountant, were responsible for the day to day implementation of the Project. The core team would be supplemented with consultants (Technical Annex para 60).

There were some weaknesses in M&E design (see section 9).



At appraisal, the risks identification was satisfactory. The main risk was security due to the conflict situation in Gaza. The associated implementation risks were access of materials and contractors to the project sites, and movement of PMU staff into and out of Gaza. The other risks identified were: (i) sudden and catastrophic failure of the lake embankment, and (ii) delays in implementation due to financing issues. However, two risks were not anticipated. These were the length of the project's implementation period (including several additional financing and restructurings) was not anticipated, and the insolvency of the international joint venture contractor.

Quality-at-Entry Rating

Moderately Satisfactory

b. Quality of supervision

The Bank team implemented the project in very difficult circumstances – wars and conflict situation. The ICR records that the Bank team administered a number of trust funds and spearheaded donor coordination over the long implementation period which spanned 14 years. The Bank team was flexible and arranged for crucial additional financing when needed. The Bank team also liaised with the Government of Israel to permit the material and equipment for the construction of the North Gaza Waste Water Plant to enter Gaza (ICR, para 110).

Nevertheless, while IEG recognizes the challenges involved in the supervision of the project over 14 years, there were some shortcomings in supervision. In IEG's view the Bank's project task team was lax in not formally resolving the discrepancy between the PDO statements in the Trust Fund Grant Agreement and in the Memorandum of the President and then using the two-part PDO in the Memorandum of the President in all the Project Papers to the Board for the AFs and project restructurings as though it was the formally agreed PDO. In addition, performance indicators could also have been revised earlier to better align with planned outcomes that could realistically be attributed to and measured under the project.

Quality of Supervision Rating

Satisfactory

Overall Bank Performance Rating

Moderately Satisfactory

9. M&E Design, Implementation, & Utilization



a. M&E Design

M&E design had major weaknesses. The project's results framework included mostly output indicators such as "effluent lake is drained" and "increase in quantity of wastewater treated and appropriately disposed of". The outcome indicator "positive incidence on local population observed at local clinics" to measure the first PDO was not fully attributable to the project and was difficult to measure. On the other hand the outcome indicator "improvement of the ground water quality in terms of salinity and nitrates contamination" was appropriate to assess the achievement of the second PDO, but no baseline and targets for this indicator were set at appraisal.

b. M&E Implementation

During implementation the results framework was revised. The indicator "positive incidence on local population observed at local clinics" was dropped as it was not practical to measure the incidence of diarrhea at local clinics and then attribute any change directly to project outputs" (ICR page 12). The target for the increase in quantities of wastewater treated and properly disposed of was decreased from 35,000 cubic meters to 25,000 cubic meters. The measurement of the indicator "improvement of ground water quality in terms of salinity and nitrates contamination" was clarified to mean that the project was not expected to improve groundwater quality, but to prevent further deterioration .

To measure the long term sustainability of the project, two indicators were added: (i) Maintenance and operational costs of the NGWWTP fully financed by the Coastal Municipality Water Utility (CMWU), Ministry of Local Government and Municipalities (target: Yes); (ii) CMWU manages plant so that effluent standards are met at all times (target: Yes).

The ICR reports (para 99) that M&E implementation was the responsibility of the PMU. The PMU hired consultants to consolidate the M& E data received from the PWA. As mentioned above, the data for the "positive incidence on local population observed at local clinics" were difficult to collect. An assessment of project benefits through a survey of 60 households (covering 400 beneficiaries) was conducted through group discussion. This was complemented by observations and secondary data collection from previously completed assessments by Water, Sanitation and Hygiene (WASH) stakeholders and monitoring groups (ICR, para 50). Data on the incidence of typhoid, diarrhea, and skin rashes were also collected from a local clinic of the Um Al Nassir village before and after the effluent lake was drained.

Quarterly monitoring reports were prepared by the PMU and, according to the ICR. their quality was satisfactory. The methodology used for analyzing the data was sound (para 99).

c. M&E Utilization



The ICR advised that data collected from the groundwater quality monitoring was used to modify the location of recovery wells in order to control the pollution movement towards the water supply wells. Moreover, the data on the effluent lake level and the infiltration basins were used for designing temporary disposal ponds, as a flood prevention measure (para 100). On the other hand, the M&E system was not helpful in providing comprehensive information on the health and environmental benefits from the project.

M&E Quality Rating

Modest

10. Other Issues

a. Safeguards

The project was classified as Environmental Assessment Category "A" because of the potential negative environmental impacts associated with the construction of the North Gaza Waste Water Treatment Plant (NGWWTP), the effluent recharge, and the re-use of sludge. In the short-term, the main negative impact of the project was the potential degradation of ground water quality from the drainage of the effluent lake before the completion of the NGWWTP. However, in the long-term, the project was expected to have a strong positive effect on the environment by protecting the groundwater from contamination of poorly treated wastewater. The other anticipated impacts were the elimination of potential flooding from the effluent lake at Beit Lahia on adjacent lands and the reuse of the sludge generated by NGWWTP.

At the time of approval, the Environmental Assessment (EA) study was being carried out on a fast-track basis. This was in accordance with the OP 8.0 as the project was an emergency operation. The Middle East and North Africa Regional Vice-president had requested for an exemption to allow the disclosure of the draft EA report shortly after the Board presentation (MOP paras 27). The ICR reports that Environmental Impact Assessment (EIA) was disclosed by the Palestinian Water Authority (PWA). The first EIA study "Improvements to Beit Lahia and Associated Developments", was financed from SIDA funds in 1999. The second EIA study "Proposed New Wastewater Treatment Works" covered (i) the NGWWTP (ii) the sewage transfer from the existing BLWWTP to the new NGWWTP site (iii) the activities associated with the decommissioning of BLWWTP, financed from SIDA funds, 1999. The full EA (safeguards category A) including EMP for the NGEST Project, was financed by the Bank in 2006. The Bank's project team informed IEG that the first EIA was disclosed in Feb 2006 and the updated EIA in April 2013.

No other safeguards were triggered.

The ICR reports (para 31) that not all measures of the environmental management plan were fully achieved. For example, as noted already, only 14 out of the 28 recovery wells were constructed, thus some residual safety and environmental risks remain in place until those measures are fully completed. They are being financed by AFD and scheduled to be finalized in 2023. The rating of safeguards performance in the ISRs ranged from "moderately satisfactory" to "Moderately unsatisfactory" during the implementation period. The Bank project team explained to IEG that "what remains to be completed is the decommissioning of the old



BLWWTP and the remedial works on the effluent lake site, which were not completed due to time and funding limitations. A detailed study was carried out in consultation with key stakeholders that included social and environmental measures, preparation of the design and tender documents. Carrying out of these works is pending the availability of funding”

b. Fiduciary Compliance

The Financial Management: The ICR reports (para 106) that the financial performance rating was satisfactory. The project complied with the Bank’s financial management guidelines including budgeting, internal controls, financial reporting, staffing, and auditing. Audit reports and Interim Financial Reports (IFRs) were submitted to the Bank on time and with only minor issues. The Bank project team informed IEG that external audits of project accounts were conducted and were unqualified.

PWA had had a budget and disbursement plan which was broken down by donor and funding sources, and this plan was updated regularly. However, because of currency exchange variations, the last audit report had over US\$200,000 in exchange rate losses. The project team informed IEG that “these are reporting variances as the reporting currency was in USD, but some trust funds were in GBP or Euro. Any receipts in GBP or Euro were exchanged as of the date of receipt into USD and payments were made in USD. This was a reporting loss to the project”.

Procurement: The ICR reports (para 105) that the project procurement was in accordance with the Bank’s Procurement Guidelines, January 2011, revised July 2014. The procurement contracts for the large civil works as well as their subsequent amendments were subjected to the Bank’s Prior reviews. In addition, the Bank carried out five ex-post procurement reviews over the lifetime of the project. There was no major noncompliance.

There were, however, some procurement challenges:

- The Project Director was responsible not only for the project contract management decision-making but also other projects in the water sector in Gaza. This overload led to procurement delays.
- Finalizing the contract with a qualified international joint venture took almost two years. This was partly because the context of Gaza make it less attractive for qualified bidders (ICR para 96).
- There were procurement delays due to conflicts in Gaza that led to prolonged period of inaction.
- Sometimes, contract dates had to go through multiple amendments to extend completion dates. This was due to the lengthy clearances required for imported items.



c. Unintended impacts (Positive or Negative)

d. Other

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Moderately Satisfactory	Moderately Satisfactory	---
Bank Performance	Moderately Satisfactory	Moderately Satisfactory	---
Quality of M&E	Modest	Modest	---
Quality of ICR		Substantial	---

12. Lessons

Several lessons have been selected from the ICR as relevant to other similar operations in the World Bank with some adaptation of the language (ICR paras 117 to 123):

- **Designated financial resources for the operation and maintenance of crucial social infrastructure in poor fragile, conflict and violence (FCV) affected countries can ensure the sustainability of crucial infrastructure.** Operation, maintenance, and replacement costs of critical social infrastructure facilities such as sewage systems in poor FCV affected countries are typically not affordable by the public sector because payments for services by beneficiaries, even if made, are generally inadequate to sustain the costs of running such infrastructure. In this project the North Gaza Waste Water Treatment Plant (NGWWTP), constructed as part of the project, is expected to accumulate a deficit of US\$9.5 million during the first five years of its operation. Unless funds are available to cover these costs the inevitable outcome will be deterioration of the NGWWTP and ultimately complete costly reconstruction or rehabilitation.
- **In situations where electricity supplies based on fossil fuels to operate infrastructure are unreliable, alternate renewable energy sources are usually available.** This project's experience shows that in Gaza, where energy is a particular challenge, the NGWWTP will be operated in future using alternate renewable energy sources such as on-site solar panels.



- **When strong donor coordination is established at the start of a project it provides mutual reinforcement of effort.** For a project with a multitude of donors, an effective division of labor between donors at various stages can benefit the project. Co-financing and parallel financing arrangements with the various technical and financial partners in this project provided a level of flexibility in the preparation, initiation and prioritization of critical activities. This project provided a specific example in the reuse of the treated waste water for irrigation available from the operation of the NGWWTP which will be financed by the Agence de Developpement (AFD).

13. Assessment Recommended?

No

14. Comments on Quality of ICR

The ICR is comprehensive and provides a good overview of the implementation challenges. It follows OPCS guidelines and is results oriented and provides some useful lessons. The efficiency analysis was comprehensive, but the ICR provided no justification for the 6% discount rate used in the economic analysis.

The ICR also did not discuss why an interim ICR was not prepared for this project, as per Bank guidelines, for projects undergoing implementation for more than 10 years. This review notes that the rationale for not preparing an interim ICR (stipulated in World Bank BP10.00, para 5) was mentioned in the Project Paper (paragraph 55) for the third Additional Financing namely that, if closing date extensions and additional financing are solely for cost overruns, Management can decide to have a single ICR prepared at project completion. The Country Director decided that this project met the requirements for a single ICR.

Overall, the quality of the ICR is substantial.

a. Quality of ICR Rating

Substantial