

China

Ex-Post Evaluation of Japanese ODA Loan Project
Tongyu River Irrigation Development Project in Jiangsu Province (I) (II)

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1. Project Description



Project Site



Tongyu River

1.1 Background

In the early 1980s, the Household Responsibility System (HSR)¹⁹ was implemented for agricultural production in China. Due to the introduction of policies such as raising the price at which the government purchased agricultural product, the sector expanded greatly, from producing roughly 300 million tons of food in 1978 to over 400 million tons in 1984. However, productivity of cultivated land thereafter became sluggish and remained stagnant until 1989.

Meanwhile, the population reached 1.25 billion in 2000, requiring the production of 500 million tons of food. However, since it was difficult to reach this goal due to the stagnation mentioned above, the Eighth Five-Year Plan (1991-1995) set a high food production target of 455 million tons by 1995. In order to achieve this, measures were taken such as firmly establishing the HSR, enlarging planted and irrigated areas for major agricultural products and increasing production of chemical fertilizers.

¹⁹ This system first got its start in the early 1980s. Each farming household rents land from the state for farm use and engages in agricultural production. A certain amount of the crop produced is collected by the state, while farmers are free to use any remainder as they please. Compared to collective farming (the People's Commune System), the increase in the discretionary amount cultivated per person increased farmers' incentives to produce and greatly improved agricultural production.

As of 1990, Jiangsu Province boasted the fourth-highest production of grains in the country and was sixth in cotton production. Since the province is located in a river basin including the Huai and Changjiang Rivers, two major rivers, large-scale irrigation is possible. Thus the province was designated an important area for development among the country's irrigated areas in the above policy target and was expected to be a major center for storing grain in China, exporting food to other provinces.

1.2 Project Outline

The objective of this project was to extend and construct the Tongyu River in Subei, Jiangsu Province, thus improving agricultural productivity by improving agricultural water supply and expanding water transport, thereby contributing to the area's economic development.

Approved Amount/ Disbursed Amount	JPY 11,535 million yen (Phase 1: 4,018 million yen, Phase 2: 7,517 million yen) / 11,532 million yen (Phase 1: 4,017 million yen, Phase 2: 7,515 million yen)
Exchange of Notes Date/ Loan Agreement Signing Date	September 1991 (Phase 1), January 1995 (Phase 2) / October 1991 (Phase 1), January 1995 (Phase 2)
Terms and Conditions	Interest Rate: 2.6% Repayment Period: 30 years Grace Period: 10 years Conditions for Procurement: General Untied
Borrower / Executing Agency(ies)	Ministry of Foreign Trade and Economic Cooperation, the People's Republic of China / Ministry of Water Resources of the People's Republic of China
Final Disbursement Date	December 1997 (Phase 1), February 2000 (Phase 2)
Main Contractor	Ranken Enterprises Limited
Main Consultant	None
Feasibility Studies, etc.	Feasibility Study on Tongyu River Project in Jiangsu Province, the People's Republic of China, Water Conservancy Survey and Design Institute of Jiangsu Province, November, 1990
Related Projects	Irrigated Agriculture Intensification Project (1991-1995, World Bank) Taizhou Yangtze River Water Diverting Channel Pro-

	ject (1998-2003, Chinese Government) Taidong River Project (2010- , World Bank)
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2. Outline of the Evaluation Study

2.1 External Evaluator

Masahiro Oseko, General Manager, Nevka Co. Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: September 2009 – June 2010

Duration of the Field Study: December 10-24, 2009, March 12-26, 2010

2.3 Constraints during the Evaluation Study

The total time estimated to complete the project at the time of its inception was 6 years and 3 months, but it actually took more than 16 years to be completely inspected and approved. Two years later, this ex-post evaluation study was conducted, which ended up comparing current conditions with those of nearly 20 years ago. During those 20 years, personnel in charge have moved or retired and data has been scattered and lost, posing difficulties for the evaluation. Further, there have been significant changes in social conditions over these 20 years, and it was observed that the plan from 20 years ago was not necessarily appropriate for the present. For example, this project was mainly designed as an agricultural project, but it has become more of a comprehensive project, including industrial and distribution sectors over the 20 years. While the project is now serving a broad role for overall development in the coastal area of Jiangsu Province, this ex-post evaluation study evaluated the project as one for improving agricultural productivity and expanding water transport.

3. Results of the Evaluation (Overall Rating: C)

3.1 Relevance (Rating: a)

3.1.1 Relevance with the Development Plan of China

From the Eighth Five-Year Plan (1990-1995) until the present Eleventh Five-Year Plan (2006-2010), in order to solve the problems of ensuring a stable food supply and redressing the regional income gap, the Chinese central government has consistently treated the increase of food production, the expansion of land under cultivation, including the irrigated area for major agricultural products, and the promotion of the South-to-North Water Diversion Projects as important policy issues. In addition, the Jiangsu Coastal Development Plan (August 2009) is a comprehensive development plan concerning agriculture, industry and commerce in coastal Jiangsu Province, and the Tongyu River is one of the

key infrastructures for the plan.

Aligning these policies from the central government, in 1990, the Jiangsu Province government settled on the Eighth Five-Year Plan as a provincial-level policy and proceeded with 10 large infrastructure projects. The Tongyu River Irrigation Development Project is one of those projects for the “Comprehensive Agricultural Development of the Huang-Huai-Hai Coast.” In addition, as of now, the “Three-Year Implementation Proposal for the Modernized Agricultural Development of the Jiangsu Coast (December 2009)” and the “Yancheng Coastal Development Plan for the Agricultural Sector (2007)” drawn up by the Jiangsu Province government and the Yancheng Municipality. These two plans are designed to further develop the Tongyu River and make the most efficient use of it aligning the central government’s Jiangsu Coastal Development Plan.

3.1.2 Relevance with the Development Needs of China

Since 1990s until the present, Jiangsu Province has had high agricultural productivity, ranking among China’s top three. However, as of 1990, in the Subei area of the province, one-third of the Tongyu river basin’s arable land had a middle level yield of 3 to 4.5 tons per hectare, while half of the land had a low level yield of 3 tons or below. In addition, roughly 60,000 hectares of the surrounding land was saline-alkali land, although much of it could be cleansed and made suitable for farming by providing a large amount of water. This was how it became indispensable that water be supplied to the land around the Tongyu River with an irrigation project. However, nearby water resources were already close to their limit and the water quality was not good, so a large-scale irrigation canal for farming became necessary to draw water from the Yangtze River, which is relatively close and has an abundant amount of good quality water.

Large and small canals, such as the Beijing-Hangzhou Grand Canal, have been constructed in the Subei area since ancient times to ensure water supplies for farming. With regard to water transport, these canals had also served as primary shipping routes using small boats. Since the freight traffic had heavily relied on water transportation, there were no large main roads or railways developed nearby. Meanwhile, demand for shipping had increased in the central Tongyu River area as the economy had developed, but as there were no large-scale canals that 1,000-ton ships could pass through on the east side of the Grand Canal, water transport posed an impediment to meeting this demand.

3.1.3 Relevance with Japan’s ODA Policy

At the time of the project appraisal, the implementation policy set by the Overseas Economic Cooperation Fund (JICA at the present) focused on the following three areas: the environment, food and poverty, and the reduction of regional disparities. Focal points

under the country-specific implementation policy were prevention of desertification, environmentally-friendly agriculture, poverty alleviation through rural development and improvement of agricultural productivity, and irrigation to make efficient use of water resources.

This project has been highly relevant to the country's development plan and its development needs, as well as Japan's ODA policy. Therefore the project's relevance is rated as high.

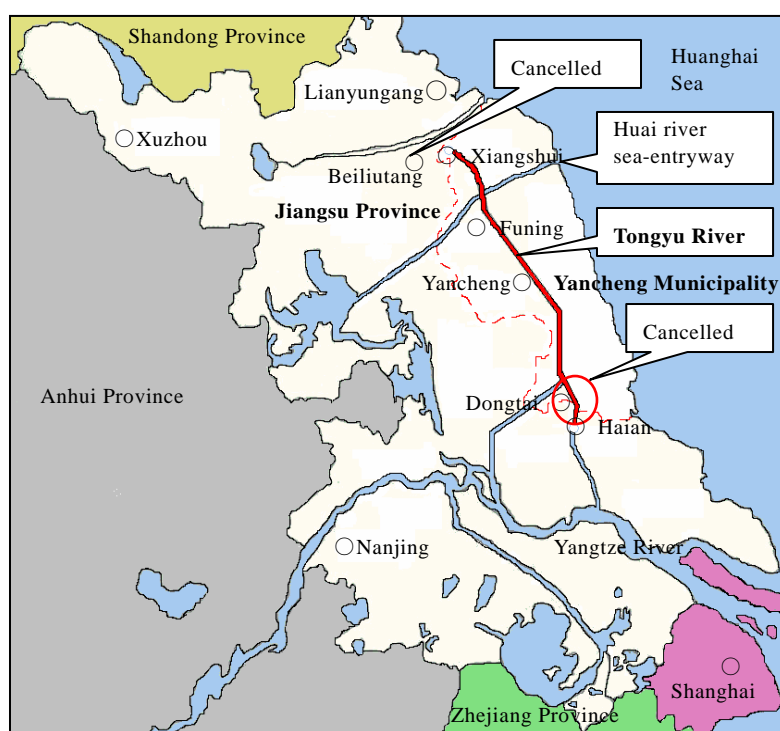
3.2 Efficiency (Rating: c)

3.2.1 Project Outputs

Outputs planned and achieved are as shown in the table at the end of this report.

There are two subprojects — the Haian and Beiluitang river shiplocks — that were cancelled due to a lack of funds. In addition, since the Haian subproject was cancelled, construction to extend the waterway between Haian and Dongtai was also cancelled (Figure 1). The

Figure 1 Project Area



both of the projects were intended to serve for water transport. But with funds lacking, focus was placed on irrigation as the project's main purpose, and the subprojects for water transport, which were of relatively low priority, were cancelled. It is believed that this decision was appropriate. The cause for the lack of funds was the steep rise in prices of construction materials. Commodity prices in China rose sharply with the rapid economic growth during the 1990s. According to the *Jiangsu Statistical Yearbook 2008*, the raw materials price indicators, which include construction materials, rose about 120% every year during the decade, thus resulting in a lack of funds for the project.

Additionally, the completed Subei drainage culvert was demolished after its construction as an effect of the Huai River Sea-Entryway Project (another project budgeted by Jiangsu Province). The Huai River Sea-Entryway Project was a newly devised counter-

measure against flooding initiated as a result of the serious floods that occurred in 1998. The Huai River drains water from western inlands into the eastern Huanghai Sea, so it intersects with the Tongyu River running north-south. After considering various alternatives to minimize the construction's impact on nearby areas and its costs, the Subei drainage culvert was chosen for the intersection. It was impossible to foresee the implementation of the Huai River Sea-Entryway Project when the Tongyu River Project was planned. So the resulting demolition of the Subei drainage culverts was inevitable.

Meanwhile, the plan initially called for 320 small-scale facilities such as sluice gates and bridges, but in the end this number has risen to 420. This increase was the result responding to changes in social conditions nearby such as the construction of railways and roads during the project's long construction phase.

The time for this project has reached a long period of more than 10 years and the expansion and reduction of outputs were caused by changes in society during the time it has been carried out. Each expansion and reduction was an appropriate response to changing conditions and it would not be right to condemn these decisions, but as a result there have been deviations between the plan and outputs made.

3.2.2 Project Inputs

3.2.2.1 Project Period

Under the plan, the period for carrying out the project was 6 years and 3 months (75 months) from October 1991 to December 1997, but it actually took 11 years and 3 months (135 months) from October 1991 to December 2002 (when all construction was completed). The plan has expanded to 180% of its original schedule, significantly longer than planned. The primary reasons for the extensions are: delayed construction due to the serious floods in Jiangsu Province in 1991; surveys, model tests and design changes concerning difficult constructions such as the Xiangshui Shiplock; and time requirements for deliberations, procedures and such concerning the cancellation of subprojects (see 3.2.1). Primary construction of waterways was completed in December 2000. From 1997 until that time, irrigation water was supplied from each section upon its completed construction.

3.2.2.2 Project Cost

The planned cost of the project was JPY 18.782 billion, but it actually became JPY 27.694 billion, 147% higher than planned. The primary causes for going over budget were the steep rise in construction material costs during the period of rapid economic growth in the 1990s and increases in the cost of land acquisitions (RMB 3 per m² under the plan, but actually RMB 6 – 7.5 per m²).

With regards to the amount of the ODA loan, the total amount lent was JPY 11.532 billion, roughly the same as the JPY 11.535 billion under the plan.

The project cost was higher than planned, while the project period was significantly longer than planned. Therefore, the efficiency of the project was low.

3.3 Effectiveness (Rating: b)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators

(1) Effects on Agricultural Development

Agricultural development expected under the plan was in the target area of 219,900 ha by increasing irrigated land area, boosting the rice, wheat and cotton harvests and changing products cultivated. However, neither the Tongyu River's general administrative agencies²⁰ nor the agency concerned with agriculture²¹ could specify the land area that benefited from the project²². In addition to this, few data on operation and effect indicators were available. So the evaluation comparing the plan's figures with those for actual results was hardly carried out. Therefore, as an alternative method, the evaluation was made using the agriculture indicators for the entirety of the Yancheng Municipality, the largest area of land directly benefiting from the project. The agricultural indicators in sections 1) through 3) below were all according to the *Yancheng Statistical Yearbook 2009* (China Statistics Press, 2009).

1) Arable Land Area

A regression analysis of arable land area shows that there was a slightly decreasing trend from the time before the project and during the project (1985 – 2002) and that there was a slightly increasing trend after its completion (2003 – 2008), but neither trend is distinguished. As can be seen in Figure 2, they were fairly stable. Accordingly, the expansion of arable land area due to the project is unconfirmed. Note that there was a rapid expansion in year of 2000, but the reason is incomprehensible. Since the trend after 2000 was again constant as before, this expansion is thought to be caused not by a change in

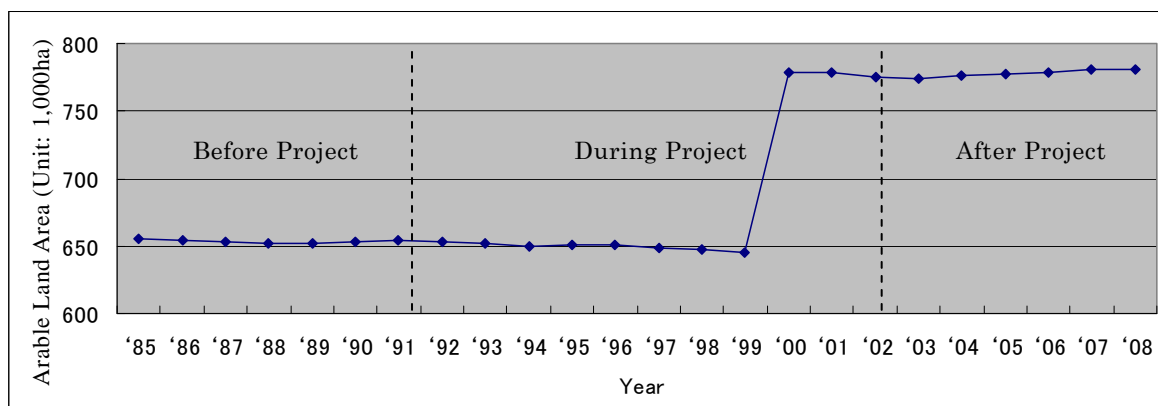
²⁰ The Jiangsu Province Water Conservancy Department is the general administrative agency for facility construction and the Yancheng Municipal Water Bureau is the general administrative agency for managing facilities.

²¹ Agriculture Bureau, Yancheng Municipal Agriculture Committee

²² Targeted area under the plan was: 192,200 ha (low yield land and saline-alkali land) in the irrigated area North to the Main Irrigation Canal; 19,387 ha (saline-alkali land) in the reclamation area North to Doulonggang River; and 8,313 ha (saline-alkali land) in the reclamation area South to Doulonggang River. But neither the target area planned nor the actual current benefited area could be specified by the agencies concerned. Targeted area planned was not an administrative district and not identical with Yancheng Municipality.

actual arable land area, but rather by a change in the method for statistics.

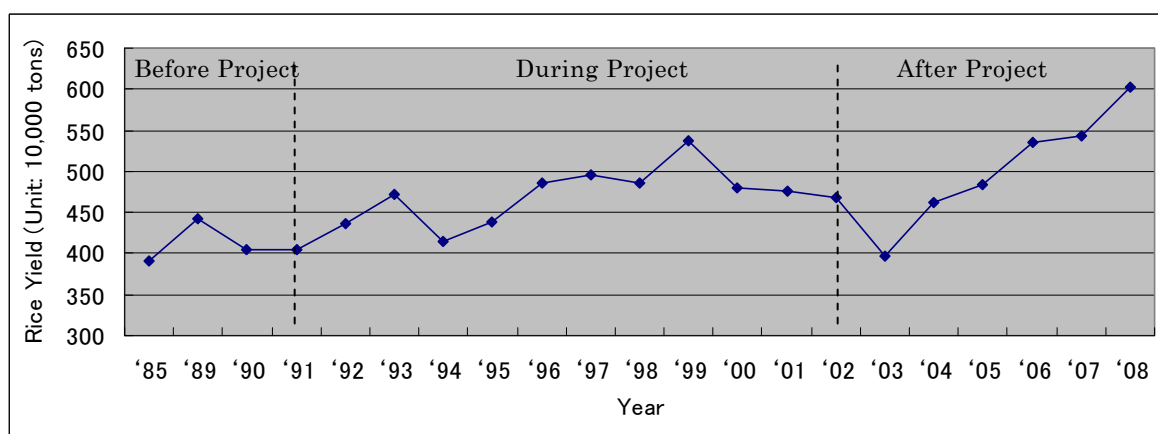
Figure 2 - Arable Land Area



2) Rice Yield

Although there were fluctuations in rice yield both before and during the project (1985 – 2002), the overall trend was an increasing one. The increasing trend is more notable after the project's completion (2003 – 2008). Based on interviews with the Tongyu River's administrative agencies and the agency concerned with agriculture, no other projects that have had a large impact on rice yield have been carried out, so this project can be regarded as one of the major contributors to the increasing trend of rice yield.

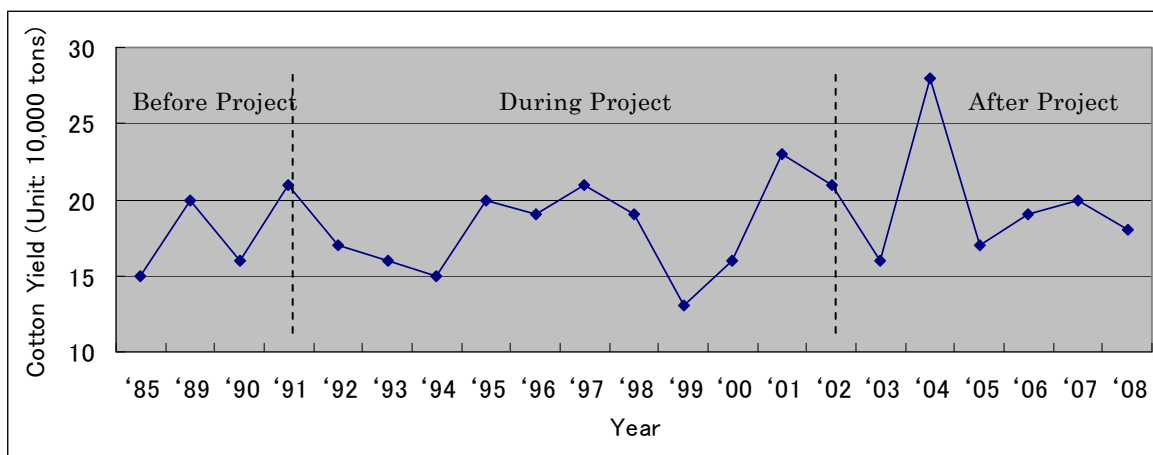
Figure 3 – Rice Yield



3) Cotton Yield

As shown in Figure 4, cotton yield was fairly constant from before the project until after completion (1985 – 2008). No meaningful trends can be read even from a regression analysis. Accordingly, no notable contribution of the project can be seen to cotton yield.

Figure 4 – Cotton Yield



(2) Effects on Water Transport

Regarding effects on water transport development, no specific operation and effect indicators were prepared in the plan. Therefore, this evaluation employed quantitative indicators using traffic through and tolls for the Xiangshui and Datao Shiplocks.

At the Xiangshui Shiplock, traffic tonnage increased an average of roughly 134% annually from 780,000 tons in 2001 to 6.26 million tons in 2009, while tolls collected increased an average of roughly 140% annually from RMB 530,000 to RMB 6.17 million. At the Datao Shiplock, traffic tonnage increased an average of roughly 108% annually from 3.96 million tons in 2004 to 4.86 million tons in 2008, while tolls collected increased an average of roughly 113% annually from RMB 3.08 million to RMB 4.72 million. Before the project, there were no shiplocks for water transport on the Tongyu River and there were no tolls for passage, but the tolls from the project have become a new source of revenue for the Yancheng Municipality.



Xiangshui Shiplock

3.3.1.2 Results of Calculation of Internal Rate of Return (IRR)

When the project was appraised, the economic internal rate of return (EIRR) was calculated as shown in Table 1 and the project was deemed to have sufficient economic profitability.

Table 1 – EIRR Calculation Assumptions and Results from Project Examination

Project Life	40 Years After Project Completion
Costs	<ol style="list-style-type: none"> 1. Construction 2. Operation and maintenance 3. Facility renewal
Benefits	<ol style="list-style-type: none"> 1. Increased agricultural production (farm revenues per ha) 2. Easier and bigger water traffic passage <ol style="list-style-type: none"> 2.1 Less costs for detours 2.2 Hazard prevention by widening canal 2.3 Less transport expenses by reducing number of shiplocks 2.4 Shortened river distance
EIRR (Phase 2 Assessment)	18.3%

As described above in 3.3.3.1 (1), the target area planned and currently benefiting area from the project cannot be specified. Therefore, due to the fact that data needed for quantitative analysis was not available, analysis for the internal rate of return could not be carried out.

3.3.2 Qualitative Effects

3.3.2.1 Questionnaires and Interviews to Farmers

In order to quantitatively and qualitatively evaluate the agricultural benefits of the project, a questionnaire survey of 104 people and interviews with 2 individuals and 9 groups were conducted among the farmers within the Yancheng Municipality, who are direct beneficiaries of the project. Because the ex-post evaluation compares the situation before and after the project, the questionnaires and interviews had to ask farmers to remember and compare their situation before (1991) and after (2009) the project, spanning a twenty-year period. Therefore, the reliability of the survey is supposed to be low. But looking only at the responses, farming income (rice, wheat, cotton, etc.) after the project rose approximately 7 times over pre-project income, and farming expenses (seeds, seedlings, fertilizer, agrochemicals, farming machinery rentals, etc.) increased 11-fold.

Qualitative answers to questions showed large improvements on mechanization, crop replacement, labor and living standards. This implies that the amount of water for agriculture was increased by this project, which led to the increase of farmers' income. And farmers invested their income in mechanization and crop replacement resulting further increase of income, thus created the virtuous circle.

3.3.2.2 Questionnaires and Interviews to Companies Using Water Transport

In order to quantitatively and qualitatively evaluate the water transport benefits of the project, a questionnaire survey of 27 companies and an interview with 1 company using water transport and 2 water transport shipping companies were conducted among the water transport companies within the Yancheng Municipality, who are direct beneficiaries of the project. According to these, over the past 20 years, the total annual volume of shipping on the water increased roughly 11-fold, while total annual water shipping expenses rose approximately 9 times, indicating high effectiveness for water transport costs. Many companies (20 out of 27) also pointed out low shipping costs in their qualitative responses. Besides economic improvements, many respondents also pointed out improvements in safety, convenience, speed, etc. From these results, the great positive effects extended by the project to companies in the area can be recognized.

3.3.3 Overlaps and Effects of Other Projects

The benefiting area of this project, the Tongyu River Project, partially overlapped with the one of the Irrigated Agriculture Intensification Project (1991-1995, World Bank). However, the Tongyu River Project was for construction on primary waterways, while the World Bank's project was for the construction of facilities on secondary and lesser waterways connected to the Tongyu River, including other activities such as agricultural extension and agricultural mechanization. Therefore, while benefiting areas overlapped, both projects have a mutually complementary relationship, and the two projects should be regarded as one project constructing an irrigation system from primary to the most outlying waterways.

In addition, the Taizhou Yangtze River Water Diverting Channel Project (1998-2003, Jiangsu Province) and the Taidong River Project (since 2010, World Bank) are both waterways supplying water from the Yangtze River to the Tongyu River. These two projects and the Tongyu River Project are treated as the Tongyu Canal Construction Project. The Tongyu River Project is sometimes called in China the "Middle part of" Tongyu Canal Project, which is still continuing to be extended to the upper and lower parts of the canal.

As shown in the above, positive results can be seen particularly in rice production and water transportation. However, because the target area planned and the actual current benefiting area could not be verified, and quantitative benefits could not be confirmed regarding the cotton production and irrigated land area in the Yangcheng Municipality, this project has somewhat achieved its objectives. Therefore its effectiveness is fair.

Note that the results of the questionnaires to farmers were less heavily evaluated since their reliability is considered to be low because it was a comparison of the current situa-

tion and the situation 20 years ago relying only on the memories of farmers and there is a concern of some bias in the sampling of farmers.

3.4 Impact

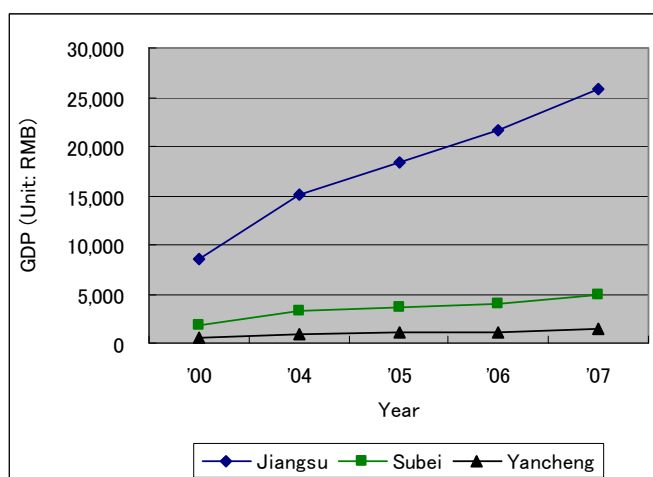
3.4.1 Intended Impacts

3.4.1.1 Impact on the Regional Economy

(1) Gross Domestic Product (GDP) of Yancheng Municipality

As data prior to the year 2000 could not be acquired, an ex-ante and ex-post comparison could not be made, but as far as looking at the economic trends following 2000, as shown in Figure 5, the GDPs of Jiangsu Province, the Subei area of Jiangsu Province and the Yancheng Municipality all showed favorable increases. However, the rate of rise in Yancheng, which was directly impacted by the project, is not particularly great compared to that of Jaingsu Province or Subei area. Accordingly, it cannot be said that the project's impact has stretched to the entire regional economy.

Figure 5 – GDP of Jiangsu Province, Subei and Yancheng

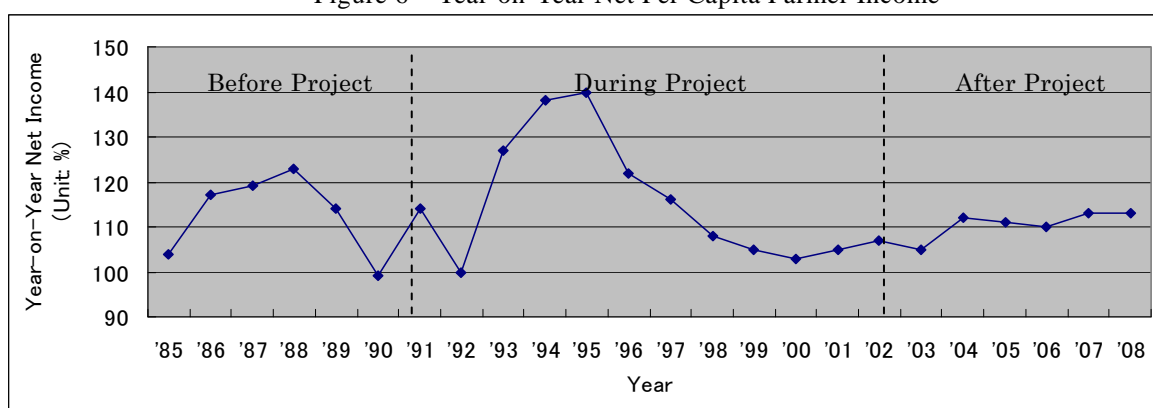


Sources: Jiangsu Statistical Yearbook 2008,
Yancheng Statistical Yearbook 2009

(2) Increase in Per Capita Farmer Income

As shown in Figure 6, year-on-year net per capita farmer income consistently rose around 110% starting in the year 1985. But no particularly large changes can be seen during and after the project. Accordingly, it cannot be read from the statistics that there are positive impacts for farmer income by the project.

Figure 6 – Year-on-Year Net Per Capita Farmer Income



Source: Yancheng Statistical Yearbook 2009.

3.4.2 Other Impacts

3.4.2.1 Impacts on the Natural Environment and Society

(1) Improvements of Water for Daily Use

The Chinese government's environmental standards for water quality are divided into Categories I – III for drinkable water sources, Categories IV and V for agricultural and industrial use, and anything below Category V cannot even be used for agriculture or industry. While the Tongyu River was classified before the project as Category IV and V, it is now classified as Category III, and the River is called the "Clear Water River." This positive effect has been brought about by the design of waterways which increases the volume of filthy water discharge and clean water intake, and by the strengthening of water quality laws and regulations and their enforcement.

The Tongyu River's water quality is managed as prescribed by both the Tongyu River Management Implementation Law (a municipal regulation) and the Tongyu River Water Quality and Prevention Pollution Order (a provincial regulation). The Yancheng Municipal Water Bureau publishes data on water quality measurements on its website and updates it weekly. Several water companies are located on the banks to supply water from the Tongyu River as a utility. The people living in the river basin use its water in their daily lives. A number of respondents to the questionnaires to farmers also pointed out improved water quality and subsequent reductions in labor.

(2) Impact on the Natural Environment

23.3 km² out of 24.7 km² of the river basin area was afforestable, and all of the area's tree-planting projects have been completed. The central government has recognized the proactive greening activities and pollution prevention measures taken by the project resulting positive impacts on society, ecology and tourism, and thus designated the project

area as “National Scenic Water Area.”

Regarding conservation of rare wild animals, by connecting over 10 rivers, the project makes a large contribution to adjusting and improving the ecosystem (wetlands) between those rivers, thus creating an appropriate habitat for rare species such as the red-crowned crane and the milu (Père David's deer). This is the largest preservation area for the red-crowned crane in China, and is the largest in the world for the milu.



Milu

(3) Land Acquisition and Resettlement

While the project appraisal expected the resettlement of 29,929 people in 6,995 households, the plan was changed when its detail designs were worked out so as to minimize resettlements to 8,977 people in 3,884 households, which can be highly appreciated. However, on the other hand, this change of plans undeniably caused for the schedule overrun of the project.

According to the questionnaires and interviews to farmers, although there were some cases who complained of problems such as delayed payment for land acquisition compensation and reduced incomes due to the resettlement (1 out of 104 people), the relocations and site acquisition as a whole went well and agricultural production and farming income improved thereafter.

(4) Gender Considerations

According to farmer interviews, labor burdens have been reduced and work hours have been shortened for both men and women. This was due to the fact that the amount of water for agriculture was increased by this project, which led to an increase of farmers' income, and farmers invested their income in purchases or group lending of agricultural machines, which reduced farmers' labor burdens and work hours. Shortened work hours are especially welcomed by women, who are allowed to spend more time for housework and child care.

(5) Reduced Flood Damage

The project completion report tells that over 400 million tons of water was drained through the Tongyu River during the flood seasons of 2000, 2003 and 2006, flood damage was greatly reduced.

However, this cannot necessarily be substantiated through the statistical data. As shown in Table 2, while rainfall was 911 mm and flooded land area was 49,000 m² during the

1991 floods (before the project), rainfall was 604 mm and flooded land was 54,000 m² during the 2003 floods (after the project); more land was flooded even though there was less rainfall. This was affected by the fact that there were 1,000km² of wetlands with water retention of 2 billion tons in the

western upstream area in 1991, while in 2003 the wetlands had shrunk to 50km², leading to a steep drop in water retention. In addition, varying rainfall patterns affect the amount of flooded land. That implies that the land area submerged in floods is largely affected by factors other than the project, i.e. the land's water retention and rainfall patterns. Therefore, from the flood damage data, it is difficult to see a direct contribution to the flood control by the project.

Table 2 Flood Damage in Yancheng since 1991

Year/Month	Rainfall (mm)	Flooded Area (10,000 m ²)	Flood Victims (10,000 people)	Economic Loss (RMB 100 mil.)
1991.6	911	49	508	35
2003.6	604	54	453	55
2006.6	411	41	399	29
2007.6	442	14	137	10

Source: Yangcheng Municipal Water Bureau

As stated above, while it is difficult to verify the project's intended impacts (contribution to the regional economic development of Subei, Jiangsu Province) from the statistics, they could be confirmed to a certain extent through the farmer questionnaires. Otherwise, positive impacts were observed on water for domestic use, the natural environment conservation, post-resettlement farming income, etc. No negative impacts can be recognized.

3.5 Sustainability (Rating: a)

3.5.1 Structural Aspects of Operation and Maintenance

3.5.1.1 Operation and Maintenance Systems for Tongyu River

The Jiangsu Province Water Conservancy Department is the general administrative agency for construction works and the Yancheng Municipal Water Bureau is the general administrative agency for operation and maintenance of facilities. At the Yancheng Municipal Water Bureau, the Yancheng Municipal River Management Offices (11 offices) mainly oversee waterways and the Yancheng Municipal Tongyu River Construction Management Agencies (6 agencies) oversee associated facilities such as shiplocks and pumping stations.

Tasks and procedures of operation and maintenance are standardized at each of the Yancheng Municipal Water Bureau's agencies, and actual operations are appropriately conducted based on these standards. Records and reports regarding operation and maintenance are also appropriately taken according to each agency's procedural guidelines, and they are compiled and bound annually and monthly. For example, the Yandu District

Tongyu Riverbank Management Office monitors waterways and reports on topics such as daily observations, abnormalities and accounting. These reports are compiled monthly and annually and submitted to the Yancheng Municipal River Management Office. Copies are bound and kept in the office of its general manager.

Irrigation stations, which are the government's agencies for managing secondary and lesser waterways, are direct contact points with farmers. The irrigation stations have four duties: collecting water fees; publicizing and instructing the country's agriculture policies; managing the implementation of small-scale projects; and flood control measures. Their personnel, duties, budgets, training and such are established by the provincial government, and they can be regarded as reliable management systems.

3.5.1.2 Operation and Maintenance Systems for Irrigated Land

Operation and maintenance of outlying waterways and farmlands are left to villages. The Jiangsu Province Water Conservancy Department and the Yancheng Municipal Water Bureau are not involved in the management of farmlands. The responsible agency for supervising and directing administration of farmlands is the Agricultural Committee of Jiangsu Province Agriculture Department. But it may be ap-



Farmland and ditches

propriate that the provincial Water Conservancy Department and the municipal Water Bureau should be involved in the administration of farmlands from the view point of water supply.

Water users associations (23 associations) have been introduced in some parts of the Yancheng Municipality for the self-administration by farmers. However, since investments in infrastructure and such are required to introduce these associations, the Yancheng municipal government has no specific plan to introduce them for all farmlands due to the financial constraints. In places where the associations have been introduced, they have come to play coordinators' roles, exercising farmland and water management jointly with several villages. Because of this cooperative way, little conflict between villages has taken places, and farm management in general seems to be going better than other areas where farmland management is conducted separately by each village.

3.5.2 Technical Aspects of Operation and Maintenance

According to information obtained through interviews and observations, the Yancheng Municipal River Management Office and the Yancheng Municipal Tongyu River Construction Management Agencies have sufficiently high technical competencies, and no specific technical problems were found in operation and maintenance of facilities.



Training (Datao Shiplock Office)

Systematic and practical trainings have been conducted on every level of administration aiming at the improvement of technical capabilities. The Jiangsu Province Water Conservancy Department conducts annual training for relevant personnel from a macro perspective including quality control and safety control. Each city and county conducts practical waterway management training. For example, the Yancheng Municipal River Management Offices and Yancheng Municipal Tongyu River Construction Management Agencies conduct a variety of trainings on regular and ad hoc basis such as facility maintenance training and small-scale construction management training for technical personnel and accounting training for clerical work personnel. Participants are given well prepared voluminous texts, from which the agencies' seriousness about training can be observed.

On the irrigation station level as well, regular training for staff such as water administration, water irrigation project management, station manager and assistant manager training and accounting are conducted regularly. There seem to be positive efforts across the entire organization to maintain and improve clerical and technical proficiency.

3.5.3 Financial Aspects of Operation and Maintenance

The budgets for the Yancheng Municipal River Management Office (11 offices) and the Yancheng Municipal Tongyu River Construction Management Agencies (6 agencies) are provided by the Municipality. Adding to this, each agency collects funds on its own through, for example, shiplock tolls, small-scale construction contract fees and such. There is also a stratified financial support system by the municipal, county and national governments. With these, sound finance is systematized and no specific problems observed in general.

Insufficient budget for maintenance was mentioned in interviews regarding dredging (shiplock offices) and lining (river management offices), but they do not pose serious impediment on operation and maintenance. In case of a major problem such as extensive

damage to facilities due to a collision by a ship (which has not actually occurred), financial measures are supposed to be taken by the municipal, provincial or national budget depending on the scale of the incident.

The operation and maintenance of small-scale facilities (pumps, gates, etc.) built by the project is covered by water fees levied from farmers by irrigation stations and subsidies from the county. The water fee collection rate is high about 90% or above. Except a small fraction of very poor farmers, the collection rate among average farmers is nearly 100%.

3.5.4 Current Status of Operation and Maintenance

As stated above in 3.5.1, the Yancheng Municipal Water Bureau standardizes procedures and details regarding operation and maintenance of the river, and offices and agencies in charge appropriately execute their duties based on them. Operation and maintenance of outlying waterways and farmlands is left to the villages and water users associations. Although the Jiangsu Province Water Conservancy Department and the Yancheng Municipal Water Bureau are not involved in it, the operation and maintenance has been conducted without any major problems.

No major problems have been observed in the operation and maintenance system, therefore sustainability of the project is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The relevance of this project is high, as it has been taken as an important policy issue of the Chinese government and was implemented by Jiangsu Province and the Yancheng Municipality as an enforcement of the policy. Efficiency is low due to expansion and reductions in outputs, significant schedule overrun and cost overrun. Alternative indicators were used to evaluate effectiveness due to the inability to specify the target area, but since certain positive effects and impacts have been recognized, the effectiveness is evaluated to be moderate. Sustainability is high, as there are no problematic issues with the operation and maintenance system, technical proficiency or finances of offices and agencies in charge. In light of the above, this project is evaluated to be fairly satisfactory.

Besides the results of the evaluation by five evaluation criteria, it is deserved to specially mention the high relevance of the project at present. This project was planned primarily as an agricultural project nearly 20 years ago. However, thereafter, China enjoyed a rapid economic growth during the 1990s, and the conditions and circumstances have changed greatly also in Subei, Jiangsu Province. Meanwhile, the significance of the project increased as a one to provide water not only for agriculture but for overall develop-

ment including industry, commerce and distribution. The current national strategy, the Jiangsu Coastal Development Plan (2009), and the provincial and municipal policies aim at the comprehensive development of this area. And they are all premised on the water from the Tongyu River. Therefore, it is worthy to give special mention to this point that the project has become more significant and highly relevant from the time it was planned to the present.

4.2 Recommendations

4.2.1 Recommendations to Executing Agencies

(1) While there are certain communication channels between the water departments (Jiangsu Province Water Conservancy Department and Yancheng Municipal Water Bureau) and the agricultural departments (Jiangsu Agriculture Department and Yancheng Municipal Agriculture Committee), the water departments do not comprehend the agricultural benefits made by the project and are not involved in farmland administration. Thus an administrative deviation was observed. In order for the water departments to effectively and efficiently implement projects, they need to track the benefits for the final beneficiaries, i.e. farmers, and feed back the results of the tracking to planning, implementation and evaluation of projects. Therefore, it is recommended that the Water Conservancy Department and the Water Bureau further concern with the business of the agricultural departments and to establish closer communication and cooperation with them.

(2) Compared to other provinces (such as Gansu Province), water users associations in Jiangsu Province seem to have been extended relatively slowly. Looking at an example of their introduction in Yancheng Municipality and comparing to villages without associations, they are very beneficial for farmers. Since associations facilitate self-administered farming by farmers involving and coordinating several villages, the inter-village links are strengthened and the management of facilities and water is conducted more effectively and efficiently. There have also been some local success stories. It is recommended that the water user associations be extended widely in the area.

4.2.2 Recommendation to JICA

As JICA has accumulated knowledge and experiences of water users association and farmers organization through its projects in the past, it could provide efficient and effective assistance for the extension of water user associations mentioned above.

4.3 Lessons Learned

(1) For implementing a large-scale project such as this project, an executing agency should plan, execute, monitor and evaluate the project with a wider perspective not only

focusing on the construction but also viewing the final benefits. In particular, it would be desirable to do the long-term continuous monitoring of the benefits brought about by the project starting from construction period until after the completion of the project. With such monitoring, it would become possible to revise plans including high-level objectives as impacts and outcomes and to change the project strategies and implementation methods. And as a result, the feedback of knowledge and experiences to other projects would be realized.

(2) As stated above in 2.3 and 4.1, this evaluation was conducted comparing the current situation with the one of 20 years ago. Because of the changes in social conditions over 20 years, the relevance of the project has changed and data has been scattered and lost, posing difficulties for the evaluation. Therefore, when a project is expected to span a long period of time, it is recommendable to conduct a mid-term evaluation to review the plan at an appropriate timing.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1. Project Outputs	1. River extension/construction (1) New: Funing – Xiangshui, 57 km (2) Extension: Haian – Dongtai – Funing, 158 km	1. River extension/construction (1) As planned (2) Haian – Dongtai cancelled, Dongtai – Funing (120 km) as planned, Taidong River connection (7.6 km) added
	2. Subprojects (1) Haian project (1 shiplock) (2) Xiangshui project (1 shiplock) (3) Beiliutang River project (1 shiplock) (4) Subei Irrigation & Drainage project (irrigation culvert: flow of 800 m ³ /s, drainage culvert: flow of 110 m ³ /s) (5) Abandoned Yellow River project (Abandoned Yellow River culverts: flow of 500 m ³ /s, 1 shiplock and pumping station: 50 m ³ /s pumped) (6) Construction of 18 bridges	2. Subprojects (1) Cancelled (2) As planned (3) Cancelled (4) Subei Irrigation Culvert: as planned (4) Subei Drainage Culvert: demolished after completion (5) Abandoned Yellow River Culverts: as planned (5) 1 shiplock: as planned plus 5 associated facilities added (5) Pump Station: as planned (6) 27 bridges constructed (23 road bridges and 4 agricultural machinery bridges)
	3. Other related facilities Communication facilities, electric power substations, small-scale sluices, pump stations and others	3. Other related facilities Ferries (27), small facilities (421), Jiangdu West Shiplock Upstream Diversion & Sandbar Severance Project, Tongyu River Flood Prevention Command System Project, Hydrological Facility Construction Project
		4. Extra Projects Datao Electric Pumping Station Project
2. Project Period	October 1991 – December 1997 (75 months)	October 1991 – December 2002 (135 months)
3. Project Cost Amount paid in Foreign currency	11,535 million yen	11,532 million yen

Amount paid in Local currency	7,247 million yen (RMB 690 million)	16,162 million yen (RMB 890 million)
Total	18,782 million yen	27,694 million yen
Japanese ODA loan portion	11,535 million yen	11,532 million yen
Exchange rate	RMB 1 = JPY 11.9 (as of Dec. 1994)	RMB 1 = JPY 18.45 (Calculated from disbursed amount (JPY) and actual construction funds (RMB))