

## Yong San Gang Irrigation Project

Report Date: March 2001

Field Survey: September 2000

### 1. Project Profile and Japan's ODA Loan



Location Map of the Project Area



Tidal Barrage Obtained by this Project

#### (1) Background

As South Korea pursued rapid industrialization in the 1960s, the resulting demand for land led to the paving of increasing areas of farmland. This practice resulted in a sharp cut in the country's self-sufficiency rate in staple foods, and a downward trend in its farming population. Dietary habits changed with rising income levels, causing a decline in consumption of grains, but that trend was counteracted by population growth. As a result, demand for agricultural products remained static. Therefore, the development of new agricultural land was needed to compensate for the destruction of farmland. The development of agricultural water supplies as part of this project accompanied the Yong San Gang General Agricultural Development Project, which began construction in four zones in 1972.

#### (2) Objectives

To build a seawall linking Hoando island in Yongam district, at the southern tip of the Korean peninsula to the tip of the Sani peninsula, and a linkage canal to Yong San Lake (a freshwater lake formed in the Zone II project), thereby creating a freshwater lake and converting a lagoon area into farmland (part of an irrigated area of 12,200ha) and shortening overland transport routes.

#### (3) Project Scope

The project consists of the elements listed below. The plan was first to build the seawall to link Hoando in Yongam district with Tarudo in Henamu district, and then to build the drainage facilities, the linkage canal and the other elements. Figure 1 shows the location of the site.

- 1) Construction of the seawall (L= 2,219m, maximum wall height = 32.3m, maximum wall base width = 250m, inclined mixed-material wall) for the purpose of forming a freshwater lake and building an access road.

- 2) Construction of drainage sluices (eight sluices of 10m x 10.5m, design drainage volume of 1,831m<sup>3</sup>/s), one ship passage gate (for 30t-class vessels), a fish access channel and desalination culverts (four culverts of L=295m, D=2,200mm) to allow the passage of vessels and aquatic organisms, and for desalination function.
- 3) Construction of a linkage canal (L=4,344m, earth-lined open canal, bottom width = 15m, maximum flow volume = 257m<sup>3</sup>/s) to regulate water levels in the Yong San and Yongam Lakes.
- 4) Entry roads: 9,416m, effective width 7.0m.
- 5) Pumping stations: Eight locations.
- 6) Water canals: 21 canals totaling 180km.
- 7) Embankment building: Embankments, fields within embankments, and other facilities for 6,370ha.
- 8) Rice field clearance (940ha).
- 9) Plot demarcation (560ha).
- 10) Dry field irrigation (1,430ha), and other elements.

The ODA loan covered the entire foreign currency portion and part of the local currency cost of elements 1), 2) and 3).



**Figure 1 Location Map of the Project Area**

**(4) Borrower/Executing Agency**

Republic of Korea/Agricultural Infrastructure Cooperation  
(formerly Agricultural Development Corporation), Yong San Gang Agency

### **(5) Outline of Loan Agreement**

Loan Amount/Loan Disbursed Amount	¥4,440 million / ¥4,434 million
Exchange of Notes/Loan Agreement	April 1988 / June 1988
Terms and Conditions	Interest rate: 4.25%, Repayment period: 25 years (7 years for grace period), General Untied
Final Disbursement Date	August 1993

## **2. Results and Evaluation**

### **(1) Relevance**

This plan, which fulfilled the following needs in Zone III, as outlined in the Yong San Gang General Agricultural Development Project, was considered relevant.

- Formation of a freshwater lake.
- Drying of tidelands.
- Expansion of the irrigated area, including the dried tidelands.
- Shortening of overland transport routes.

### **(2) Efficiency**

The construction of the seawall, which was covered by the ODA loan, was initially scheduled for completion in the fourth quarter of 1991. However, procurement and construction were delayed one year, due to delays in budget disbursement on the South Korean side. As a result, the seawall and the linkage canal with Yong San Lake were completed in the fourth quarter of 1992. For the project as a whole, the development (demarcation) of land for rice cultivation, which is outside the scope of the ODA loan, has yet to be completed. According to the executing agency, and other sources, the agency is now working on developing rice paddies, with the aim of completing them in 2003.

The Yong San Gang General Agricultural Development Project as a whole is still under way in Zone IV, and is scheduled for completion in 2003, one year behind the initial schedule.

### **(3) Effectiveness**

#### **1) Quantitative effects**

The seawall (with drainage sluices) and the linkage canal with Yong San Lake, which were covered by the ODA loan, were completed in the fourth quarter of 1992. However, the project as a whole has not been completed, and settlement on the reclaimed land, agricultural production and cultivation on the dried land had not been completed by the end of September 2000. Some temporary agricultural production on the undeveloped farmland was halted when demarcation work began, and the land will be formally sold once that process is complete.

The access road along the seawall has already realized its direct effect of shortening overland travel distances. The opening of the access road has shortened the distance between Mokp'o and Chin-Do by approximately 40km (a travel time of approximately one hour), as well as providing a link to the west coast expressway, making transport in the region more convenient. The volume of traffic on the access road is

increasing, rising from 2,986 vehicles/day in 1994 to 11,174 vehicles/day in 1999. As industrialization of the area proceeds, overland transport is expected to develop further, making this access road even more important.

**Table 1 Traffic Volume Across the Seawall**

	1994	1995	1996	1997	1998	1999
Traffic volume (vehicles/day)	2,986	4,516	7,282	9,917	10,690	11,174

Source: {Agricultural Infrastructure Corporation}

Note: Average values from four surveys per year.

**1) Economic internal rate of return (EIRR)**

An EIRR value of 10.2% was calculated at the time of the appraisal. As the project plan as a whole has not been completed, it is not possible to recalculate the value at this stage.

**2) Qualitative effects**

The project effects anticipated at the time of the appraisal were promotion of agriculture in the region, more convenient transport and improved disaster prevention functions. No promotion of agriculture in the region has been realized to date because the project as a whole is not scheduled for completion before 2003. The status of the other effects is described below.

**a) More convenient transport**

As mentioned above, transport convenience has been improved. Exchanges between previously isolated areas have increased; people in those areas have easier access to public facilities for education, medical care and welfare; distribution and market systems are stronger; and a range of other social and economic effects have been realized by the construction of this access road.

**b) Improved disaster prevention functions**

The construction of the seawall and the sluice gates has enabled control of the external water level, delivering water control effects adequate for settlement on the reclaimed land, agricultural production and cultivation activities, which will begin once the project is complete.

**(4) Impact**

**1) Environmental impact**

No notable adverse environmental or social impact from the project has been observed to date. Reduction of fishery resources and negative impact on ecological systems and other elements of the surrounding natural environment are anticipated, but specifics have not yet been observed because the project as a whole has not been completed. However, the environmental department from the head office of the project executing agency visits the site once every six months to conduct an environmental survey. The results are communicated to the Environment Agency, which suggests that due consideration is being given to environmental impact. Further, the drainage sluices are effective in desalinating the freshwater lake.

## 2) Social impact

The construction of the access road enhanced transport convenience, leading to the development of tourist and industrial areas, effects that were not anticipated when the project was planned. Compensation for fishing rights in connection with the implementation of this project was made in line with national regulations, and with the consent of the compensated parties.

## (5) Sustainability

### 1) Operation and maintenance

The executing agency for this project has a total staff of 6,112, nationwide. The office responsible for the seawall (and related sluice gates) built under the project employs 13 people, of whom three are engineers and ten are guards. The participating engineers have experience with other projects and are all highly trained.

The three engineers are responsible for day-to-day maintenance. They ask the Mokp'o office to take over any tasks that their local office is unable to handle. The Mokp'o area has three local seawall offices, in addition to this one, with three engineers posted to each. The local offices cooperate to help each other carry out tasks that cannot be handled by any single office. The local office works together with the Mokp'o office to carry out regular inspections. There is also a system by which either the head office in Seoul or private contractors are commissioned to solve problems that are beyond the means of the Mokp'o area.

There are no notable problems with the maintenance budget. The budget is largely allocated as requested, and does not impede maintenance.

**Table 3 Planned and Actual Maintenance Budgets for each Financial Year**

	1994	1995	1996	1997	1998	1999	2000
Plan	343	381	300	319	583	549	776
Actual	343	381	300	319	583	549	n.a.

Source: Agricultural Infrastructure Corporation

## 2) Future prospects

According to the executing agency, the project is scheduled for completion in 2003. Completion is to be followed by settlement of the reclaimed land, agricultural production and cultivation. The project as a whole is in line with South Korean agricultural policy, and it can be anticipated that the effects of the project will be realized on completion and will be sustainable.

### Comparison of Original and Actual Scope

Item	Plan	Actual
Project Scope (for ODA loan only)		
1)Construction of seawall	Total length: 2.2km Maximum wall height: 32.3m Maximum wall base width: 250m Road width of bank: 12.0m	Same as left Same as left Same as left Same as left
2)Construction of drainage sluices	10m × 10.5m × 8 sluices Drainage volume: 1,831m <sup>3</sup> /s Ship passage gate: 30t-class Desalination culvert: L=295m, D=2200m/m, 4 culverts)	Same as left Same as left Same as left Same as left
3)Construction of linkage canal	Total length: 4.3km Base width: 15m	Total length: 4.4km Same as left
Implementation Schedule (for ODA loan only)		
1) Construction of seawall	2nd Stage in 1988 ~ 4th Stage in 1991	2nd Stage in 1988 ~ 4th Stage in 1992
2) Construction of drainage sluices	2nd Stage in 1988 ~1st Stage in 1991	2nd Stage in 1988 ~ 4th Stage in 1992
3) Construction of linkage canal	2nd Stage in 1989 ~ 4th Stage in 1990	2nd Stage in 1989 ~ 3rd Stage in 1990
Project Cost		
Foreign currency	¥3,124 million	¥3,118 million
Local currency	¥7,011 million	N.A.
Total	¥10,135 million	N.A.
ODA loan portion	¥4,440 million	¥4,434 million
Exchange rate	1won = ¥0.18	