Indonesia

Wonorejo Multipurpose Dam Construction Project (1) (2)

External Evaluator: Takuya Okada

Field Survey: October 2004

1. Project Profile and Japan's ODA Loan

Project site location map

Wonorejo Dam Admin Bldg.

1.1 Background

The City of Surabaya[1] (the capital of East Java province; population 2.62 million, 2002; area 274km^2) is the second largest city in Indonesia after DKI Jakarta where energetic industrial and economic activity in the decade spanning 1980 to 1990 resulted in dramatic growth[2]. Meanwhile, water shortages were a perennial problem during the dry season, with particularly acute shortfalls occurring in 1982 and 1987[3]. Under these circumstances and with demand for residential and industrial water in the lower Brantas watershed forecast to expand still further, there were urgent needs to secure new water resources. Furthermore, damage due to the flooding of the Song and Gondang rivers was a perpetual problem in the Tulungagung regency (population 940,000, 2002), which is situated in the middle of the Brantas River basin, and ongoing power shortages were another problem for the regency.

1.2 Objectives

This project's objective was to supply raw water for residential and industrial use to

[1] The city is 20% larger than Osaka prefecture (222km^2); its population is similar to that of the City of Osaka (2.63 million as of January 2005).

[2] Between 1980 and 1990, the population of East Java increased at an average rate of 1.1% per annum, but the population of Surabaya increased at a much faster rate of 3.0%. Further, while gross regional domestic product (GRDP) growth for the province averaged 6.9% (1985-1989), in Surabaya it grew at 10.9% per year during the same period.

[3] Protracted dry seasons in these years led to droughts causing an extreme drop in the flow of the Surabaya River, which in turn resulted in major social problems in Surabaya due to the deterioration of mains water quality sourced from the Surabaya and supplied by the municipal water board, foul-smelling water and so forth.

Surabaya and its environs through the construction of a multipurpose dam in Tulungagung, a regency situated in the Brantas River Basin in East Java, in an effort to mitigate flood damage to the area and to improve power supplies, thereby contributing to regional economic growth and improved living standards.

1.3 Borrower/Executing Agency

Government of the Indonesian Republic/Directorate General of Water Resources, Department of Public Works

1.4 Outline of Loan Agreement

	Phase 1	Phase 2	Total
Loan Amount Disbursed Amount	14,713 million yen 14,436 million yen	37,56 million yen 2,811 million yen	18,469 million yen 17,247 million yen
Exchange of Notes Loan Agreement	Oct. 1993 Nov. 1993	Dec. 1996 Dec. 1996	— —
Terms & Conditions Interest Rate Repayment Date (Grace Period) Procurement	 2.6% 30 years (10 years) General untied	 2.5% 30 years (10 years) General untied	—
Final Disbursement Date	Dec. 2002	Nov. 2002	—
Main Contractors	Kajima Corporation, Taisei Corporation and local companies		—
Consultants	Nippon Koei Co., Ltd.		—
Feasibility Studies (F/S), etc.	1987: F/S, Government of Indonesia 1991: E/S loan (F/S review and detailed design)		—

2. Results and Evaluation

2.1 Relevance

2.1.1 Relevance of project plans at appraisal

REPELITA V (1989-1993) Indonesia's fifth five-year development plan, which was current at appraisal (1993), was calling for the integrated development of national river basins that encompass both urban and agricultural regions. The Brantas River basin, which was targeted for development under this project, is home to Surabaya, the capital of East Java Province and a city that had witnessed concentrated urban and industrial growth, and there were calls to meet rapidly expanding demand for residential and industrial water. In addition, the Tulungagung regency, situated in the middle reaches of the river basin, was prone to flood damage due to local rivers bursting their banks during the wet season, and power supplies to the regency and its surroundings were unstable. Under these circumstances, the construction of a multipurpose dam in Tulungagung as a means of ensuring water resources for Surabaya and surrounding areas and of providing flood controls and secure power supplies to Tulungagung, was a high priority undertaking.

2.1.2 Relevance of project plans at evaluation

PROPENSAS, the current national development plan (2000-2004) is calling for the service levels of public facilities and infrastructure to be maintained and for improvements to be effected in civilian access to such facilities and services. Integrated river basin management to secure water resources for urban areas, control flooding in the basin area and supply electric power thus continues to occupy a priority position in government policy. The Brantas River basin is being managed in line with the policy set forth in the Master Plan for integrated watershed management (fourth revision 1998), which targets: "the effective conservation and management of water resources to ensure continuous and optimal water use". The Wonorejo multipurpose dam that was constructed via this project is playing a critical role in water resource utilization in the Brantas River basin and thus has great importance.

2.2 Efficiency

2.2.1 Outputs

This project was executed in two phases. A comparison of planned and actual outputs in each of the phases is given in the following table.

Table 1. Comparison of Planned and Actual Outputs

Classification	Planned	Actual
Phase 1	1-1 Dam construction Effective storage capacity: 106Mm^3; Hydroelectric power: 6.2 MW [1)] 1-2 Relocation of provincial roads, construction of access roads 1-3 Infrastructure development at resettlement camp[2)]	Output components 1-1 through 1-3 were essentially completed according to original plans
Phase 2	2-1 Construction of Tiudan weir and head race 2-2 Construction of Tulungagung pumping station 2-3 Dredging of the Parit Agung drainage channel 2-4 Low-water management communications system	Output components 2-1 through 2-3 were completed as planned Output component 2-4 was cancelled
Additions		a-1 Dredging of the Dawir River and former shipping canal a-2 Installation of small hydroelectric generator (200kW)

Notes:

(1) Hydroelectric generating equipment was procured and installed under the Multipurpose Hydroelectric Dam Project (Executing Agency: Indonesia National Power Corp.), which was funded by a Japanese ODA loan in 1996.

(2) The infrastructure comprised roads/bridges, irrigation systems, low-voltage power lines, park areas, clinics, schools and other public facilities.

The Phase 1 project was completed according to plan. With the exclusion of the low-water management[4] communications system, the Phase 2 project was completed essentially in line with the original plans. No feasible bids were tendered for the low-water management communications system at the bidding stage, with the result that this output component was cancelled. In consequence, current low-water management at the dam involves visual checks, but Perum Jawa Tirtan (PJT: the agency responsible for managing the Brantas watershed), which is responsible for the management of dam facilities, reports that there are no specific problems with this method of management. It should be noted, however, that this method lacks both accuracy and expediency by comparison and it is hoped that a remote, fully-automated communications system can be introduced at the earliest possible time[5].

Figure 1. View of Wonorejo Multipurpose Dam

Although not included in the initial plans, additional works were undertaken in the form of dredging in the Dawir River (Tulungagung Regency) and a former shipping canal (Surabaya), and the installation of a small hydroelectric generator. The dredging of the Dawir River was designed to widen the scope of flood controls, while the aim of the work undertaken in the former shipping canal was to facilitate the flow of water to the Karang Pilang water treatment plant in Surabaya City[6]. The small 200kW hydroelectric generator was installed to generate the power (75kW) needed to operate facilities at the Wonorejo dam.

2.2.2 Project Period

The project was subject to an overrun of 22 months against the original plans (126%). Completion was pushed back by delays in the allocation of local currency funds as the Asian currency crisis put pressure on Indonesian government fiscal resources.

---

[4] River water is managed to enable the use of necessary water resources during a drought. The system performs long-term flow forecasts and flow measurements and monitors water intake by users.

[5] Perum Jawa Tirta (PJT) has submitted an application for grant-in-aid to JICA (Japan International Cooperation Agency) in connection with the introduction of a low-water management communications system (April 2004).

[6] PDAM Kota Surabaya, the municipal water board, in light of progressively severe pollution levels in the Surabaya River – the source of raw water for the Karang Pilang water treatment plant – and needing to create a new source of water, had begun incremental dredging of the former shipping canal, which virtually parallels the Surabaya, using central government funds; major dredging work was undertaken in this canal via this project (see Figure 2).

Table 2. Comparison of Planned and Actual project Period

	Planned	Actual
Total	Nov. 1993 – Dec. 2000 (86 months)	Nov. 1993 – Oct. 2002 (108 months)
Phase 1	Nov. 1993 – Dec. 2000 (86 months)	Nov. 1993 – Oct. 2002 (108 months)
Phase 2	Oct. 1996 – Aug. 1999 (35 months)	Dec. 1996 – Oct. 2002 (71 months)

2.2.3 Project Cost

All project costs were kept within the scope of the initial budget. This was mainly consequent upon efficient ordering, made possible by the use of competitive bidding.

Table 3. Comparison of Planned and Actual Project Costs

	Planned			Actual		
Total	¥22,727 million	Foreign currency:	¥14,882 million	¥21,935 million	Foreign currency:	¥8,815 million
		Local currency:	¥7,845 million		Local currency:	¥13,120 million
Phase 1	¥17,701 million	Foreign currency:	¥12,045 million	¥16,790 million	Foreign currency:	¥7,989 million
		Local currency:	¥5,656 million		Local currency:	¥8,810 million
Phase 2	¥5,026 million	Foreign currency:	¥2,837 million	¥5,145 million	Foreign currency:	¥826 million
		Local currency:	¥2,189 million		Local currency:	¥4,319 million

2.3 Effectiveness

2.3.1 Supplies of raw water to Surabaya and its environs

Under appraisal plans, the Brantas River was to be supplied with raw water at a rate of 8.0m^3/second during the dry season: i.e. water discharged from the Wonorejo dam at a rate of 5.5m^3/second plus water pumped from the Parit Agung drainage channel at a rate of 2.5m^3/second. However, although the current discharge capacity of the dam is essentially as planned (with water being discharged at an average rate of 5.0m^3/second during the 2002 and 2003 dry seasons [June through November]), no water is being pumped out of the Parit Agung drainage channel, instead it is being used for irrigation at points midway along the channel. This is due to shortages in the design capacity of PDAM Kota Surabaya facilities (water treatment capacity, supply network capacity), which is responsible for treating raw water and supplying treated water.

Fig. 2. Raw Water Supply Mechanism – Wonorejo Dam to the Brantas River

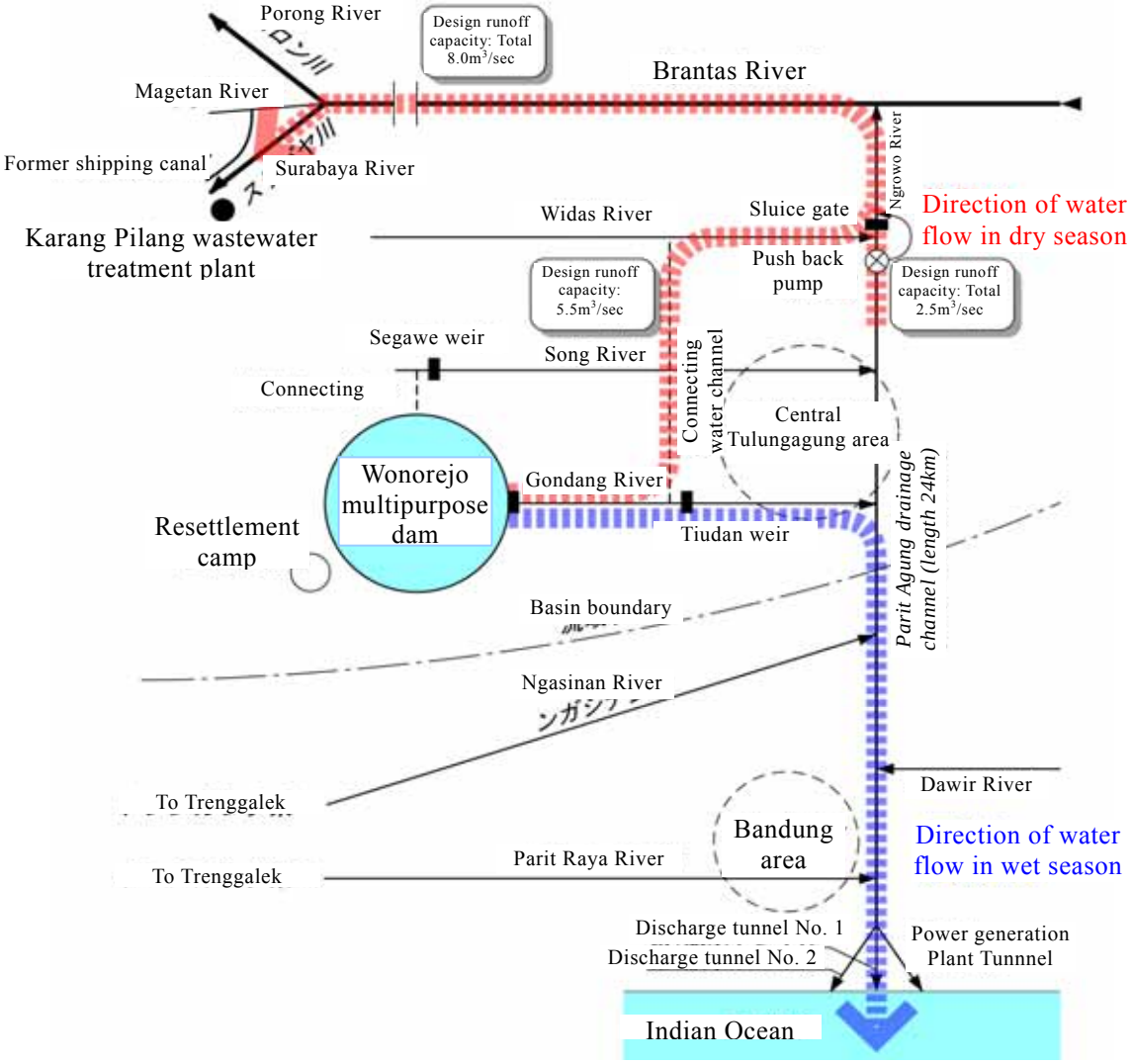
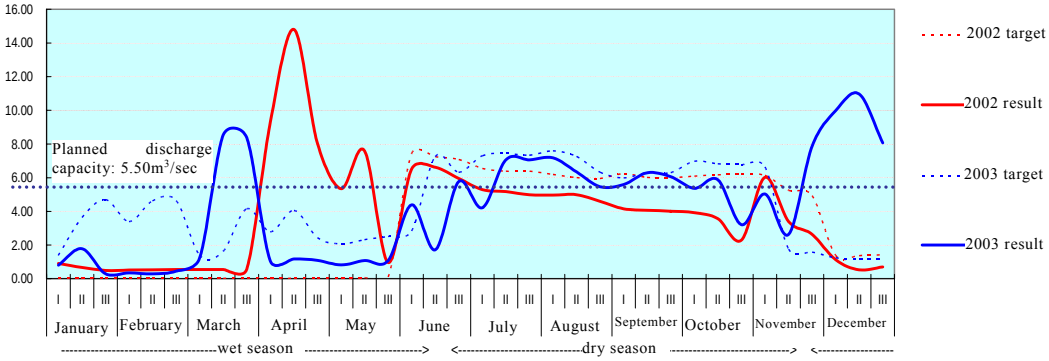


Figure 3 illustrates discharge flows and water levels in the Wonorejo dam. During the dry season water is basically discharged at rates of between 3 m^3/second to 8 m^3/second (following the Wonorejo dam → Gondang River → connecting channel → Widas River → Ngrowo River → Brantas River route); by contrast, greater volumes of water are discharged during the wet season. Water is discharged from the dam during the wet season in order to regulate water levels in the reservoir, thus it is discharged into the Indian Ocean and not the Brantas River (following the Gondang River → Tiudan weir → Parit Agung drainage channel → discharge tunnel → Indian Ocean (Madura Strait) route).

Figure 3. Volume of Water Discharged (Unit: m^3/sec)



Source: Perum Jasa Tirtar (PJT)

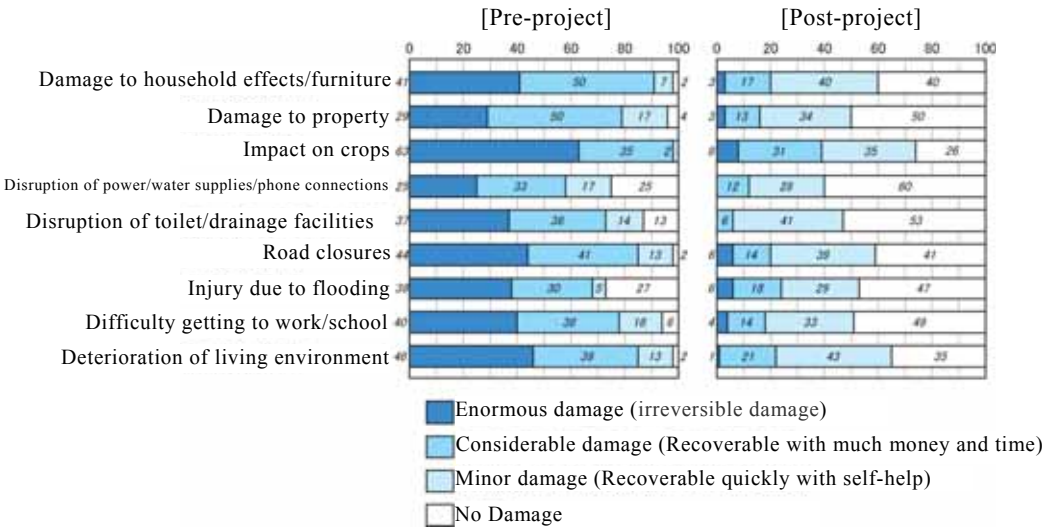
2.3.2 Mitigation of flood damage in Tulungagung

The dam construction work undertaken via this project included construction of weirs on the Song and Gondang rivers. The Segawe weir that was built on the Song River is primarily designed to ensure a diversion for excess water in the dam, while the Tiudan weir that was constructed on the Gondang is basically operated by closing the gate during the dry season and opening it during the wet season, primarily to regulate the direction of flow from the dam. Moreover, both weirs function to protect the lower watershed from 10-year return floods (caused by the rivers bursting their banks). Despite insufficient data on flood damage which precludes an objective assessment of the effects of these structures, findings from the beneficiary survey[7] that was conducted during this field survey show that although many local residents suffered comparatively severe flood damage prior to project implementation (circa 1990), since the project was completed there has been a substantial reduction in the level of damage sustained (see Figure 4). Since the floods for which the structures were designed have been smaller than the 10-year return floods, some crop damage still occurs when arable land is inundated during heavy rains; however, there have been dramatic reductions in direct damage to property and household effects caused by river floods[8].

[7] One hundred households in formerly flood-prone lower reaches of the two rivers were selected at random and interviewed using a questionnaire (the four districts covered were: Bararejo, Batang Saren, Rejo Sari, Kudung Soka).

[8] Although flood damage has now been eliminated from the lower watershed of the Gondang and Song rivers, predominantly around the Tulungagung municipality, there are no signs of any reduction in the flood damage occurring in the upper reaches of the Dawir river and the Parit Raya river basin (the Bandung area was inundated in May 2004). According to an official from the Tulungagung Regency river management agency, this was because water from the river failed to drain smoothly into the Parit Agung drainage channel.

Figure 4. Beneficiary Survey Findings on Extent of Flood Damage



2.3.3 Supplies of electricity to areas peripheral to the dam

The Wonorejo multipurpose dam has been equipped with a 6.3MW hydroelectric generator[9] [10], which is designed to stabilize power supplies to the Tulungagung Regency and surrounding areas. This generator was put into operation in 2002 after the completion of major dam construction work, generating 16.2GWh of power that year and 17.6GWh in 2003. The generator is operated by PT Pembangkitan Jawa-Bali (PT. PJB) a subsidiary of Indonesia Power (PT. PLN), the state-owned power producer. The generator employees a "subordinate generation" system that is dependent on other water uses, i.e. the turbine will only rotate when water is being discharged from the dam. In consequence, although the output capacity of the generator is 31.7GWh (operated 14 hours daily × 365 days × 6.2MW), the power station has only produced approximately half this load to date.

2.3.4 Recalculation of the Economic Internal Rate of Return (EIRR)

The economic internal rate of return (EIRR) of the project, including the Wonorejo power station, was recalculated using the same formula as that employed at appraisal, i.e. actual project costs and benefits (raw water supplies, reductions in flood damage costs and hydroelectric power production) to yield a figure of 10.2 %. The EIRR for the project was originally estimated at around 12.9% to 14.0%, but the resultant figure was lower for two reasons: (1) because supplies of raw water from the dam are at 90% of planned levels and (2) because raw water from the Parit Agung drainage channel, which was to be

[9] The generator is capable of meeting the power needs of approximately 26,000 households based on annual consumption of 1.4MWh per household per year (data obtained from the East Java Province branch of PT. PJB. In Japan, annual power consumption averages 3.5MWh per household).

[10] Power station facilities were procured and installed under the "Multipurpose Dam and Power Station Project", which was funded by a Japanese ODA loan approved in fiscal 1996; this project involved the construction of buildings and the penstock leading from the dam.

pumped at a rate of 2.5 m^3/second, is not being supplied from this source.

2.4 Impact

2.4.1 Impact on water supply services

(1) Current mains water access rate

Looking at the service coverage of water mains in Surabaya in terms of the supply rate (on a population base), it is increasing on an incremental basis, rising from 60% in 2000 to 65% in 2002.

Table 4. Access to Mains Water in Surabaya

		1990	2000	2001	2002
Municipal pop. (A)	[000 people]	247.3	260.0	261.3	262.6
Water supply pop. (B)	[000 people]	123.7	156.0	167.2	170.7
Coverage ratio (pop. base) (B/A)	[%]	50	60	64	65
Appraisal target	[%]	-	73	N.A	N.A
Average water demand (C)	[m^3/day]	217,450	443,416	457,039	483,368
	[liters/sec]	2,517	5,132	5,290	5,595
Water Board output (D)	[liters/sec]	3,950	6,700	6,970	7,277
Revenue water (E)	[liters/sec]	2,400	4,167	4,284	4,344
Non-revenue water (F)	[liters/sec]	1,550	2,533	2,686	2,933
NRW ratio (F/D)	[%]	39	38	39	40

Source: PDAM Kota Surabaya

There are still high rates of non-revenue water[11], i.e. the volume of water supplied that does not make money for the water board. Although Surabaya has a considerably lower rate of non-revenue water than other major cities in Indonesia (Jakarata: 46% (2000), Ujung Pandang (Makassar): 46% (2002)), remedial measures are necessary if PDAM Kota Surabaya is to improve its operational efficiency.

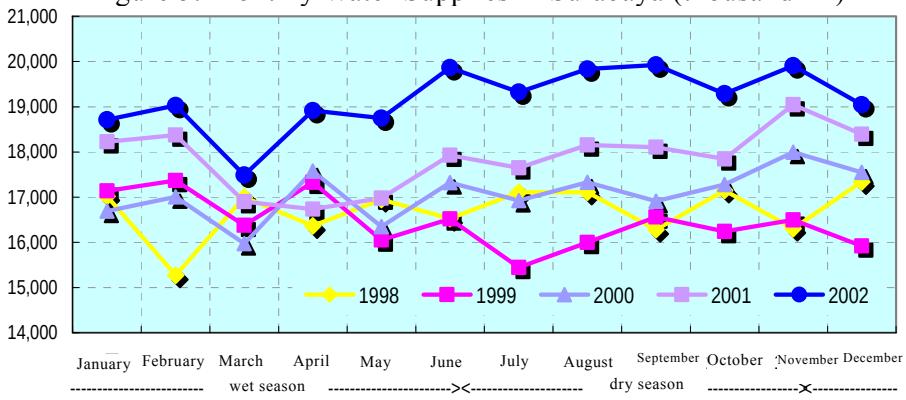
(2) Increased water supplies during the dry season

The primary objective of this project was to ensure supplies of raw water to Surabaya, particularly during the dry season. Figure 5 shows monthly water supplies for the five-year period spanning 1998, i.e. prior to completion of the dam, through 2002 (post-completion). Dry season supplies of raw water have been possible since 2002, when dam construction work was completed. The graph shows an increase of 2 million cubic meters per month during the dry season (June through November) in 2002[12], and demonstrates that this project has enabled raw water to be supplied during the dry season.

[11] According to the International Water Association (IWA), non-revenue water (NRW) is defined as water loss as unaccounted for water (UFW), plus unbilled authorized consumption (water used for fire fighting and public hydrants, etc.). UFW is separated into operational losses and technical losses, with the former resulting form illegal intake/illegal connections and meter discrepancies, and the latter from physical leakages from service pipes or pipe connections.

[12] This equates to a discharge rate of 5.0m^3/second for four hours daily.

Figure 5. Monthly Water Supplies in Surabaya (thousand m^3)



Source: PDAM Kota Surabaya

2.4.2 Impact of hydroelectric power on Tulungagung citizens

The production of hydroelectric power has stabilized/improved nighttime supplies of electricity[13]. According to the beneficiary survey already mentioned, one in two respondents (50%) stated that it is now possible "to watch nighttime TV broadcasts", "for children to study at night" and "for the area to be lit at night as a deterrent to crime". As this demonstrates, the project is basically generating the expected impacts in areas adjacent to the dam.

2.4.3 Socio-economic impact on Tulungagung

The completion of the dam, weirs and other structures has resulted in a dramatic reduction in the amount of flood damage sustained by citizens living in the lower reaches of the Song and Gondang rivers. According to the beneficiary survey, 90% of respondents stated that the project has had an impact, i.e. that "the reduction in flood damage has served to stimulate the local economy". The relief from former fears of crop damage, which occurred every time there was a flood, is an impact that has been highly evaluated by local residents.

Fig. 6. Interviews in progress

2.4.4 Impact of land acquisition/involuntary resettlement, and current conditions

The construction of the dam necessitated the relocation of 1,057 households and 4,337 people. As of 1990, 717 households and 2,935 people, i.e. 70%, had been resettled; there were still 340 households and 1,402 people needing to be moved. Some of these

[13] In Tulungagung Regency nighttime demand for power is 41MW (at evaluation), which is almost double daytime demand (22MW), and the Wonorejo power station is being operated with the aim of meeting some of this nighttime demand (based on information obtained at the Tulungagung substation).

340 relocated spontaneously and the number was subsequently reduced to 318, of which 164 households relocated to Wonorejo village near the dam site, while the remaining 154 households were resettled in communities throughout the regency.

During the field survey a visit was made to Wonorejo village where 164 households had relocated en masse; during the visit, resettled residents were interviewed and the current condition of the various public facilities was confirmed. Some twenty people were invited to attend a meeting, where they gave voice to the following opinions on the resettlement process and their current lifestyles in the village.

- The land acquisition and resettlement process involved no disputes with residents and proceeded smoothly from beginning to end.
- Roads, school buildings, health centers and other public facilities were constructed and resettled residents are satisfied with their living environment.
- Although people suffered no economic hardships in the past, either farming, or transporting materials or supplying labor during construction of the dam, it has proved difficult to find specific work since the project was completed and they have anxieties about their incomes. In this respect, it would be beneficial were the government to provide vocation training and job opportunities[14].

Figure 7. View of Wonorejo Village

The building on the left is an elementary school, that on the right a health center; the village office is visible to the rear right

As these comments show, while residents are not negative about the resettlement per se, they reflected that they should have thought more about what would happen several years down the line when relocating, and hope that the government will provide some form of vocational training as a means of providing for future living standards. Accordingly, in the future, plans to support the livelihoods of residents after resettlement need to be investigated/implemented.

2.5 Sustainability

2.5.1 Executing Agency

2.5.1.1 Technical Capacity

[14] Various opinions/requests were put forward, for example a reforestation program as a conservation measure for the dam catchment area, the introduction of cattle breeding on a trial basis, and so forth.

Since completion, major facilities, i.e. the dam and the weirs, are being operated and maintained by Perum Jasa Tirta (PJT). Approximately 25% (one in four) of PJT's employees are university graduates and the Ministry of Public Works also sends out numerous staff members. The skills/technical training detailed in job descriptions for the various positions is being carried out appropriately, and the levels of knowledge/technical skill among PJT employees are sufficient for the operation and maintenance of the project facilities.

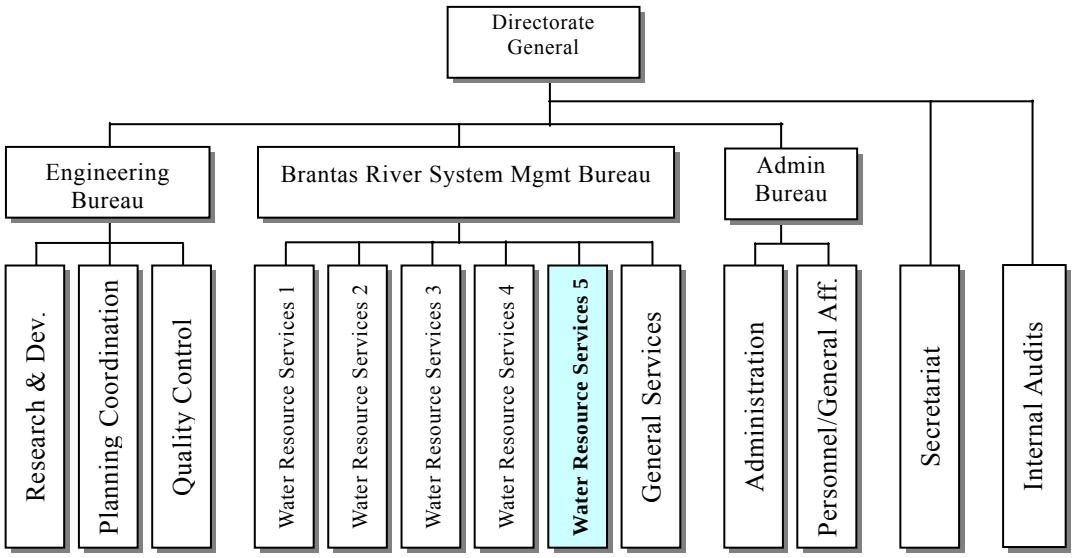
Table 5: Example of training programs listed in the PJT job description form

Job Title	Available Training
Level 1 sluice gate operator	Quality control systems, basic leadership
Level 1 measurement officer	Echo sounding technologies, basic leadership
River facilities monitoring officer	Maintenance and management of river facilities, basic leadership

2.5.1.2 Operation and Maintenance System

PJT was established in 1990 as the agency responsible for integrated water resource management in the Brantas River basin. It currently employs approximately 560 staff (as of the end of 2004), with responsibility for the Tulungagung Regency, which includes the Wonorejo dam and related facilities, falling to the Water Resources Service Department V (63 employees) of the River Management Agency (PJT).

Figure 8: Organizational Chart of the Perum Jasa Tirtan (PJT)



Source: Perum Jasa Tirta (PJT)

2.5.1.3 Financial Status

Table 6 shows the balance sheet for Water Resources Services Department V. The Wonorejo dam was put into operation at the end of 2001, increasing raw water supplies from 2002 onwards and generating commensurate rises in revenues. In December 2002,

major flooding occurred in a number of rivers that flow into the Ngrowo River, including the Widas and the Klangtur (which converges with the Brantas River at the point between Tulungagung pumping station and the Brantas River) causing damage to bank protection structures. These structures were restored in fiscal 2003 generating comparatively large maintenance costs (in excess of Rp. 1 billion), which put the department over budget that year. Interim results for the following year (2004) show revenues to be consistently exceeding expenditure, and the department is expected to regain its fiscal balance in the near future.

Table 6: Balance Sheet for Water Resource Services Division V (Unit: Rp 1,000)

	2001[Note]	2002	2003	2004[Note]
Income [A]	448,490	2,452,918	2,501,603	1,315,955
Expenditure [B]	272,734	1,818,235	3,123,981	1,255,140
Balance [A]-[B]	175,756	634,683	-622,378	60,815
Cumulative balance	175,756	810,439	188,061	248,876

Source: Perum Jasa Tirtan (PJT). Note: Figures for 2001 are for 3 months only. Figures for 2004 are for the first half of the year.

2.5.1.4 Current Operation and Maintenance Status

Broadly speaking, major supply facilities, i.e. the dam, weirs and power production facilities, etc., are being maintained in good working order.

2.5.2 Maintenance of Hydroelectric Generation Facilities

The hydroelectric generator is operated and maintained[15] by PT Pembangkitan Jawa-Bali (PT. PJB), the subsidiary of the Indonesia Power (PT. PLN) Group with responsibility for power production (see Figure 9). Since its establishment in October 1995, PT. PJB has been handling power production predominantly on the islands of Java and Bali (but including parts of Sumatra and Sulawesi). In fiscal 2003, gross output capacity was approximately 6,500MW, while gross generating capacity reached 26,000GWh (hydro 7%, coal-fired 20%, gas-fired 42%, oil-fired 31%).

Table 7: Balance Sheet and Capital Adequacy Ratios for PT. PJB (unit: Rp. 1,000)

	2002	2003
Income [A]	9,976,534	10,796,787
Expenditure [B]	9,190,991	9,324,439
Balance [A]-[B]	785,543	1,472,348
Capital adequacy ratio	83.6%	85.1%

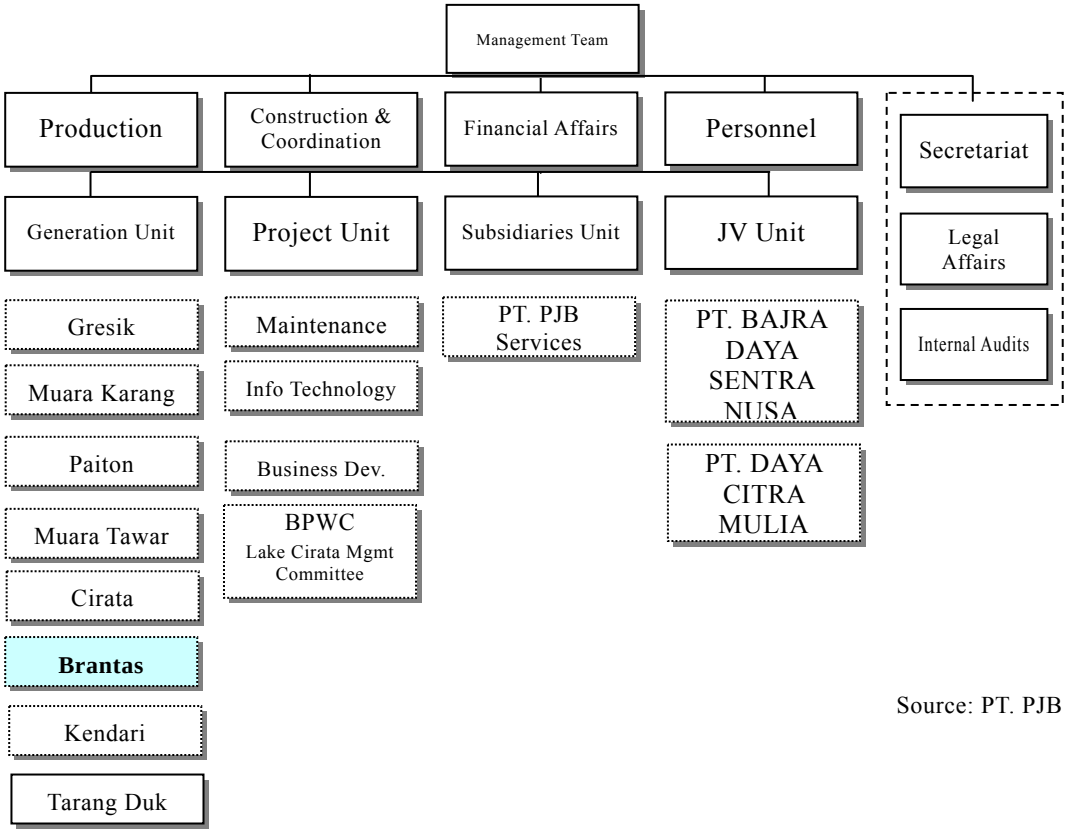
Source: PT. PJB

The Wonorejo power station (6.3MW) is operated by the Brantas Power Production Unit (total 281MW), one of eight production units under PT. PJB jurisdiction. As shown

[15] The hydroelectric generator was financed under by a separate loan. The generator was procured and installed under the "Multipurpose Dam and Power Station Project" (executing agency: Indonesia Power), which was funded by a Japanese ODA loan approved in 1996.

in Table 7, PT. PJB finances are in good condition, and the company is also involved in a maintenance optimization program in conjunction with a Singapore company in a bid to enhance its technical capacity for the operation of generation facilities.

Figure 9. Organizational Chart of Java-Bali Power Corp.



Source: PT. PJB

3. Feedback

3.1 Lessons Learned: None.

3.2 Recommendations: Water resources from the dam that was constructed via this project are being utilized effectively, but in order to attain the goal of supplying sufficient water to Surabaya City, it is recommended that PDAM Kota Surabaya expand the capacity of its water treatment facilities.

Comparison of Original and Actual Scope

Item	Planned	Actual
(1) Outputs	[Phase 1] 1-1 Dam construction Effective storage capacity: 106Mm^3 Hydroelectric power: 6.2MW 1-2 Relocation of provincial roads, construction of access roads 1-3 Infrastructure development at the resettlement camp	Output components 1-1 through 1-3 were completed as planned * A 6.3MW generator was installed as it was determined that this conformed to the standard size (in Indonesia).
	[Phase 2] 2-1 Construction of Tiudan weir and head race 2-2 Construction of Tulungagung pumping station 2-3 Dredging of Parit Agung channel 2-4 Low-water management communications system	Output components 2-1 through 2-3 were completed as planned. 2-4 was cancelled.
	[Additional outputs]	a-1 Dredging of the Dawir River and a former shipping canal a-2 Installation of a small hydroelectric generator (200kW)
(2) Project period Loan agreement Implementation Completion	[Phase 1] November 1993 Nov. 1993 – Dec. 2000 December 2000	November 1993
 Loan agreement Implementation Completion	[Phase 2] December 1996 Oct. 1996 – Aug. 1999 December 2000	December 1996 Dec. 1996 – Oct. 2002 November 2002
(3) Project costs Foreign currency Local currency Total ODA loan portion Exchange rate	[Phase 1] 12,045 million yen 5,656 million yen [Rp. 96,354 million] 17,710 million yen 14,713 million yen Rp. 1 = 0.059 yen [April 1993]	 7,989 million yen 8,801 million yen [Rp. 325,963 million] 16,790 million yen 14,436 million yen Rp. 1 = 0.027 yen [1994-2002 average]
 Foreign currency Local currency Total ODA loan portion Exchange rate	[Phase 2] 2,837 million yen 2,189 million yen [Rp. 47,592 million] 5,026 million yen 3,756 million yen Rp. 1 = 0.046 yen [April 1996]	 8,260 million yen 4,319 million yen [Rp. 159,963 million] 5,145 million yen 2,811 million yen Rp. 1 = 0.027 yen [1994-2002 average]
 Foreign currency Local currency Total ODA loan portion	[Total] 14,882 million yen 7,845 million yen [Rp. 143,946 million] 22,727 million yen 18,469 million yen	 8,815 million yen 13,120 million yen [Rp. 485,926 million] 21,935 million 17,247 million yen