

Porong River Rehabilitation Project

Report Date : October, 2002

Field Survey: August, 2001

1 . Project Profile and Japan's ODA Loan



Location Map of the Project



Downstream view from Porong Bridge



Upstream view at Lengkong Dam

1.1 Background

A number of projects were executed on the Brantas River, the second longest river in Java Island, in line with the Brantas River Basin Development Master Plan, prepared in 1959 with the assistance of the Japanese Government. Porong River is situated in the lower reaches of the Brantas River. Rehabilitation was first implemented as a part of said master plan in 1978 with a Japan's ODA, in an effort to control flooding and provide water for irrigation in the river basin.

Since the first rehabilitation project, the area along the river had been heavily excavated in order to collect sand and gravel for use in construction. As a result, flood damage, including drainage of sand, erosion or scouring of levee embankments and leakage, increased. A subsequent rehabilitation project was needed to prevent more flood damage.

1.2 Objectives

To protect the Porong River basin in the Brantas delta from flood damage and thereby contribute to securing a stable food supply for local residents, improving their standard of living and improving the regional economy.

1.3 Project Scope

The project scope is composed of the following three components:

- (i) Rehabilitation work on existing river structures such as levees, intake gates and bridge footing; providing protection to levees and bridges
- (ii) Dredging work at the Porong River estuary (500,000 m³)

- (iii) Rehabilitation of Inspection Road (234,000 m³)
- (iv) Procurement of O&M Equipment
- (v) Consulting Services (Detailed Design and Construction Supervision)

Figure 1 : Project Site Map



note : Sub-sections A, B and C above, indicated in red, are shown in detail in Attachment 1

1.4 Borrower / Executing Agency

The Government of the Republic of Indonesia / Directorate General of Water Resources Development (DGWRD), Ministry of Public Works

Actual Implementation Unit is Brantas River Basin Development Project.

1.5 Outline of Loan Agreement

Loan Amount	1,767 million yen
Loan Disbursed Amount	1,667 million yen
Exchange of Notes	April, 1988
Loan Agreement	July, 1988
Terms and Conditions	
Interest Rate	3.0% p.a.
Repayment Period (Grace Period)	30 years (10 years)
Procurement	General Untied
Final Disbursement Date	September, 1994

2 . Results and Evaluation

2.1 Relevance

At the time of project appraisal, the government advocated rehabilitation work to restore the original function of the existing river structures -- levees, bridge piers and intake gates -- that had been damaged by the excessive sand mining. The project objective was consistent with government requirements.

And this project still complies with national development policy, which is summarized below. Moreover, protecting the beneficiary area, which includes the second largest city, Surabaya, is truly indispensable considering the population and GRDP¹ growth.

<Major policy goals in National Development Plan by PROPENAS (2001-2005) >

- a) Maintenance of high economic growth and control of population growth
- b) Promotion of equitable growth and reduction of gaps between regions, social groups, sectors and urban and rural areas, as well as eradication of poverty within the population
- c) Reduction of unemployment and underemployment through job creation, productivity improvement and reduction in unbalanced population distribution
- d) Development of human resources
- e) Development of science and technology to aid Indonesia's transition to a developed, self-reliant nation
- f) Maintenance of balance between high economic growth and conservation of natural resources
- g) Development of an appropriate legal system and strengthening of social institutions that would minimize adverse impacts of economic growth on social values and culture

2.2 Efficiency

2.2.1 Project Scope

The project was completed mostly as planned. Minor revisions and additional works were incorporated during the implementation stage, to meet the requirements of the actual site conditions (see "Comparison of Original and Actual Scope" for detail).

2.2.2 Implementation Schedule

The start of the project was delayed by one year when the loan agreement was postponed. The project was completed in March 1994, behind schedule by 1.5 years.

¹⁾ The population and GRDP in East Java are as follows:

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Population (10 ³)	995	1,017	1,033	1,048	1,068	1,091	1,111	1,130	1,148	1,185
GRDP (10 ⁹ Rp)	1,276	1,559	1,753	2,693	3,036	3,430	3,966	4,664	6,608	7,555

2.2.3 Project Cost

The total project cost was 1,646 million Yen, 77 percent of the original estimate of 2,135 million Yen. In addition, the total loan disbursement is 1,594 million Yen, which less than the original estimate of 1,767 million Yen. This cost under-run can be attributed to three factors: lower O&M equipment procurement cost, and limited price escalation.

2.3 Effectiveness

2.3.1 Flooding Record in the Project Area

There were some floods recorded before the project completion²⁾. However, no floods have been recorded from 1994-2000, and consequently the project seems to have accomplished its original purpose of improving flood control in the Porong River, though there are some facility defects at the moment (see 2.5.2 Current Status of the Project Facilities).

To assess the project's effectiveness from a different angle, an Interview Survey³⁾ of beneficiaries was conducted. Figures 2 and 3 illustrate the results of the Survey; the former shows the responses of beneficiaries when asked to compare the extent of flood damage before and after the project. Figure 3 reflects respondent's feelings of security.

Figure 2 : Comparison of flood damage before and after the project

²⁾ Following are the samples of flood record before the project completion.

Date	Flood Discharge (m ³ /sec.)	Flooded Area (ha)	Inundation Days (days)	No. of Flooded Houses (houses)
10 Feb, 1984	1,420	14 (paddy)	10	134 in K. Sadar basin
13 Apr, 1984	1,470	244 (paddy/fishpond)	4	353 in K. Sadar basin
20 Feb, 1987	n.a.	200 (fishpond)	n.a.	n.a.

³⁾ During the field study on the project, a questionnaire-based Interview Survey of beneficiaries was carried out in order to examine the project effect/impact derived after the project completion. A hundred (100) interviewees were selected from the three Regencies (Sidoarjo, Mojokerto and Pasuruan), in consultation with the project office. Their respective populations are as follows: Sidoarjo, 255,000 as of 1998; Mojokerto, 295,000 as of 1997; Pasuruan, 154,000 as of 1998, for a total of 704,000. The major interview items are: 1) suffering record and people's assessment in terms of security, sanitation and socio-economical benefit, 2) impact/indirect effect of the project, and 3) further requirements and recommendations.

<Before Project (N=100)>

<After Project (N=100)>

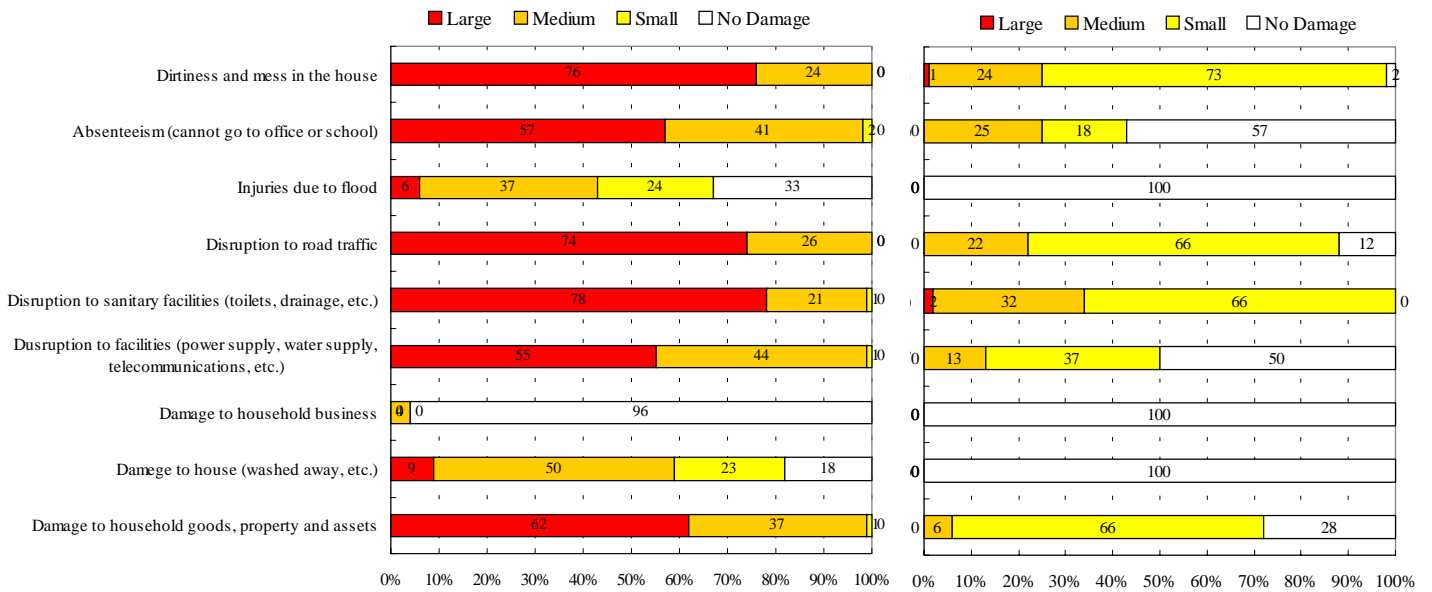
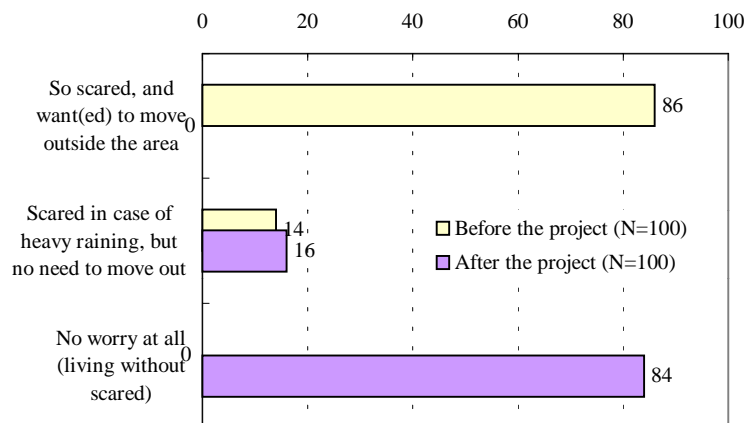


Figure 3 : An Assessment on regional safety and security



The degree of damage generally declined. Accordingly, most of the respondents can, at present, live without being threatened by floods, whereas prior to project completion, worries about potential flooding made them consider relocating.

2.3.2 Recalculation of EIRR

The EIRR of the current Project was re-calculated following the same methodology used at the time of appraisal regarding setting assumptions, applying the estimated annual expenditure and the theoretically expected benefit. The EIRR for 50 years' operation was re-evaluated at 7.5%, almost same as the projection of 7.8% at the time of project appraisal.

2.4 Impacts

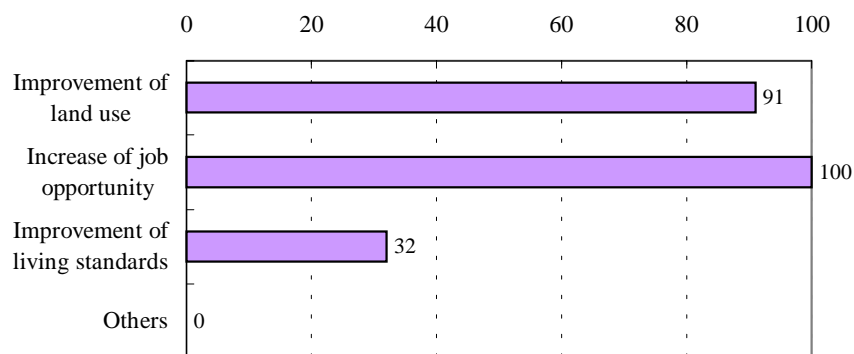
2.4.1 Impacts on Environment

No environmental impact has been reported so far by the project office.

2.4.2 Impacts on Socio-Economy

It is difficult to quantitatively analyze how the project contributes to improvement of the regional economy. Thus, an Interview Survey is helpful in providing insight into the effects of the project. In response to the Survey question, “Do you think this project supports economic activity?” 100 % said they believe the project has sufficiently contributed to the regional economy. Following the previous question, respondents were asked a multiple-choice question in an attempt to specify the type of contribution. Results are shown in Figure 4. Most of the respondents said the project increased job opportunities and improved land use, and 30% said that the project contributed to improve living standards. In addition, since this project did not necessitate relocation/resettlement, social conflicts did not arise.

Figure 4 : An assessment of regional economy (N=100)



2.5 Sustainability

2.5.1 Operation and Maintenance

The project was implemented by the Brantas River Basin Development Project Office, then handed over to the PJT-I (Perum Jasa Tirta : Water Service Corporation), which has been responsible for the O&M of the project since PJT-I was established in 1990, in accordance with Government Regulations. Its mission is to:

- Operate and maintain water resources infrastructure;
- Manage the river basin, e.g. the conservation, development and utilization of water and water resources;
- Rehabilitate water resources infrastructure;
- Provide raw water for such purposes as drinking water supply, electricity enterprises, agricultural enterprises, fisheries enterprises, industry, port, flushing, and other enterprises which utilize water and energy generated from water;

- Provide water for industry, potable water and wastewater treatment.

As of 2000, PJT-I has a staff of 463 in number, including its Board of Directors. 45 are in charge of O&M activities for the project and more staffs are in need. The technical level of the staff, based on a self-assessment, is adequate in implementation and operation/maintenance capability, although one potential major issue is the aging of personnel (the majority of the staff are over 40). This situation may cause lowest mobility and flexibility of the staff, increasing the human resources management burden. To cope with this situation, it is necessary for PJT-I to make efforts to introduce younger staff and rejuvenate the organization's capability and vibrancy.

2.5.2 Current Status of the Project Facilities

Riverbed degradation is found to be lower than the original design, set in the flood control master plan, at around two meters in the downstream area and five meters in the upstream area of the Porong River.

Three factors which causes the degradation are: a decrease in sediment transportation, the result of trapping by dams and weirs upstream; excessive sand mining in the Brantas River; and the maternal flow of the Porong River. The levee and revetment at several sites between the New Lenkong Dam and the toll road bridge have been damaged due to riverbed degradation, causing structural collapse and sliding.

Riverbed degradation has also caused eroding and scouring in the levee as the water currents collide in the river channel, making riverbed conditions irregular. Those damaged levee and river structures are anticipated not to be durable for the large magnitude of floods over a fifty-year return period.

The ground sills, located downstream of the toll road bridge, were constructed in 1990. Originally 100 m wide, a 20-m section on the left side partially collapsed in 1991 and was restored 1995. On the right side, a 40-m section was damaged in 1995 and reconstructed in 1996 by PJT, then washed away again in the same year (see Figure 5). No reconstruction work has been performed since 1996. Restoration work on the structure is recommended to protect the pier foundations of the toll road bridge from further exposure.

Figure 5 : A View from Porong Expressway Bridge



Levee collapsed due to riverbed degradation

2.5.3 Financial Status

Table 1 shows O&M costs for 2000, including all the river jurisdictions, as reported by the Bureau of Planning and Control, PJT-I. P1 covers urgent repair/ rehabilitation and P2 indicates normal (routine) O&M activities. Actual O&M expenditures from 1998 to 2000 are indicated in Table 2.

Table 1 : Required O&M Cost in 2000 (million Rp.)

O&M Works	Yearly Cost
P1 (absolutely necessary)	33,054
P2 (necessary as normal O&M)	24,757
Total	57,811

source: PJT-I, Bureau of Planning and Control

Table 2 : O&M Expenditure (million Rp.)

Year	Actual O&M Cost
1998	24,647
1999	27,480
2000	26,674
Average (1998 - 2000)	26,277

source: PJT-I, Admin. and Finance Bureau

Based on the data above, the cost coverage ratio as a whole is around 45% on average, barely covering the amount necessary for normal O&M.

2.5.4 Project Sustainability

The project achieved its original purpose of strengthening flood control capacity; however the facilities are being compromised by riverbed degradation, the result of intensive sand and gravel mining activities in the river basin. Rehabilitation of the

facilities and control of river sand mining are required urgently. Even with the implementation of the measures, however, the project will not be fully sustainable. Strengthening the finances of the O&M body is of course required. Furthermore, finding a way to terminate illegal sand mining activities is indispensable for sustainability. Though the provincial government of East Java enforces regulations⁴⁾ on sand mining, they have not been effective in stopping the activity. According to the project staff of PJT, sand miners take sand and gravel from areas close to Surabaya City, rather than from the mountainside, which the government recommends as a place for sand mining, because of transportation costs.

These observations were confirmed in “The Study under JBIC SAPS for 24 infrastructure Rehabilitation Projects (July 2001).” The report recommended implementing the following works in order to recover and retain the facilities:

- 1) Construction or repair of such river structures as levee, revetment and groundfills
- 2) A comprehensive sediment management study, carried out as an engineering research effort
- 3) Financial strengthening of the PJT to make O&M sustainable

The rehabilitation works will be implemented under Japan’s ODA loan, named “Water Resources Existing Facilities Rehabilitation and Capacity Improvement Project”⁵⁾.

3 . Lessons Learned

A study of social aspects, including project-related human activities such as sand mining should be incorporated in project formulation.

4 . Recommendations

Sand mining activities in the river basement must be prevented through further enforcement of governmental law, which prohibits this activity. As a result, local communities should be made aware of the law. Such an intensive excavation cannot help but damage the river structures through riverbed degradation, seen not only in this project but also in other rivers such as Brantas, Solo, Madiun and Ular.

⁴⁾ A Governor’s instruction of “Prohibition of sand mining along the Brantas River, Surabaya River, Porong River and Marmoyo River and the transfer of sand mining to Mt. Kelud and Mt. Semeru” in 1994, “Forbidding mining activities without permission by Water Resources Development Services on the Brantas River” in 1995 and “Prohibition of sand mining without permission on the Brantas River basin” in 1997.

⁵⁾ Loan Agreement (L/A) for Water Resources Existing Facilities Rehabilitation and Capacity Improvement Project was concluded on October 10,2002.

Comparison of Original and Actual Scope

Item	Plan	Actual
(1) Project Scope		
1. Rehabilitation Works		
a) Revetment		
-Wet Masonry	56,720 m ²	<i>5,679 m length</i>
-Gabion Mattress	2,020 m	0
-Concrete block masonry	-	<i>1,518 m length</i>
b) Levee Embankment (slope=1:2, width=3-5)	52,550 m ³	496,900 m ³
c) Foot Protection	6,200 m	<i>1,712 m length</i>
d) Groin	297 set	<i>2,023 m length</i>
e) Dredging of River Mouth	500,000 m ³	333,892 m ³
f) Repairing of Gate		
-Gate	3 nos@7.20 × 2.00 m	4 nos@7.00 × 1.50 m
-Hoist	2 nos@7.45 × 2.00 m	1 nos@7.00 × 2.50 m
g) Protection of the Porong Bridge	5 nos	as planned
h) Improvement of Inspection Road	1 set	3 sets
-New Construction	80,850 m ²	<i>25,365 m length</i>
-Rehabilitation	234,500 m ²	<i>10,904 m length</i>
i) Improvement of gabion wall	1,500 m ²	0
j) Protection against Seepage	675 m ²	<i>7,248 m length</i>
k) Bridge Construction	1 set	2 sets
l) Siphon	-	2 lanes@1.50 × 1.50 m
m) Drainage Sluice	-	3 sets
n) Widening of high water channel	-	970 m length
o) Bangil tak Spillway	-	1 set
1. O&M Equipment		
a) Bulldozer (20t)	1 set	0
b) Bulldozer (15t)	1 set	2 unit
c) Swamp Dozer (13t)	2 set	4 unit
d) Dozer Shovel (1.2m ²)	1 set	0
e) Dump Truck (6t)	6 set	4 unit
f) Grease Car (6t)	1 set	0
g) Motor Grader (13t)	1 set	1 unit
h) Ordinary Truck (6t)	2 set	4 unit
i) Tamping Rammer (80kg)	4 set	0
j) Water Pump (4kg)	4 set	0
k) Service boat (35HP)	1 set	0
l) Vibro Hammer	1 set	4 unit
m) Sheet Pile 12m (pcs)	2,000 pcs	<i>480 unit@12 m</i>
n) Trailer (30t)	1 set	0
o) Spare parts	1 set	0
p) Cargo Truck w/h Crane (6t)	-	2 unit
q) Diesel Pile Hammer w/h Leader (1.5t)	-	2 unit
r) Wheel loader (1.2m ³)	-	1 unit
s) Hydraulic Excavator (0.4m ³)	-	1 unit
2. Consulting Services	Total : 168 M/M (Foreign : 89 M/M) (Local : 79 M/M)	Total : 190.4 M/M (Foreign : 87.5 M/M) (Local : 102.9 M/M)

<p>(2) Implementation Schedule</p> <p>1. Loan Agreement</p> <p>2. Procurement of Goods and Services</p> <p>a) Consultant -E/S Contract -Detail of Design</p> <p>b) Procurement of Civil Works for Revetment Groin etc.</p> <p>c) Procurement of Equipment & Parts for O&M</p> <p>d) Procurement of Metal Works (Gates)</p> <p>3. Construction Works</p> <p>a) Protection of Porong Bridge Footing</p> <p>b) Dredging of Estuary</p> <p>c) Revetment</p> <p>d) Levee Embankment</p> <p>e) Foot Protection</p> <p>f) Groin</p> <p>g) Improvement of Inspection Road</p> <p>h) Improvement of Gabion Wall</p> <p>i) Protection against Seepage</p> <p>j) Rehabilitation of Banjil Tak Floodway</p> <p>4. Engineering Services (Supervision and O&M)</p>	<p>Oct. 1987</p> <p>Mar. 1988 Apr. 1988 – Oct. 1988 May 1988 – Mar. 1991</p> <p>Nov. 1988 – Mar. 1991</p> <p>Nov. 1988 – Mar. 1991 (Installation Feb. 1992 to Mar. 1992 and Oct. 1992)</p> <p><Urgent Repair> Jun. 1990 – Nov. 1990 <Groundsill> Jun 1991 – Dec 1991</p> <p><Urgent Repair> May 1990 – Oct. 1990 <Groundsill> May 1991 to Sep. 1992</p> <p>Apr. 1990 – Dec. 1992</p> <p>(: completion)</p>	<p>Jul. 1988</p> <p>Aug. 1989 Jun. 1989 – Jun 1990 Aug. 1991 – Feb. 1994</p> <p>Nov. 1992 – Nov. 1993</p> <p>included in Package II schedule of Rehabilitation Works</p> <p><Urgent Repair> Aug. 1989 – Dec. 1989 <Groundsill> Aug. 1990 – Jan. 1991</p> <p>Aug. 1991 – Feb. 1994</p> <p>Jun. 1989 – Mar. 1994</p> <p>(: completion)</p>
<p>(3) Project Cost</p> <p>Foreign currency</p> <p>Local currency</p> <p>Total</p> <p>ODA loan portion</p> <p>Exchange Rate</p>	<p>1,237 million yen 895 million yen (10,173 million Rp) 2,135 million yen 1,767 million yen 1Rp. = 0.088 yen (as of 1987)</p>	<p>1,096 million yen 550 million yen</p> <p>1,646 million yen 1,594 million yen</p>

Independent Evaluator's Opinion on Porong River Rehabilitation Project

Mochammad Maksum
Agricultural Economist and Director of the Center
for Rural and Regional Development Studies,
Gadjah Mada University, Yogyakarta Indonesia

The objectives of the project are still very relevant to the national development policy of the Republic of Indonesia. Technically, the project was completed as planned with minor revision and additional work as compared to the original plan. Though the completion of the project was reported as 1.5 years late than the original schedule, financial performance of the project was characterized by a cost under run of about 77 %.

Physical effectiveness was remarkably shown by the project based on the fact that there is no more flood experienced by the beneficiaries. While, at the financial level, recalculated EIRR of 7.5% is almost the same with that estimated in the appraisal

Simple observation based on perceptual survey shows that the impact of the project on regional economy was perceived to be significant. However, the reviewer is failed to elaborate the extent to which the impact of the project on socioeconomic improvement of the beneficiaries has been attained.

The existence of the PJT-I as a public-owned company could institutionally guarantee sustainable operation of the system on commercial basis. However, financial status in the O&M was proven to be poor. Actual spending in O&M was realized only at an average rate of 45% from what should have been required.

In addition to those, physical sustainability of the project would be very much constrained by riverbed condition, which is reported as getting lower and lower due to excessive sand mining illegally done by the people.

It is recommended, therefore, that progressive public policy needs to be formulated to regulate mining activities simultaneously supported by intensive public advocacy needs to be intensively conducted on participatory basis to conserve the system.