

Eastern Seaboard Development Plan Water Resource Development / Water Pipeline Project

Report Date: September 1999
Field Survey: November 1998

1 Project Summary and Japan's ODA Loan

(1) Background

Since there are few large rivers and rainfall is scarce throughout the year in the Eastern Seaboard, the apprehension arose that Eastern Seaboard would fall short of water as a result of large-scale industrial development. In order to meet the increasing demands for water from development of the seaboard and to avoid water shortages which would interfere with economic and social activity, development of water resources (dams) (see (3),1) and water pipeline projects (see (3),2~5) were planned. In addition, these projects were to be part of Eastern Seaboard Development Plan.

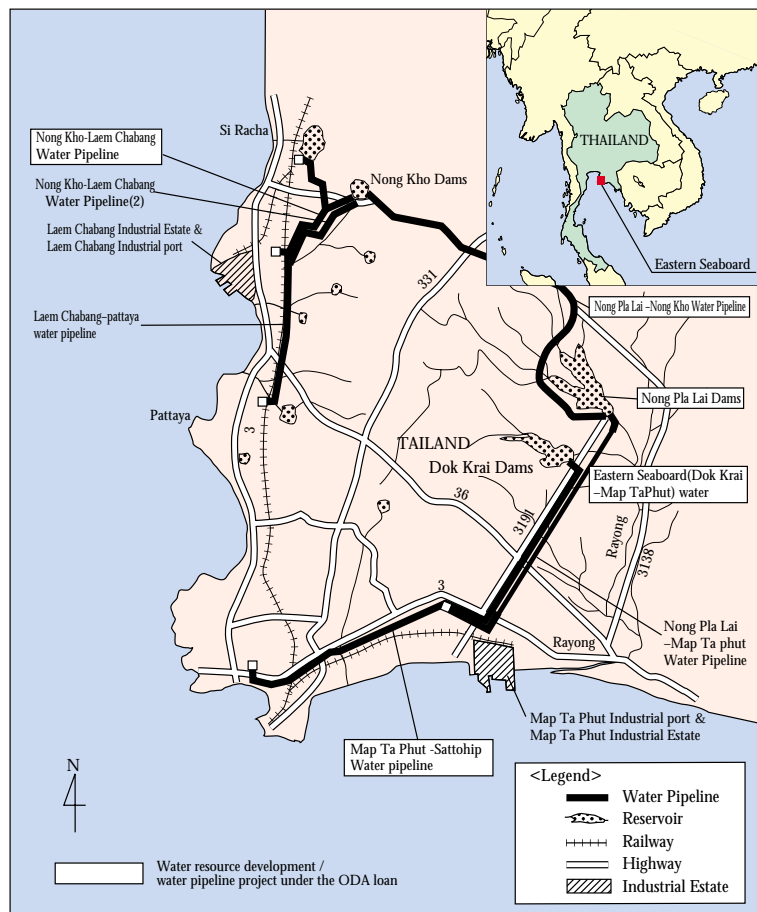
(2) Objectives

To keep up with the growing demand for domestic and industrial waters in the western coastal area of Eastern Seaboard, including Laem Chabang, and in the southern coastal area of Eastern Seaboard, including Map Ta Phut.

(3) Project Scope

The ODA loan applies to full amount of the foreign currency and a part of the local currency for Projects 1, 3 and 5, and the ODA loans covered the full amount of the foreign currency with regard to Projects 2 and 4. The evaluation

items for this time are 1, 3 and 5; however since the five projects including 2 and 4, as a whole, are to exhibit the desired effects as a network, all of the five projects are evaluated in terms of their operation and maintenance performance.



Project Name	Executing Agency	Remarks
1. Nong Pla Lai Reservoir Project	RID ¹⁾	Development of reservoirs In the scope of present evaluation
2. Nong Kho - Laem Chabang Water Pipeline Project	PWD ²⁾	Water transmission to the western coastal area Ex-post evaluation was conducted before In the scope of present evaluation
3. Nong Pla Lai - Nong Kho Water Pipeline Project	PWD	
4. Eastern Seaboard (Dok Krai - Map Ta Phut) Water Pipeline Project	RID	Water transmission to the southern coastal area Ex-post evaluation was conducted before
5. Map Ta Phut - Sattahip Water Pipeline Project	RID	In the scope of present evaluation

Note: 1) RID: Royal Irrigation Department, Ministry of Agriculture and Cooperatives
2) PWD: Public Works Department, Ministry of Interior

(5) Outline of Loan Agreement:

	Nong Pla Lai Reservoir Project	Map Ta Phut - Sattahip Water Pipeline Project	Nong Pla Lai - Nong Kho Water Pipeline Project
Loan Amount	¥4,357million	¥1,459 million	¥6,362 million
Loan Disbursed Amount	¥3,226 million	¥1,052 million	¥4,102 million
Date of Exchange of Notes	September 1988	September 1988	December 1992
Date of Loan Agreement	September 1988	November 1988	January 1993
Loan Conditions			
Interest Rate	2.9%	2.9%	3.0%
Repayment Period (Grace Period)	30 years (10 years)	30 years (10 years)	25 years (7 years)
Final Disbursement Date	January 1995	March 1994	May 1999

2 Analysis and Evaluation

(1) Project Scope

Nong Pla Lai Reservoir Project (hereinafter referred to as ND Project), Nong Pla Lai-Nong Kho water pipeline project (hereinafter referred to as N-N water pipeline project) and Map Ta Phut-Sattahip water pipeline project (hereinafter referred to as M-S water pipeline project) were respectively implemented almost as scheduled. As part of the consulting services for the project of ND project, preliminary feasibility study for the construction of the underground dam and training of experts for such a study were added to the scope of the project.

(2) Implementation Schedule

ND project was finished 4 months earlier than the original schedule, and this performance can be said to be good. N-N water pipeline project was completed about one year behind the schedule. This delay was due to the time required for evaluating tenders and for purchasing the land, but after the construction began, the construction proceeded as scheduled without significant delay. This performance can be said to be generally good. M-S water pipeline project was completed about 2 years later than the schedule. Since the case of the delay was slow progress in selecting a consultant and contractor, administrative procedures at RID are expected to be improved further.

(3) Project Cost

The total project cost of the ND project was slightly over the original plan, and the major reason thereof was that the cost for purchasing the land was more than 1.5 times that of the original plan. The total project cost for N-N water pipeline project was about 60% of the original plan, due to tax-exemption for purchasing equipment, heated competition in bidding, and depreciation of baht's exchange rate to yen. The total project cost for M-S water pipeline project was approximately the same as the original plan (around 90% of the original plan).

Comparison of Original Plan and Actual

Item	Plan	Actual
1. Project Scope		
• ND project		
Reservoir (storage area/effective storage capacity)	22.9 km ² /151.9 million m ³	22.9 km ² /151.2 million m ³
Dam body height/dam body length	Homogenous earth-fill dam	Homogenous earth-fill dam
Other facilities	23.5 m/4,060 m	24.0 m/4,060 m
Other facilities	Roads, administration building etc.	Roads, administration building etc.
• N-N Water Pipeline Project		
Water pipeline	Steel pipe 1,350 mm x 38.78 km	Steel pipe 1,350 mm x 38.78 km
Pumping system	Steel pipe 900 mm x 4.5 km	Steel pipe 900 mm x 4.5 km
Other facilities	9 units	9 units
Other facilities	Flow control system	Flow control system
• M-S Water Pipeline Project		
Water pipeline	Steel pipe 1,600 mm x 22.6 km	Steel pipe 1,600 mm x 22.6 km
Pumping system	Steel pipe 900 mm x 8.3 km	Steel pipe 900 mm x 8.3 km
Other facilities	Steel pipe 700 mm x 14.3 km	Steel pipe 700 mm x 14.3 km
Other facilities	3 units	3 units
Other facilities	Administration building, etc.	Administration building, etc.
2. Implementation Schedule		
(commencement to completion)		

• ND Project	January 1990 to November 1993	September 1990 to July 1993
• N-N Water Pipeline Project	September 1993 to February 1996	April 1994 to April 1997
• M-S Water Pipeline Project	August 1989 to December 1990	July 1991 to March 1993
3. Project Cost		
(Unit: million yen)	(Total/ ODA loan portion)	(Total/ ODA loan portion)
• ND Project	8,615/4,357	9,255/3,226
• N-N Water Pipeline Project	12,532/6,362	7,626/4,102
• M-S Water Pipeline Project	1,570/1,459	1,450/1,052

(4) Project Implementation Scheme

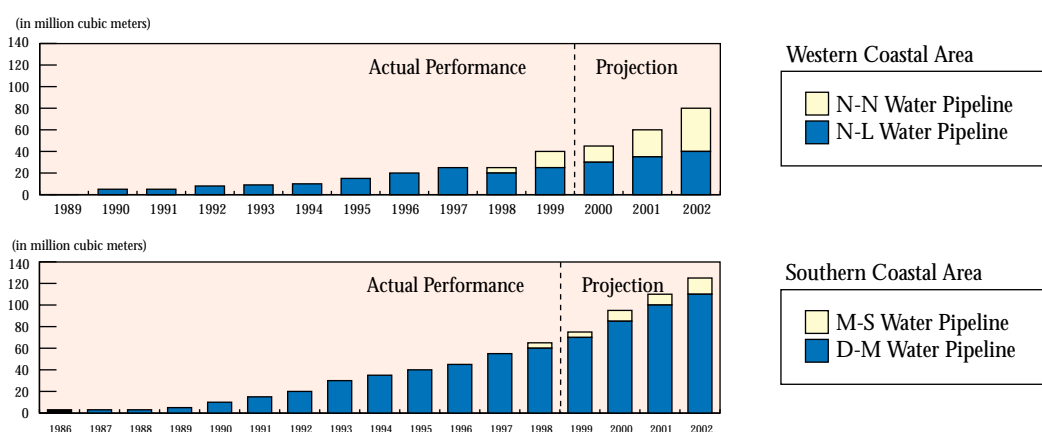
The executing agencies are RID and PWD. Both agencies have necessary experience and capability in waterworks projects, and for the projects for this evaluation, both of them generally exhibited good performances. As noted in "Implementation Schedule," however, in the case of the M-S water pipeline project, there is some room for further improvement in administrative procedure at RID.

(5) Operations and Maintenance

Operations and maintenance of Nong Pla Lai Reservoir is conducted by RID, as in the case of its construction project implementation. With regard to the water pipeline projects, their operation and maintenance, after the foundation of East Water Resources Development and Management Public Co., Ltd. (East Water) in 1992, were commissioned to East Water, the only agency responsible for supplying raw water in the Eastern Seaboard of Thailand. Initially, East Water was established as a state owned enterprise, and since then, privatized by opening 51% of the stock publicly. After being placed in operation, East Water has continued improving operation efficiency through automation, and East Water is a representative case in which privatization brought improvement in operational efficiency in water supply in Thailand.

(6) Operational Performance

The water transmission amount by each water pipeline is as shown in graphs below, and the data in 1999 and in the subsequent years are based upon projections by East Water.



The water transmission pipelines in the western coastal area supply industrial water mainly for Laem Chabang Industrial Estate and domestic water for Laem Chabang City and Chonburi City. The water transmission pipelines in the southern coastal area supply industrial water in Map Ta Phut Industrial Complex and domestic water in Sattahip City and Ban Chiang District. In both N-N water pipeline and M-S water pipeline, their utilization rate still remains low, because operation just started in 1998, but it is projected to grow along with the development of domestic water distribution facilities in Sattahip City, Ban Chiang District, etc. In addition, the water supply amounts from Nong Pla Lai Reservoir are shown in the table below, and as known from this table, the supply amount has grown year by year after the completion of the dam.

	Projection at the time of appraisal (2001)	1994	1995	1996	1997
Supply amount (million m ³ /year)	104	50	56	76.8	78.8

(7) Management Performance of East Water

The financial status of East Water in charge of operation and maintenance of water transmission pipelines, recorded more than 40% net profit, and as a private company, is in a stable management.

(8) Project Effects and Impacts

(i) Quantitative Effects

(a) Water Transmission Amount

The water transmission amount achieved by five projects (in fiscal 1998) consists of 9.4 million cubic meters of industrial water and 13.7 million cubic meters of domestic water in the western coastal area, and of 58.6 million cubic meters of industrial water and 1.9 million cubic meters of domestic water in the southern coastal area. These projects have achieved their project objectives as designed in keeping up with the growing demand of waters associated with industrialization and urbanization of Eastern Seaboard.

(b) Financial Internal Rate of Return (FIRR)

FIRR based on the actual performance is 1.9% (5.2% if the uniform rate between N-L and N-N water pipeline projects is assumed) for the western coastal area water transmission project, and 9.7% for the southern coastal area water transmission project. Furthermore, FIRR of Nong Pla Lai Reservoir project takes on 5.9%, even if the calculation assumes the benefit coming from water transmission project only.

(ii) Qualitative Effects

The five projects have played an important role in realizing industrial development of Eastern Seaboard including both Laem Chabang and Map Ta Phut areas, through stable supply of waters indispensable for the industrial development.

3 Lessons Learned

Entrusting of the operations and maintenance for the water supply system to the private sector can lead to the efficient performance in the operation and maintenance system, if necessary preconditions are sufficiently met. These preconditions include the limitation of the contents of services entrusted, the initial arrangement of the business environment by the government, and so forth. Considering the importance of meeting these preconditions, it is necessary for the developing country's government and its executing agency to examine these preconditions sufficiently and then to determine what should be entrusted.



Pump Room in the Estate of East Water Company



Nong Pla Lai Reservoir Spillway