



## 1. Project Data

|  |   |   |
|--|---|---|
| <b>Project ID</b><br>P117745                   | <b>Project Name</b><br>EG-Farm-level Irrigation Modernization |   |
| <b>Country</b><br>Egypt, Arab Republic of      | <b>Practice Area(Lead)</b><br>Water                           |   |
| <b>L/C/TF Number(s)</b><br>IBRD-79840,TF-13794 | <b>Closing Date (Original)</b><br>30-Jun-2016                 | <b>Total Project Cost (USD)</b><br>100,000,000.00 |
| <b>Bank Approval Date</b><br>14-Dec-2010       | <b>Closing Date (Actual)</b><br>31-Dec-2017                   |   |
|  | <b>IBRD/IDA (USD)</b>   | <b>Grants (USD)</b>                               |
| Original Commitment                            | 100,000,000.00  | 3,875,410.00                                      |
| Revised Commitment                             | 100,000,000.00  | 0.00  |
| Actual   | 100,000,000.00  | 0.00  |

|  |   |   |                                |
|--|---|---|--------------------------------|
| <b>Prepared by</b><br>Ranga Rajan<br>Krishnamani | <b>Reviewed by</b><br>April B. Connelly | <b>ICR Review Coordinator</b><br>Christopher David Nelson | <b>Group</b><br>IEGSD (Unit 4) |
|--|---|---|--------------------------------|

## 2. Project Objectives and Components

### a. Objectives

The original Project Development Objectives (PDOs) as stated in the Loan Agreement (Schedule 1, page 5) and the Project Appraisal Document (PAD, page 4) were:

**"To increase agricultural profitability and improve equity in access to higher-quality water for small-scale farmers in the command areas of Mahmoudia, Manaifa and Meet Yazid located in the Nile Delta."**



The original PDO is assessed in terms of the two objectives. (1) To increase agricultural profitability through access to higher-quality water for small scale farmers in the command areas of Mahmoudia, Manaifa and Meet Yazid located in the Nile Delta. and, (2) To improve equity in access to higher-quality water for small-scale farmers in the command areas of Mahmoudia, Manaifa and Meet Yazid located in the Nile Delta.

The revised PDO as stated in the restructuring paper was:

**"To increase access to improved irrigation systems in the project areas of Mahmoudia, Manaifa and Meet Yazid located in the Nile Delta, in an equitable manner".**

**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**

21-Jun-2016

**c. Will a split evaluation be undertaken?**

Yes

**d. Components**

There were two components (PAD, pages 5-6).

**One. Marwa and Farm-Level Irrigation Improvements.** Appraisal estimate US\$139.30 million. Actual cost US\$139.30 million. This component supported Marwa (Quaternary farm-level ditches) and farm level modernization activities on 200,000 feddans (a unit of land area) in three irrigation command areas in the old lands in Nile Delta (Mahmoudia, Manaifa and Meet Yazid). Activities included: (1) Marwa and off-farm improvements comprising transformation of open marwa canals to low -pressure distribution systems and upgrading mesqa (tertiary channels that receive water from branch canals) pump stations: (2) changing about 75% of the pump stations from diesel to electric pumps and installing dedicated rural electric-power grids: (3) farm level improvements (such as, laser land-levelling, deep ploughing, gypsum application, reshaping field drains and flexible hose systems): (4) capacity building for use and maintenance of mesqa and marwa-level works and land improvement activities: and, (5) conducting field surveys.

**Two. Farm-level Technology Modernization.** Appraisal estimate US\$14.10 million. Actual cost US\$14.10 million. This component aimed at enhancing farmer knowledge of improved irrigation, associated land improvement and crop production technologies. Activities included:(1) Increasing farmer awareness of marwa improvements: (2) demonstrations of improved marwa and farm-level irrigation systems, on-farm water management and associated land improvement and agronomic practices for field and horticultural crops: (3) training lead farmers and extension staff in irrigation management and associated



practices: (4) improving extension delivery through mass media broadcasting, increasing outreach of the Ministry of Agriculture and Land Reclamation's (MALR) interactive web-based extension information networks: (5) providing support for implementation, Monitoring and Evaluation (M&E) activities and environmental monitoring.

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

**Project cost.** Appraisal estimate US\$183.87 million. Actual cost at closure on December 31, 2017, US\$156.60 million. Actual project cost on June 30, 2018, US\$173.70 (96.5% of the appraisal estimate). According to the information provided by the team, the difference between the actual project cost and the appraisal estimate was due to exchange rate changes during implementation.

**Project financing.** The project was financed by an IBRD loan. Appraisal estimate US\$100.00 million. Amount disbursed US\$100.00 million. There was parallel financing from the French Development Agency (AFD in French). Appraisal estimate US\$50.00 million. Actual financing from AFD at closure US\$42.00 million. According to the information provided by the team, the difference between the actual financing and appraisal estimate was due to exchange rate changes during implementation.

**Borrower contribution.** Appraisal estimate US\$30.00 million. Their contribution at closure US\$14.60 million. The ICR provides no information on why the contribution by the borrower was lower than planned at appraisal.

**Dates.** The project was approved on December 14, 2010, made effective on July 10, 2012 and scheduled for completion on June 30, 2016.

These changes were made through a Level 1 restructuring on June 21, 2016. (1) The original PDO was revised. The original PDO of increasing agricultural profitability was unrealistic, with respect to the project timelines. The original PDO focused on the long-term impact of the project. While the project activities were expected to lay the foundation for the long-term goal, these goals could only be achieved after project closing, when the civil and electricity works were complete and the farmers adopted the new techniques based on the observation of the "lead farmers". (2) The targets for activities associated introducing modern irrigation technologies was scaled down, as the shift to both technology and crop type depended on factors external to the project (such as farmer attitudes, local financing for irrigation equipment and access to markets): (3) "Force account" mechanism (an approach which entails financing administering community-based construction activities was replaced with an approach of clustered medium-scale contracts by commercial contractors, in view of the limited capacity within the Ministry of Agriculture (MALR) and the Project Management Unit to administer small contracts: (5) Involuntary Resettlement Safeguards was triggered (discussed in section 10a). (5) The closing date was extended by 18 months for completing ongoing activities which had been subject to delays associated with implementing the "force account" approach.



The second Level 2 restructuring on May 31, 2017 was intended to address the effects of the depreciation of the Egyptian Pound (LE) relative to the US\$. The depreciation increased the cost of inputs and slowed progress on physical works, as contractors could no longer cover their costs. The restructuring allowed the IBRD to increase its share of financing from 60% to 90% for physical works and from 60% to 100% for consulting services. This change enabled the French Development Agency (AFD) to cover the cost of variation orders on affected contracts (which the Bank was not authorized to make, as the Bank financing for the project did not include contingency provisions for price changes). The project closed on December 31, 2017.

**Restructuring and Split rating.** This assessment is based on a split rating of achievements under the original and revised objectives, weighted by disbursement of 38% before restructuring when the PDO was revised and 62% after restructuring.

### 3. Relevance of Objectives

#### Rationale

**Original Objective.** The PDOs were relevant to the government strategy. The agricultural sector remained vital for raising rural incomes as this sector provided employment for about 30% of the workforce. In the years before appraisal, agricultural productivity remained below potential. The issues facing the agricultural sector included: (1) water scarcity (limited freshwater resources and increasing demand for water resources due to population growth, agricultural expansion and industrial development); (2) food security (about 40% of Egypt's food requirements met through imports); and, (3) climate change factors (climate change models projected an increasing probability of severe weather events that would increase volatility and decrease production of key crops). The six objectives of the Government's *Sustainable Development Strategy: Egypt's Vision 2030 and Planning Reform* were: (i) Sustainable use of natural agricultural resources: (ii) increasing productivity of land and water units: (iii) increasing food security: (iv) increasing competitiveness of agricultural products in domestic and international markets: (v) improving the climate for agricultural investment: and, (vi) improving the living standards of rural inhabitants and reducing rural poverty. In the irrigation sector, the strategy aimed at developing a national irrigation modernization program aimed at improving the efficiency of water conveyance and distribution systems and on-farm irrigation systems.

The PDOs were well-aligned with the Bank strategy for Egypt. The Country Assistance Strategy (CAS) for the 2006-2011 period highlighted the need for improving the management and efficiency of water and land resources. The Interim Strategy Note (ISN) for the 2012-2014 period identified the need for developing coherent policies in water supply through local participation. The Bank's current Country Partnership Framework (CPF) for the 2015-2019 period underscored the need for increasing agricultural productivity and off-farm employment through policy reforms, better connective infrastructure, efficient water allocation systems and improving agricultural and agro-industrial logistics. The second focus area of the CPF



identified the need for "improving opportunities for private sector job creation" through "enhancing access to improved agricultural and irrigation services." (CPF page 53).

However, there were important shortcomings. The original PDO, of increasing agricultural profitability focused on the long-term project impact and was unrealistic in terms of the project timelines and insufficiently aligned with the project components. The PDO's theory of change was a leap of faith and the strategic articulation of how the two parts of the project work together was unfounded. While the project activities were expected to lay the foundation for the long-term goals, these goals could only be achieved after project closing as farmers gradually adopted the new techniques based on the observation of gain by the "lead farmers". (Restructuring paper, page 5).

**Revised Objective.** The revised objective dropped the PDO associated with increasing agricultural profitability and focused on increasing access to improved irrigation systems in an equitable manner in the project area. The revised objective remained consistent with the strategies noted above but was more realistic in terms of what could be achieved within the lifetime of the project.. However, under the revised PDO, the link between the improvement in irrigation is insufficiently outlined against the intended impact. Thus, the progress from one to the other was divorced from the true intentions of the project.

Given these shortcomings, relevance of objectives is rated Substantial.

### Rating

Substantial

## 4. Achievement of Objectives (Efficacy)

### Objective 1 Objective

To increase agricultural profitability in the command areas of Mahmoudia, Manaifa and Meet Yazid located in the Nile Delta.

### Rationale

### Outputs.

**Theory of Change.** Structural improvements (such as marwa and off-farm marwa improvements, modernization of the marwa canals, improved infield water application, technological changes, improved management practices, changing pump stations from diesel to electric pumps and other farm-level improvements) aimed at improving marwa and farm-level irrigation. These improvements together with capacity building activities for use and maintenance of mesqa and marwa-level works and farm support services, could be expected to reduce the time and cost associated with irrigation and



thereby improve irrigation efficiency. The intended outcomes in terms of increasing agricultural profitability were however long-term goals and the long-term goals could only be achieved after project closing as farmers gradually adopted the new techniques based on the observation of gain by the "lead farmers".

### **Outputs.**

- 81,816 feddans of marwa improvement works had been completed. This represented 58% of the target.
- 939 diesel pumps were rehabilitated. This represented 32% of the target.
- 1,792 electric pumps were rehabilitated. This represented 32% of the target.
- Only 36% of the pumping stations were rehabilitated due to the delays associated with securing permits and work approvals from government authorities, slow procurement and unforeseen changes in planned installations..
- Higher value horticultural crops were planted in 1218 feddans (512 Ha) at closure as compared to the revised target of 100. The shift to high-value horticultural crops could not be attributed to the project, given that promoting a shift to high-value horticultural crops, required completion of the marwa modernization first and needed much longer timelines than the project period (ICR, page 11).

### **Outcomes.**

- Based on the data on annual yield measurements in 2015, 2016 and 2017, agricultural output (in Egyptian Pound (LE) per feddan) from the main irrigated crops increased by 30.9% in the project areas. This exceeded the original target of 10%.
- According to a beneficiary survey conducted at project closure (discussed in detail below), 368 farmers reported a decrease in irrigation time and 131 farmers reported increase in crop yields.

The irrigation activities were completed in a limited project area (about a third of the diesel pumps, electric pumps and pumping stations were rehabilitated and 58% of the marwa improvement works, were completed in the project area). Although the outcome pertaining to increase in agricultural output was realized, this outcome could not be attributed to the project, given that project activities only aimed at improving irrigation facilities and as the ICR (page 11) acknowledges, improving agricultural profitability depended on factors outside the scope of this project (such as farmers' access to finance and final markets).

**Rating**  
Modest

### **Objective 1 Revision 1**



### Revised Objective

This objective was dropped.

### Revised Rationale

### Revised Rating

Not Rated/Not Applicable

## Objective 2 Objective

To improve equity in access to higher-quality water for small-scale farmers in the command areas of Mahmoudia, Manaifa and Meet Yazid located in the Nile Delta.

### Rationale

### Outputs.

**Theory of change.** Activities such as Marwa and farm level irrigation improvements and farm level technology modernization activities discussed above aimed at farm-level modernization in the project area. Activities such as modernized marwa hydraulic systems (pipelines or lined-canals) combined with improved operational procedures (systematic rotations), specifically aimed at reducing the disparities in access to higher-quality water between the top-end users and the tail-end users. These activities could be expected to contribute to equity in access to higher-quality water for small-scale farmers in the project area.

***Marwa and Farm-Level Irrigation Improvements*** (ICR, pages 39).

- Marwa (including modernizing marwa hydraulic systems with pipelines or lined canals) and farm level irrigation improvements were completed as targeted.
- A total area of 65252 Hectares (Ha) of irrigation infrastructure was modernized at closure, as compared to the target of 80000 Ha.
- The electric grid was installed and diesel pumps were replaced with electric pumps on tertiary (mesqua) canals.
- 155300 electric pumps were installed at project closure. This exceeded both the original and revised targets of 130000 and 155300 respectively.



***Farm Level Technology Modernization (ICR, page 34- 36 and 39).***

- 7534 farmers were trained on aspects of pump operations (including pump activation, operational butterfly valve-settings and electric and diesel-motor maintenance), as compared to the target of 7500 farmers.
- 15 technologies were demonstrated in the project areas as targeted. The technologies were demonstrated in the areas of : (i) community composting: (ii) silage: (iii) fodder from rice straw: (iv) on-farm irrigation improvements by buried pipe: (v) on-farm irrigation improvements by lined Marwas: (vi) use of an electronic complaint system: (vii) regular transplant of rice by rope: (viii) system of rice intensification: (ix) land laser-levelling: (x) deep ploughing: (xi) adding gypsum to soil: (xii) use of different rice varieties in Farmer-Field Schools (FFS): (xiii) use of card payment for electricity supply: (xiv) raised beds: and (xv) modern irrigation for horticulture in old Land.
- Higher value horticultural crops were planted in 1218 feddans (512 Ha) at closure as compared to the revised target of 100.
- A monitoring and evaluation system was established at closure.

***Outcomes.***

- 197663 water users (including landowners and tenant farmers) had access to improved irrigation and drainage services at project closure. This represented a 41% increase relative to the target of 140000 water users. Gender-disaggregated data obtained from sample survey undertaken by extension focal point officers, showed that 15.813 female water users had access to improved irrigation and drainage services at project closure. This represented a 13% increase relative to the target of 14,000 female water users.
- Results of measurement made on sampled marwas showed that tail enders (who often suffered from water shortages and had to rely on pumping poor quality drain water) received on average 85% of the water flow as compared to 50% at the baseline. This exceeded the target of 75%.
- Farmers' costs for pumping water into mesquas (as a result of switch from diesel to electric pumps), decreased by 46% at project closure. This exceeded the target of 30%. The time required for field-level irrigation activities reduced by 37% as compared to the target of 20%.
- The re-use of drainage water by farmers, especially those at the tail end of the quaternary canals reduced by 95%, as compared to the target of 50%.

A beneficiary survey was conducted at project closure on a sample of 561 beneficiaries to assess their experience with the project, at project closure. The main conclusions of the survey were as follows: (1) 85% of the respondents reported satisfaction with the agricultural services, as compared to the target of 70%. (2) 45.8% of the sample reported that they received information about the project from agricultural associations/cooperatives and extension workers. (3) 1,233 complaints were received by the grievance



mechanism established for solving project-related complaints relating to technical issues (such as, damages to hydrants, pipelines and machines) and issues relating to compensation. Of these, 1,201 complaints were resolved: (3) 74% of the respondents were satisfied with the rehabilitation of irrigation and 51% from the electrification of irrigation machines: (4) 368 farmers reported a decrease in irrigation time. and, (5) 131 farmers reported increase in crop yields.

Given that the outcomes were exceeded in all cases and given that tail enders received greater water flow at project closure than as compared to the baseline, it is reasonable to conclude that the project significantly contributed to the PDO of improving equity in access to higher-quality water for small-scale farmers in the project area.

**Rating**  
Substantial

### **Objective 2 Revision 1** **Revised Objective**

This objective was not revised.

### **Revised Rationale**

#### **Outputs.**

- The outputs discussed above were also relevant to this objective.

#### **Outcomes.**

- The outcomes discussed above were relevant to this objective.

**Revised Rating**  
Substantial

### **Rationale**

The objective of improving agricultural profitability were long-term goals and these goals could only be achieved after project closing as farmers gradually adopted the new techniques based on the observation of gains by the "lead farmers". Efficacy before restructuring is, therefore, rated as Modest. The outcomes for the objective of improving equity in access to higher-quality water for small-scale farmers in the project area were realized or exceeded during the lifetime of the project. Efficacy after restructuring is rated as Substantial.



## Overall Efficacy Rating

Substantial

### 5. Efficiency

**Economic Analysis.** A cost-benefit analysis was conducted at appraisal and at closure for activities associated with farm level irrigation improvements. This component accounted for about 76% of the costs at the appraisal estimate and 90% of the actual costs. The quantitative benefits of the project were assumed to come from the gains to participating farmers due to increased value of production and reduction in irrigation costs. The Net Present Value (NPV) at 10% discount rate at closure was 2.29 Egyptian Pound (EGP), as compared to the NPV of 1.15 EGP billion at appraisal. The ex post Economic Internal Rate of Return (EIRR) at 22% was a high rate of return, even though it was lower than the ex ante EIRR of 29%, due to the implementation delays. Other benefits from the project not factored into the economic analysis included public benefits (such as due to water savings from improved irrigation that could be diverted to other uses), environmental benefits (due to the reduction of Green House Gas (GHG) emissions) and improved health of residents in the project areas (due to reduced exposure to noxious fumes from diesel pumps).

An economic analysis was conducted at appraisal comparing the incremental cost and benefits associated with switching from diesel to electric mesqa pumps (PAD, pages 11-12). The incremental benefits of electric pumps was assumed to come from energy cost savings. The other benefits not included in the economic analysis included farmer support for electric pumps (as shown by a social assessment conducted at appraisal), as it was expected to lower their operating costs. The incremental cost of installing electric pumps (including the cost of installing a dedicated rural electric power grid), was estimated at US\$41 million. The EIRR for continuing with the existing diesel pumps was 30% as compared to the EIRR of 26% for installing electric pumps. Given that non-quantifiable factors such as farmer preferences were not taken into account, the switch from diesel to electric pumps was deemed to be preferable at appraisal.

**Administrative and Operational Issues.** Project implementation experienced delays in the initial years due to the use of the "force account" approach and the weak capacity in the Ministry of Agriculture and Land Reclamation (MALR) and the Project Management Unit (PMU) to process several small contracts. This approach was eventually replaced with clustered contracts administered by commercial contractors and this change in approach contributed to the rapid increase in construction activity and project process in the latter years of the project. The lack of technical assistance activities at design also contributed to delays. This was rectified eventually with the provision of technical assistance, which contributed to the accelerated project progress in the later years. Lack of arrangements for covering price contingencies contributed to delays following the depreciation of the Egyptian Pound relative to the US\$ during implementation. This issue was eventually resolved by the supervision team and the Project Management Unit in collaboration with the French Agency for Development.



## Efficiency Rating

Substantial

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    | ✓               | 29.00           | 76.00<br><input type="checkbox"/> Not Applicable |
| ICR Estimate | ✓               | 22.00           | 90.00<br><input type="checkbox"/> Not Applicable |

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

## 6. Outcome

**Original objectives.** Although the original PDOs - to increase the agricultural profitability and to improve access to higher quality water for small-scale farmers in the command areas - were relevant to the Government and the Bank strategies, the original PDO of improving agricultural profitability was unrealistic in terms of the project timelines. The original PDO focused on the long term impact of the project. While the project activities were expected to lay the foundation for the long-term goals, these goals could only be achieved after project closing as farmers gradually adopt the new techniques based on the observation of gain by the "lead farmers". The increase in agricultural output in the project area during the life of the project was attributed more to factors exogenous to the project than to project activities. Efficacy of the objective of increasing agricultural profitability is rated as Modest. Efficiency is rated as Substantial, in view of the relatively high EIRR and the successful completion of activities. Outcome before restructuring is rated as Moderately Unsatisfactory.

**Revised objective.** The relevance of the objective to the Bank and Government remained substantial. The revised objective was realistic in terms of the project timeframe and reflected a tighter and more robust theory of change, even with minor shortcomings in its strategic link to the intended impacts. Efficacy of the revised single objective, to improve access to improved irrigation systems in the project areas in an equitable manner, is rated as Substantial, given that the intended outcomes were achieved. With substantial efficiency, the overall outcome of the revised project is rated as Satisfactory.

Taking into account the ratings discussed above and weighting by the shares of disbursements before and after restructuring ( $0.38 \times 3 + 0.62 \times 5 = 4.24$ ), the overall rating is Moderately Satisfactory.



**a. Outcome Rating**  
Moderately Satisfactory

## 7. Risk to Development Outcome

**Sustainability of electric pumps.** There is a risk pertaining to the sustainability of the modernized mesqas and Marwas, given that the government could either reduce or eliminate the subsidies for the electricity used in agriculture. This could undermine the cost savings associated with the replaced electric pumps at the mesqa level.

**Sustainability of civil works.** This risk is rated as Low, as the civil works to improve the performance of mesqa and marwa systems were not complicated and did not require high level operational skills from contractors.

**Operations and Maintenance.** Given the involvement of the marwa committees and the training provided to the representatives of the Water User Associations, the risk associated with Operational and Maintenance issues among beneficiaries in future, is likely to be low.

## 8. Assessment of Bank Performance

### a. Quality-at-Entry

The project was prepared based on the lessons from prior Bank-financed irrigation projects in Egypt (The Irrigation Improvement and Management Project and the Irrigation Improvement: Project: P073977). Lessons incorporated at design included, replacing diesel pumps with electric pumps at the mesqa level (preceded by activities of installing dedicated rural electric-power grids). Several risks were identified at appraisal including High risks associated with the poor quality of local materials and workmanship and procurement delays. Mitigation measures incorporated at design included, quality inspection of works by external agencies and training in procurement by a donor agency early in the project life. The arrangements made at appraisal for safeguards and fiduciary compliance were appropriate (discussed in section 10).

- There were several shortcomings at Quality-at-Entry. The original PDO was unrealistic, in terms of project timelines and with respect to the project activities (given that irrigation is not sufficient for improving agricultural profitability).
- The design overestimated the capacity of the the Ministry of Agriculture and Land Reclamation (MALR) and the Project Management Unit (PMU) to administer the "force account" approach. Neither the MALR nor the PMU have the capacity or the required resources for supervising multiple small



contractors. These factors contributed to delays in the first three years of implementation and eventually the approach was replaced with an approach using cluster of medium-scale contracts administered by commercial contractors.

- The design did not include provisions for price contingencies. The increase in cost of inputs due to the depreciation of the Egyptian Pound relative to the US\$ caused delays, until the issue was resolved with arrangements with the French Development Agency (AFD) (ICR, page 10).
- The design did not include Technical Assistance (TA) Activities at design aimed at providing engineering support to the PMU and these activities were incorporated three years after project implementation (ICR, page 27, paragraph 79). It is not clear if the project at Quality-at-Entry was ready for implementation, in terms of detailed design and engineering feasibility studies (ICR, page 18). Lack of these studies caused delays in implementing the civil works activities.
- There were internal limitations within the Bank at design. The project was led by the agricultural sector of the Bank working directly with their counterparts with the MALR. There was very little involvement at design from the Water Sector team, which had Irrigation and Drainage technical experts with a long history of engagement with MALR in prior Bank-financed Irrigation Projects in Egypt (ICR, page 24).
- There were shortcomings in M&E design (discussed in section 9a).

### **Quality-at-Entry Rating**

Moderately Unsatisfactory

#### **b. Quality of supervision**

According to the ICR (page 24, paragraph 68), 31 supervision missions were conducted during the project implementation period. The supervision team included specialists with expertise in engineering, irrigation, agronomy, extension and social expertise. The team made arrangements with consulting firms to provide technical support to the MALR and the PMU for making the switch from the 'force account' approach and this aided in increasing the construction activities in the latter years of project implementation (ICR, page 19). The team worked together with the French Development Agency to resolve the issue of cost increases in the wake of the depreciation of Egyptian Pound during implementation (ICR, page 10). Field visits by mission members and feedback provided by the team aided in tracking monitoring project progress and taking corrective action (Borrower's ICR, page 53). The arrangements made for compliance with the additional safeguards triggered during project restructuring were appropriate (discussed in section 10a).

- Given the delays in the initial years of project implementation, the project restructuring which took place in the fifth year of the project, should have been done earlier (ICR, page 19).
- According to the borrower (the Ministry of International Cooperation), the continuity of leadership of the Bank team was undermined the frequent changes in Task Team Leaders (TTLs), with seven TTLs over in eight years, from design to project completion (ICR page 24).



### **Quality of Supervision Rating**

Moderately Satisfactory

### **Overall Bank Performance Rating**

Moderately Satisfactory

## **9. M&E Design, Implementation, & Utilization**

### **a. M&E Design**

Of the five original M&E indicators, three indicators - a 30% reduction in irrigation operating costs in Egyptian Pound per feddan, a 50% reduction in drainage water reuse by farmers, especially those at the tail-end of quaternary canals (with reduction being measured against baseline and non-project neighboring comparison areas) and establishment of 20,000 active marwa committees - were appropriate for monitoring project performance. The intermediate indicators aimed at monitoring performance with respect to the project investments (such as the number of electric pumps installed on mesqas, reduction in farmers costs as a result of switching from diesel pumps to electric pumps and reduction in farmers' time for applying water to fields as a result of marwa modernization), were appropriate.

The two key outcome indicators - a 10% increase in agricultural output from the main-irrigated crops measured in Egyptian Pounds (LE) per feddan and a 20% reduction in difference in yields between farmers at the tail-end and head-reach of quaternary canals - were unrealistic, as increase in agricultural output and difference in yield could not be attributed to project activities in the irrigation sector.

### **b. M&E Implementation**

With the change in PDO, the indicator pertaining to increase in agricultural profitability was dropped. The two new indicators that were added following the project restructuring - the number of water users (including the number of female beneficiaries) provided with improved irrigation and drainage services - were appropriate for monitoring the revised PDO. Surveys were carried in 2016 and 2017 in some areas with the same sample of households (including with tail-end farmers at Marwas for about 8% of the total cropped area) to monitor project performance.

### **c. M&E Utilization**

The monitoring indicators during implementation were used as a reporting tool to the Ministry of Agriculture and Land Reclamation to address areas where progress was lacking during implementation and at closure were used for monitoring overall project performance.



## M&E Quality Rating

Modest

## 10. Other Issues

### a. Safeguards

The project was classified as a Category B project. Other than Environmental Assessment (OP/BP 4.01), two safeguard policies were triggered: Pest Management (OP 4.09); and, Projects on International Waterways (OP/BP 7.50).

**Environmental and Pest Management safeguards.** The PAD (page 14) notes that no adverse environmental impacts were anticipated at appraisal. Although the project did not envision either procuring insecticides or horizontally expanding irrigation lands, there was the possibility that intensifying crop production through vertical expansion could increase the residual pesticide/fertilizer load per feddan in some project areas. An Environmental Impact Assessment (EIA) was conducted and an Environmental and Social Management Plan (EMP) was prepared and publicly-disclosed to address environmental and pest management issues at appraisal (PAD, page 15). In April 2015, the ESMP was revised to include an action plan to mitigate the social impacts on Project Affecter Persons (PAPs) and the ESMP included a method for safely disposing of asbestos ceilings on the old pump stations. The ICR (page 22) reports that the ESMP was implemented satisfactorily and a total of 25 asbestos roofs from old pump houses were replaced with less harmful ones during implementation (ICR, pages 21-22).

**Project on International Waterways.** The PAD (page 14) notes that an assessment made at appraisal determined that the project was not expected to adversely change the quality and quantity of water flows to the other riparian countries (The Nile - Egypt's source of renewable water is shared within nine other riparian countries (Burundi, Rwanda, the Democratic Republic of Congo, Tanzania, Kenya, Uganda, Ethiopia, Eritrea and Sudan). The assessment concluded that notification of riparian states was not required (PAD, page 14).

**Involuntary Resettlement (OP/BP 4.12).** This safeguards was triggered during the project restructuring on June 2016 to cover the potential loss of land value for landholder farmers (due to the installation of electrical poles on their land). (ICR, page 10). A Resettlement Policy Framework (RPF) and a Resettlement Action Plan (RAP) was prepared and field work was undertaken to register the Project Affected Persons. At closure, 1,033 beneficiary farmers were compensated (US\$13 per person) (ICR, page 22).

### b. Fiduciary Compliance



**Financial Management.** An assessment was conducted at appraisal to judge the financial management capacity of the implementing agency, the Executive Authority for Land Improvement (EALIP) (PAD, page 15). The financial management risk was rated as High, in view of the lack of experienced staff within EALIP of Bank-financed projects. Mitigation measures were incorporated at design including, review of project reports by an external auditor and with the mitigation measures, the financial risk was rated as Moderate. The ICR (page 23) notes that financial management during implementation was satisfactory. The Project Management Unit's (PMU's) financial management team included an experienced financial officer supported by several graduate staff with the required skills. An Independent external auditor was appointed to audit the project's annual financial statements and the audit reports were in compliance with the Bank's requirements. The Task Team Leader clarified that the final audit was unqualified.

**Procurement.** An assessment was made at appraisal to judge the procurement management capacity of EALIP (ICR, page 10). The procurement risk at appraisal was rated as High in view of the weak capacity within the PMU. (PAD, page 10). Mitigation measures to address procurement risks included, requiring all contracts to be subject to prior review. A procurement plan was prepared at appraisal and procurement activities were to be supervised at least twice a year (ICR, page 66). The ICR (page 23) notes that training was provided to the PMU during implementation and there were no procurement issues during the project execution period.

**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**

The ICR (pages 25-27) draws ten lessons. The following five lessons were judged by this review to be the most important with respect to application to other Bank operations, with some modification of language.



**(1) Contracts need provisions for price contingencies during implementation.** The depreciation of the Egyptian Pound relative to the US\$ during the implementation of this project caused a severe increase in the prices of inputs for the modernization works. This stalled work progress until alternative arrangements could be made. Allowance made at design for meeting price contingencies would help in reducing delays in future projects.

**(2) Technical assistance needs to be addressed at design.** The Project Management Unit (PMU) lacked the required technical capacity for engineering supervision and this contributed to delays in the initial years of the project. The required technical assistance to the PMU was added after three and half years after project effectiveness. The experience of this project demonstrated that technical assistance activities should be included in future projects from the project start.

**(3) Work contracts of significant size and executed by competent commercial contractors may be required in countries with weak implementation capacity.** The initial approach in this project envisaged the "force account" approach administered by community-led and small contractors. This approach proved to be ineffective for meeting the demands of large scale works, given the lack of capacity of the Ministry of Agriculture and Land Reclamation and the PMU. Replacing this approach with clustered contracts administered by commercial contractors speeded up progress in the final years of the project.

**(4) Progress sequencing of physical works can be useful for for marwa/mesqa improvements.** In the case of this project, the electricity infrastructure works preceded marwa/mesqa improvements. Constructing the electricity transmission lines up to the pump station before commencing works on the Marwas helped in enhancing the farmer's trust in the benefits of the project.

**(5) The involvement of farmers and Water Users Associations (WUAs) in final design and in supervision leads to ownership.** In the case of this project, a social assessment survey conducted at appraisal showed overwhelming farmer support for electric pumps as compared to diesel pumps. Also farmers represented through their marwa committees, mesqa WUAs and agricultural cooperatives were involved in key stages of the project design and this helped in their commitment to the project.

IEG draws the following lesson from this project.

**(1) A realistic assessment of the project timelines is required for a robust theory of change.** The original PDO of increasing agricultural profitability was unrealistic in terms of the project timeframe. This undermined the theory of change and the relevance of the results framework. This issue was appropriately addressed at the Level 1 restructuring.

### 13. Assessment Recommended?

No



## 14. Comments on Quality of ICR

The ICR is well-written and provides a good analysis of the project. It clearly discusses the rationale for electric pumps as compared to diesel pumps and candidly discusses the problems that arose during implementation (such as the difficulties associated with the "force account" approach in the face of the weak implementation capacity of the Ministry of Agriculture and Land Reclamation and the Project Management Unit and the issues that arose in the wake of the depreciation of the Egyptian Pound relative to the US\$. The ICR draws useful lessons from the experience of implementing this project. The ratings provided in the ICR is for the most part, consistent with the guidelines.

Given that the PDO was revised through a Level 1 restructuring and the outcomes before project restructuring were implemented in a limited project area, the guidelines require a split evaluation of objectives, before and after restructuring. The ICR is also long and could have been more concise.

### a. Quality of ICR Rating

Substantial