

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country : Arab Republic of Egypt

Project : Project for Construction of the New Dirout Group of Regulators

Loan Agreement : March 15, 2015

Loan Amount : 5,854 million yen

Borrower : Government of the Arab Republic of Egypt

2. Background and Necessity of the Project

(1) Current State and Issues of the Agriculture and Water Sectors in Egypt

The Arab Republic of Egypt (hereinafter referred to as “Egypt”) has low precipitation which is 5mm per annum (the world average is 880mm) in most of the land and is almost totally dependent on accumulated subsoil water sourced from the Nile and its tributaries. As the result of an international water agreement signed with Sudan in 1959, the annual volume of water available to Egypt has been fixed at 55.5 billion cubic meters, so it has needed to manage this limited water resource effectively. On the other hand, according to the data of the Central Agency for Public Mobilization and Statistics, demand for water used in agriculture, industry and daily life has increased significantly, due to an annual increase in population of about 2 percent and the associated pressures of increased food production and farmland development, as well as economic growth in excess of 5 percent (slowed down after the political change in 2011). Amid such circumstances, an urgent issue for Egypt has been to achieve the efficient and rational use of water in the agricultural sector, which accounts for greater than 80 percent of water demand.

(2) Development Policies for the Agriculture and Water Sectors in Egypt and the Priority of the Project

In Egypt, agriculture and land development comes under the jurisdiction of the Ministry of Agriculture and Land Reclamation (MALR), and irrigation comes under the jurisdiction of the Ministry of Water Resources and Irrigation (MWRI). The National Water Resources Plan 2017, formulated by the MWRI in May 2005, states that the efficient allocation of irrigation water is essential for improving both the cropping ratio and the volume of available water per unit area, which are declining; and strengthening the water management system is an urgent issue. Furthermore, the Agricultural Sustainable Development Strategy 2030, which was formulated by the MALR in 2010, contains a target of improving irrigation efficiency from 50 percent (2007) to 80% (2030). The existing group of regulators in Dirout currently performs an important function of distributing 9.6 billion cubic meters of irrigation water per year, which is equivalent to 17 percent of the annual available volume of

water sourced from the Nile, to 600,000 hectares of farmland in the Upper Egypt region of central Egypt. Approximately 140 years have passed since the existing regulators were constructed, and they are in need of rebuilding so as to ensure a stable supply of irrigation water and efficient water use. Achievement of efficient water allocation through this Project will benefit the poor through the improvement of agricultural productivity.

### (3) Japan and JICA's Policy and Operations in the Agriculture and Water Sectors

One of Japan's priority assistance areas for Egypt's Rolling Plan is "poverty reduction and improvement of living standards," and one of the development goals in this area is "agricultural and rural development." In this regard, JICA is providing support, utilizing grant aid and technical cooperation, under the Upgrading Agricultural Structure in the Upper Egypt program. So far, grant aid, such as the Project for Rehabilitation and Improvement of Monshat El Dahab Regulator on Bahr Yusef Canal, has been utilized to undertake repair and improvement work at four diversion weirs (regulators at Lahoun, Mazoura, Sakoula and Monshat El Dahab) along the Bahr Yusef Canal (total length: 132 km), which supplies irrigation water to 340,000 hectares benefitting in Upper Egypt. The work has helped to restore the stable intake of irrigation water, namely the primary function of regulators, as well as the function of discharging water into downstream canals. Furthermore, in the Project for Strengthening Water Management Transfer (technical cooperation project, 2012–2015), JICA has provided support to the MWRI in relation to establishing an implementation structure aimed at enhancing the transfer of the water management of branch canal basins from MWRI to water user organizations (WUOs). By constructing a new group of regulators in Dirout, which are the key core water-use facilities in the Upper Egypt region located at the origin of the above mentioned Bahr Yusef Canal, this ODA Loan Project will complement the achievements of past cooperation projects.

### (4) Other Donors' Activities

With respect to loans relating to the repair and improvement of regulators: Italy, Romania and Austria have provided loans of 325 million euro for the Esna Barrage Improvement Project since the late 1990s; recently, the European Investment Bank (EIB) and the Kreditanstalt für Wiederaufbau (KfW) have provided loans of 320 million euro for the Naga Hammadi Barrage Project; and KfW has also provided loans of 430 million euro for the Assiut Barrage Project.

### (5) Necessity of the Project

The Project is consistent with Egypt's development issues and development policies, Japan's assistance policy, as well as JICA's priority areas for assistance. Moreover,

by providing the loan with Special Terms for Economic Partnership (STEP), it is also expected that Japan's technology will be used (overflow double-leaf gates and steel sheet pile double-wall cofferdam construction method). Therefore, it is highly necessary and relevant for JICA to provide assistance through the Project.

### 3. Project Description

#### (1) Project Objective

The objective of the Project is to construct new regulators in Dirout city and install water distribution system to develop capacity for efficient water distribution, and thereby, contribute to increasing agricultural productivity in Upper Egypt.

#### (2) Project Site/Target Area

City of Dirout in Assiut Governorate and its surrounding basin (governorates of Giza, Beni Suef, Faiyum and Minya)

#### (3) Project Components

- 1) Construction of regulators (construction of five new regulators, production and installation of gates, development of surroundings, temporary cofferdam work)
- 2) Equipment related to the water management system (system development, central management facility, etc.)
- 3) Consulting services (bidding assistance and construction supervision)

#### (4) Estimated Project Cost

6,288 million yen (ODA Loan Amount: 5,854 million yen)

#### (5) Schedule

From March 2015 to December 2023 (total: 106 months). The Project will conclude once the facilities begin service (December 2022).

#### (6) Project Implementation Structure

- 1) Borrower: Government of the Arab Republic of Egypt
- 2) Guarantor: None
- 3) Executing Agency: Ministry of Water Resources and Irrigation (MWRI)
- 4) Operation and Maintenance System: MWRI

#### (7) Environmental and Social Considerations/Poverty Reductions/Social Development

##### 1) Environmental and Social Considerations

- ① Category: B
- ② Reason for Categorization: The Project does not fall under the category of a sensitive sector, characteristic or area as listed in the *JICA Guidelines for*

*Environmental and Social Considerations* (April 2010), and its adverse impact on the environment is not likely to be significant.

- ③ Environmental Permit: The Environmental Impact Assessment (EIA) of the Project was approved by the Egyptian Environmental Affairs Agency in September 2010.
- ④ Anti-Pollution Measures: During construction, steel sheet piles will be used as a measure against water pollution. In addition, water will be sprayed, soundproofing equipment will be installed and equipment will be properly maintained and managed as a measure against air pollution and noise. Due to concerns about rising groundwater levels between the existing regulators and the new regulators once they are in service, an analysis of flow conditions will be undertaken during the basic design by means of technical assistance, and steps will be taken as necessary, such as installing watertight walls and collecting pipes.
- ⑤ Natural Environment: Despite the Project site being located 6 km east of Chikly Island (national cultural heritage and water bird sanctuary) and 8 km northwest of Bou-Kornine National Park (reservation for Barbary Sheep), any spread of airborne pollutants into these protected areas has been recognized as being limited, and so the adverse impact on the air environment surrounding the protected areas is expected to be minimal.
- ⑥ Social Environment: The Project involves the relocation of one mosque. The mosque to be relocated will be rebuilt by the executing agency on nearby grounds of the executing agency prior to construction of the new group of regulators in Dirout.
- ⑦ Other/Monitoring: During construction, the executing agency and the contractor will monitor such matters as air, water quality, noise and vibration, odor, waste and the safety of the regulators. Once the regulators are in service, the executing agency and other organizations will monitor such matters as water quality, noise and vibration, odor and waste.

## 2) Promotion of Poverty Reduction:

As a result of achieving efficient water allocation, it is expected that agricultural productivity will improve, and this will help to increase the incomes of farmers living in the Upper Egypt region where Egypt's poor are concentrated. It is also expected that the construction work will help create jobs in the region.

## 3) Promotion of Social Development (e.g. Gender Perspective, Measure for Infectious Diseases Including HIV/AIDS, Participatory Development, Consideration for the Person with Disability, etc.): None in particular.

(8) Collaboration with Other Donors

None in particular.

(9) Other Important Issues

1) As part of the Project, detailed designs, P/Q documents and tender documents will be produced using technical assistance by JICA.

2) It is anticipated that the following Japanese technologies will be utilized as part of STEP loans:

Overflow double-leaf gates: A system of two gates which enables water levels to be controlled with a high degree of accuracy and water to be discharged in a timely manner by adjusting an upper and lower gate.

Steel sheet pile double-wall cofferdam construction method: A cofferdam construction method that minimizes the impact on the surrounding environment by undertaking construction work while water still flows, without building a diversion canal.

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators

| Indicator   | Baseline<br>(Actual Value in 2013) | Target (2025)<br>[Expected value 3 years after<br>project completion]                                     |
|---|------------------------------------|---|
| Inflow into feeder sluice gates (million cubic meters)  | Measurement not possible           | Measurement will become possible, and water will be managed on the premise of necessary volumes of water. |
| Inflow into the Bahr Yusef Canal (million cubic meters) | Summer: 2,100<br>Winter: 1,700     | Summer: approx. 2,300 (10% increase)<br>Winter: approx. 1,800 (6% increase)                               |
| Wheat output (million tons per year)                    | 1.70                               | 1.74  |
| Maize output (million tons per year)                    | 2.20                               | 2.29  |

2) Internal Rate of Return

Based on the conditions indicated below, the Project's economic internal rate of return (EIRR) is 21.2 percent. The financial internal rate of return (FIRR) has not been calculated.

**【EIRR】**

Cost: Project costs (excluding tax), and operation, maintenance and management costs

Benefit: Increase in crop yield as a consequence of more stable distribution of water

Project Life: 50 years

## (2) Qualitative Effects

Improvement of agricultural productivity as a result of achieving efficient water allocation

## 5. External Factors and Risk Control

The executing agency will implement necessary budgetary measures without delay.

## 6. Lessons Learned from Past Projects

### (1) Evaluation of Similar Projects

Results of the ex-post evaluation of the Project for Rehabilitation and Improvement of Sakoula Regulator on Bahr Yusef Canal—a grant aid project in Egypt—identified that proper water allocation was not being done because certain intake facilities downstream from the improved regulator were drawing excess water. A lesson to be learned is that “in order to properly manage the necessary volume of water and the actual volume of water taken in the benefitting area, mechanisms for managing necessary flow rates in real time in each catchment area, including downstream areas are important.”

### (2) Lessons Learned from Past Projects

In view of this lesson, in addition to constructing new regulators, the Project also aims to strengthen the capacity for managing flow rates in real time by introducing a water management system.

## 7. Plan for Future Evaluation

### (1) Indicators to be used for future evaluation

Inflow into feeder sluice gates (million cubic meters)

Inflow into the Bahr Yusef Canal (million cubic meters)

Wheat output (million tons per year)

Maize output (million tons per year)

### (2) Timing

3 years after completion of the Project