Philippines

Pampanga Delta Development Project, Flood Control Component (1)

External Evaluator: Taro Tsubugo

Field Survey: November 2004

1. Project Profile and Japan's ODA Loan

Project site location map

A newly-developed dike road

1.1 Background

The Philippines experiences severe damages from flooding and landslides caused by tropical storms. Although the government attaches importance to flood control projects, constraint on the fiscal budget have hampered the implementation of these projects. The lower basin of the Pampanga River is one of the areas most frequently affected by flooding. In the Pampanga Delta, which is consisted of swampy lowland and the mouth areas of the Pampanga River, typhoons frequently resulted in flooding and caused considerable damage to the farming and fishing industry and to public and private property. With the delta being at 0-9m above sea level, the Pampanga River has limited flow capacity. Flood control projects undertaken on the Pampanga River can date back to 1939. As the development potential (such as aquaculture) of the lower basin areas drew attentions in more recent years, the necessity of flood controls at the west of Sulipan, in particular, had increased.

1.2 Objectives

This project's objective was to enhance flood controls on the lower basins of the Pampanga River in Central Luzon, an area prone to perennial flooding, by implementing river improvement works, thereby contributing to improvements in living standards and to regional economic growth.

1.3 Borrower/Executing Agency

Government of the Philippine Republic/Department of Public Works and Highways (DPWH)

1.4 Outline of Loan Agreement

Loan Amount/Disbursed Amount	8,634 million yen/7,537 million yen
Exchange of Notes/Loan Agreement	October 1989/February 1990
Terms and Conditions Interest Rate Repayment Date (Grace Period) Procurement	 2.7% 30 years (10 years) General untied (Consultant component: partially untied)
Final Disbursement Date	December 2001
Contractors	Kawasho Corporation, Hanil Development Co., Ltd. (Korea), Leadway Construction (Philippines)
Consultants	Nippon Koei Co., Ltd., Japan Construction Consultants
Feasibility Study (F/S), etc.	M/P and F/S: 1982, JICA E/S (D/D): 1989, JBIC (PH-P71)

2. Results and Evaluation

2.1 Relevance

2.1.1 Relevance of project plans at appraisal

At the time of appraisal, the five-year Medium-Term Philippines Development Plan (1988-1992) stipulated that priority attention be given to mitigating natural disasters. In addition, the Medium-Term Development Plan (1988-1992) developed by the project's executing agency, the Department of Public Works and Highways (DPWH), had placed a priority on enhancing flood controls in the Pampanga Delta, which is perennially a victim to flood damage, and on mitigating the damage therefrom. Accordingly, Phase 1 of the Pampanga Delta Development Project (PDDP: flood control component) was a high priority undertaking that involved the implementation of river improvement works corresponding to a 20-year return period flood probability.

2.1.2 Relevance of project plans at evaluation

The current five-year Medium-Term Philippines Development Plan (2004-2010) also stipulates that priority attention be given to mitigating natural disasters. This plan goes on to state that flood control in the Pampanga Delta remains a priority task for infrastructure and water resources management. Accordingly, this project, the objective of which was to mitigate flood damage through the implementation of river improvement works, has maintained its relevance.

2.2 Efficiency

2.2.1 Outputs

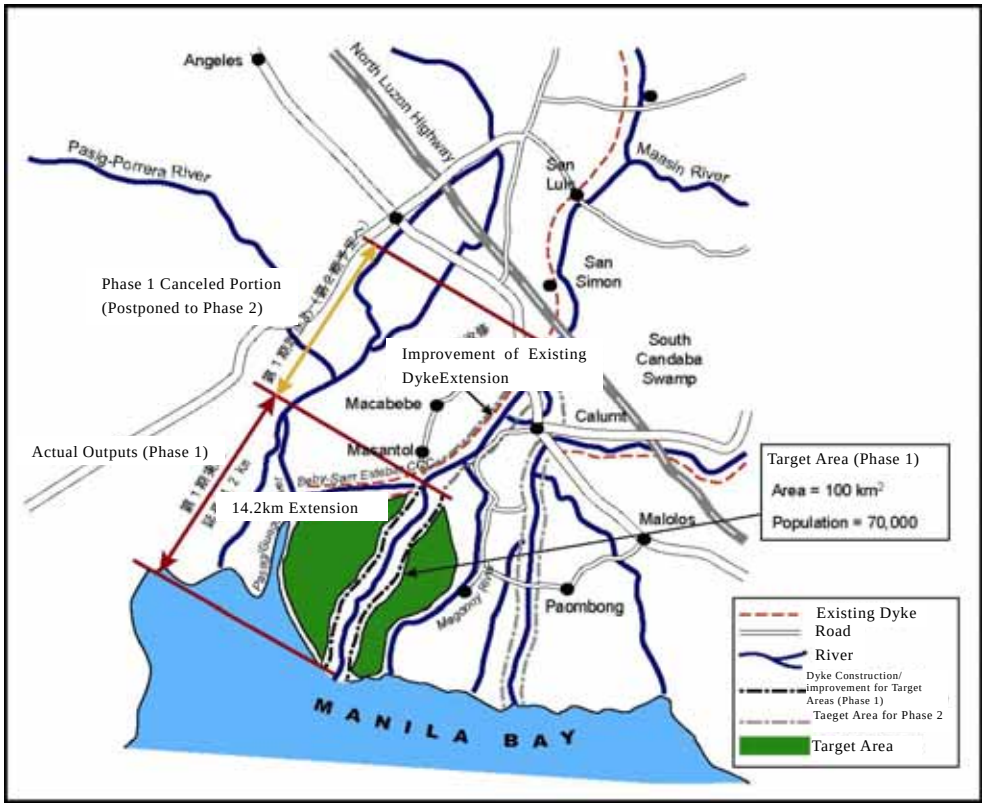
As the bid price for civil engineering works exceeded calculations, the construction of dikes, the primary output of the PDDP, had to be shortened from the planned 22.7km to 15.4km due to budget constraint. At the detailed design phase of this project, the executing agency (DPWH) developed resettlement plans and started providing local residents of project information through municipal governments and barangay captains. After the project had been commenced, however, some of the households did not agree on resettlement plans and the length of dikes was further reduced to 14.2km (right bank) and 13.2km (left bank)[1]. Dredging and related construction works were also reduced along with this decision. A comparison of planned and actual outputs is given in the table below. The location of the flood control facilities in this project is shown in Figure 1. The project covered an area of 100km^2 within the Pampanga Delta and benefited approximately 70,000 people.

Table 1. Comparison of Planned and Actual Outputs

	Appraisal plans	Actual Outputs
1)Procurement of dredgers	4	As planned
2) Civil engineering works		
a) River improvement works		
Dike construction	22.7 km (Sulipan to Manila Bay)	14.2 km (right bank), 13.2 km (left bank) (Masantol to Manila Bay)
River widening	750 m	As planned
Dredging volume	17,652,000 m^3	12,205,000 m^3
b) Sluice gates	21	16

[1] Facing downriver, the right-hand side is referred to as the right bank, the left-hand side as the left bank.

Figure 1. Map of area in which flood control facilities were constructed



2.2.2 Project Period

The PDDP delayed for 72 months and took approximately 1.9 times of the planned project period. The delays occurred during the construction phase. A suspension of works due to the shortage of counterpart funding (October 1993 – April 1995), a work suspension from difficult negotiations with residents of Calumpit on land acquisition (one year from December 1999) and a dredger accidents caused by fire and leakage are primary causes for the delays. Contractor's poor performance in the arrangement of heavy equipment caused a delay in a certain section of the construction works. Land acquisition negotiations and efforts to secure funds caused holdups in the internal procedures and implementation of land acquisition, which also affected the implementation schedule over the whole project period.

2.2.3 Project Cost

The final costs of the project was 11,018 million yen against a budget of 13,634 million yen, and the PDDP was completed for approximately 81% of the initial budget. Given that the length of dike and dredging volumes were limited to around 60-70% of an original scope, a comparison of budget and actual outputs reveals that the cost of the project in fact exceeded the projected amount. The aforementioned delays in civil engineering works required a review of unit costs in accordance with inflation.

2.2.4 Land Acquisition and Involuntary Resettlement

Involving the widening of the Pampanga River, land acquisition, involuntary resettlement, and the development of resettlement sites, the PDDP provided resettled residents with relocation sites alongside the dikes[2]. Planned and actual implementation of land acquisition areas, the number of resettled households, and the relocation and/or construction of public facilities are given in the table below.

Fig. 2. Base Mound

Table 2. Comparison of Plans and Actual Outputs for Land Acquisition and Facilities for Resettled Residents

Item	Planned	Actual
Land acquisition	17,921,000m^2	11,603,000m^2
No. of households affected	2,180	1,851 863 (right bank) 988 (left bank)
Primary school buildings	10	As left
Community halls	14 (8 new)	As left
Churches	Unknown	11
Deep wells	29 (new)	As left

Source: Executing Agency (DPWH)

Table 3. Breakdown of Involuntary Resettlement Component

	Left bank	Right bank	Total
No. of households affected	988	863	1,851
-Resettled in Base Mound	349	592	941
-Resettled in other locations	214	128	342
-Remaining households and returnees	425	143	568

Source: Executing Agency (DPWH)

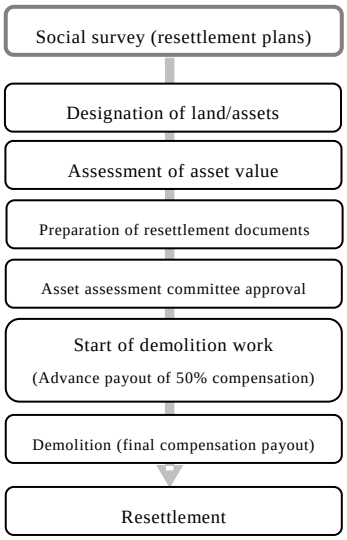
The government prohibits high water channels from being used for anything other than aquaculture. Although the majority of residents affected by involuntary resettlement received compensation, approximately a third are still living in the high water channels. For their continuous stay in high water channels, there are several reasons: (1) Opposition to resettlement due to dissatisfaction with the amount of compensation offered, (2) Construction of the resettlement sites had not been completed when demolition works were commenced, (3) Holdups in the payment of compensation stopped further demolition works, (4) Lease rights at the Base Mound have been sold for cash, (5) Some residents moved to the resettlement sites but had insufficient capital to build property and thus returned to cheap rental properties in the high water channels.

[2] An area of 60.6 hectares encompassing 14 sites and 2,614 households was prepared along both sides of the dike in the lower basins of the Pampanga Delta (Base Mound).

Compensation for land acquisition and resettlement

Land acquisition and resettlement procedures were conducted in accordance with the relevant laws and regulations of the Philippines (see Fig.2 flowchart). Compensation was paid for loss of fixed assets, including residential areas, farm land, and buildings, and for loss of fruit trees (to the owners) and as living assistance[3] (to leaseholders). Results of a beneficiary survey covering 808 landowners and resettled residents chosen by random selection show that 69% of landowners were satisfied with the amount of compensation they received. Meanwhile, 79% of leaseholders expressed satisfaction with their compensation. Reasons given for dissatisfaction included "assessment values were lower than expected", "no land is provided at the resettlement site", "Compensation does not cover sufficiently the cost of a new home", and "late payments".

Fig. 2 Procedural Flowchart



On government explanations on the PDDP and the understanding among residents, 91% of respondents stated that they were satisfied with the explanations on the resettlement program that were provided by the government. Those residents who expressed dissatisfaction stated that they had received no explanation on alternative ways to earn a living.

2.3 Effectiveness

(1) Flood control and damage limitation

Prior to the completion of the PDDP, the beneficiary areas had suffered from flooding with an average depth exceeding 100cm. When typhoons passed through the region, the Pampanga River often broke its river banks. Although the PDDP contribute to its main objectives (i.e., prevention of dike breakage and overflow), the beneficiary area has subsequently experienced flood damage as detailed in the table below. According to the results of the beneficiary (residents) survey (150 people), all respondents living on the left bank stated that their property has been inundated since project completion, while this held true for 40% of respondents living on the right bank.

[3] Financial assistance for residents who owned no fixed assets after the resettlement process was complete; according to the executing agency (DPWH), the amount of compensation was set with a view to compensing workers for the loss of approximately three years worth of earnings opportunities (assumed to come from agriculture).

Table 4. Flood Damage in the Beneficiary Area (annual peaks)

Year	Flood depth (cm)	Flood duration (days)	Flooded households[1)]	Agricultural losses[2)]	Highest water level[3)]
1998	50-120	N.A.	N.A.	N.A.	4.87m
1999	70-150	N.A.	N.A.	N.A.	4.67m
2000	80-150	4.5	N.A.	N.A.	4.40m
2002	50-80	6.5	18,307	188.7	4.00m
2003	30	2.0	7,443	34.8	4.70m
2004	30-90	7.8	14,288	261.5	4.50m

Sources: Executing Agency (DPWH), Provincial Disaster Coordination Bureau, and the beneficiary (residents) survey (flood duration)
Note 1): 2002 (Typhoon Gloria, July), 2003 (Typhoon Impudo), 2004 (Typhoon Marce, September)
Note 2): As for Note 1); amounts given are in millions of pesos (for all Pampanga province)
Note 3): Estimates for the Pampanga River below the Sulipan bridge (approx. 9km up river from the dike sections developed via the PDDP).

Fig. 3. The river swollen by rains

On the left bank, inundation in the area without new dikes (Candelaria and Calumpit) causes flooding. This type of flooding results in the inundation of flood waters into the beneficiary area, which occurs at least once a year. On the right bank, backwater from the Pampanga River causes runoff problems in northern parts of the beneficiary area[4] and, eventually, flooding damages. Backwater occurs when water levels in the Pampanga River and its tributary are high. In addition, the eruption of Mt. Pinatubo in 1992 heightened riverbeds in adjacent branches of the river[5] and prevents smooth drainage.

(2) Changes in Awareness of Flood Damage among Local Residents

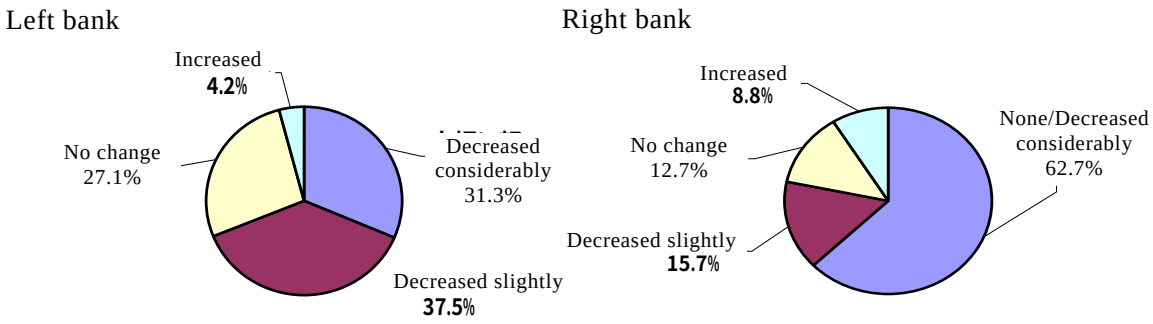
Frequency of damage

Many residents have experienced flooding since the completion of the PDDP, but the frequency of flooding is on the decrease. Results from the beneficiary (residents) survey show that 69% of residents living on the left bank and 78% of residents living on the right bank have recognized a decrease in the frequency of flood as compared to pre-project levels.

[4] According to the executing agency (DPWH), the area is served by drainage channels that flow into the main Pampanga tributary, but problems opening and closing the sluice gate (not one of the ones installed under the PDDP) that is designed to prevent back flow constitute one of the causes of flooding on the right bank.

[5] It has been confirmed that the bed of the Rio Chico, one of the major tributaries of the Pampanga River, has risen by approximately 3.6m since Mt. Pinatubo erupted (1988-1993 end).

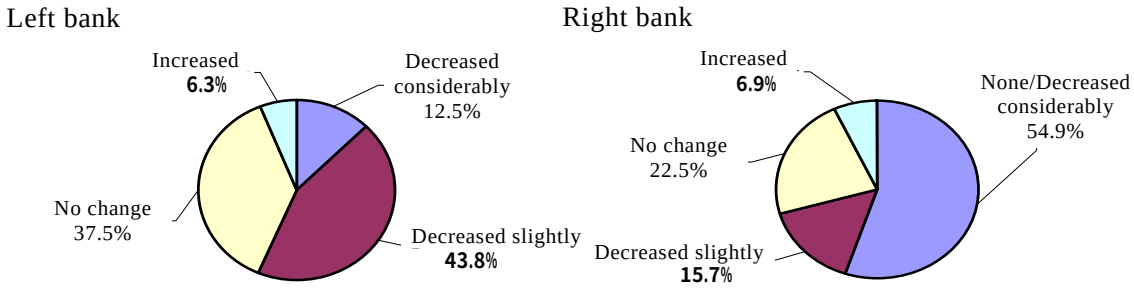
Figure 4. Changes in Frequency of Flood Damage (post-completion)



Extent of damage

Results from the beneficiary (residents) survey show that 56% of residents living on the left bank have experienced less serious flooding damage as compared to pre-project levels. By contrast, 77% of residents living on the right bank, including 55% who stated that they had experience no damage or considerable decrease since the completion of the project, stated that the extent of damage has decreased as compared to pre-project levels.

Figure 5. Changes in Extent of Flood Damage (post-completion)



2.4 Impact

Fig. 4: An interview in progress

(1) Improved Living Standards

a) Peace of mind among local residents

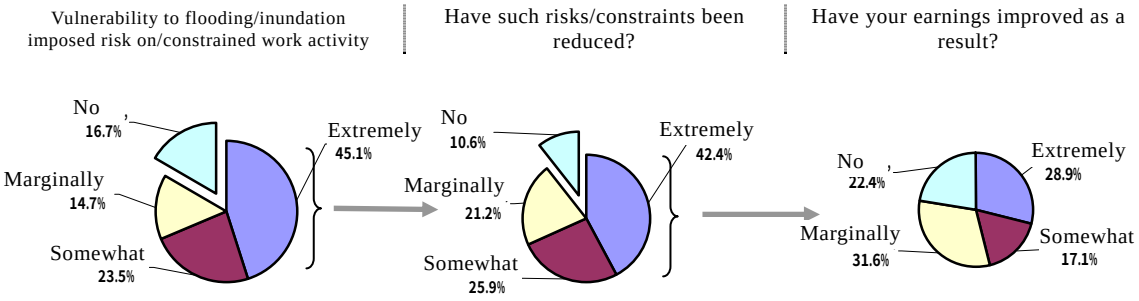
According to results from the beneficiary (residents) survey, the majority of respondents living on the right bank (80%) where damage due to the incursion of river waters has decreased are worried about flooding, but say that they have fewer concerns since the PDDP was completed, while 75% of respondents living on the left bank stated that their concerns have abated, despite the continued occurrence of flooding. Fears of flooding among residents of the left bank have been mitigated by the widening of river channels and the construction of dikes, which have served to prevent the river from breaking its banks near residential areas

and increased the time to overflow, meaning that people now have plenty of time to prepare for evacuation.

b) Earnings-related changes

Results from the beneficiary (residents) survey show that many respondents living on the right bank (83%) were aware of vulnerability to flooding as a risk to/constraint on their ability to continue pursuing livelihood activities. Since the completion of the PDDP, 89% of these residents stated that this risk has been reduced. On the other hand, 91% of respondents living on the left bank stated that they were cognizant of this risk, with 86% recognizing a post-project decrease (however, 51% stated that there had been only a marginal reduction in flood-related risk).

Figure 5. Risk to Income Source/Reductions in Constraints & Improvements in Earnings (right bank)



Moreover, 46% of residents living on the right bank who recognized that flooding was the biggest risk to livelihood activities, and that there had been a marginal reduction in said risk, stated that their livelihood had improved either considerably or to some extent[6]. However, since residents of the left bank have recognized only a slight reduction in the extent of flood damage, such improvements have been felt by a mere 30%. Although flooding is not completely unavoidable, by alleviating the concerns of local residents, the PDDP is contributing to better livelihood (such as aquaculture and commercial and service activities), particularly among residents on the right bank.

c) Improvement in Sanitation and Outbreaks of Waterborne Disease

In results from the beneficiary (residents) survey, the improvement in sanitary conditions over pre-project levels had been felt by 79% of respondents living on the right bank, with 59% considering this improvement impact of the PDDP. Moreover, 46% of the residents who recognized improvement in sanitation had felt a substantial reduction in the incidence of waterborne diseases. By contrast, 63% of respondents from the left bank stated that there

[6] This includes 37% of respondents on the right bank who have switched from farming to aquaculture (confirmed at evaluation). Fish breeding generally produces higher earnings and profits than farming, and it is thus necessary to consider the link between occupational changes and the improvements in livelihood activity.

had an improvement in sanitary conditions, with 17% attributing this to the PDDP.

d) Access to Cities and Municipalities

On access to cities and municipalities, which has a substantial effect on livelihood, 81% of respondents living on the right bank stated that there has been an improvement as the result of the development of dike roads (of which 57% cited a major improvement). On the left bank, 71% of residents stated that access had improved (with 21% citing a major improvement). Residents on the left bank urged the early completion of dike for more convenient transportation in the region, pointing out that the dike road developed by the PDDP does not connect with any public highways (because of the shorter length of dike).

(2) Impact on the Local Economy

a) Impact on Agriculture and Fisheries

In the beneficiary area and its periphery, paddy and arable land has been converted into fish breeding ponds since the implementation of the PDDP. As a result, cropping areas and production levels of rice are in decline while the production of fish and other aquatic resources are on increase. The production of rice and cultured fish and the areas for these productions are shown in the table below. The switch to aquaculture is attributed to seawater incursion, to high financial returns, and to the land use policy of the municipal governments[7] (Masantol, Macabebe, and Minalin).

Table 5. Rice/Aquatic Resource Production Volumes & Areas in and around the Beneficiary Area

Town	1998 (mid-project)		2003 (post-project)	
	Area (ha)	Yield (ton)	Area (ha)	Yield (ton)
Aquaculture				
Macabebe	N.A.	4,430.6	2,719.2	10,085.9
Masantol	N.A.	1,769.4	1,303.3	3,836.0
Minalin	N.A.	2,007.8	1,101.7	4,705.9
Rice				
Macabebe	1,773	4,740	835	3,111
Masantol	167	320	20	Not reported
Minalin	455	1,677	191	883

Source: Pampanga Bureau of Agriculture

Fig. 5. A breeding pond

In the beneficiary survey to residents who are engaged in the farming and fishing activities (50 from aquaculture; 8 from agriculture), 66% of those engaged in aquaculture cited an increase over pre-project levels, with 24% attributing this to the PDDP. It is believed that less frequent flooding and a

[7] The Strategic Agriculture and Fishery Development Zoning (SAFDZ), 1999

reduction in the extent of damages have increased the number of annual productions and diminished the risks involved in undertaking aquaculture. In addition, approximately half of those engaged in aquaculture (47%) pointed to higher profit margins and more favorable environmental conditions, which are enabling them to pursue production activities throughout the year.

b) Changes in Land Use and Prices

The majority or respondents (55%) did not recognize any change in land prices in the beneficiary area, while 32% stated that they had increased. According to those residents who referred to an increase in land prices, the increase in land price is attributable to the improvements in access to cities and municipalities.

(3) Impact on Resettled Residents

a) Current status of basic infrastructure post-resettlement

Utility poles for power distribution (individual households are responsible for connections), communal deep wells, dike roads and roads within the community, primary schools, communal halls, and churches were constructed at the resettlement site (Base Mound[8]) in the PDDP. The communal facilities were developed in accordance with the wishes of displaced households, the majority of whom were satisfied with the arrangements; however, according to the results of the survey of resettled residents, 43% are dissatisfied with the usability of dike roads[9], 21% with power supplies, and 13% with drinking water supplies. Dissatisfaction with electricity supplies predominantly stems from the fact that the burden of connection charges falls on the individual and some are not able to receive power, while well water is brackish and water is not supplied to individual households, hence the dissatisfaction with drinking water supplies.

b) Impact on the lifestyles of resettled residents

Results from the survey of resettled residents found 39% of households to include at least one member with stable employment, though in 59% of households no member has stable work or a means of livelihood, and in 21% at least one member of the household is living separately for economic reasons. It should be noted that 13% of respondents stated that they had lost stable employment and/or the means of livelihood as a result of the PDDP either because 1) they relinquished farmland or breeding ponds, or because 2) it was now impossible to earn from boat crossings.

[8] Residents who were resettled at the Base Mound were granted leasehold rights by the municipal government and pay rent averaging 360 pesos per year (per plot) to the municipal governments.

[9] Refer to the explanation provided in 2.4, 1), b).

Many of the resettled residents stated that their household earnings were lower than pre-resettlement levels. Approximately half (51%) stated that their earnings had decreased, 30% that there had been no change and just 19% that their income had increased. Of those who claimed that their earnings had fallen, 76% stated that the project had been highly instrumental to this effect. As many residents gave up farmland and/or breeding ponds as a consequence of resettlement and have now switched to seasonal worker in large-scale aquaculture operations, their earnings are now lower than before resettlement[10].

Since primary schools have been built in each of the Base Mound communities, the PDDP has had no negative impact on school attendance among resettled households. According to the survey, 94% of respondents' children at primary school age go to school everyday.

c) Implementation of support programs for resettled residents

As a relief measure for resettled residents, the municipal government unit responsible for the beneficiary area is granting land leases for aquaculture operations in the high water channels on a priority basis[11]. The areas are apportioned on a pro rata basis corresponding to the number of households in each barangay, and users pay between 2,500 to 3,500 pesos per hectare per year to the municipal governments in rent.

(4) Environmental Impacts

a) Impact of seawater incursion

Both the high profitability of aquaculture and the municipal governments' policy in the conversion of land use affect the use of land (rice paddies and arable land are being turned into breeding ponds). More seawater incursion into the Pampanga Delta might contribute to this change but it is unclear whether the PDDP has had any effect on seawater incursion[12].

b) Saltwater contamination of wells (brackish well water)

According to the results of the beneficiary (residents) survey, most residents (97%) are using the deep wells. The majority of these (93%) recognized no change in the salt content of well water after the implementation of the PDDP. The PDDP is not considered to increase salt content of well water.

[10] According to municipal government officials, the initial investment required to set up an aquaculture business is comparatively high. Only those people with capital can set up large-scale breeding ponds after resettlement. Some residents who relinquished their breeding ponds are employed by the owners of these businesses only for the hatchery and the harvest season. As a result, their earnings are lower than before.

[11] Permission to undertake aquaculture operations is not necessarily granted only to resettled residents.

[12] Since no scientific surveys have been undertaken since project completion, it is difficult to assess what impact the PDDP has had, if any, on the levels of seawater incursion in the area at this evaluation. However, a study on this phenomenon was undertaken during the implementation phase, with the results of the analysis demonstrating that El Nino (drought) is causing the abnormal seawater incursion, not the PDDP.

2.5 Sustainability

2.5.1 Executing Agency

The Pampanga River Control System (PRCS) of the Department of Public Works and Highways (DPWH) is responsible for the periodic maintenance and repair of flood control facilities (dikes, drainage channels, and sluice gates[13]). The DPWH flood control project office (PMO-MFCP) is responsible for large-scale rehabilitation works. Routine inspections and simple maintenance works on civil engineering infrastructure, such as the dikes, and sluice gates[14] fall under the jurisdiction of the municipal government engineering office.

2.5.1.1 Technical Capacity

The technical skills of PRCS employees present no problem in the performance of operation and maintenance work. According to PRCS, many of its engineers gained experience from work supervision in the planning phase at the Pampanga Delta Development Office (PMO-PDDP), the PDDP's project management office. Their experience at PMO-PDDP has contributed to improvements in their technical skills. Training for PRCS employees had been suspended due to funding shortages at the time of the evaluation, but employees continue to participate in the training program[15] under the technical assistance from JICA. As employees of the municipal government engineering office have the necessary skills to perform simple maintenance work on civil engineering facilities (reinforcing cracks in sloping dike banks, repairing cracks and peeled pavement in dike roads, etc.), there are no problems in this area either.

2.5.1.2 Operation and Maintenance System

This project is the Phase 1 of the PDDP. As the prospect of the Phase 2 is unclear, the PRCS has seen considerable cutbacks in its functions and workforce (there were ten engineers at evaluation). However, the PRCS stated that its current workforce presents no problems in respect of the operation and maintenance system. It should be noted that there is a plan to incorporate the PRCS into the DPWH PMO-MFCP with a view to improving the management of flood control facilities in the Pampanga Delta.

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[13] The sluice gates that are designed to prevent back flow into tributaries when waters in the Pampanga River rise.

[14] These sluice gates control the flow of water into and out of the river inside the dike via a lifting and lowering mechanism, and in many instances were installed to pull in water for irrigation or to discharge sewerage.

[15] Namely, the Enhancement of Capabilities in Flood Control and Sabo Engineering, which started in March 2002. The program involves training in survey analysis of flood control projects and facility planning and design (engineering).

2.5.1.3 Financial Status

PRCS's operation and maintenance budget has been slashed in line with the reductions in its functions and workforce. The PRCS budget (for periodic maintenance and special repairs) averaged 60 million pesos between 1997 and 2002, but was cut in fiscal 2003 and had fallen to 5.2 million in fiscal 2004. Since then, the budget has been allocated pragmatically with 30 million going to periodic maintenance and the remainder to special repairs, and in fiscal 2004, all available operation and maintenance funds were directed to structural repairs, including conspicuously damaged banks and dikes.

Budget cut in the DPWH has been across the board and are not only limited to the water resources management sector. Within the government and the congress, however, there are strong calls for mitigation and prevention of flood damages. With the aforementioned plans to integrate PRCS into the DPWH PMO-MFCP, the PRCS has prospects for an increase in its operation and maintenance budget in FY2005.

2.5.2 Current Operation and Maintenance Status

At the time of evaluation, there was no serious erosion or severe damage to the dikes/dike roads in the PDDP. Since the facilities are relatively new, they have yet to be under routing maintenance or repair. Sluice gates are also free of damage. Since the gates can be opened and closed manually[16], the lack of spare parts caused no problem. In addition, the dredgers, which were procured for the project, are being properly maintained and are currently in use on other flood control projects.

The municipal governments are responsible for the maintenance of the Base Mound and communal facilities. Their responsibilities are mainly cleaning of facilities and well inspections. Although the municipal governments has received requests from residents for additional infrastructure, including paved dike roads, drainage channels and waste management facilities, budget constraints do not allow both the municipal government and DPWH to respond these requests. DPWH prohibits the construction of permanent structures in flood channels, which constitute one of the assets under DPWH management. The municipal governments undertake regular patrols under DPWH instruction, but as already mentioned, many residents continue to live in the flood channel and municipal government guidance has lost substance.

[16] The sluice gates are operated by barangay representatives in coordination with the municipal governments.

3. Feedback

3.1 Lessons Learned

Had adequate preparation been made for land acquisition and the process properly coordinated, project progress could have been expedited and local opposition transformed into approval. More specifically, had the budget secured for the resettlement program at an earlier stage and preparations of the resettlement site been timed to coincide with eviction orders, these measures might have helped to build consensus among affected residents and have facilitated the eviction process. The lessons learned from this project have been incorporated into the executing agency's guidelines on land acquisition and involuntary resettlement (2003 edition).

3.2 Recommendations

With the flood control facilities in their present state the anticipated benefits of the project are not being fully realized; the executing agency is therefore advised to hold explanatory meetings and public hearings when launching the Phase II project[17].

Resettled residents have been granted the right to breed fish in the high water channel as a relief measure. However, in order that those households who gave up their land can obtain sufficient benefits and earn appropriate incomes from this work, the executing agency is advised to devise a policy that combines the priority allocation of space with financial support, such as loans.

[17] The order of priority in flood control projects should be carefully examined before the implementation of the Phase II.

Comparison of Original and Actual Scope

Item	Planned	Actual
(1) Outputs		
1) Procurement of dredgers	4	As planned
2) Civil engineering works		
a) River improvements		
Dike construction	22.7 km (Sulipan – Manila Bay)	14.2 km (right bank/13.2 km (left bank) (Masantol – Manila Bay)
River widening	750 m	As planned
Dredging volume	17,652,000 m^3	12,205,000 m^3
Sand-fill volume	1,792,000 m^3	1,898,000 m^3
High water channel flow rate	3,800-4,300 m^3/s (capacity equivalence: 20-yr return probability)	As planned
b) Sluice gates	21	16 (right bank: 9; left bank: 7)
c) Bridge approach road	1 (Sulipan Bridge)	Cancelled (work undertaken via a separate project)
	17,921,300 m^2	11,602,800 m^2
3) Land acquisition	Technical assistance for bidding procedures, work supervision	As planned
4) Consulting services	319.6 M/M	449.2 M/M
(2) Project period		
L/A signing	February 1990	February 1990
Consultant selection	Feb. 1990 Jan. 1991	December 1990
Procurement of dredgers	Feb. 1990 – Apr. 1992	February 1990 (bidding)
Bidding	Nov. 1990 – Sept. 1991	Jul. 1992 – Dec. 1992
Civil engineering works	Oct. 1991 – Dec. 1996	Feb. 1994 – Dec. 2002
Land acquisition	Feb. 1990 – Aug. 1995	Jun. 1990 – Dec. 2001
(3) Project costs		
Foreign currency	6,274 million yen	7,537 million yen
Local currency	7,360 million yen (1,187 million pesos)	3,481 million yen (915 million pesos)
Total	13,634 million yen	11,018 million yen
ODA loan portion	8,634 million yen	7,537 million yen
Exchange rate	1 Peso = 6.20 yen (June 1989)	1 Peso = 3.80 yen (1995-2001 average)