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The World Bank

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Report No. P-5161-KO

MEMORANDUM AND RECOMMENDATION
OF THE
PRESIDENT OF THE
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
TO THE
EXECUTIVE DIRECTORS
ON A
PROPOSED LOAN
IN AN AMOUNT EQUIVALENT TO US\$34.0 MILLION
TO THE
REPUBLIC OF KOREA
FOR THE
JUAM REGIONAL WATER SUPPLY PROJECT

FEBRUARY 16, 1990

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CURRENCY EQUIVALENTS

Currency Unit	=	Won (W)
1 Won	=	US\$0.0015
US\$1	=	W 660 (September 1989)

WEIGHTS AND MEASURES

1 meter (m)	=	39.37 inches (in)
1 kilometer (km)	=	0.62 mile
1 cubic meter (cu m)	=	1,000 liter or 264 US gallons
Gigawatt hour (Gwh)	=	1 million kilowatt hours (kWh)
liter (l)	=	0.26 US gallons
liter per capita per day (lcd)	=	0.26 US gallons per capita per day
million liters per day (MLD)	=	thousand cubic meters per day

ABBREVIATIONS AND ACRONYMS

KMA	Kwangju Metropolitan Area
KOWACO	Korea Water Resources Corporation
KWB	Kwangju Water Bureau
MOC	Ministry of Construction
NWIP	National Water Improvement Program
NRW	Non-Revenue Water

FISCAL YEAR
January 1 to December 31

KOREA

JUAM REGIONAL WATER SUPPLY PROJECT

Loan and Project Summary

Borrower: Republic of Korea
Amount: US\$34 million equivalent.
Terms: 15 years, including 5 years of grace, at the standard variable interest rate.

Financing Plan:

	US\$ million
World Bank	34.0
Government	149.1
TOTAL	<u>183.1</u>

**Economic Rate
of Return:**

8%

**Staff Appraisal
Report:**

Report No. 8083-KO

Map:

IBRD 21919

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1. The following memorandum and recommendation on a proposed loan to the Republic of Korea for US\$34 million equivalent is submitted for approval. The loan would help finance the Juam Regional Water Supply Project and would be for a term of 15 years, including a five year grace period, at the Bank's standard variable interest rate.
2. Background. Korea is one of the most urbanized of the developing countries. Its urban population grew from 28% in 1960, to 76% in 1987, and would reach 80% of the total population by the year 2000. This rapid urbanization, averaging 3.2% p.a. during 1980-87, has overextended most urban services, including water supply. Investments in the sector, which received comparatively lower priority in the 1960s, increased rapidly and succeeded in expanding the population served by house connections from 17% of the population in 1960, to 32% in 1970 and, remarkably, to 74% by 1988. Ongoing investments, averaging about US\$760 million p.a. will increase the population served to 80% by 1991. However, many municipalities have much lower coverage than the average and still suffer from restricted supply, water rationing and uneven water quality.
3. Sector Reform. A fundamental reorganization of the sector, which is supported by the Bank, is being formulated. The key elements of this reform have been recently approved by the President under a National Water Improvement Program (NWIP) to ensure that: (a) good quality water is available to the total population; (b) adequate monitoring and improved effectiveness of the sector is achieved; and (c) adequate staff training is provided. The NWIP will be implemented between 1990 and 1995 and will expand the previously planned investments for water supply by US\$2,060 million which will be allocated to modernize several hundred existing treatment plants, replace about 27,500 km of corroded or leaking pipes, in order to reduce non-revenue water (NRW), and train sectoral staff. About 50% of this amount would be financed by long-term government loans and the remainder by internal cash generation made possible by a 30% increase in water tariffs between 1990 and 1992 (9% p.a.). The NWIP would also improve the sector by: (a) converting the municipal Water Bureaus into quasi-corporations; (b) unifying the planning, financing and construction of regional water supply systems under the Korean Water Resources Corporation (KOWACO), which would also have a major role in controlling water quantity (through dams) and quality (through sewage treatment plants) in the main rivers and (c) strengthen the country's capacity to monitor, control and reduce water pollution.
4. A major focus of the NWIP is the cleaning up of the Korean rivers, which are increasingly polluted as a result of accelerated industrial and urban development. Under the Plan, sewage treatment plants would be completed in all cities, and even in small municipalities where their pollution affects key water sources. Improvements and better monitoring and control would also be applied to about 26,000 industrial treatment plants, and to pollution from livestock and farming. Many industries will have to relocate to ensure protection of water sources. These investments would average about US\$800 million per year.
5. Rationale for Bank Involvement. Although Bank lending to Korea has been scaled down, the Bank's capacity for technical analysis, as a basis for providing advice to help improve sector policies, is valued by the Government. In general, the Bank's strategy focuses on sectoral lending, particularly for social sectors, poverty alleviation, institutional development, and transfer of technology. In accord with the Bank's strategy, the proposed project would support the development of one of Korea's least-developed regions, with emphasis on expanding services to the urban poor. The Bank's involvement in project preparation has already resulted in considerable savings in the project. The project would

introduce sound pricing policies and tariffs and improve the financial planning of the Kwangju Water Bureau (KWB) and KOWACO. More significantly, the project would also allow the Bank to continue a dialogue with the Government on the sectoral reorganization (paras. 3 and 4), which would have profound implications for the management of water supply, sewerage, water pollution control, and urban services throughout the country.

6. Project Objectives. The objectives of the project are to: (a) support the development of one of the poorest and least-developed regions in Korea; (b) improve and expand water supply to about 96% of the population in Kwangju Metropolitan Area (KMA) by 2001 and thus serve most of the region's low-income population; (c) ensure efficient use of scarce water resources; (d) strengthen Kwangju Water Bureau's (KWB) and KOWACO's planning capacity and finances; and (e) support institutional improvements in the sector.

7. Project Description. The Juam Regional Water Supply System would ultimately supply KMA (which includes the Special City of Kwangju and eight smaller municipalities) with 640 million liters per day (MLD) of water from Juam Dam. The proposed project is the first stage of that system and includes: (a) a pumping station with a peak capacity of about 520 MLD; (b) a raw water transmission main, including about 14 km of tunnels designed for the final capacity (about 2.6 m to 2.8 m in diameter) and about 22 km of pipelines (1.8 m to 2.4 m in diameter); (c) a treatment plant with a capacity of 60 MLD; (d) transmission pipelines for Naju and seven other municipalities (about 25.5 km) and (e) engineering services for project design and supervision. Kwangju and the other municipalities will be responsible for constructing and financing the complementary works, including storage reservoirs and distribution networks required to use the bulk water provided. Kwangju will also build and finance a treatment plant for 230 MLD of water. The project sets targets to increase the efficiency of distribution and reduce water leakage in Kwangju, sets financial targets for KWB and KOWACO, and supports improvements in their planning and management information systems.

8. The project would be carried out in five years, and would be implemented by MOC. Its total cost is estimated at US\$178.7 million equivalent, with a foreign exchange component of US\$63.2 million (35%). The total financing required, including interest during construction, is US\$183.1 million, of which the Bank would finance US\$34 million (19% of the total) and the Government will finance the remaining US\$149.1 million. A breakdown of costs and the financing plan are shown in Schedule A. Amounts and methods of procurement and of disbursements, and the disbursement schedule are shown in Schedule B. A timetable of key project processing events and the status of Bank Group operations in the Republic of Korea are given in Schedules C and D, respectively. The Staff Appraisal Report, No. 8083-KO, is being distributed separately. The complementary works by KWB, estimated at US\$69.4 million, would be financed by bonds (US\$33.0 million), KWB's net internal cash generation (US\$12.1 million), and Government loans (US\$24.2 million). The complementary works in the eight municipalities (about US\$13.1 million) would be mainly financed by Government loans and contributions from the municipalities and the Province. After project completion, the assets of the bulk water system and its debt service liabilities, including the foreign exchange risk, would be transferred to KOWACO. The municipalities will own and operate their facilities.

9. Actions Agreed. Assurances were obtained (I) From the Government, that: (a) by December 31, 1993 the eight municipalities will expand their distribution systems to use the water provided by the project; and (b) a Transfer and Operations Agreement for the project, a draft of which would be presented to the Bank for comments by December 31, 1993, would be signed with KOWACO prior to completion of the project. (II) From Kwangju City that KWB would (a) complete the first phase of the water treatment plant and distribution system by December 31, 1993; (b) include in its investment program for 1990-93 a satisfactory program for leak detection and for rehabilitation of the water distribution network; (c) implement by December 31, 1990, a program for computerized planning and financial forecasting and provide periodic projections to the Bank; (d) implement by December 31, 1990, a management information system, with monthly information on water demand, revenues and costs; and (e) achieve an annual rate of return of at least 9% on revalued fixed assets in operation.

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(III) From KOWACO that its Dams Division would achieve an annual rate of return of 5% on revalued fixed assets in operation, and its Water Division would achieve a rate of return on revalued fixed assets of at least 2% in 1990, 3.5% in 1991 and 5% thereafter.

10. Justification. The proposed project would provide urgently needed water to KMA, one of the poorest and least developed areas in Korea, providing basic social infrastructure for the economic and social development of the area. The project would extend water services to most of the population in KMA (91% by 1994 and 96% by 2001). The total additional population to be provided with water by house connections for the first time would be considerable, more than two hundred thousand by 1994, 55% of whom would be urban poor. The project capacity, supplemented in a second stage by additional treatment and distribution facilities, would provide water to about one million persons by 2011. The project would set adequate financial goals for KOWACO, which supplies water to more than 100 municipalities throughout Korea, promoting the optimization of scarce water resources and setting incentives to reduce water leakage and wastage. The Bank would work jointly with KOWACO (which is expanding its already large involvement in the sector) to maximize the benefit of the ongoing NWIP. KWB would also benefit from financial targets and improved planning.

11. Because of economies of scale, the treated water pipe and the tunnels will be constructed for the system final capacity. This makes the investment lumpy and reduces the rate of return. The ERR for the project is estimated at 8%. This is based only on tariff revenues. However, the benefits measured by water sales comprise only a fraction of the total benefits of the project and underestimate its ERR, by excluding important benefits which are difficult to quantify. These benefits include improvement of the living standards of the population already connected, the consumer surplus, the increased economic rents in new areas supplied with water, and the health and general welfare benefits brought about by a safe and reliable water supply.

12. Risks. There are no unusual project risks. The major risk is that the planned industrial and social development of the area would not evolve as projected, reducing water demand and resulting in unused capacity. This risk is mitigated by the existence of other cities with very critical water shortage problems, which could use the water by extending the transmission system. Another risk would be delayed completion by Kwangju and the other municipalities of the treatment or distribution works required to use the water provided by the project. However, the Government has given high priority to water supply, and the concerned Ministries to the KMA. Failure to reduce NRW would increase the cost of water and in the long term reduce the number of persons benefited. However, KWB has already reduced NRW considerably, and a NWIP includes actions for reducing NRW through the rehabilitation of distribution systems, particularly in cities like Kwangju, which have higher than average NRW.

13. Recommendation. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Bank and recommend that the Executive Directors approve the proposed loan.

Barber B. Conable
President

Attachments
Washington, D.C.
February 16, 1990

KOREA

JUAM REGIONAL WATER SUPPLY PROJECT

ESTIMATED COSTS AND FINANCING PLAN

Estimated Project Costs:

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	---- (US\$ million) ----		
Pumping and Raw Water Transmission	70.9	38.0	108.9
Treatment and Treated Water Transmission	17.6	13.4	31.0
Engineering	3.7	0.0	3.7
Land Purchase and Compensation	4.8	0.0	4.8
<u>Base Cost</u> (July 1989)	97.0	51.4	148.4
Physical Contingencies	6.7	3.1	9.8
Price Contingencies	11.8	8.7	20.5
<u>Total Project Cost</u> a/	<u>115.5</u>	<u>63.2</u>	<u>178.7</u>
Interest During Construction	0.0	4.4	4.4
<u>Total Financing Required</u>	<u>115.5</u>	<u>67.6</u>	<u>183.1</u>

Financing Plan:

World Bank	0.0	34.0	34.0
Government Contributions	115.5	33.6	149.1
TOTAL	<u>115.5</u>	<u>67.6</u>	<u>183.1</u>

a/ Including taxes and duties equivalent to US\$8 million.

KOREA

Schedule B

JUAM REGIONAL WATER SUPPLY PROJECT

Procurement Method and Disbursements

(US\$ Million) 1]

Project Component	ICB	LCB	OTHER	TOTAL
Civil Works		109.5 (0.0)	1.0 2] (0.0)	110.5 (0.0)
Materials & Equipment	53.0 (33.0)	1.7 (1.0)	4.4 2] (0.0)	59.1 (34.0)
Engineering			4.0 (0.0)	4.0 (0.0)
Land Acquisition			5.1 (0.0)	5.1 (0.0)
SUBTOTAL	53.0	111.2	14.5	178.7
IBRD FINANCING	(33.0)	(1.0)	(0.0)	(34.0)

1] Figures in parentheses are amounts financed by the Bank.

2] Construction of the power line by the Korean Electric Power Company.

Disbursements

Category	Amount (US\$ Million)	Expenditures to be Financed
Equipment & Materials	34.00	100% of foreign expenditures and ex-factory local expenditures; 65% of local expenditures

Estimated IBRD Disbursements

Bank Fiscal Year	FY90	FY91	FY92	FY93	FY94	FY95
			(US\$ million)			
Annual	3.7	2.1	6.8	11.7	8.0	1.7
Cumulative	3.7	5.8	12.6	24.3	32.3	34.0

KOREA

JUAM REGIONAL WATER SUPPLY PROJECT

TIMETABLE OF KEY PROJECT PROCESSING STEPS

- | | | |
|-----|------------------------------------------|---------------------------------------------------------------------------------------|
| (a) | Time Taken to Prepare the Project | 18 months |
| (b) | Prepared by: | Local consultants with Bank assistance. |
| (c) | First Bank Mission: | November 1988 |
| (d) | Appraisal Mission Start: | September 4, 1989 |
| (e) | Negotiations: | January 8, 1990 |
| (f) | Planned Date of Effectiveness: | May 1990 |
| (g) | List of Relevant PCRs and PPARs: | First Water Supply Project (Loan 2072-KO).
(PPAR No. 8174 - November 1989) |

THE STATUS OF BANK GROUP OPERATIONS IN THE REPUBLIC OF KOREA

A. Statement of Bank Loans and IDA Credits /a
(As of September 30, 1989)

Loan or Credit Number	Fiscal Year	Borrower	Purpose	Amount (\$ million) (less cancellations)		
				Bank	IDA	Undisbursed
Seventy-four loans and nine credits fully disbursed				4,732.97	115.58	-
2350	1984	Republic of Korea	Second Water Supply	51.53		0.24
2388	1984	Republic of Korea	Jeonju Regional Development	40.68		2.41
2392	1984	Republic of Korea	Highway Sector	216.42		1.20
2427	1984	Republic of Korea	Education Sector	100.00		4.77
2491	1985	Republic of Korea	Water Supply	90.00		2.88
2514	1985	SMG	Urban Transportation	28.76		9.66
2571	1985	Republic of Korea	Second Industrial Finance	183.12		4.86
2600	1986	Republic of Korea	Seoul-Busan Corridor	34.60		7.89
2615	1986	Republic of Korea	Fourth Water Supply	34.13		0.92
2671	1986	KEPCO	Second Power	194.15		16.28
2704	1986	KLDC	Urban Land Development	150.00		28.13
2726	1986	Republic of Korea	Pusan Port	134.50		65.79
2853	1987	Republic of Korea	Housing Finance Sector	150.00		9.01
2905	1988	Republic of Korea	Kyonggi Regional Transport	116.00		87.49
2908	1988	Taegu City Government	Taegu Urban Transport	30.00		28.00
2913	1988	Korea Technology Corp.	Third Technology Development	50.00		25.91
3037	1989	Republic of Korea	Technology Advancement	16.40		16.40
3061	1989	Republic of Korea	Road Improvement	200.00		200.00
<u>Total</u>				<u>6,553.25</u>	<u>115.58</u>	<u>511.84</u>
Of which has been repaid				<u>3,209.87</u>	<u>14.71</u>	
<u>Total Now Outstanding</u>				<u>3,343.38</u>	<u>100.87</u>	
Less: Amount sold				131.51		
Of which repaid				<u>74.87</u>		
<u>Total Now Held By Bank and IDA</u>				<u>3,286.74</u>	<u>100.87</u>	
<u>Total Undisbursed</u>				<u>511.84</u>	<u>-</u>	<u>511.84</u>

/a The status of the projects listed in Part A are described in a separate report on all Bank/IDA-financed projects in execution, which is updated twice yearly and circulated to the Executive Directors on April 30 and October 31.

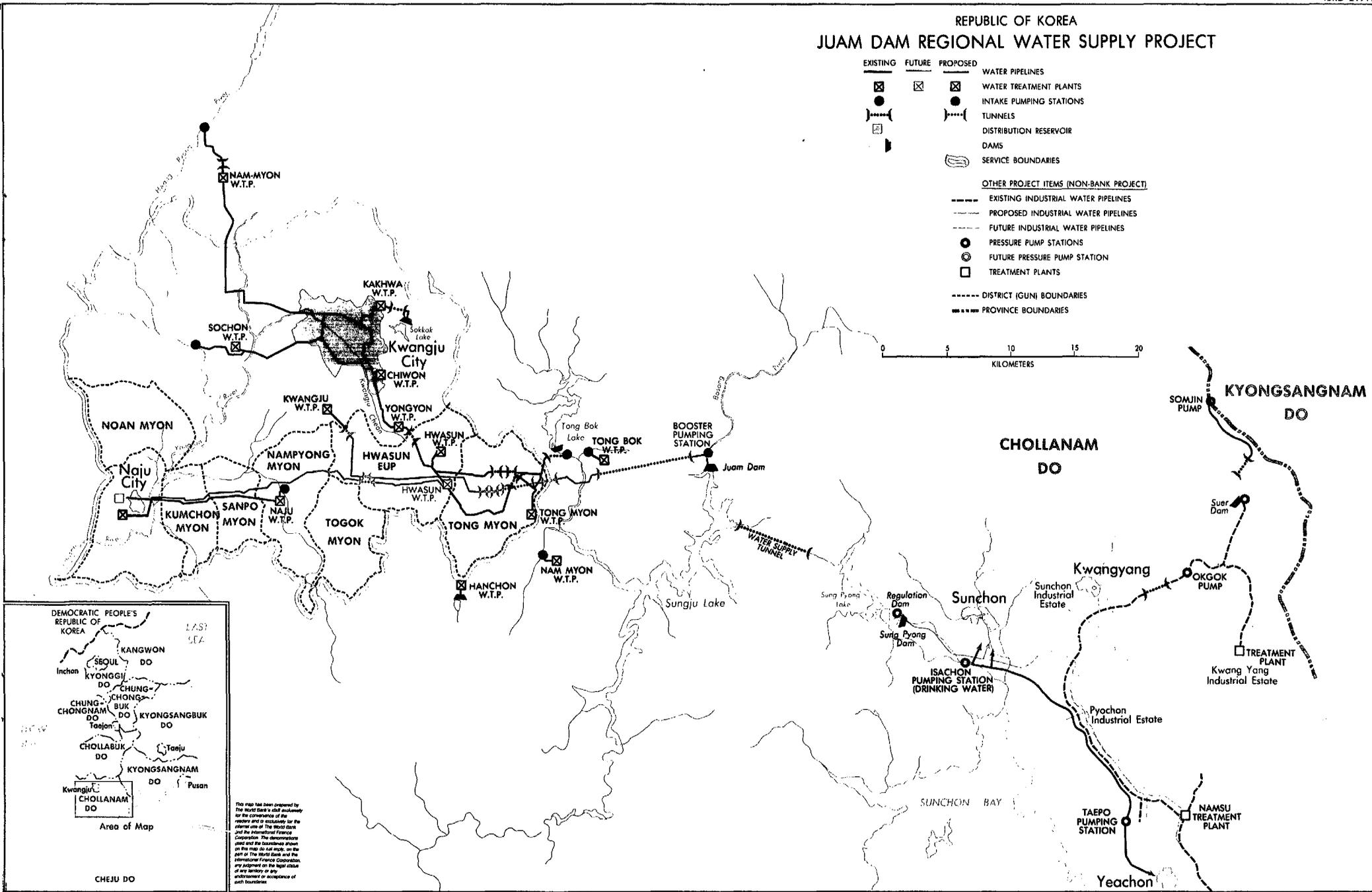
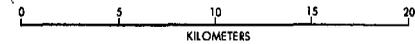
B. Statement of IFC Investments
(As of September 30, 1989)

Fiscal Year	Obligor	Type of Business	Loan --- (US\$million)	Equity	Total ---
1968	KLB (KDFC)	Development Financing	-	0.7	0.7
1969	Honam Silk Co.	Textiles	1.4	0.3	1.7
1970	Atlas Paper	Pulp and paper	4.5	0.5	5.0/a
1971	Korea Investment Finance Corp.	Capital Market Development	-	0.7	0.7
1974	KLB (KDFC)	Development Financing	-	0.4	0.4
1974	Korea Investment Finance Corp.	Capital Market Development	-	0.3	0.3
1975	Gold Star & Co. Ltd.	Electronic Products	16.0	1.3	17.3
1975	Korea Securities Finance Corp.	Capital Market Development	5.0	0.6	5.6
1975	Tong Yang Nylon Company, Ltd.	Synthetic Fibers	6.9	5.1	12.0
1975	Hae Un Dae Dev. Co. Ltd. (Busan)	Tourism	2.8	1.2	4.0
1976	Korea Investment Finance Corp.	Capital Market Development	-	0.4	0.4
1976/ 84/87	Chonju Paper Mfg. Co.	Paper	5.0	1.0	6.0
1976/86	Korea Zinc Co. Ltd.	Zinc	21.0	5.6	26.6
1976	KLB (KDFC)	Development Financing	17.8	-	17.8
1976	Gold Star & Co. Ltd.	Electronic Products	10.0	0.4	10.4
1977	Gold Star & Co. Ltd.	Electronic Products	-	0.2	0.2
1977	KLB (KDFC)	Development Financing	-	0.3	0.3
1977	Korea Securities Finance Corp.	Capital Market	-	0.5	0.5
1977	Korea Development Leasing Corp.	Capital Market	15.0	0.4	15.4
1978	KLB (KDFC)	Development Financing	-	1.1	1.1
1979	Gold Star & Co. Ltd.	Electronic Products	-	1.7	1.7
1979	KIFIC	Capital Market	-	0.6	0.6
1979	Korea Development Leasing Corp.		-	0.5	0.5
1979	Gold Star & Co. Ltd.	Electronic Products	-	1.5	1.5
1980/84 85/87/ 88/89	Gold Star & Co. Ltd.	Electronic Products	-	18.4	18.4
1980	Korea Investment Finance Corp.	Capital Market	-	0.6	0.6
1980/ 82/84	Korea Securities Finance Corp.	Capital Market	-	2.3	2.3
1980	KLB (KDFC)	Development Financing	-	4.9	4.9
1981	Taihan Bulk Terminal	Grain Port Terminal	7.0	2.5	9.5
1982/85/ 89	KIFIC	Capital Market	-	5.9	5.9
1982	K-TAC (Korea Tech. Advancement Corp.)	Research & Development	-	0.6	0.6
1983/85	KDIC	Money & Capital Market	-	5.9	5.9
1984	Halla Cement	Cement Const. Material	4.3	3.9	8.2
1985/86	Korea Fund	Money & Capital Market	-	12.8	12.8
1987	Korea Business & Research Information	Money and Capital Market	-	0.1	0.1
1988	ANAN	General Manufacturing	-	15.8	15.8
1989	Oriental	Chemicals & Petrochemicals	-	15.2	15.2
<u>Total Gross Commitments</u>			<u>116.7</u>	<u>114.2</u>	<u>230.9</u>
Less: cancellations, terminations, repayments and sales			111.7	48.0	159.7
<u>Total Commitments Now Held by IFC</u>			<u>5.0</u>	<u>66.2</u>	<u>71.2</u>
<u>Total Undisbursed (including participant's portion)</u>			<u>-</u>	<u>2.7</u>	<u>2.7</u>

/a Cancelled at the request of the Company.

REPUBLIC OF KOREA JUAM DAM REGIONAL WATER SUPPLY PROJECT

- | EXISTING | FUTURE | PROPOSED | |
|-----------------------------------------------|--------|----------|-------------------------------------|
| ☒ | ☒ | ☒ | WATER PIPELINES |
| ● | ● | ● | WATER TREATMENT PLANTS |
| ⊙ | ⊙ | ⊙ | INTAKE PUMPING STATIONS |
| ⋯ | ⋯ | ⋯ | TUNNELS |
| ⊞ | ⊞ | ⊞ | DISTRIBUTION RESERVOIR |
| ▲ | ▲ | ▲ | DAMS |
| ⊞ | ⊞ | ⊞ | SERVICE BOUNDARIES |
| OTHER PROJECT ITEMS (NON-BANK PROJECT) | | | |
| --- | --- | --- | EXISTING INDUSTRIAL WATER PIPELINES |
| --- | --- | --- | PROPOSED INDUSTRIAL WATER PIPELINES |
| --- | --- | --- | FUTURE INDUSTRIAL WATER PIPELINES |
| ⊙ | ⊙ | ⊙ | PRESSURE PUMP STATIONS |
| ⊙ | ⊙ | ⊙ | FUTURE PRESSURE PUMP STATION |
| ☐ | ☐ | ☐ | TREATMENT PLANTS |
| --- | --- | --- | DISTRICT (GUN) BOUNDARIES |
| --- | --- | --- | PROVINCE BOUNDARIES |



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