Argentina

Project for Improvement of the Hygienic Environment of the Reconquista River Basin

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Field Survey: November 2005

1. Project Profile and Japan's ODA Loan

Map of project area

The upgraded Reconquista River

1.1 Background

The target area for this project includes nine cities in the lower Reconquista River Basin in the northern part of metropolitan Buenos Aires, a city which has a particularly high population density within the Province of Buenos Aires situated in the center of Argentina. The size of the basin area is 644km^2 and the population within this region came to approximately 2,505,000 people as of 1991.

Due to the industrialization policies of the 1940s and 1950s, the fostering of industry was given priority in this region and the development of economic infrastructure was advanced from an early stage. However, the development of social infrastructure, on the other hand, was delayed. In particular, the diffusion rate for hygienic services such as water supply and sewage was low, with medical care services being insufficient as well.

As of 1991, the number of recipients of sewage service within the basin was approximately 399,000 people, and the sewage diffusion rate was 16%. Meanwhile, about 1,684,000 of the approximately 2,106,000 residents not receiving sewage service used septic tanks, and private sector sewage hauling companies would periodically collect the sewage in the tanks. The remaining 423,000 or so people either used stercoraries or had no sort of alternate means. The Bella Vista treatment facility was the only one within the basin that treated the sewage taken

in by the sewage hauling companies. This facility only had the capacity to treat about 12.6% of the sewage in the septic tanks inside the basin. The remaining portion would be taken to municipally-managed digestion tanks or sewage disposal sites without being treated, aside from which the majority would be illegally dumped in places like rivers.

As of 1991, the number of recipients of water supply service within the basin was approximately 810,000 people, and the water supply diffusion rate was 32%. Meanwhile, about 1,322,000 of the approximately 1,580,000 residents not receiving water supply service maintained underground water through wells that were drilled and owned privately. The remaining 258,000 people were dependent upon unpurified open well water, rainwater, or water trucks for their drinking water.

Moreover, for the Reconquista River Basin the natural course of the rivers is completely intact, and there were only small segments of the river where dredging was carried out. There is little difference in elevation between upstream and downstream areas, and major parts of roads were paved to respond to the expansion of urbanization within the basin. Due to these factors, rainwater that fell in the basin did not seep into the ground, and the percentage of this water that would flow into the rivers increased. As a result, flooding of the rivers came to occur frequently in much of the area when the amount of water increased during the summer rainy season. Furthermore, seasonal winds from the southeast in the winter caused the water levels to rise in the Lujan River downstream of the Reconquista River, as well as in the La Plata River. Because of this, the lower Reconquista River's Basin area would be submerged and flood damage would occur.

As an example, during the heavy flooding of 1985 an area of 119.7km^2, equivalent to 18.6% of the basin as a whole, was submerged. Of this region 28.4% was comprised of residential areas. Some 305,500 people (corresponding to 12.3% of the basin's population) suffered inundation damage from this flood. Out of this number, 71,000 people were forced to evacuate and 28,000 people suffered property damage.

Table 1. Population and Water Supply and Sewage Diffusion Rates of the Reconquista River Basin Prior to the Implementation of this Project (1991)

(Unit: 1,000 people)

City	Population	Population within the basin	Population receiving sewage service	Sewage diffusion rate	Population receiving water supply service	Water supply diffusion rate
San Fernando	143	143	34	24%	72	50%
San Isidoro	299	208	38	18%	182	88%
General San Martín	404	265	41	15%	148	56%
Tres de Febrero	349	178	54	30%	113	63%
Moron	641	600	129	22%	182	30%
Tigre	255	168	21	13%	32	19%
General Sarmiento	650	349	26	7%	29	8%
Moreno	287	286	19	7%	25	9%
Merlo	386	308	37	12%	27	9%
Total	3,414	2,505	399	16%	810	32%

(Note) The diffusion rates for sewage and water supply both represent the percentage of the population receiving water supply or sewage out of the population within the basin.

(Source) FS

1.2 Objective

The objective of this project was set as contributing to mitigating flood damage and to improving the hygienic environment of the residents in the region. This was to be done by striving to perform flood control through upgrading rivers and improving drainage in the Reconquista River Basin, as well as enhancement of its water quality through the development of sewage treatment facilities and the strengthening of systems like wastewater management.

1.3 Borrower/Executing Agency

Argentine Republic/Province of Buenos Aires Government

The scope for this project pertains to multiple ministries within the provincial government, as well as provincial public companies under the government's jurisdiction. Because of this, the Coordination Unit for Reconquista River Project (UNIREC) was established for the smooth management and regulation of this project as an organization under the direct jurisdiction of the governor of Buenos Aires. UNIREC came to facilitate the project with the cooperation of the relevant ministries and agencies, such as the Ministry of Public Works and Services[1].

1.4 Outline of Loan Agreement

Loan Amount/ Disbursed Amount	8,150 million yen 4,725 million yen
Exchange of Notes Loan Agreement	September 1994 March 1995
Terms and Conditions - Interest Rate - Repayment Period (Grace Period) - Procurement	 5.0% p.a. 25 years 7 years General Untied
Final Disbursement Date	August 2002
Feasibility Study (F/S), etc.	F/S completed in March 1993 by the Ministry of Public Works and Services of the Province of Buenos Aires. Loan agreement with the Inter-American Development Bank (IDB) in March 1994 (US$150 million)[2].

2. Evaluation Results

2.1 Relevance

2.1.1 Relevance at the time of appraisal

In Argentina, interest in environment issues began to increase from around

[1] As part of the structural changes from 2002, UNIREC was changed from an organization under the direct jurisdiction of the governor to a department of the Ministry of Public Works of the Province of Buenos Aires. It must be noted that at this time, UNIREC lost its status as an organization possessing independent authority.

[2] This project is co-financed by the IDB.

1987-1988. Chief among this were issues like the pollution of water (the pollution of river and groundwater by industrial and domestic wastewater) and natural disaster such as that exemplified by flooding, which came to be taken up as major environmental issues. In Argentina's mid-term development plan (1993-1995) environmental conservation was positioned as a priority area for developmental investment policies. Moreover, at this time the formulation of the environmental policy guidelines was accelerated through the leadership of the Secretariat of Sustainable Development and Environmental Policy, and this project was accorded a high priority as a pilot project of the guidelines.

At the time, no organizations existed in the Province of Buenos Aires for comprehensively monitoring and managing environment issues, and nothing like an environmental plan had been formulated. Yet the worsening of the hygienic environment of residents in the surrounding areas caused by the flooding of the rivers was turning into a serious policy challenge.

As has been described above, for the lower Reconquista River Basin in particular, improvements to the networks for water supply and sewage services were delayed, and domestic and industrial wastewater were being discharged into rivers without undergoing sufficient treatment. In addition, during frequent flooding of the rivers septic tanks would also overflow, causing pollution of aquifer via wells, and the hygienic conditions of area residents would sink to a poor state.

In such a state of affairs there was a great deal of importance in conducting river purification and flood control for the Reconquista River. Furthermore, as will be described later, at the planning stage it was assumed that the total project costs would reach an enormous amount equivalent to 35,165 million yen. As such, the fact that this project was implemented through co-financing with the IDB was considered to be of immense significance[3].

2.1.2 Relevance at the time of evaluation

In Argentina a 1995-1999 edition mid-term development plan was formulated to carry over from the mid-term development plan (1993-1995). Following this, however, no policies consistent with this plan are being formulated. However, in the Millennium Development Goals (MDGs) for Argentina, environmental conservation and improving the hygienic environment are positioned as primary development goals.

[3] It was planned that the IDB would contribute a loan of US$150 million.

The Trust Fund for the Development of Infrastructure was established in the Province of Buenos Aires in October 2000. The fund proposes to provide investments of 1 billion pesos over the next 10 years to public works, including those related to hygiene and hydraulic power, recognizing this field as an important area.

Consequently this project is believed to have high relevance at the time of evaluation.

In the Reconquista River Basin, a certain degree of success has been achieved through the implementation of this project. Examples of this include the mitigation of flood damage through the improvement of infrastructure designed for flood prevention. The importance of this project is great. From the perspective of maintaining this success, it is believed that for the future the focus should be shifted to operation and maintenance of this infrastructure.

2.2 Efficiency

2.2.1 Outputs (project scope)

The scope[4] for this project is comprised of: (1) the upgrading of rivers (dredging, underwater excavating, widening, creating channels, banking, etc.); (2) the improvement of drainage (installation of backwater drainage pump stations, improvement of drainage channels, etc.); and (3) hygienic projects and planning (installation of a sewage treatment plant, sludge treatment, implementation of supplemental environmental plans, etc.). The various segments of the project were carried out through co-financing from JBIC and IDB. A comparison of the plan and its actual performance is indicated in Table 2.

Table 2. Outputs from this Project (Comparison of the Plan and its Actual Performance)

Plan	Actual Performance
(1) Upgrading rivers (JBIC portion) (2) Upgrading discharge channels ・Extend by approximately 7km ・Excavating underwater/dredging 2,000,000m^3 ・Embankments/levees 157,230m^3	(1) Upgrading rivers (JBIC portion) (2) Upgrading discharge channels ・Extended by approximately 7km ・Excavating underwater/dredging 1,350,000m^3 ・Embankments/levees 170,000m^3

[4] Here the description includes projects financed by IDB.

Plan	Actual Performance
(IDB portion) 1) Distributary dams (divergence point from drainage ditch) approximately 7.050km 2) Upgrading of Reconquista trunk stream extension of approximately 43km 3). Upgrading of tributaries ・Basualdo River (approximately 3.7km) ・ Los Berros River (approximately 1.3km) ・Soto River (approximately 1.1km) 4) Banking of the Las Tunas River ・ Extension of 3.2km ・ Excavating underwater 69,000m^3 ・ Banking 97,980m^3 5) Construction of bridges and other infrastructure ・ Renovate 9 bridges, reinforce 16 bridges and 6 pedestrian bridges ・ Move 1 electrical wire tower and 1 gas pipe line (2) Improvement of drainage (JBIC portion) 1) Installation of backwater drainage pump stations ・10 pump stations (total capacity of 69m^3/s, electrical capacity of 3,490KW, 24 units) ・ Power distribution facility (extended by 22.9km) [IDB portion] 2) Improvement of drainage channels (surrounding the pump stations) ・12 drainage channels (overall extension of approximately 25km) total capacity of 665.05m^3/s	(IDB portion) 1) Distributary dams (divergence point from drainage ditch) as planned 2) Upgrading of Reconquista trunk stream as planned 3) Upgrading of tributaries as planned 4) Banking of the Las Tunas River as planned 5) Construction of bridges and other infrastructure ・13 bridges renovated, 9 bridges and 6 pedestrian bridges reinforced ・ 1 electrical wire tower and 1 gas pipe line moved (2) Improvement of drainage (JBIC portion) 1) Installation of backwater drainage pump stations largely as planned ・ 10 pump stations (total capacity of 97.5m^3/s, electrical capacity of 5,075kW, 30 units) ・Power distribution facility (extended by 22.9km) [IDB portion] 2) Improvement of drainage channels (surrounding the pump stations) as planned

Plan	Actual Performance
(3) Hygienic projects and planning (JBIC portion)] 1) Installation of sewage treatment plants ・Total population 1,597,000 people ・ Planned treatment capacity of 9,600m^3/d ・new installation of 3 treatment plants and the expansion and rehabilitation of 1 treatment plant 2) Sludge treatment ・Total disposal amount of excavated and dredged soil 7,000,000m^3 (IDB portion) 3) Supplemental environmental plans ・ Plan to control industrial wastewater ・Comprehensive management plan for the basin (COMIREC) ・ Social action plan ・ Development of flood relief regions ・ Development of network for monitoring water levels, water volume, and water quality	(3) Hygienic projects and planning (JBIC portion) 1) Installation of a sewage treatment plants The sewage treatment plant were not constructed 2) Sludge treatment ・Total disposal amount of excavated and dredged soil 685,000m^3 (IDB portion) 3) Supplemental environmental plans ・Plan to control industrial wastewater → implementation completed ・Comprehensive management plan for the basin → partially implemented ・Social action plan → implementation completed ・ Development of flood relief regions → implementation completed ・ Development of network for monitoring water levels, water volume, and water quality → not implemented

Backwater drainage pump station

No. 9 (distant view) Draining water

An explanation of the difference between the plan and its actual performance is provided below.

Four points will be provided for the portion financed by JBIC.

The first point is that for construction work related to upgrading the rivers the total amount disposed of through excavation and dredging as part of upgrading drainage ditches was less than the amount planned. This is because a study performed by the consultant prior to implementation concerned with recalling the discharge channels confirmed that the total amount that should be disposed of through excavation and dredging was less than thought necessary in estimates from the initial stages.

The second point is that changes were observed concerning the installation of backwater drainage pump stations for the construction work related to drainage improvement. After the review on the planned amount of rain and basin, the capacity required for backwater drainage was reexamined. Accordingly, while the installation sites for the pump stations remained the same, the installed direction and capacity (output and number of units) of several of the pump stations was altered.

The third point is related to the hygienic projects and planning. Not one of the four sewage treatment plants initially planned were ever constructed. This change could possibly be the largest modification to this project. The straightforward reason for why the sewage treatment plants were not constructed is the debt problem that arose in the wake of Argentina's economic crisis from 2001-2002. Because of this, JBIC was forced to halt new disbursements from then on, the result of which was that the procurement of construction costs became difficult. Furthermore, it is difficult to continue with lending to countries that have previously declared defaults on the repayment of their debts from the point of view of securing ODA loan claims. To maintain the balance between the loan and the

effects of project implementation, the suspension of new disbursements was an unavoidable and natural step. Moreover, one fact hidden behind the scenes of the economic crisis that is not to be overlooked is the significant procedural delays that persisted through to the construction of the sewage treatment plants. Whatever the reason for the change, though, the sewage treatment plants that were initially planned at four locations were not constructed. As a result, the fact is that the project could not achieve the anticipated results in terms of effectiveness or impact. How best to deal with this issue is something that must be seriously reviewed as part of the evaluation for this project.

Sewage treatment plants currently under construction
(procured through local funds)

The fourth point is likewise related to hygienic projects and planning, and it is that the sludge treatment volume decreased slightly from the initial plan. According to an on-site survey conducted by the consultant, it was demonstrated that the degree of pollution of the dredged sludge was lower than initially estimated. As a result, the amount of dangerous sludge that needed to be treated decreased.

For the portion financed by IDB, it is recognized that the project was implemented largely according to plan. However, there are two points of discrepancy that should be pointed out. The first is that out of the construction work related to upgrading the rivers, the number of bridges which were to be renovated or reinforced was changed from the initial plan. The local governments recognized needs or requests claimed by local residents living near the bridges and understood that the initial plan needed to change its priority in renovation or reinforcement. This prompted the provincial governments to decide the change in its plan. The second is that out of the items related to the hygienic projects and

planning, the implementation details of the supplemental environmental plans have been changed from the initial plan. In particular, a network for monitoring water levels, water volume, and water quality has not been developed. This is due to the previously mentioned economic crisis in the country, which forced a change in the financial order of priority of the provinces. The crisis also generated shortages in the budget of the provincial government and made it difficult for the local community to pay for additional costs. Furthermore, there was initially a plan to set up the Comite de Cuenca del Rio Reconquista (COMIREC) within the comprehensive management plan for the basin as an operation and maintenance agency for this project. However, as of the present this agency has not been set up according to plan, and the claim could be made that COMIREC is essentially in a dysfunctional state. The fact that COMIREC is dysfunctional is pointed out as a challenge from the point of view of the sustainability of this project. Reference to this point will be made in the section on "Sustainability."

2.2.2 Project period

A comparison of the initial plan and its actual performance in terms of the implementation period for this project (JBIC component) is shown in Table 3.

Table 3. Comparison of the Initial Plan and the Actual Period

	Initial plan	Actual performance
Signing of loan agreement	March 1995	March 1995
Upgrading of discharge channels	1995-December 1999	February 1999-December 2001
Installation of backwater drainage pump stations	1997-December 1999	February 1999- December 2001
Construction of sewage treatment plants	1997-December 1998	Not implemented
Sludge treatment	1996-December 1999	February 1999-December 2001

The significant delays in the implementation period were due to the: (1) that fact that the establishment of the COMIREC as an operation and maintenance

agency, which was one of the conditions of the IDB loan, fell behind schedule; (2) the replacement of the official in charge of the executing agency and troubles and delays in hiring the consultant related to the bidding process, which delayed the process by three years between the conclusion of the loan agreement and the initiation of construction work; (3) the overlap in authority between the executing agency and other public organizations, as well as extreme difficulties in the bidding procedure and coordination that resulted in delays in the start of construction work from the initial plan, and (4) the confusion regarding the management structure for this project within the executing agency following the occurrence of the 2001-2002 economic crisis. (3) and (4) are considered to have been the major factors in relation to JBIC's part of the project.

In the initial plan, JBIC's portion had a planned period of four years and nine months lasting from March 1995 until December 1999. However, it eventually came to take seven years and five months from March 1995 until August 2002, with a required period that was 156% longer than planned. What is more, at the time of completion in August 2002, JBIC received a request from the Argentinean side for an extension of loan disbursement. However, the decision was made to reject this request and to finish the project when the loan disbursement ended as was initially planned.

2.2.3 Project cost

A comparison of the initial plan and its actual performance in regards to project cost is shown in Table 4.

Table 4: Comparison of the Initial Plan and the Actual Project Cost

(1) Project cost from the initial plan

	Foreign currency (1 million yen)	Local currency (1,000 peso)	Total (1 million yen)	JBIC component (1 million yen)
Upgrading rivers (※1)	1,761	95,930	11,834	996
Drainage improvement (※2)	1,822	16,294	3,533	2,668
Hygienic projects and planning (※3)	2,084	37,079	5,978	4,134
Consulting services	488	9,023	1,435	0
Resident relocation/land acquisition	0	8,801	924	0
General management/organizational enhancement	72	3,423	432	0
Material reserve funds	574	16,153	2,270	352
Financial costs	0	31,868	3,346	0
Taxes	0	51,554	5,413	0
Total	6,801	270,125	35,165	8,150

(Note) The JBIC components include the upgrading of discharge channels in ※1, the installation of backwater drainage pump stations in ※2, and the installation of sewage treatment plants and sludge treatment in ※3.

The exchange rate is US$1.00 = 1.00 peso = 105 yen

(Source) JBIC

(2) Actual project cost

	Total (1 million yen)	IDB components (1 million yen)	JBIC components (1 million yen)	Local components (1 million yen)
Upgrading rivers	20,476	12,543	1,361 (※1)	6,572

Drainage improvement	5,224	0	3,364	1,859
Hygienic projects and planning	907	737	0	171
Consulting services	4,364	2,235	0	2,130
Resident relocation/land acquisition	0	0	0	0
General management/organizational enhancement	364	119	0	245
Material reserve funds	0	0	0	0
Financial costs	5,262	101	0	5,161
Total	36,598	15,735	4,725	16,138

(Note) Expenditures for sludge treatment are included in ※1.

(Source) The data from UNIREC was calculated using the rate US$1.00 = 114 yen

While the total project cost was 35,165 million yen in the initial plan, in actual performance the figure came to 36,598 million yen; 104% compared to the plan. However, speaking in terms of the portions targeted by ODA loans, the amount remained at 4,725 million yen compared to the 8,150 million yen planned (58% compared to the plan). The biggest reason for the substantial decrease in the portions targeted by ODA loans is that the sewage treatment plants were not constructed.

2.3 Effectiveness

2.3.1 Mitigation of flood damage

At the time of appraisal items like lowering the number of deaths and injuries caused by flood damage, improving the living environments of regional residents and the environment for regional economic activities by mitigating the risk of floods, and the reclamation and efficient utilization of land ruined by flooding were listed as effects for this project. However, while such indicators of operational effectiveness were established in relation to this project, target values based upon them were not specified. Owing to this, it is difficult to compare the target values and values of actual performance and to perform analyses and evaluations of the degree to which the objectives were attained. Similarly, IDB as well did not set any target value using specific indicators; the only objective for this project was flood control for the Reconquista River Basin when it rises up as a result of rainfall and severe rain storms. As a consequence of this, the executing

agency has not necessarily kept data on indicators which are capable of measuring the effectiveness of this project. As such, any judgment of the effectiveness of this project has no recourse but to remain at a qualitative level.

Through a field survey it was confirmed that all of the survey's respondents acknowledge that since the year 2001 flood damage has been mitigated due to the implementation of this project (survey conducted from December 10, 2005-January 31, 2006 by means of interview surveys targeting seven regions in the Reconquista River Basin; all 21 interviewees responded that they acknowledge that flood damage has been mitigated). This project undertook construction work to upgrade rivers in the main trunk and tributaries of the Reconquista River, improvements like the creation of channels and the expansion of river width, improvement of drainage through operation of backwater drainage pump stations. All of the above contributed to developing the structure where it is unlikely that large-scale flood damage will occur even when there is an increase in water. In connection with this, a comparison was performed on satellite photographs of the heavy flooding from 1985 and periods when the water has increased since the year 2001. Through this, it was confirmed that damage from flooding has not been expanding since 2001.

2.3.2 Improving the water quality of the rivers

At the time of appraisal items like reducing flooding-induced overflows of septic tanks and mitigating the contamination of groundwater, decreasing infectious diseases attributable to water, as well as improving the water quality of the rivers and alleviating foul odors caused by pollution were listed as effects by this project (indicators of operational effectiveness were not established). Furthermore, the IDB presented target values related to improving the water quality of the rivers, which are indicated in Table 5. According to the executing agency, as of 2002 the following objectives had been achieved.

Table 5: Objectives Related to Improving Water Quality Established by the IDB

(1) By the time of project completion dissolved oxygen levels at mid-stream and down-stream areas should exceed zero throughout the year.
(2) The following quantitative data should be maintained in 2002 for the upper basin.
Dissolved oxygen: over 4mg/l
BOD: 20mg/l or below
pH: between 6.5 and 8.5
Total suspended solid: 0
Cadmium: less than 3.9 micrograms (μg)/l
Chromium: less than 10.0μg/l
Mercury: less than 2.4μg/l
Lead: less than 3.2μg/l
Zinc: less than 120.0μg/l
Population of fecal coliform bacterium: less than 1,000ppm in 85% of test samples
(3) The following quantitative data should be maintained in 2002 for the middle and lower basin.
Dissolved oxygen: over 1mg/l
BOD: 70mg/l or below
pH: between 6.5 and 8.5
Total suspended solid: 0
Cadmium: less than 9.5μg/l
Chromium: less than 170.0μg/l
Mercury: less than 8.9μg/l
Lead: less than 70μg/l
Zinc: less than 250.0μg/l
Population of fecal coliform bacterium: less than 1,900ppm in 85% of test samples

Moreover, following this project, the Provincial Department of Sanitary and Hydraulic Works of the Province of Buenos Aires in January 2005 carried out a sampling study, and Table 6 shows data from this study.

Table 6: Sampling Study Conducted by Provincial 'the Provincial Department of Sanitary and Hydraulic Works' (January 2005)

(1) Amount of dissolved oxygen
Minimum value 0.38mg/l (site at Bridge Route 202)
0.47mg/l (site at Bridge Route 197)
0.41mg/l (site at Bridge Cocarsa)
Maximum values 7.36mg/l and 8.21mg/l
(between Gaspar Campos and Morón Stream)
(2) BOD
Minimum value 2mg/l (site at Cascallares)
Maximum value 91mg/l (site at Bridge Cocarsa)
Median value 23mg/l (16 sampling sites)
(3) Heavy metals Not detected

(Note) All of the data listed above is from the lower basin

Judging from the above data on water quality, it is apparent that the improvement of water quality was effective to a certain degree. This comes despite the fact that the sewage treatment plants which were supposed to be important outputs for the project financed by JBIC, were not constructed for the reasons mentioned above. The change was brought about by the project covered by IDB, which includes the implementation of a plan to control industrial wastewater, construction work to improve the state of the river basin (work for the dredging of riverbed), and an environmental education campaign under the social action plan. Moreover, a comparison was performed of the water quality standards used in Japan (river water quality standards type E: adaptability of the purpose of use: level three of environmental conservation for industrial water)[5] with the water quality from the middle and lower Reconquista River Basin following the implementation of this project. The results indicate that the water quality in the basin does not meet the standards for Japan. In addition, based on the data from one sampling study in 2005, it appears the water quality has been deteriorating since the year 2002. In the medium term, the water quality has not necessarily been maintained.

[5] In Japan's river water quality standards type E (adaptability of the purpose of use: level three of environmental conservation for industrial water) standards are provided; for example, the amount of dissolved oxygen should be 2mg/l or above, BOD should be 10mg/l or below, and pH should be between 6.0 and 8.5.

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

The benefit of this project include higher land price by mitigating the possibility of flood damage, as well as reducing the various losses suffered by industries located in the Reconquista River Basin due to floods, reducing the damage to social infrastructure, and easing the adverse effects to transportation. The executing agency has confirmed that if these are assumed to be the economic benefits for this project, then the Economic Internal Rate of Return (EIRR) can be estimated to be approximately between 12.7% and 14.2%.

2.4 Impacts

2.4.1 Improving the living environment of the regional residents

According to material from the executing agency it was stated that, "Out of the total population living in middle and downstream river basin, 11% or more were suffering damage from the floods which occurred frequently." It can be expected that hereafter these people will no longer suffer damage from flooding as a result of the implementation of this project. The number of beneficiaries of this project can be supposed to be approximately 416,000 people, which is equivalent to 11% of the roughly 3.73 million people (3,726,566 people according to the 2001 national census) living in 13 cities[6] in the middle and downstream areas. This figure is based on the presupposition that no large-scale floods have occurred following the implementation of this project, and also assumes that 11% of the population in the middle and downstream areas received the benefits of the project.

Moreover, it has been pointed out that through the implementation of this project, it has been made possible to restore area greater than 150,000ha in size which used to be classified as a submerged area when floods would occur. In particular, due to the mitigation of flood damage, the sanitary issues and losses of property which occurred have been done away with, and the price of land has gone up within the residential neighborhoods in the lower basin.

What is more, there are also indications found in resident interviews to the effect that the project has enabled the social advancement of women through the use of time which has been freed up. This time has been freed through benefits such as reductions in the burden of household labor on women; for example, owing to the mitigation of flood damage the time spent working to bale muddy

[6] The nine cities from the Reconquista River Basin in Table 1 became 13 cities as a result of partitions that occurred afterwards. To be specific, the city of Moron was partitioned into the cities of Moron, Hurlingham, and Ituzaingo; and the city of General Sarmiento was partitioned into the cities of Jose C. Paz, Malvinas Argentinas, and San Miguel.

water out has decreased.

2.4.2 Environment

It became clear that the construction work for upgrading the rivers did not worsen contamination of the dredged and excavated soil as had been initially estimated in the plan. Consequently, the amount of soil warranting disposal remained around 10% of the amount that had been initially planned for. No other adverse affects upon the surrounding environment as a result of this project have been reported.

2.4.3 Land acquisition and relocation of residents

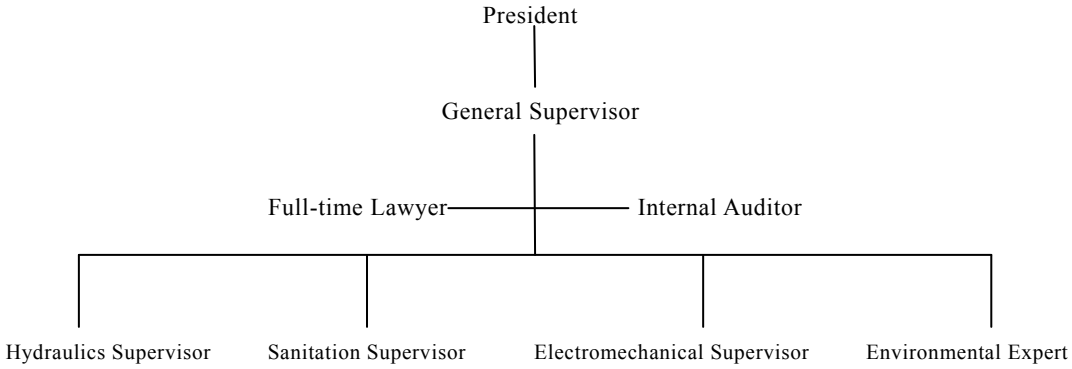
Efforts were taken to keep the acquisition of land through this project down to a minimum. Because of this, the number of residents forced to relocate due to this project was kept down to the 44 households as had been initially planned for, with these relocated households also being provided with substitute land. Owing to this, no particular problems have arisen.

2.5 Sustainability

2.5.1 Executing agency

As has been mentioned previously, the implementation of this project is something that pertains to multiple ministries within the Buenos Aires provincial government or to provincial public companies under the government's jurisdiction as well. As such, it was supposed that the smooth implementation of a complex coordination of various interests would be essential. For this reason, the Coordination Unit for Reconquista River Project (UNIREC) was established as an organization under the direct jurisdiction of the governor for the implementation of this project. UNIREC was accorded a strong independent authority on par with the ministries, and came to proactively promote cooperation for this project.

Table 7. Organizational Chart of UNIREC at the Time of Project Implementation



At the end of 2001 construction work related to flood prevention had largely been completed. Moreover, the financial condition of the provincial government was in a severe state. Therefore, from April 2002 onward UNIREC's organizational objective has become completing the remaining projects, and it has been positioned as a division of the water utility department in the Ministry of Public Works and Services where it remains today. These remaining projects include coordination with the basin's local government, the sale of land which it became possible to reuse due to the reduction in flooding, the construction of the sewage treatment plants and introduction of the monitoring system that were not implemented through this project, as well as an investigation of the actual conditions for industries. Furthermore, as will be described later, since COMIREC, which was supposed to act as the maintenance agency for this project, was dysfunctional, UNIREC essentially came to fulfill the role of the operation and maintenance agency for this project.

2.5.2 Operation and maintenance

At the outset the IDB, which was the co-financing institution for this project, set the establishment of COMIREC as a body to conduct comprehensive management and water quality preservation in the Reconquista River Basin as a precondition for the start of the project. However, the creation of COMIREC was delayed substantially, which was one of the reasons for the delay in starting the project. But in 2001 Law No. 12653, which sets forth the establishment of COMIREC was ratified by congress; through this, gradual steps began towards its creation. Following its establishment in 2001, negotiations were conducted between COMIREC, the basin's local government, UNIREC, and the water utility

department of the Province of Buenos Aires. However, an agreement regarding operation and maintenance for this project was never reached, and as of yet COMIREC is essentially dysfunctional. Under such a situation the executing agency UNIREC has come to conduct the maintenance of facilities outfitted through this project on behalf of COMIREC. In addition, at UNIREC it is considered important that facilities and machineries be maintained in a condition that allows them to function in good working order (the on-site survey found cases where the cables which control the backwater drainage pump stations remaining severed for a certain period of time and others).

2.5.2.1 Technical capacity and budget

JBIC is indicating the technical challenges for UNIREC, which is essentially conducting operation and maintenance. According to the executing agency, they were ensuring the technical ability of personnel involved in operation machineries provided through this project through efforts such as creating manuals for operation and maintenance as well as holding training sessions. It is basically believed that there are no technical problems from the point of view of sustainability.

According to the executing agency, on average approximately US$2.64 million per year will be needed by way of maintenance fees for this project. But the amount that can actually be raised through budgetary allowances is only about US$2.50 million. Owing to such budgetary constraints, only the bare minimum personnel required are being allocated for maintenance, and there are concerns over shortages in terms of manpower.

2.5.2.2 Operation and maintenance structure

The greatest challenge from an organizational standpoint is the fact that COMIREC, which was set up to be the operation and maintenance agency for this project, is essentially dysfunctional. Up to now UNIREC has acted as a de facto agency for operation and maintenance on behalf of COMIREC, owing to which no particular problems have arisen and maintenance has been carried out. Currently this project as a whole is close to reaching completion and UNIREC's role as the executing agency is nearing its end, calling for discussion on how UNIREC should be as an organization. As such, it is considered essential that a system be created quickly which would allow operation and maintenance to be properly performed by COMIREC, as COMIREC was the one originally meant to be the maintenance agency. Based upon this perspective, it is believed that a number of tasks must be

performed in order to make COMIREC function. These are: conducting improvements on the legal side, providing the budgetary allowances that will be needed to carry out activities, and granting it the authority to coordinate among administrative organizations. Moreover, COMIREC is currently not a permanent organization. According it the standing of a permanent administrative organization is believed to be necessary in order for operation and maintenance to be properly conducted through COMIREC.

3. Feedback

3.1 Lessons Learned

3.1.1 From the time this project plan was selected, it was predicted that balancing interests would be complex, as it involved many government ministries and agencies. This is why, for smooth project management and coordination, a special project unit (UNIREC) was established in the provincial government, and this project unit was directly controlled by the governor. When the project actually started, the need for complex coordination of interests contributed to large implementation schedule delays, as predicted. From this point of view, more prudent decisions may have been required for this project when first establishing the plan's schedule. For projects like this, which must coordinate with many provincial government departments, an implementation schedule with extra time is desirable. The co-financing institution IDB has a five-year time limit, but JBIC has no such limit. In particular, where there are co-financial institutions, proactively setting a project period which is realistically achievable at the planning stage is a point which must be borne in mind.

3.1.2 As this project had IDB co-financing, and considering that JBIC did not have extensive prior experience providing loans to Argentina, close cooperation with IDB for project management should have been considered, to achieve better project results.

3.1.3 During this project's implementation, the economic crisis erupted in 2001 and caused continuous instability for this activity in all Argentina's administrative institutions. In the end, the situation deteriorated to the extent that the central government halted debt payments to JBIC. After JBIC received that decision, it halted all new loans. As a result of these exceptional circumstances, part of the initial plan was not implemented. Even though it became impossible to achieve the

proposed results, the decision may have been unavoidable. We will observe this country's economic transition, as it will be important to consider in what manner to revive suspended new lending and achieve the initial goals.

3.2 Recommendations

(To the executing agency)

3.2.1 It is urgent that this project proceed with development of sewage treatment plants. Providing adequate domestic wastewater treatment is essential to maintain the impact of improvements in water quality. To do this, in addition to sewage treatment plants, it is also necessary to develop a sewage treatment network that connects homes to the treatment plants. Currently, the provincial government is proceeding with sewage treatment plant construction. A treatment network is presumed in the specifications, but there is no plan at the moment to build a sewage treatment network. There are concerns that after completing sewage treatment plants, this problem will prevent the plants from adequately performing their functions.

3.2.2 In connection with the above points, it may be important to establish a department which represents the entire government, with authority to control overall policy. The creation of this department will prevent the above situation where the province is constructing sewage treatment plants which presume a sewage treatment network while there is no budget allocated to build the network. This may be the most reasonable way to reduce the problem of uncoordinated policy, from the standpoint of efficient use of limited budgets.

3.2.3 COMIREC was the institution established to manage maintenance operations. However, COMIREC is actually not functioning, due to insufficient budgets and the need to coordinate with related institutions. To strengthen maintenance management through the organizational arrangement, it is urgent to coordinate with related institutions and to create an environment where COMIREC can operate effectively.

3.2.4 It is important to monitor this project's results, based on quantitative data. To do this, it is desirable to refer to indicators shown on monitoring sheets or other sources.

Comparison of Original and Actual Scope

Item	Plan	Actual
(1) Output (JBIC Component)	(1) Upgrading rivers 1) Upgrading discharge channels · Extend by approx. 7km · Excavation/dredging 2,000,000m³ · Embankments/levees 157,230m^3 (2) Improvement of drainage 1) Installation of backwater drainage pump stations · 10 pump stations (total capacity of 69m^3/s, electrical capacity of 3,490kW, 24 units) · Power distribution facility (extend by 22.9km) (3) Hygienic projects and planning 1) Installation of sewage treatment plants · Total population 1,597,000 · Planned treatment capacity of 9,600m^3/d · New installation of 3 treatment plants and the expansion and rehabilitation of 1 treatment plant 2) Sludge treatment · Total disposal amount of excavated and dredged soil 7,000,000m^3	(1) Upgrading rivers 1) Upgrading discharge channels · Extended by approx. 7km · Excavation/dredging 1,350,000m³ · Embankments/levees 170,000m^3 (2) Improvement of drainage 1) Installation of backwater drainage pump stations · 10 pump stations (total capacity of 97.5m^3/s, electrical capacity of 5,075kW, 30 units) · Power distribution facility (extended by 22.9km) (3) Hygienic projects and planning 1) Installation of sewage treatment plants The sewage treatment plants were not constructed 2) Sludge treatment · Total disposal amount of excavated and dredged soil 685,000m^3

(2) Project Period (JBIC component)		
Discharge channel recovery	1995-December 1999	February 1999-December 2001
Installation of backwater drainage pump stations	1997-December 1999	February 1999-December 2001
Installation of sewage treatment plants	1997-December 1998	Not implemented
Sludge treatment	1996-December 1999	February 1999-December 2001
(3) Project Cost		
Foreign currency	6,801 million yen	Unknown
Local currency	28,364 million yen (270,125,000 pesos)	Unknown
Total	35,165 million yen	36,598 million yen
ODA Loan	8,150 million yen	4,725 million yen
Portion	1.00 peso = 105 yen	US$1.00 = 114 yen
Exchange rate	(As of December 1992)	