Indonesia

Bili-Bili Multi-porpose Dam Project(1)(2)(3)

Field Survey: July 2003

1. Project Profile & Japan's ODA Loan

Project Location Map

Bili-Bili Multipurpose Dam spillway

1.1. Background

Ujung Pandang (currently Makassar; population: approx. 1.2 million), the capital city in South Sulawesi Province, is positioned as one of the principle cities in eastern Indonesia in the country's national development plans and has developed steadily. However, the city was stricken by flooding from the Jeneberang River almost every year and this was impeding further economic development. In addition, supplies of drinking water for domestic, industrial and irrigation use are essential for regional development (supplies were 30% of demand at the appraisal) and improvements were urgently required. Furthermore, PLN (the public electricity corporation at that time) had predicted that continuing growth in demand for power produced by the industrialization policy for the city and the surrounding area and by the rise in living standards would create electricity shortages by 1999, and had identified the need to secure sufficient power supplies as a priority task.

Under these circumstances[1], there were strong calls for the early completion of the Bili-Bili multipurpose dam with a view to preventing flood damage to Makassar and the surrounding areas, to stabilizing supplies of domestic and industrial water by 2005, to enabling the supply of irrigation water during the dry season, and moreover, to deal with the tight balance of power supply and demand in PLN's eighth region in 1999.

1.2. Objectives

1. To reduce flood damage, to stabilize supplies of drinking, industrial and irrigation water, and to deal with the projected surge in demand for power through the construction of a multipurpose dam and related facilities[2].

   - Flood control: 50-year flood probability
   - Supplies of drinking & industrial water: supply 2,800 liters/second of the 4,200 liters/second demand

[1] At the appraisal, a Jeneberang River improvement project targeting flood control and dealing with the 10-year flood probability rate was already being implemented.

[2] The requirements for the achievement these goals were as follows; regional water authority (PDAM) responsible for water supply services must expand water purification capacity for water supply; central and regional governments must complete work to improve / construct irrigation systems in order to expand irrigation areas for the expansion of irrigated area; and PLN must build new power plants for power supply. The smooth execution / completion of these were thus demanded and executed independently from this project (see section 2.1).

projected for 2005

- Expansion of irrigated areas: expand irrigated area in the dry season from 2,605 ha to 19,538 ha
- Electrical power supply: install the generating capacity of 17.2 MW

2. To stabilize supplies of raw water by installing a raw water transmission main from Bili-Bili multipurpose dam to the Somba Opu water treatment plant, leading to the response to water demand from Makassar and the surrounding area.

1.3. Outputs

The outputs of this project for each phase are as below.

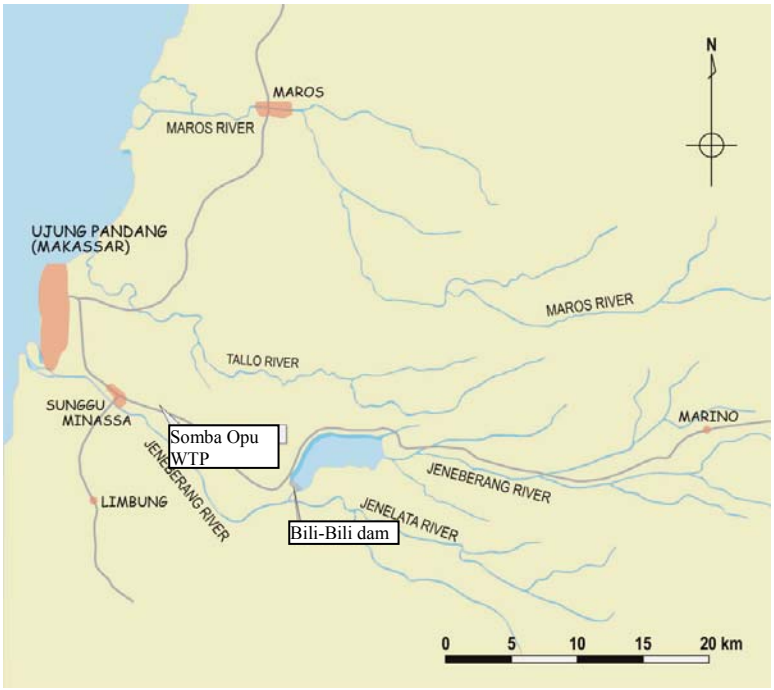
■ **Phase I** - Diversion tunnels from the Jeneberang River (2 tunnels)[3]
- Construction of incidental roads as well as roads / bridges for engineering work
- Rerelacement of pump facilities
- Consulting services relating to all dam construction work

■ **Phase II** - Construction of a coffer dam
- Construction of the main dam structure (main dam, port wing, starboard wing) and related facilities
- Construction of incidental facilities
- Consulting services relating to the detailed design for environment improvement work and environment management & monitoring planning; detailed design for the raw water transmission main

■ **Phase III** - Installment of raw water transmission main from the Bili-Bili multipurpose dam to the Somba Opu water treatment plant
- Consulting services relating to the raw water transmission main

[3] This work involves digging a tunnel into the bank of the river and altering its course, in order to enable work relating to dam construction to be undertaken on the riverbed.

Figure 1: Area covered by the project



1.4. Borrower / Executing Agency

Republic of Indonesia / Ministry of Settlement and Regional Infrastructure

1.5. Outline of Loan Agreement

	Phase I	Phase II	Phase III	Total
Loan Amount Disbursed Amount	6,662 million yen 6,150 million yen	20,798 million yen 15,565 million yen	3,488 million yen 3,450 million yen	30,948 million yen 25,165 million yen
Exchange of Notes Loan Agreement	December 1990 December 1990	September 1992 October 1992	November 1994 November 1994	--
Terms & Conditions Interest Rate Repayment Date (Grace Period) Procurement	 2.5% 30 years (10 years) General untied	 2.6% 30 years (10 years) General untied	 2.6% 30 years (10 years) General untied	 --
Final Disbursement Date	December 1999	November 2001	December 2001	--

2. Results & Evaluation

2.1. Relevance

The objective of this project is to protect Ujung Pandanga (now Makassar) and its environs from flood damage, to stabilize water supplies (including industrial water), to enable the supply of irrigation water during the dry season, and to deal with the tight balance of power supply and demand. These objectives were consistent with one of the water resource development goals set forth in the sixth five-year national development plan at the appraisal, namely: "to improve the efficiency of water resource utilization, to enhance productivity, and to increase supplies of raw water to fulfill domestic, agricultural, tourism and electric power demand." Furthermore, the objective of the Water Resources Development and Management Program of the national development plan (2000-2004) at the evaluation was "to utilize water resources efficiently", thereby ensuring the relevance of this project.

2.2. Efficiency

2.2.1. Outputs

This project was implemented in three phases. The outputs for each phase are as below.

1. In Phase I, the originally planned outputs (dispersion tunnels, incidental road, roads and bridges for dam construction, dam construction, pump facilities) were all implemented on schedule. Additionally, construction of a rubber dam to prevent salt water from flowing into the lower reaches of the Jeneberang River was added. PDAM has an intake gate near the dam at the mouth of the Jeneberang and the rubber dam was constructed to protect raw water supplies to Makassar from sea water incursion.

Figure 2: Rubber dam

2. In Phase II, sediment control work (reforestation, sabo (erosion control) dam) in the vicinity of the dam reservoir and a regulating pond (including drainage facilities) to counter flooding from the Pampang River (major municipal drainage channels) were added to the initial outputs (main dam, management facilities and incidental dam facilities).

Figure 3: Pampang Regulating Pond

3. In Phase III, expansions of the regulating pond located in the lower reaches of the Jeneberang River were added to the initial outputs (installation of a raw water treatment main to the PDAM-operated Somba Opu water treatment plant (approx. 16km)). The capacity of the regulating pond was expanded with the objective of helping to increase water supply to northern (Panaikang water treatment plant) and eastern (Macini water treatment plant) parts of Makassar.

Figure 4: The tip of the regulating pond

These changes / additions were consistent with the project's aim to improve flood control and increase water supply efficiency, and were thus relevant.

2.2.2. Implementation Period

Phase I and Phase II of the project were scheduled for completion in December 1998 and December 2000, respectively, but the completion of both phases was delayed by approximately one year (Phase I: December 1999; Phase II: November 2001). The estimated completion date for Phase III was March 1999. Although the additional work was undertaken, this phase was completed in January of that year, i.e. virtually on schedule. In addition, land acquisition was delayed by two years, but this had no notable impact on the implementation schedule.

2.2.3. Project Costs

As Table 1 illustrates, total project costs for the three phases (including the aforementioned additional work undertaken during each phase) amounted to 25,217 million yen, which is equivalent to 65% of the planned amount of 39,263 million yen. This saving is primarily attributed to competitive bidding, which resulted in efficient ordering, and to substantial decreases in local currency costs.

Table 1: Project Costs & ODA Loan Amounts Used

	Phase I 1991-1999	Phase II 1993-2001	Phase III 1994-1999	Total
Foreign currency costs (actual)	5,608 million yen (3,041million yen)	17,511 million yen (6,669million yen)	2,790million yen (693million yen)	25,909million yen (10,403million yen)
Local currency costs (actual)	3,473million yen (3,109million yen)	8,568million yen (8,896million yen)	1,313million yen (2,809million yen)	13,354million yen (14,814million yen)
Total project cost (actual)	9,081million yen (6,150million yen)	26,079million yen (15,565million yen)	4,103million yen (3,502million yen)	39,263million yen (25,217million yen)
ODA loan portion (actual)	6,662million yen (6,150million yen)	20,798million yen (15,565million yen)	3,488million yen (3,450million yen)	30,948million yen (25,165million yen)

Note: Figures were obtained from the Jeneberang River Basin Development Project office

2.3. Effectiveness

The dam constructed through this project is a multipurpose dam that has four objectives, i.e. flood damage prevention, water supply for domestic and industrial use, the supply of irrigation water, and electric power supply. However, since water supply for domestic and industrial use, irrigation water supply and electric power supply components were primarily executed as separate projects, this evaluation report will only analyze the dam's effectiveness in preventing flood damage.

(1) Prevention of Flood Damage

In terms of flood control (the dam and the embankment correspond to a 50-year flood probability), there has been no flood damage due to the overflow of external waters (rivers) since the project was completed in 2001 (see Table 2). Since the dam went into service in 2000, there have been rains of 396mm/day, which is equivalent to a 25-year return period, but no flood occurred (it is estimated that assets worth approx. Rp140 billion were protected). Since the flood control level of the Jeneberang River corresponded to a 10-year return period prior to project implementation, it is considered that this project prevented the flood.

Table 2: History of Flood-related Damage[4]

Year	Largest area of inundation (ha)	Largest no. of properties flooded (dwellings)	Largest no. of flood victims (people)	Largest damages (million Rp)	Flood duration (days)	Flood depth (meters)
1989	700	8,400	45,000	3,904	3.8	2.0
1990 *1	-	-	-	-	-	-
1991	-	-	-	-	-	-
1992	800	9,600	52,000	4,674	1.5	2.1
1993	900	7,200	39,000	2,896	No record	1.9
1994	-	-	-	-	-	-
1995	-	-	-	-	-	-
1996	-	-	-	-	-	-
1997	-	-	-	-	-	-
1998 *2	-	-	-	-	-	-
1999	-	-	-	-	-	-
2000	2,535	30,420	129,000 *4 (incl. 2 fatalities)	9,773	No record	2.2
2001 *3	-	-	-	-	-	-
2002	-	-	-	-	-	-

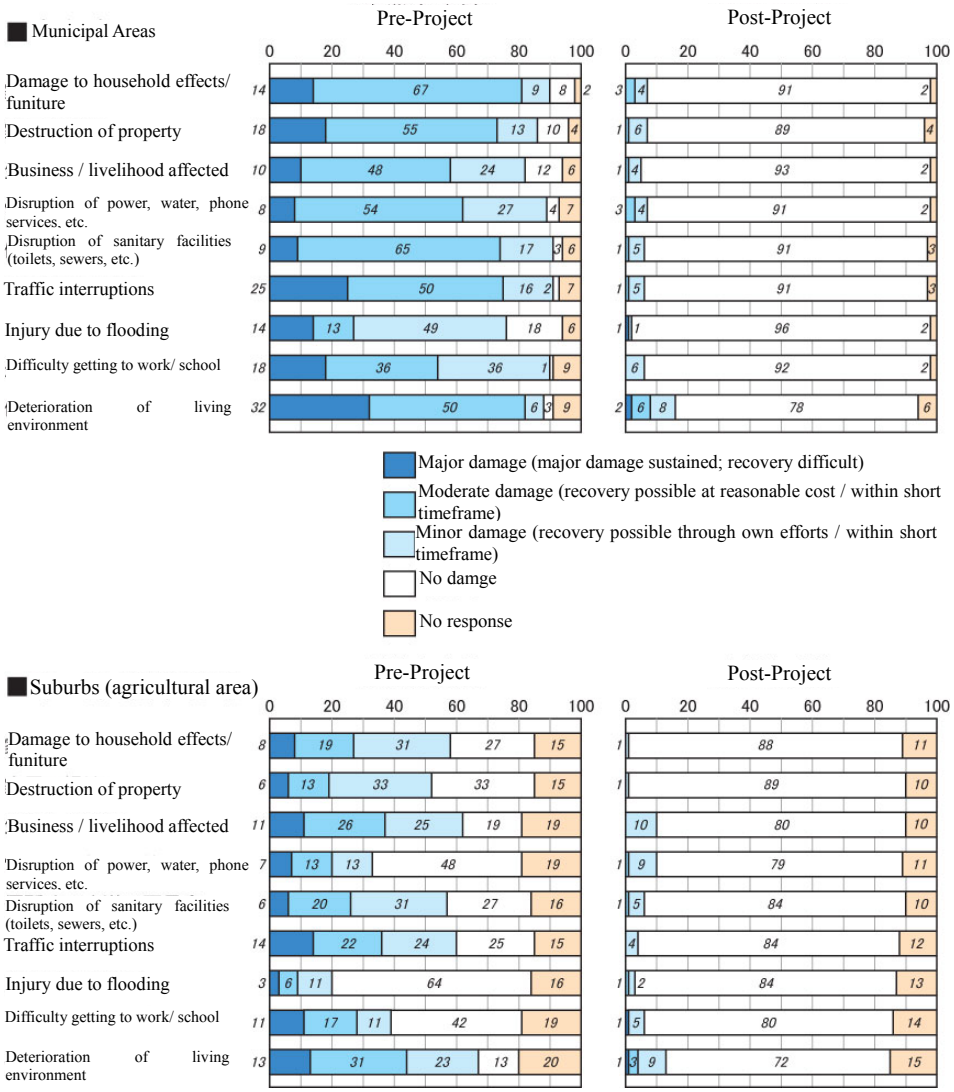
Note: Data was obtained from the Jeneberang River Basin Development Project office. [*1] was the year of the Phase I appraisal; [*2] was the year that dam facilities went into service; [*3] was the year of project completion. [*4] is an estimate obtained by multiplying the number of properties flooded by average household size (4.25 people/house).

Results from the beneficiary survey[5] conducted during the field survey also show the fact that, despite the differences between municipal areas and outlying agricultural areas (Fig. 5), the devastating damage caused by flooding in previous years has been largely eliminated in consequence of the completion of this project. Using this survey, the content and extent of flood-related damage before and after project implementation were compared based on the recollections of beneficiaries, which evidenced a substantial reduction in flood-related damage in the target area.

[4] Although some floods due to deficiencies in the capacity of municipal drainage channels have occurred annually in the rainy season (between November and January), data on such small-scale flood damage has not been included in the table.

[5] Covering Makassar, the survey targeted to collect a total sample of 200, in which 100 were collected from municipal areas (Kecamatan Mamajang and Kecamatan Tamalate) and 100 from outlying agricultural areas (Kelurahan Pangkabinanga and Kelurahan Taman Nyeleng). Respondents were asked about the history of flood damage and to evaluate the safety of the region; the content and extent of project effects and impacts and any additional opinions / requests.

Figure 5: Comparison of Pre- and Post-Project Flood Damage



Source: compiled from the results of the PEDAC2003 beneficiary opinion survey

As indicated, although there has been a reduction in damage directly attributable to the overflow of the Jeneberang River, municipal drainage channels (the capacity of facilities and operation & maintenance status) are insufficiently developed. The development of municipal drainage channels is outside the scope of this project and is being promoted by the Makassar Municipal Development Agency (Dinas Cipta Karya, Kota Makassar), but shortfalls in the municipal government's budget are rendering it difficult to sufficiently tackle the capacity expansions and improvements of maintenance status in drainage channels.

【Case Study】Perceptions of flood damage by residents of Kelurahan Pangkabinanga in Kecamatan Pallanga

1) After the project completion, there was heavy rain in January 2002 but no flooding occurred. As in Makassar, although inundation occurred as the result of insufficient drainage capacity within irrigated areas, there was no other over-topping from the river - a frequent occurrence before the dam was completed – and there was no serious damage due to sediment or driftwood.

2) Up to the 1980s, flooding (over-topping) was a frequent occurrence in areas of the village near the Jeneberang River, and it was hazardous and in an unstable condition, due to erosion of river slopes, etc.; however, the construction of the dam has eliminated these concerns, enabling the construction of new houses along the banks of the river (the houses visited were built 4 years ago (in 1999)).

3) The absence of flooding has also had an impact on agricultural production and contributed to stable harvests. Farmers in this village have traditionally practiced double rice cropping and flood damage to crops adversely affected farm revenues. This is no longer a problem.

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

Except flood damage prevention, three of the project's target effects, i.e. the effects of water supply, irrigation water supply and power supply will realize after the completion of separate follow-on projects. In consequence, given the actual state of effect, recalculating the EIRR at the evaluation is difficult. Notwithstanding, an EIRR calculation was attempted based on the costs of this and related projects, and the actual completion / service status of facilities and equipment. At the appraisal, project benefits were taken as flood damage prevention, and supplies of irrigation water, electrical power and water supply. With regard to irrigation, a related project is in progress (estimated for completion at the end of 2003), and with power, a hydroelectric power plant is under construction (expected to come online in December 2005). The effects of these projects can be expected to appear in a few years. With regard to mains water supplies, although no definitive funding plan has been formulated for the expansion of water treatment plant, for the sake of convenience, it was assumed that WATER TREATMENT PLANT will have been expanded to planned levels by 2010. Based on these conditions, the EIRR was recalculated at the evaluation to yield an estimated figure of 12.9%, which slightly exceeds the figure worked out at appraisal (10.8% - 12.5%). This is because the onset of project benefits (electricity, water supply, irrigation) other than flood damage prevention was delayed, although project costs were in fact kept well within budget.

2.4. Impacts

(1) Stable Economic Growth Resulting from Improvements in the Living Environment

As mentioned in section 2.3 (Effectiveness) the completion of this project has prevented river flooding, and the resultant improvements in the living environment are believed to underpin stable economic growth. In fact, in the beneficiary survey conducted during the field survey, 95% of respondents stated

that "the project supports economic activity in the region", thereby verifying its economic impact.

(2) Environmental Impact

For this project, 9,605ha of forest was cut and 1,850ha was inundated with water. However, various environmental improvement measures have been taken, including reforestation, based on the environmental impact assessment (EIA) that was conducted during project implementation. Water quality has been monitored and there have been no notable problems. Trees were planted to create a green belt around the dam. This work was undertaken during Phase II and serves both to improve the landscape and to help curb the influx of sediment caused by soil erosion.

Figure 6: View of the Dam Reservoir

Trees were planted to create a green belt that comes down to the water's edge.

(3) Social Impact

The residents of 2,085 households were relocated for the purpose of this project (FY1990-1997). From 1984, the executing agency held several briefings with local residents to explain the outline of development plans and compensation, and obtained their agreement. Compensation was in line with market prices for land and property, etc. (actual compensation totaled approx. 4.5 billion yen). Of the 2,085 households targeted for relocation, 618 were resettled in Kabupaten Mamuju (5 locations) or Kabupaten Luwu (one location), both located in the north of South Sulawesi Province, under the Ministry of Resettlement's Transmigration Program (TP); 1,467 households moved to areas around the dam reservoir on their own choices (Self Choice Program: SCP). Regarding the development of infrastructure at resettlement sites, this work was undertaken by the Ministry of Resettlement for the TP, and the executing agency added two outputs to Phase II for the SCP.

In this evaluation, evaluators visited residents who had been relocated for this project to check up on current living standards and ask about the reasons for choosing a particular resettlement site.

Figure 7: Infrastructure Developed for Resettled Residents

A visit was paid to Kec. Parangloe, one of the relocation areas situated in Kabupaten Gowa near the upper Bili-Bili Dam river basin. This district originally stretched around the land for dam construction and four villages were submerged with the residents of these communities moving to lakeside areas in the upper river basin of the dam. This site is an example of land that was chosen by villagers who had received compensation for land and property assets (SCP). Schools (elementary, junior high and high), a

health center, a market, wells, a town hall, and a police station were built as part of the social environment improvement scope component of Phase II.

In open-ended questions relating to social impacts that were included in the beneficiary survey, of the 70 valid responses received from municipal areas, 75% stated that "After the supplies of raw water from the dam have started, the quality of water has improved" (53 people). The residents of Massakar confirmed that the construction of the dam and the raw water supply has had the desirable effect of improving water quality.

Several random visits were paid to families living in this area, with residents being asked to assess conditions at the time of the relocation and their current living conditions.

1) Mr. Mustali **(in 40s, male):** He moved from Lana village (approx. 1km from his current address) in 1996 and has been lived here for around seven years. He chose the SCP not the TP because his parents are elderly and he decided that it would be difficult for them to start in a new area. He bought his current house with the compensation received for resettlement. He had concerns about the future prior to resettling but now lives happily with his parents and children. He is also essentially satisfied with village facilities.

2) **Mrs. Rosna (in 30s, female):** She moved from Parang village in 1997 and has been living here for some six years. She chose the SCP not the TP because she lacked confidence in her ability to rebuild her life in a new area. Although she was worried about how things would turn out prior to her move, she is satisfied with her current living environment. She has small children and was thus particularly pleased that elementary, junior high and high schools were developed. However, it is difficult to secure domestic water during the dry season (it is not possible to obtain sufficient water from the well in the area) and she has to buy in water at a cost of 100Rp/liter. Her husband earns a living catching and selling fish from the dam reservoir.

3) **Mr. Mangngai Daeng Tika (in 50s, male):** He selected the TP and moved from his former address to Tommo village in Kabupaten Mamuju in November 1991, but returned to this area a year ago and has built his own house. He chose the TP not the SCP originally, because he would be near his old address with the SCP, while he would only be able to buy a small plot of land (less than 0.5ha) and was attracted by the 2ha plot that came with the TP, despite the distance involved. He was young at the time and felt that he had enough energy to make a success of living in a new area. He was initially given 2ha in Kabu. Mamuju, but subsequently purchased additional land and currently owns a 6ha plot (he raises two crops of rice a year and has a cacao plantation). He moved back to this area because of a lack of good educational facilities (high schools) in his Mamuju neighborhood, citing the proximity of a high school as the reason for his return. He is not only proud of his own success but says that all his friends who moved to Kabu. Mamuju have worked very hard and been remarkably successful.

2.5. Sustainability

2.5.1. Executing Agency

(1) Technical Capacity

Although the activities of the Jeneberang River Basin Development Project office are funded by the central government (personnel, finances), project-related operations have been executed under the direction of / orders from the provincial governor since the decentralization of power in 2001. The staff members who operate the dam have sufficient technical skills for routine activities.

(2) Operation and Maintenance System

Dam facilities are operated and maintained by the project office based on budgetary measures funded by the central government. The project office is also responsible for the O&M of the raw water treatment main that was laid under this project.

(3) Financial Status

Between 2000 and 2002 the budget for O&M averaged 414 million Rp. per annum (roughly 4.2 million yen).

2.5.2. Operation and Maintenance Status

The O&M status of the main dam structure, transmission pipes (raw water treatment main) and other incidental facilities that were constructed through this project is generally favorable. The monitoring systems at the Jenelata observatory and the Bayang observatory were damaged by heavy rain in 2002. This means that the control station is unable to conduct remote surveillance / keep records and it is hoped that the damage will be repaired promptly, although it has no direct effect on the operation of water gates, etc.

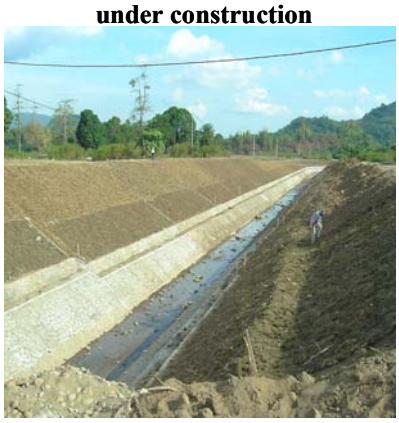
2.6. Status of Other Related Projects

[Water Supply]

The supply of municipal mains water is undertaken by the Makassar municipal water authority (PDAM). Under this project a transmission pipe (raw water treatment main; total length: 16km; internal diameter: 1.5-1.65m) was constructed with the aim of supplying raw water at a rate of 2.8m^3/s from the Bili-Bili Dam to the Somba Opu water treatment plant by 2005. The Ujung Pandang Water Supply Development Project (IP-416) designed to supply this raw water to Makassar City was completed in July 2001 and is currently supplying / treating raw water at a rate of 1.1m^3/s.

[Irrigation Water Supply]

Figure. 8: Bili-Bili Irrigation Project under construction



With reference to irrigation water supply, the Bili-Bili Irrigation Project (IP-479), a separate project being funded by a Japanese ODA loan, is currently in progress, with the final disbursement scheduled for February 2005.

This project covers three areas that source their water from the Jeneberang River system, i.e. Bili-Bili, Kampili and Bissua. The work in the Bili-Bili area involves construction of an intake weir with an area of approximately 2,400ha and the rehabilitation of existing water channels. In the Bissua area an intake weir with an area of around 3,800ha and water channels are under construction. The completion of this work will enable irrigation water to be supplied to an area totaling approximately 24,000ha (approx. 19,500ha in the initial plans) in the dry season.

[Electric Power Supply]

The Bili-Bili hydropower plant is currently under construction under a separate multipurpose dam project (IP-464) funded by a Japanese ODA loan.

Upon completion, this power plant will have an installed generating capacity of 17.2MW and is expected to supply 75GWh of power annually. This equates to around 4% of total electricity consumption in South Sulawesi (1,680GWh in 2001), which may not represent a particularly large contribution to power supplies within the province but will supply the Kapu. Gowa and Makassar City transmission grids directly and is expected to improve the supply situation in surrounding areas.

3. Feedback

3.1. Lessons learned

None.

3.2. Recommendations

[To the executing agency]

The internal water drainage plan described in the master plan needs to be promptly executed.

Municipal drainage channels in Makassar, which were not included in this project, are insufficiently developed, and this resulted in the occurrence of inundation damage in 2000. The Makassar City internal water drainage plan is considered to be of high priority / great urgency if the effects of this project are to be enhanced. Thus, the municipal government should be asked to formulate specific policies for internal water drainage (drafting F/S, approving the EIA, etc.) and to handle this development work systematically.

Comparison of Original & Actual Scope

[Phase I]

Item	Planned	Actual
1. Outputs		
Relocated road	L=15.7km	As planned
1) Paving		
- Surface specifications	Hot asphalt mix	As planned
- Underground specifications	Macadam paving	Asphalt treatment base
- Foundation specifications	T=25cm	T=30cm
2) Bridges	1 (Mangempang bridge)	As planned
Relocation of pump shed	1 set	As planned
Tunnel-type flow regulation		
1) Tunnel-type flow regulation 1	L=300m, φ 9.3m	As planned
2) Tunnel-type flow regulation 2	L=300m, φ 9.3m	As planned
Construction roads / bridges & downstream revetment work		
1) Bili-Bili bridge	L=153.6 m	As planned
2) Pattalikang bridge	L=61.5 m	As planned
3) Downstream revetment work	L=200 m	As planned
Rubber dam construction		
1) Revetment work	-	Additionally constructed
2) Malino road repair work	-	Additionally constructed
3) Flushing gate	-	Additionally constructed
Consulting services	Foreign consultants: 599 M/M Local consultants: 899 M/M Total: 1,498 M/M	Foreign consultants: 645 M/M Local consultants: 1,553 M/M Total: 2,198 M/M * Excluding the engineering services for the rubber dam
2 Project period		
1) L/A conclusion	Oct. 1990	Dec. 1990
2) Consultant selection	May 1990 – May 1991	May 1990 – May 1991
3) Consulting services	May 1991 – Dec. 1998	Jun. 1991 – Dec. 1999
4) Work	Aug. 1992 – Aug. 1995	May 1992 – Nov. 1999
3 Project costs		
Foreign currency	5,608 million yen	3,041 million yen
Local currency	3,473 million yen	3,109 million yen
Total	9,081 million yen	6,150 million yen
ODA loan portion	6,662 million yen	6,150 million yen
Exchange rate	1 Rp. = 0.080 yen (March 1990)	

[Phase II]

Item	Planned	Actual
1. Outputs		
Construction work		
1) Main dam	H=73m, L=750m	As planned
2) Port-wing dam	H=42m, L=646m	As planned
3) Starboard-wing dam	H=52m, L=412m	As planned
Incidental work	Buildings, telecommunications equipment, electrical work	As planned
Environment improvement works (output addition)		
1) Sabo Dam (for sediment control)	-	4 units
2) Sand Pocket Dam	-	4 units
3) Soil conservation	-	2 packages

4) Reforestation	-	2 packages
5) Infrastructure development at resettlement site	-	5 packages
Pampang River improvement works (output addition)	-	2 packages
Consulting services	Foreign consultants: 131 M/M Local consultants: 277 M/M Total: 408 M/M	Foreign consultants: 366 M/M Local consultants: 1,223 M/M Total: 1,589 M/M
2. Project period		
1) L/A conclusion	Oct. 1992	As left
2) Consultant selection		
3) Consulting services	Aug. 1993 – Dec. 2000	Jul. 1993 – Dec. 2001
4) Civil engineering works	Sept. 1994 – Dec. 1998	Jan. 1994 – Dec. 1999
(additional components)	--	(Mar. 1996 – Nov. 2001)
5) Equipment work	Apr. 1997 – Dec. 1998	Aug. 1997 – Dec. 1999
3. Project costs		
Foreign currency	17,511 million yen	6,669 million yen
Local currency	8,568 million yen (133,878 million Rp.)	8,896 million yen
Total	26,079 million yen	15,565 million yen
ODA loan portion	20,798 million yen	15,565 million yen
Exchange rate	1 Rp. = 0.064 yen (April 1992)	

[Phase III]

Item	Planned	Actual
1. Outputs		
Raw water transmission main (upriver section)	L=6.0 km, φ=1.65 m	As planned
Raw water transmission main (downriver section)	L=10.3 km, φ=1.50 m	As planned
Consulting services	Foreign consultants: 87 M/M Local consultants: 273 M/M Total: 360 M/M	Foreign consultants: 86 M/M Local consultants: 230 M/M Total: 316 M/M
2. Project period		
1) L/A conclusion	Oct. 1994	Nov. 1994
2) Consultant selection	Jul. 1994 – Jun. 1995	Dec. 1994 – Sept. 1995
3) Tenders / contracts	Oct. 1995 – Dec. 1996	Jun. 1995 – Jan. 1996
4) Procurement & installation (incl. trial operation)	Jan. 1997 – Jan. 1999	Feb. 1996 – Jan. 1999
5) Land acquisition (Phase I – Phase III)	1990 - 1995	1990 - 1997
3. Project costs		
Foreign currency	2,790 million yen	693 million yen
Local currency	1,313 million yen (26,260 million Rp)	2,809 million yen
Total	4,103 million yen	3,503 million yen
ODA loan portion	3,488 million yen	3,503 million yen
Exchange rate	1 Rp. = 0.050 yen (April 1994)	

Third Party Evaluator's Opinion on
Bili-Bili Multipurpose Dam Project (1), (2), and (3)

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University of Indonesia

Relevance

The background part of the report introduced the problem and situation of Makassar city at the time of project formulation as well as its prospect in the future. The objective of the project was, as predicted, to solve the associated problem as well as to anticipate the existing situation, future prospect and demand. Evaluator agrees that the proposed solution was logically appropriate to address the problem and anticipate the future development, and that the relevance of the project to the problem was crystal clear. In addition to that, legally speaking, the project was also in accordance with the Water Resource Development and Management program of the National Development Plan (2000-2004). In fact, the project may claim that not only did it comply with the water national development program, but also was in line with the domestic economic development of Makassar city.

Priority-wise, the project was intended to solve an endemic, seasonal problem that arises almost every year. Taking into account project beneficiary of 1.2 million population of Makassar city, role of Makassar city as an important hub for the eastern part of Indonesia, as well as the prospect of the project to provide many more important contributions to the development of Makassar city and surroundings, the project might acquire high priority and importance among other development program planned back then. Water resource management program was also among government priority during 2000-2004, after years of illegal logging and settlement, environment ignorance, as well as excessive garbage disposal had caused many cities endemic flood damage problem and unhealthy sanitary for years. Therefore, we are convinced that the project confirm to the priority of the Indonesia's government policy to improve people's quality of life as well as national Human Development Index (HDI) rating among other nations.

At present time, the relevance and importance of the project remains high. Not only does it solve the targeted problem, but it also enables significant foundation for more economic opportunities for the Makassar city and surroundings, such as clean (drinkable) water and wastewater treatment for household sanitary needs, irrigation for agriculture, and electricity for industrial / commercial needs.

Impact

The project seems successful to provide direct impact on reinforcing control over seasonal flood damage to Makassar city as well as to promote indirect impact on stable economic growth for 1.2 million of population. Negative impact of dam construction project on environmental and social issues has always raised concern among environmentalists. Among other environmental concerns are water quality, deforestation, sedimentation and erosion, and downstream hydrology. Among other social issues are those relate to project-affected people, such as failed benefit-sharing, unsatisfactory resettlement, disrupted riverian activities, etc. As far as the report described, we begin to believe that those issues have been addressed carefully and the majority of people were satisfied. To dramatically increase the positive impact, further service infrastructure needs to be introduced as soon as possible.