Morocco

Water Supply Improvement Project (MR-P6)

External Evaluator: Yuriko Sakairi (NATSOURCE JAPAN CO., LTD.)

Field Survey: February-March 2006

1. Project Profile and Japan's ODA Loan

ONEP Regional Office (Khemisset)

Water Tank

1.1 Background

Morocco is located on the northernmost edge of the African continent facing the Atlantic Ocean and Mediterranean Sea and has a total land area of 446,000km^2 (approximately 1.2 times the size of Japan) and a population of approximately 30 million (2003, about one-fourth that of Japan). The plains along the northern coast have a Mediterranean climate, the inland area a continental climate, and to the east side of the Atlas Mountains a desert climate. Mountain ranges are found in the north and southeast, and these are subject to frequent droughts due to their geographic and climatic characteristics, which prevents the stable supply of water and makes water resource management an important issue.

Agriculture accounts for 90% of the water resource use, with the remaining 10% being used for cities and industry. Regions with less than 500,000 people depend mostly on underground water for their water supply, but since underground water resources are limited, use of surface water is being increased through the construction of dams, long-distance aqueducts, pumping stations, and water purification plants. There are no problems with the quality of the water supplied to cities either chemically or bacteriologically, but the underground water used in rural areas is sometimes polluted by waste water from households, so installing water service facilities to supply clean drinking water is an urgent issue.

1.2 Objective

To install water service facilities throughout Morocco to improve and expand water services to the cities and poor rural areas[1] in particular, and thereby contribute to improving public sanitation and the standard of living.

1.3 Borrower/Executing Agency

Office National de l'Eau Potable (ONEP) (Guaranteed by the Kingdom of Morocco)

1.4 Outline of Loan Agreement

Loan Amount/ Disbursed Amount	6,099 million yen/3,209 million yen
Exchange of Notes/ Loan Agreement	March 1995 March 1995
Terms and Conditions - Interest Rate - Repayment Period (Grace Period) - Procurement	 3.0% 30 years 10 years General untied
Final Disbursement Date	March 2002
Main Contractors	—
Consulting Services	HIDROPROJECTO (Portugal)
Feasibility Study (F/S) etc.	ONEP (1991)

2. Evaluation Result

2.1 Relevance

2.1.1 Relevance at the time of appraisal

The National Development Plan (1993-1997) made improving public sanitation and raising the standard of living in rural areas by expanding the installation of water service facilities in rural areas as one of the priority issues. Further, the Water Service Sector Development Strategy (1995 to 2010) aimed to meet the demand for water service among the poor and improve their standard of living by increasing the coverage of water service facilities and improving services. It also called for increasing the water supply rate to cities from 90% to 100% in 2000[2] and increasing the overall household supply to 90%. Since the objective of this project was to increase and expand the water supply in urban and rural areas, it had a high priority

[1] The "poor" was not strictly defined at the time of project appraisal, but according to the World Bank, 15% of the population is below the poverty line (income of US$1 per day). Generally, poverty is a major issue in rural development, and it has been reported that two-thirds of the poor live in farming villages. Further, the poor population is also increasing in the cities. (Source: Country Assistance Strategy, World Bank 2005)

[2] This includes communal faucets and wells.

and was to provide the yen loan.

2.1.2 Relevance at the time of evaluation

The National Development Plan (2000-2004) makes increasing access to the drinking water and raising the standard of living in rural areas by expanding the installation of water service facilities in rural areas one of the priority issues. In addition, the Water Service Sector Development Strategy (1995-2010) aims to increase the coverage of water service facilities and improve services with the goals of meeting the demand for water service of the poor and improving their standard of living. Further, the National Program for Rural Water Supply and Sanitation (PAGER) established in 1996 has set the target of supplying water to 11 million people by 2010[3]. This project aims to increase and expand the water supply in urban and rural areas, so the importance of this project remains very high.

2.2 Efficiency

2.2.1 Outputs

A profile of the project plan and its outputs are shown in Table 1. At the time of the appraisal, yen loan was planned to be provided to the construction of water service facilities (including connecting households to the system) in the eighteen ONEP regional offices and two regional directorates general of ONEP[4] shown in (1). The original Japanese ODA loan plan included the Essaouira ONEP regional office and the Tangier ONEP directorate general, but a detailed feasibility study conducted after 1995 showed a decreased prospective demand for these and the planned work in these areas was cancelled. In addition, two cities (Ifrane and Taourirt) of ONEP regional offices subject to the yen loan were forced to build water service facilities as an emergency response to a 1995 drought, which resulted in cancellation of some of the construction that was planned under the yen loan.

The items to be financed by the World Bank were the construction of water service facilities for the six regional water corporations (Régies)[5] and one of the ONEP regional offices in (1) and the work in (2). The items to be financed by the African Development Bank were the construction of water service facilities for one regional water corporation, two ONEP regional offices, and one ONEP directorate general as well as the work in (3), (4), and (5). In regards to the regional water

[3] The government has subsequently moved up the target to supplying 12 million people by 2007.

[4] Eighteen ONEP regional offices of Azrou, Ben Ahmed, Ben Slimane, Berrechid, Erfoud, Errachidia, Ifrane, Khemisset, Khenifra, Midelt, Oued Zem, Ouezzane, Sidi Slimane, Essaouira, Taourirt, Tiflet, Had Kourt, and El Kella des Sraghnas, and the two ONEP regional directorates general Tanger and Fouarat.

[5] Nationwide water purification and the supply of water to 167 small- and medium-size cities is administered by ONEP, and the supply of water (water distribution only, water purification is handled by ONEP) to 16 large cities is the responsibility of the regional water public utilities (Régies). The regional water public utilities are administered by the Ministry of the Interior (Appraisal (1994)).

corporations that were the subject of World Bank financing in (1), the Moroccan government policy to privatize the potable water supply operation in Casablanca and Rabat resulted in the removal of these areas from the project plan, so work was only conducted for the four regional water corporations of Fés, Meknés, Marrakech, and Khenitra. In regards to item (2), the work was cancelled after revision of the IT program. And for the items in (5), the amount of consultant work was increased to handle the additional work generated by changes in the construction method, water pipe routes, and other work in some areas.

Table 1. Project Profile and Outputs

Item	Project (at appraisal)	Executing agency	Actual performance
(1) Installation of water service facilities in areas administered by regional water corporations, ONEP regional offices, and ONEP regional directorates general	Installation of water service facilities in areas administered by 6 regional water corporations, 18 ONEP regional offices, and 2 ONEP regional directorates general	Yen loan (Installation of water service facilities in areas administered by 18 ONEP regional offices and 2 ONEP regional directorates general)	Installation of water service facilities in areas administered by 4 regional water corporations, 17 ONEP regional offices, and 1 ONEP regional directorate general
		World Bank (Installation of water service facilities in areas administered by 6 regional water corporations [Casablanca, Fés, Meknés, Marrakech, Kenitra, Rabat] and part of 1 ONEP directorate general [Fouarat] (construction of 1 water purification plant and rehabilitation of 4 pumping stations)	
		African Development Bank (Construction of water service	

		facilities (construction of 2 intake weirs, 1 water supply facility) in areas administered by 1 regional water corporation [Marrakech] and 1 ONEP regional office [Tangier]) Note: There is an overlap of execution areas between the yen loan and World Bank financing.	
(2) Provision of support for improving the financial and operational performance of the regional water corporations and support for transferring the operation and maintenance of the regional water service system to the local community (construction of information center and IT program (computer procurement and training) to increase operation efficiency and strengthen the management system)		World Bank	Cancelled.
(3) Procurement of weather data collection equipment		African Development Bank	As planned
(4) Provision of technical assistance to regions for sanitation education and water quality control		African Development Bank	As planned

(5) Provision of consulting services	36MM	African Development Bank	47MM

2.2.2 Project period

The planned project period at the time of appraisal was March 1995 to March 1998 (37 months), but it actually started in March 1995 and ended in March 2002 (85 months). This significant delay was mainly the result of ONEP's unfamiliarity with procedures, since this was the agency's first time to receive loans from Japan Bank for International Cooperation, delays in the consultant selection procedures that required two years for hiring, which in turn delayed the preparation of tender documents and the construction procurement procedures, and the approximately 60 separate procurements and the amount of time required to process the great number of contracts. Delays were also caused by the need to change the project scope that generated additional procedures, such as making decisions within ONEP on changes and applying for approval from JBIC. In addition, this being a joint financing project with the World Bank and African Development Bank and there being multiple construction projects planned for concurrent execution, the great deal of time required for the preparation of the documents, conduct of the tender evaluation, and other processing to satisfy the differing tender requirements of the three banks seriously delayed the start of construction, such that major construction did not start until 1999.

2.2.3 Project costs

The total project cost planned at the time of the appraisal was 8,133 million yen (6,099 million yen financed by yen loan), but the actual cost was 4,220 million yen (3,209 million financed by yen loan). This marked reduction in the cost was due to the cancellation of construction for which the World Bank was financing and the postponement of the information center construction and implementation of the IT program, which resulted in cancellation of approximately 58% of the World Bank financing. The actual amount of the yen loan was less than that of the initial plan due to the cancellation of the construction of facilities in Essaouira and Tangier (approx. 27% of the yen loan amount). Although JBIC extended the loan disbursement period to handle the delay, work in some areas remained uncompleted at the end of the disbursement, so the burden for this portion was assumed by ONEP, which further reduced the yen loan amount.

Water supply pump in a water distribution facility

2.3 Effectiveness

2.3.1 Population served[6]

Table 2 shows the population served with water supply for the areas covered by the yen loan[7]. In 1995, 605,000 people were receiving water supply to their houses, and by 2004, this had increased by 50% to 910,000 people. The growth rate at the time of appraisal was forecast to be over 6%, but it actually stayed around 4%, and the achievement rate each year was low at about 80% of the plan value. The population served was forecast based on an annual 5% increase in national population estimate from the 1984 national census.

Table 2. Population Served

(Unit: 1,000 people)

	1995	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Total population	809	881	901	921	942	963	985
Total forecast of population served *1	725	923	981	—	—	—	—
Total population served *2	605	739	769	805	838	865	909
Annual rate of increase (%)	—	—	4	5	4	3	5

*1 ONEP did not calculate a forecast value for 2001 to 2004.

*2: This is the actual total population served in the areas covered by the yen loan.

[6] The population for which water services are provided to each household.

[7] Tanger and Essaouira were left out because they were removed from the yen loan. Fouarat was left out because it is also supplying water to neighboring cities and there are no statistics for Fouarat alone.

2.3.2 Daily average amount of water supply and average water usage

There was no plan value for the daily average amount of water supply, but the actual amount of water supply for the cities covered by the yen loan gradually increased from 1995. By 2004, this had increased 30% from 1995 to 108,204 m^3. Table 3 shows the average water usage per household. Water usage had been declining after 1995 and has remained constant since 2002.

Fig.1 Average Amount of Water Supply (unit: m3/day)

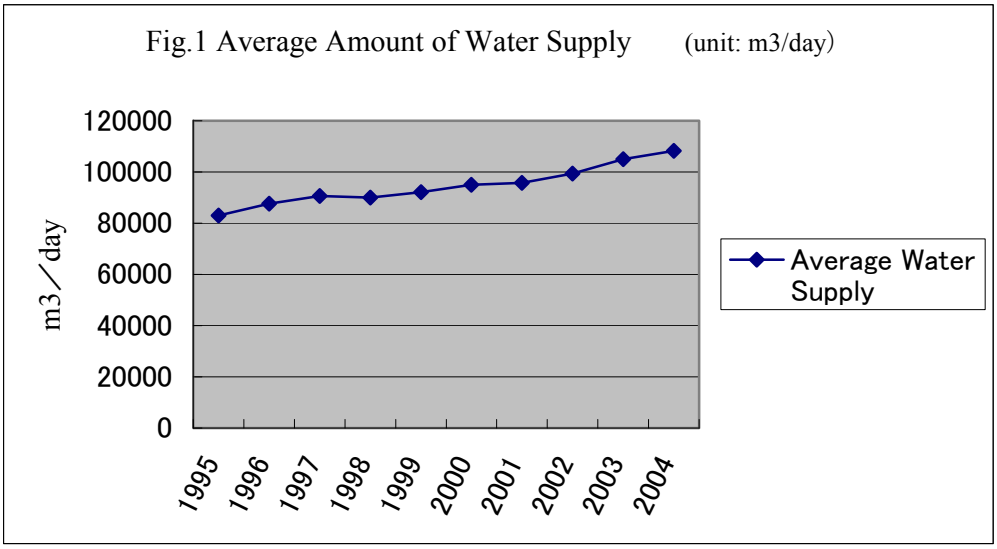


Table 3. Change in Annual Water Supply Per Household Unit: (m^3)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Water Fee	1.56	1.47	1.46	1.42	1.38	1.37	1.34	1.30	1.30	1.30

2.3.3 Unaccounted-for Water Rate

The unaccounted-for water rate was estimated in the 2000 plan to be 14% to 34% depending on the city and the actual rate was 12.7% to 42.9%. The actual value in 2002 when construction ended had worsened slightly to 14.1% to 44.1%. In some cases this was due to greater leakage caused by higher water pressure resulting from the construction of water towers. The results from the three cities where the water pipes were repaired, etc., to improve the unaccounted-for water rate are given in Table 4, which shows that although the rate was improved for Khenifra, it worsened for the other cities. Improvement of the unaccounted-for water rate is a priority for ONEP, and the German Kreditanstalt für Wiederaufbau (KfW) is providing assistance in this area.

Table 4. Unaccounted-for Water Rate Actual Value (Plan Value)

(Unit: %)

	1995	1998	2000	2001	2002	2003	2004
Khemisset	24.6 (15)	24.7 (15)	25.7 (14)	28.4	33.6	31.8	28.6
Khenifra	29.9 (30)	18.8 (27)	23.5 (24)	21.2	22.4	22.8	19.7
Sidi Slimane	31.1 (27)	27.0 (25)	28.0 (24)	25.0	29.5	31.2	35.1

2.3.4 Percentage of Population Served

Table 5 shows the highest and lowest of the percentage of population served among the cities covered by this project. The percentage of population served has increased markedly since 1995; there are now only two cities in which the rate does not reach 90%. The rate is high at above 90% in the other 18 regions. Since there are some households that cannot afford the cost accompanying the start of water supply even though the pipes have been laid close to their home, ONEP is working to increase the percentage of population served, such as by implementing an installment plan for low-income households.

Table 5. Percentage of Population Served Actual Value (Plan Value)

(Unit: %)

	1995	2000	2002	2004
Lowest value	42 (56)	69 (70)	72	87
Highest value	87 (97)	95 (96)	95	96

2.3.5 Internal Rate of Return

The Financial Internal Rate of Return (FIRR) at the time of the appraisal was calculated at 14.5% over the 20-year life of the project taking into consideration such expenses as consulting services, land acquisition costs, taxes, and operation and maintenance costs, and such benefits as income growth from water service fees generated as a result of this project. When this was recalculated during this evaluation by including the actual income growth in water sales from this project, it was found to be 3.4%. A major reason for the difference was that the demand for water did not increase as much as forecast at the time of the appraisal. In addition, although the Economic Internal Rate of Return (EIRR) was not calculated at the time of the appraisal, during this evaluation it was calculated to be 3.7%. The main

factors contributing to the low EIRR was a low number of new consumers and low growth in water usage. The investment by this project expanded the supply capacity, and increased demand is expected as Moroccan economy grows, but it will probably require several more years before this increased capacity will generate sufficient benefits.

2.4 Impact

2.4.1 Impact on the project's water supply services

To study what impact this project had on the living and sanitation environment, a beneficiary survey[8] of households having water supplied to their homes was conducted in Khemisset, a city about 100km east of the capital of Rabat. Here the water is supplied from the ONEP Khemisset Regional Office, and the supply rate in 2004 was at the 95% level. In Khemisset, the yen loan was used to improve the water supply services by repairing existing water service facilities, constructing water tanks, and other means. The survey results showed that a stable supply of potable water is being supplied, such as 24-hour water supply, decreased supply interruptions, and improved water pressure and flow, that the cost of potable water has decreased, and that over 80% of respondents were satisfied.

2.4.2 Impact on the living environment

In regards to the living environment, it was reported that sanitation improved, the burden on women and children involved in water hauling labor was reduced, and water consumption increased. Before water was directly supplied to homes, 91% of respondents reported hauling water one to two times per day and 66% reported two or more times per day. In regards to the time spent hauling water, 86% of respondents reported one hour or less because the communal well was relatively close. In addition, 94% reported that there was a water source within 0.4km one-way. The increase in consumption was due to improved water pressure and flow in areas where homes were already connected to the water system, and to increased convenience in areas where a water system was newly installed. Since many new households got connected to the water system, the average water consumption per

[8] The population of Khemisset Province is 105,000 (2004). A beneficiaries survey randomly selected 120 households and asked them to fill out a questionnaire in areas in the suburbs of the provincial capital of Khemisset, where water service facilities were installed for the first time (Farah 1 and Farah 2) and in areas where existing water pipes were repaired (Centre Ville). This is not an area of rural villages, but it is a small city. The total water consumer population is 3,000 people (1,500 people in Farah 1 and Farah 2, and 1,500 people in Centre Ville). The number of valid responses collected was 119.

household increased by over 75%, but the water price declined to about 30% of that before the water service facilities were installed (90 DH/month → 25 DH/month).

In regards to the impact on the living environment of the children, 68% of the valid responses reported an increase in the number of school attendance days. In addition, it was also learned that because the time spent hauling water was reduced, the women could use more time for housework, to make handicrafts, and other activities. One of the changes to the living environment of women is that 11% reported fewer opportunities to exchange information, which was frequently done during the water hauling work, but 16% reported that less water hauling work gave them more free time, which increased their opportunities for obtaining information from television, radio, and books, such as the Koran, as well as increasing their opportunities to exchange information with relatives and neighbors.

Although we cannot confirm the direct causal relationship with this project, infant and child mortality is decreasing nationwide (The respective infant and child mortality rates are shown in Tables 6 and 7.). In the beneficiaries survey only one young child was reported to have been infected with an infectious disease for which water was thought to be the source.

Table 6. Child Mortality Rate for Under Age 5 (Per 1,000 Children)

(Unit: Deaths per 1,000)

	1990	1995	2001	2002	2003
Nationwide	85.0	61.0	—	—	39.0

Note: This is the number of newborn children who die in the first five years of life. (The number of deaths by age five per 1,000 births.)

Table 7: Infant Mortality Rate (Per 1,000 Infants)

(Unit: Deaths per 1,000)

	1990	1995	2001	2002	2003
Nationwide	66.0	51.0	—	—	36.0

Note: This is the number of infants who die in the first year of life (The number of deaths per 1,000 births).

The majority of residents are using the water service as drinking water, and for clothes washing and other activities they are using water carried from the communal well. This is the work of women and girls, and during the beneficiaries survey, it was observed that mothers and daughters are using plastic containers in place of buckets to haul water. In areas where the water system does not directly connect to individual homes, the project has built communal faucets called *borne- fontaine* that are contributing to the improvement of the rural sanitation environment by

supplying clean water. The ONEP regional office aims to decrease the unaccounted-for water rate and improve fee collections by increasing the fee collection rate for water supplied from communal faucets by installing water meters on them.

According to the executing agency, the project has not forced any residents to relocate and the only land acquisition was for the laying of pipes along the shoulders of public roads.

Borne- fontaine

Mother and daughter hauling water from a well

2.5 Sustainability

2.5.1 Executing agency (ONEP)

The executing agency for this project is the Office National de l'Eau Potable (ONEP). This agency supplies 80% of Morocco's water demand, employs 7,000 people, and is a financially self-sufficient corporation. Its head office is located in the national capital Rabat and engages in such activities as formulating, executing, and operating[9] water service and sewer service supply plans. The World Bank deems the project to have good sustainability due to the high level of technical and other capabilities of the executing agency.

2.5.1.1 Technical capability

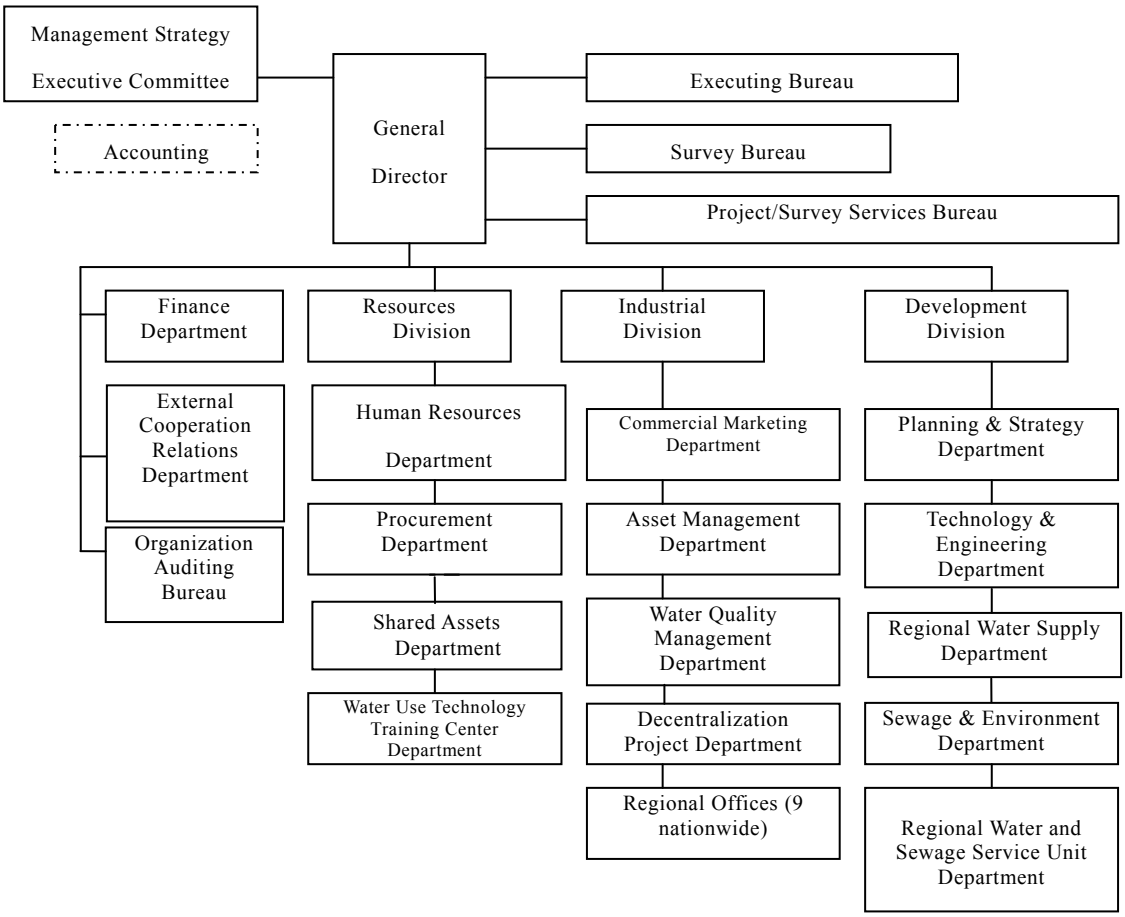
The head and regional offices employ experienced engineers, and the agency has been operating and maintaining the water service facilities since its establishment in 1972. Training is provided for employees and there is an abundance of experienced employees with expertise.

[9] The law governing sewage facilities was amended in 2000 so that service provider can conclude operation agreements with local governments to construct, operate, and maintain sewage facilities. Service provision is being planned for 80 priority districts.

2.5.1.2 Structure

As shown by the following ONEP organizational chart, there are six units under the general director. These are the Organization Auditing Bureau, External Cooperation Relations Department, Finance Department, Resources Division, Industrial Division, and Development Division. As part of the recent delegation of authority to the regions, strengthening of management improvement is being promoted by implementing management agreements with the nine regional offices.

Fig. 2 ONEP Organizational Chart



2.5.1.3 Financial status

An ordinary loss was recorded in 2001, but the occurrence of a large extraordinary profit[10] resulted in a net profit. The company has been profitable every year since 2001 and is enjoying stable business circumstances. The water fee

[10] The extraordinary profit occurred as a result of adjustment of corporate tax in 2001.

collection rate is high at over 90%, income and profits are stable, and fixed assets are 12 billion DH. Accompanying the government's recent acceleration of the National Program for Rural Water Supply and Sanitation (PAGER) to attain a 91% drinking water access rate (12 million people) by 2007[11], ONEP undertook a new project from the Department of Territory Development, Water and Environment starting in 2004 to independently execute the PAGER project[12]. The PAGER finances its operations with domestic borrowing, donor loans, and surcharge on water service fees, but since it would be difficult to recover the capital investment in the regional water supply project plan from water fees alone, the impact on company finances from project expansion needs to be monitored.

Table 8. Financial Status of ONEP

(Unit: 1,000 DH)

	2001	2002	2003	2004
Operating income	1,710,657	1,624,053	2,040,211	2,048,165
Ordinary income	26,440	147,774	233,313	191,549
Net profit	1,111,459	64,552	126,801	130,111

2.5.2 Operation and maintenance

Operation and maintenance of water service facilities is conducted by the regional offices, but the head office provides the budgets based on their maintenance and repair plan. Experienced engineers are also employed by the regional offices and are tackling the problem of the unaccounted-for water rate as the maximum priority issue, so there seems to be no problems in particular with operation and maintenance.

Scene of the beneficiaries survey

Children in a town with new water service

[11] The initial target was to achieve 80% (11 million people) by 2010.

[12] For the PAGER framework, the Japan ODA loan financed two projects, Regional Water Supply Project (I) and Regional Water Supply Project (II), and for the former ONEP is now in charge while for the latter the Department of Territory Development, Water and Environment has been responsible for project execution even after 2004

3. Feedback

3.1 Lessons Learned

3.1.1

This project has financed the implementation plan of ONEP with the cooperation of other donors, but the project was such that it was difficult to calculate the benefits due to the project structure and component configuration. There were significant unquantifiable benefits, such as reduced water hauling time and burden of women and children, increased school attendance rate, and improved sanitation.

3.1.2

Since changes to the project plan required additional procedures and processing that delayed the project, it is desirable that the feasibility study be nearly completed at the time of the appraisal.

3.2 Recommendations

None.

Comparison of Original and Actual Scope

Item	Plan	Actual
(1) Outputs		
・ Installing water service Facilities in areas administered by regional water corporations, ONEP regional offices, and ONEP regional directorates general	Installing water service facilities in areas administered by 6 regional water corporations, 18 ONEP regional offices, and 2 ONEP regional directorates general	Installed water service facilities in areas administered by 4 regional water corporations, 17 ONEP regional offices, and 1 ONEP regional directorate general
・ Providing support for improving the financial and operational performance of the regional water corporations and providing support for transferring the operation and maintenance of the region water service system to the local community (Information center construction and IT program (computer procurement and training) to increase operation efficiency and strengthen the management system)		Cancelled
・ Procuring weather data collection equipment		As planned
・ Providing technical assistance to regions for sanitation education and water quality control		As planned
・ Providing consulting services	36MM	47MM
(2) Project Period	March 1995 to March 1998 (37 months)	March 1995 to March 2002 (85 months)
(3) Project Cost		
Foreign currency	3,562 million yen	2,418.1 million
Local currency	4,572 million yen	1,801.94 million yen
Total	8,134 million yen	4,220 million yen
Yen loan portion	6,099 million yen	3,209 million yen
Exchange rate	1 dirham = 11.7 yen	1 dirham = 11.0 yen