Fiji

Nadi-Lautoka Regional Water Supply Project

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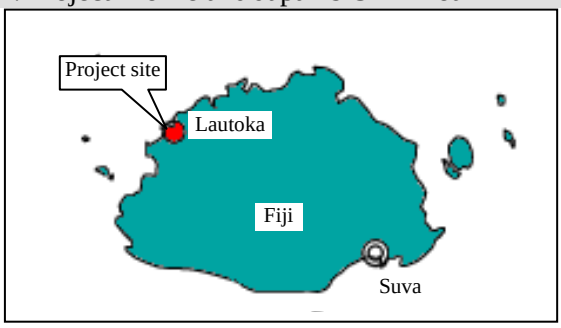
Field Survey: November 2007, May 2008

1. Project Profile and Japan's ODA Loan



Map of the project area

Buabua Water Treatment Plant

1.1 Background

Nadi, a town located in the western part of Viti Levu Island, which makes up close to half of the total area of Fiji which is about the size of Japan's Shikoku. With its own international airport, Nadi is an important centre of Fiji's tourist industry, and by population, it is the third largest urban centre. Lautoka, a city located north of Nadi, is the centre of Fiji's sugar industry, and has the second largest population in Fiji.

In Fiji, water supply systems have been developed mostly in cities and towns with large populations, with the result that about 70% of the population now has access to water services. However, the areas targeted by this project are regularly afflicted by water outages because the existing water supply systems are unable to produce enough water. Additionally, due to the growing number of tourists in Nadi and the population increase in Lautoka (caused by the development of residential areas), a substantial increase in demand for running water is expected. It is against this background that the need to expand the water supply systems in these regions arose.

1.2 Objective

The objective of this project is to improve the water supply shortage caused by insufficient capacity of the current facilities and respond to the new demand for water among consumers and industries (tourism, etc.) by improving and expanding the water supply systems in Nadi, Lautoka, and their surrounding areas; thereby contributing to the promotion of the health and welfare of the local residents and the national economy including tourism, the largest source of foreign currency.

1.3 Borrower / Executing Agency

The Republic of the Fiji Islands / Public Works Department of the Ministry of Communications, Works and Energy (currently the Ministry of Finance, National Planning, Sugar Industry and Public Utilities [Water and Energy])

1.4 Outline of Loan Agreement

Loan Amount / Loan Disbursed Amount	2,287 million yen / 2,244 million yen	
Exchange of Notes / Loan Agreement	February 1998 / February 1998	
Terms and Conditions	Main portion	Consulting service portion
- Interest Rate	2.5%	2.1%
- Repayment Period (Grace Period)	25 years (7 years)	
- Procurement	General untied	
Date of Disbursement Completion	April 2004	
Main Contractors	–	
Consultant Services	Sinclair Knight Merz (Australia) Nihon Suido Consultants Co., Ltd. (Japan)	

2. Evaluation Result (rating: B)

2.1 Relevance (rating: a)

This project has highly relevant with Fiji government's national plans both at the time of appraisal and at the time of ex-post evaluation.

2.1.1 Relevance at the time of appraisal

First, in its medium-term national development plan of 1993, dubbed "Opportunities for Growth: Policies and Strategies for Fiji in the Medium Term," the Fijian government presented a policy of expanding the water supply including supplying safe and reliable drinking water to all urban areas and developing water supply systems in rural areas still without water services.

Next, in 1996, the Nadi-Lautoka Regional Water Supply Project Master Plan (hereinafter referred to as the "Master Plan") was formulated with the target year of 2016 based on projected increases in population and demand. Specifically, the Master Plan is a plan that emphasizes the development and expansion of water treatment plants and reservoirs as well as the installation of water pipes.

This project came about, when, based on the approval by a Cabinet meeting in response to the Master Plan, the Fijian government submitted Japan a request for an ODA loan. At the same time, as already described, there were specific needs for developing water supply systems: residents were facing the problem of frequent water outages and lack of water supply and water pressure, and demand was projected to increase sharply in the days to come.

In this way, at the time of appraisal, the project was correctly judged to be relevant.

2.1.2 Relevance at the time of ex-post evaluation

In the government's development plan formulated at the time of evaluation, "to supply safe and reliable drinking water to both urban and rural areas" is the policy objective regarding water systems. Toward this end, high target values have been established by using indicators such as the population served, the number of persons newly connected, and the unaccounted-for-water rate (the target year ranges from 2009 to 2011, depending on the indicator).

On the policy enforcement front, the aforesaid Master Plan is considered to be in force even at the ex-post evaluation stage, and in that sense, there is no doubt about the relevance of the project.

However, in the Nadi and Lautoka regions, as described later, even after achieving a certain degree of success through this project, it is clear that, on the basis of that success, further water supply development is needed. At this point in time, while this gives support to the project's relevance, it also shows the lessons in respect of the appropriateness of the Master Plan and the project's scope.

2.2 Efficiency (rating: b)

At 27% longer than the planned period, and 20.5% more costly than the planned project cost, the project can be evaluated as moderately efficient.

2.2.1. Outputs

This project is comprised of civil works and consulting services. It is also divided into two categories: (i) the "Ongoing Operations" and "Extremely Urgent Operations," which are carried out with Fijian funds, and (ii) the "Urgent Operations (Urgent Components)" and "Urgent Operations (Year 2005 Target Components)," which are carried out with Japan's ODA loans.

[Civil works]

With regard to civil works, both the components of the project funded by Fiji and with Japan's ODA loans were implemented in accordance with the original plan. After a careful study of the plan at the implementation stage, the booster pumping station in Lautoka, which was planned as part of the Urgent Operations (Urgent Components) funded by Japan's ODA loans, was replaced by one that would not require any knowledge of electrical technology at the project's operation and maintenance stage (This replacement caused additional cost which was bored by Fiji and with Japan's ODA loans).

The building of booster pumping station was originally planned to improve the already available water pipes (which functions by natural water flow) between Nagado water treatment

plant and Lautoka region to deal with the lack of water source of Lautoka region during the seasons of less rainfall.[1] After the installation of the water pipes, there was still a concern on water shortage, thus as a result of comparing the cost for building new pipes with that of booster pump on the same route, a more inexpensive choice to install booster pump was introduced as a part of the Fiji government's master plan. Based on this plan, an operation of building booster pump was taken up.

However, this plan was switched to an option: to build a new water pipe in parallel with the old pipe (which functions by natural water flow) instead of installing booster pump based on the technical assessment by engineering consultants in the process of project design. According to the assessment, the technical ability of executing agency in operation and maintenance of electric equipments is extremely lacking.

Additionally, as a result of a study conducted as part of the consulting services for this project, the original plan of building reservoirs at five locations in Lautoka in the Urgent Operations (Year 2005 Target Components) was changed to one under which reservoirs with a higher level of impounded water would be built at three locations.

Planned	**Actual**
Ongoing Operations (Fiji Funds)	
Reservoirs (2): In Lautoka ・ DMO Reservoir (2.0 ML) ・ Phulger Reservoir (3.0 ML) Distribution pipes: In Lautoka	Nearly as planned
Special Urgent Operations (Fiji Funds)	
Double introducing pipes: Vaturu – Nagado Water Treatment Plant Reservoir (1): Delaisiro Reservoir (newly constructed: 3.0 ML) Main distribution pipes: Blackrock – Martintar Distribution pipes: In Lautoka	As planned
Urgent Operations (Urgent Components) (Japan's ODA loan)	
Water treatment plants (3): ・ Nagado Water Treatment Plant (improved, expanded: 45 → 90 ML) ・ Saru Water Treatment Plant (improved: 4.5 ML) ・ Buabua Water Treatment Plant (newly constructed: 8.5 ML) Reservoirs (3): ・ Nagado Reservoir (expanded: 3.0 ML) ・ Lolobalavu Reservoir (expanded: 2.5 ML) ・ Mulomulo Reservoir (newly constructed: 0.38 ML) Booster pumping station: In Lautoka Water pipes / distribution pipes: ・ Nawaicoba – Nabila Reservoir ・ Nabila – Mamanuca ・ Buabua Water Treatment Plant –Latouka suburb ・ Vuda – Vuda Reservoir	Nearly as planned (The booster pumping station was replaced by Lomolomo water pipes)

[1] Project target regions are undulating areas, thus the natural water flows through up and down of mountains and hills.

・ Vuda Reservoir – Lomolomo Other: Construction of a water meter inspection/repair plant	
Urgent Operations (2005 Target Components) (Japan's ODA Loan)	
Reservoirs (7): [Nadi region] ・ Nabila Reservoir (newly constructed: 0.75 ML) ・ Blackrock Reservoir (expanded: 1.5 ML) [Lautoka region] ・ Suburban reservoirs (5 locations: 2.2 ML): Sites identified through consulting services Water pipes / distribution pipes: ・ Lolobalavu Reservoir – Delaisiro Reservoir ・ Lolobalavu Reservoir – Nabaka ・ Delaisiro Reservoir – ・ Vuda ・ Nagado Water Treatment Plant – ・ Buabua Water Treatment Plant – Lautoka suburb	Nearly as planned (In Lautoka region, reservoirs are located in the following three locations) ・ Buabua Reservoir (newly constructed: 1.5 ML) ・ Qualito Reservoir (newly constructed: 0.75 ML) ・ Vakabuli Reservoir (newly constructed: 0.375 ML)

[Consulting services]

Basically, consulting services were implemented in keeping with the original plan. However, "the sewerage system survey," which was included in the original plan, was not conducted due to financial reasons of the Fijian government.

Planned	Actual
(A) Water leakage prevention plan ・ Carried out as part of the ongoing operation (Fiji funds)	(A) Water leakage prevention plan ・ Support of an Australian consultant firm: 6 MM × 2 (training, workshop, leakage survey at the raw water transmission stage)
(B) Project management unit (PMU) support ・ Project management engineer (monitoring and supervision of the entire project) ・ Project accountant: Monitoring and supervision of the project's income and expenditure	(B) Project management unit (PMU) support ・ 2 consultants hired to make up for the lack of project management capacity of the Fiji government
(C) Engineering consultants for water supply projects ・ Detailed design, bidding assistance, construction monitoring and supervision ・ Optimization survey for Nagado Treatment Plant ・ Feasibility survey on water sources in Vitogo Creek ・ Training program: Analysis of unaccounted-for water (UFW), measures to prevent water leakage, water meter repair, improvement of water bill collection, water quality control	(C) Engineering consultants for water supply projects ・ Detailed design: Managed by a Japanese consultant firm ・ Construction monitoring and supervision: Managed by an Australian consultant firm (also in charge of the water quality management training program) ・ Training program: Except for some parts of the training program, an Australian consultant firm (not the one that monitored and supervised the construction mentioned above) (Details of the training program) ・ Training in unaccounted-for water ・ Water meter inspection and repair program ・ Training in making bill collection more efficient
(D) Sewerage system survey (This may be implemented by other donors) ・ Review of existing surveys ・ Selection of urgent operation components, F/S, EIA	(D) Sewerage system survey ・ Not yet implemented

2.2.2 Project period (rating: b)

The actual period of this project exceeded the planned period (between 125% and 150%).

The project took 16 months longer to implement than initially planned, or more than 127% of the original plan. Among the factors responsible for this delay are the discontinuation of the plan forced by the political situation in 2000, and the delay in land acquisition.

Planned	Actual
Feb. 1998 (L/A) – Dec. 2002 (construction completion) (59 months)	Feb. 1998 – Apr. 2004 (75 months) (127% of the planned period)

2.2.3 Project cost (rating: b) [2]

The project cost was slightly more than the planned cost (between 100% and 125%).

While the amount of Japan's ODA loan provided by Japan was within the plan (98.1%), the project's cost for the Fijian government exceeded the planned cost. Consequently, the project as a whole cost was 120.5% of the planned cost. It has been reported by the Fijian government cites that among other things, the inaccurate cost estimation, the discontinuance due to political situation and exchange fluctuation were the reasons for the additional cost.[3]

Planned	Actual
3,461 million yen (Japan's ODA loan portion: 2,287 million yen)(1 Fiji dollar = 88.9 yen)	4,170 million yen (Japan's ODA loan portion: 2,244 million yen) (1 Fiji dollar = 57 yen) (120.5% of the planned cost)

Saru Water Treatment Plant

[2] About the project cost, there is inconsistency in numbers of total cost which are (i) an accumulation of all the costs incurred and ii) a project cost) between tables noted in Project Completion Report (PCR). Upon the query sent to the executing agency, no reply has been received, therefore the number of ii) was taken as the project cost to be mentioned in this report as this was done in a Special Assistance for Project Sustainability (SAPS) conducted by the former JBIC.

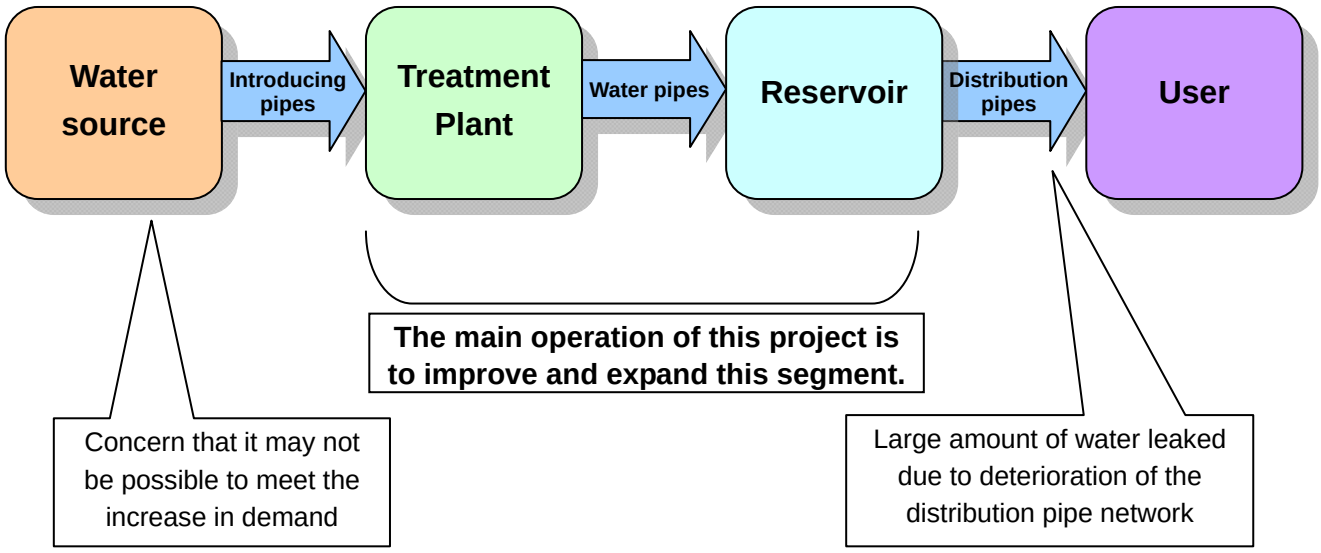
[3] As mentioned in the "2.2.1 Output," the additional cost incurred by the replacement of the methods from the use of electrical technology to that without it at the booster pumping stations at Lautoka However this cost was less than 10% of the total additional cost covered by Fijian government and ODA loan.

2.3 Effectiveness (rating: a)

This project has largely achieved its objectives, and effectiveness is highly satisfactory.

However, as the diagram below shows, despite the fact that this project scope is limited to improving and expanding the intermediate stages (mainly, water treatment plants, reservoirs and water pipes) in providing water services to the target areas, the project actually sets its objectives of improving and expanding the entire process. Consequently, it is judged to be a problem that both the effect indicators and the impact perspective assumed responsibility beyond the competence of the project. That being said, however, based on the analysis and judgment described below, the project may be evaluated as highly effective.

Figure 1: Relationship between the project and the entire water service flow



2.3.1 Operation and effect indicators

[Amount of water supply]

The capacity of the water treatment plants has been enhanced by the implementation of the project, as evidenced by the fact that the daily amount of water supply has increased from 51 ML to 103 ML, or achieved the target of 93 ML set prior to the implementation. The plants are operating at near maximum treatment capacity.

[Unaccounted-for-water rate]

The unaccounted-for-water rate is an indicator that is influenced by factors (mainly that of downstream water supply network) which are outside the scope of this project, so it is not always appropriate as an indicator of the project's effectiveness.

In addition, the baseline of unaccounted-for-water rate in the areas targeted by this project

having been estimated to be about 29% at the time of appraisal (according to the Master Plan), is now found to be in question as the baseline of the same indicator is about 50% according to both an ADB report conducted in 2007 and a Special Assistance for Project Sustainability (SAPS) conducted by the former JBIC (2007). In other words, the baseline of 26% (the planned value) assumed at the time of appraisal itself can be confirmed to have differed greatly from the actual level at that time. The unaccounted-for-water rate before and after the project thus cannot be compared.

The data for the unaccounted-for-water rate is treated as being not applicable for two reasons: (i) the said rate is an indicator likely to be influenced by factors outside the scope of this project; and (ii) it is not possible to make a before-and-after comparison.

[Fee collection rate]

The fee collection rate, like the unaccounted-for-water rate, is an indicator that is influenced by factors (such as water supply situation [water outages], water meters, water billing and collection sector, etc.) which are outside the scope of this project, so it is not always appropriate as an indicator of the project's effectiveness.

Again, like the unaccounted-for-water rate, it has been confirmed that the baseline (80%) for the planned value of fee collection rate assumed at the time of appraisal was significantly different from the actual level at that time as it is even now estimated to be between 50-60% (although it is in a rising trend in both target areas). Thus, in the context of a planned value of 90% set at the time of appraisal, it is not possible to make a before-and-after comparison.

However, judging from the facts that the fee collection rate has risen since the project's completion, that the measures for the billing and collecting of fees for water services have been placed as principal components in SAPS mentioned above and that they have been actually implemented, it can be assumed that the project brought about a certain level of effects (However, it is important to keep in mind that, unless problems related to the aforesaid external factors are solved, the fundamental improvement of fee collection will not be achieved).

2.3.2 Economic calculation

Given the aforementioned actual values of unaccounted-for-water rate and the fee collection rate assumed at the planning stage, and the fact that the water service fees have not been revised for the past ten years, the project's financial internal rate of return (FIRR) is assumed to be lower than it was assumed at the planning stage.

2.3.3 Qualitative effects

2.3.3.1 Improvement of the water supply shortage caused by insufficient capacity of the current facilities

As the result of achievement of the planned quantity of water supply in the areas targeted through the implementation of the project, specific benefits of the project have appeared, including extension of the hours of water services and decrease in the number of water trucks dispatched. There are more places where the water supply situation has noticeably improved, as evidenced by the fact that many areas where there were no water services before the implementation of this project now have 10–12 hours of water service per day. Also, in the target areas where each with ten water trucks used to operate before the implementation of the project, only one water truck each has been operating these days.

However, not all water-related problems have been solved, as evidenced by the fact that water outages are still a daily occurrence in both Nadi and Lautoka, and 24-hour water service is still not available in some parts of the target areas. According to a survey of 12 main locations in Lautoka conducted by the city office, eight of the surveyed areas still experience water outages. Also, according to a beneficiary survey[4] of residents carried out in three districts each of Nadi and Lautoka, even after the completion of the project, only 30–50% of the residents in Nadi and 5–25% of those in Lautoka have access to water supply around the clock.

Table 1: Water Supply Improvement in Nadi Region

Area	Previous situation	Situation in 2006	Reason for improvement
Kachiquani	No water service	10–12 hours/day	Mulomulo Reservoir and related water pipes
Indis Road	No water service	10–12 hours/day	Same as above
Tabarak Road	No water service	10–12 hours/day	Same as above
Nasau	Low pressure	10–12 hours/day	Same as above
Vutovuto Road	No water service	10–12 hours/day	Same as above
Mulomuro	No water service	10–12 hours/day, low pressure at high altitude	Same as above
Navo	Low pressure	10–12 hours/day	Lolobalavu Reservoir and related water pipes
Malolo	Low pressure	10–12 hours/day, low pressure at high altitude	Same as above
Transmitter Road	No water service	10–12 hours/day, low pressure at high altitude	Same as above
Tunalia	No water service	10–12 hours/day	Same as above
Bunyas	Low pressure	10–12 hours/day	Same as above
Alipate Road	No water service	10–12 hours/day	Same as above
Latchmaiya Road	Low pressure	10–12 hours/day	Same as above

Source: Saman Ekanayake, “Situation of Water Supply Schemes in the Western Division” (2006)

[4] The questionnaire survey was conducted to 40 households each at three districts selected from each project target areas, Nadi and Lautoka. In other words, the total number of the sample households is 240 (which is 40householdsmultiplied by 6 districts). In selecting sample districts, both flat/slop and urban/suburbs were covered and advice from the Nadi town hall and Lauoka city hall was also heard. In each district, every other household was selected, and when the one was absent, the next door was selected. The six sample districts are as follows: Votualevu, Kerebula, and Mountain (in Nadi), and Sulua Street, Waiyavi Stage 5, and Tavakubu/Kashmir/Kermode (in Lautoka).

Table 2: Water Cuts in Lautoka

(Survey conducted in November 2007)

	Area	Start of water outage	End of water outage
1	Simila	09:00	17:00
		21:00	05:00
2	Waiyavi Stage 5	21:00	06:00
3	Central Business District	21:30	05:00
4	Tavakubu Stage 6	08:00	16:00
		20:00	04:00
5	Natabua	No water outage	
6	Tavakubu/Kermode/Kashmir	09:00	16:30
		20:00	05:00
7	Tavakubu/Razak Road	09:00	15:00
		21:00	05:00
8	Sukanaivalu Road, Kamkamica Park	20:00	06:00
9	New Field 40 Subdivision	No water outage	
10	Sulua Street	No water outage	
11	Vomo Street	20:00	04:00
12	Field 40 Subdivision	No water outage	

Source: Lautoka City Office

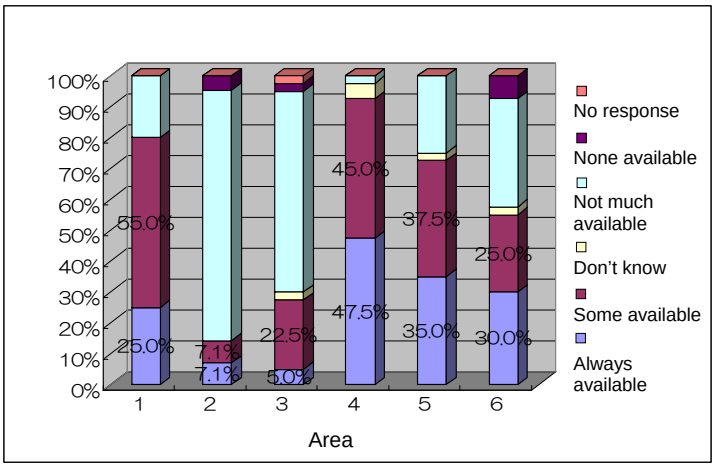
Despite the adequate amount of water supply provided as planned, the main reason why the water cuts (outage) are still observed is that the executing agency has been restricting the water supply to certain hours through adjustment of the water bulbs (according to the executing agency and the report of SAPS). This adjustment has been done to secure the water in the reservoirs from its unnecessary outflow to the distribution pipes, which are mainly caused by illegal connections to water supplies and large amounts of water leakage, which are outside the scope of this project.[5] For the additional information, it has been reported that, by the engineering consultants of this project, such a discontinuous/restricted water supply as mentioned above has led to the damage of the water pipes.

Thus, to improve water services to local inhabitants and businesses and to increase the effectiveness of this project, measures to increase the effectiveness of regional water supply projects as a whole, including parts that are outside this project are needed.

[5] This illegal connections to water supplies and large amounts of water leakage is obvious, which are outside the scope of this project, is obvious from the detailed analysis of SAP and the fact that the Western Division of the executing agency has been involved in repair work daily in response to the claims from the citizens.

Water leakage (found everywhere in the city)

Figure 2: Water Supply after the Completion of the Project



Source: Beneficiary survey
Note: 1–3 are for the Lautoka region, 4–6, for the Nadi region.

2.3.3.2 Response to the new demand for consumer and industrial (tourism, etc) use

The implementation of this project has produced a number of specific results. For instance, the amount of water supply targeted has been successfully secured in the target areas, and as a result, the numbers of households connected to water supplies and those newly connected are now on the increase. On the other hand, there are still areas where applications for new connection are limited because supply cannot keep up with demand. Additionally, given the many plans for development of tourism and housing in the areas targeted by this project, the demand for water services is expected to increase going forward. As a consequence, in addition to measures to deal with water leakages, the need to secure new sources of water has come to be widely recognized. On this point, as was the case noted above, a situation has emerged where factors outside the scope of this project may influence the effectiveness of the project.

Table 3: Number of Newly Connected Households per Year

Year	00	01	02	03	04	05	06	07
N	387	287	220	271	452	305	575	514
L	186	212	146	211	271	277	346	181

Source: Water and Sewerage Department, Western Division
Note: L: Lautoka, N: Nadi

2.3.3.3 Countermeasures based on the problems at hand

As noted above, the project has generated a certain number of effects regarding "improvement of the water supply shortage caused by insufficient capacity of the current facilities" and "response to the new demand for consumer and industrial (tourism, etc) use." The situation, however, is that some fundamental issues centred on factors outside the project scope still remain unsolved.

On the basis of analysis and recommendations based on SAPS implemented by the former JBIC, the Fijian government has begun revising the Nadi-Lautoka Regional Water Supply Project Master Plan formulated in 1996. Three companies which have been tendered offers are currently being examined for final selection in response to the issue of the terms of reference (TOR) concerning consultant contracts in September 2007. The revision centres on, among other things: (i) review of growth in population and demands for water; (ii) study of new water sources; (iii) review of water supply network; and (iv) improvement of water leakage measures.

2.4 Impact

First it is necessary to point out that the impacts initially assumed at the time of appraisal are beyond the scope of the project. Thus it is not appropriate to assess them in this report though it is done as below merely for reference.

[Tourist industry]

Since the mid-1980s, tourism, Fiji's biggest industry and the main source of foreign exchange earnings, expanded from 200,000 tourists to 400,000. However, in 2000, the number of tourists plunged to the 300,000 level due to the political situation. Since then, the industry has recovered steadily up until 2006. In both 2005 and 2006, a total of around 550,000 tourists visited the Fiji Islands. Although the number of tourists again decreased due to the political situation, in 2008, the number of tourists is expected to bounce back to the 550,000 level in 2008. The number is expected to be, even at the lowest estimate, 750,000, or 1.5 fold in coming years.

Except for during the periods of political instability, the number of foreign tourists to Fiji has increased steadily. Nadi, one of the regions targeted by this project, is a main tourist centre in Fiji. The project is believed to have played an important role in supporting the favourable growth in the number of tourists to Fiji. However, in the Fiji Tourism Development Plan (Nadi

Corridor Edition), which was published by the Ministry of Tourism in 2007, it is pointed out that, given the increase in demand for water noted above, over the next five to ten years, in addition to the expansion of water supply capacity made possible by this project, new water sources will have to be developed.

[Water quality]

The executing agency has pointed that the implementation of the project helped improve the quality of water supplied which has been maintained at the level of international standard, and which in turn greatly reduced the risk of contracting diseases caused by contaminated water.

Table 4: Number of Diseases caused by a Tap Water (Diarrhea) <Lautoka Hospital>

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Number	275	290	638	234	324	481	105	31	21	47	114	72

Source: Ministry of Health

[Other]

The implementation of the project has not given rise to any major environmental problems.

As regard to the land acquisition under this project, it took longer and cost more than was planned at the time of appraisal for the process of getting land owners' consent.

2.5 Sustainability (rating: b)

Though some problems have been observed in terms of technical capacity and the operation and maintenance system, thus sustainability of this project is moderate. There are structural problems, such as shortage of human resources, and financial difficulties.

2.5.1 Executing agency

2.5.1.1 Operation and maintenance system

As a result of the organizational restructuring of the Fijian government, since January 2008, the Water and Sewerage Department (WSD) of the Ministry of Finance, National Planning, Sugar Industry, and Public Utilities (Water and Energy) has been the executing agency of the Nadi-Lautoka Regional Water Supply Project, and WSD's Western Division is now responsible for the operation and maintenance of the facilities targeted by the project.

In August 2007, a law designed to turn WSD into a state-run public corporation (Fiji Water Authority [FWA]) was promulgated, but the effective date has yet to de decided. As matters stand, FWA is slated to be established in the second half of 2008. Members of FWA's board of directors are scheduled to be selected by the Charter Administration Committee, which has already gone into action, and the newly established board of directors is expected to appoint its first CEO.

2.5.1.2 Technical capacity

At present, the executing agency is well aware of the skill shortage (lack of skilled workers) in the operation and maintenance of the water supply facilities. Indeed, the agency was aware of this problem when the project came to an end. By and large, in the water supply facilities, there are enough workers, but many of them lack the required skills. By contrast, at the management level, workers have the necessary skills but their number is not enough.

From the planning stage of this project, given the skill shortage of the WSD staff, a water supply scheme (i.e., a natural downstream system) was planned to be adopted. This scheme does not require the use of pumps for which knowledge and competence in matters related to electricity are necessary), thus that has turned out to be a wise decision. Nevertheless, it has been indicated, by the Fijian government, that WSD still continues to suffer from skill shortage.

The main reason it is so difficult to secure skilled workers is that, because of the wage difference between government workers and those working in the private sector, in Fiji it is nearly impossible to get skilled workers to work in the public sector. Instead skilled workers choose to work in private companies in Fiji or those in neighbouring developed countries (Australia and New Zealand) or in Middle East countries, where they can land high-paying jobs. So these skilled workers have little incentive to remain in their homeland and work for the government.

In response to the issue of the lack of skilled workers, the Fijian government is considering the adoption of a policy that aims to secure the employment of highly skilled engineers by offering them wage increases when FWA is established. However, this is premised on the financial backing of a water rate revision, and the Fijian government has already announced that it will not revise its rates for at least three years after FWA is established. That means the FWA policy will not be realized until after 2011.

2.5.1.3 Financial status

Today the water services in Fiji are still not being run on a self-paying base; they are run with funds drawn from the general accounting budget of the government. The water fees collected from consumers are put in the state reserves, and are not directly used for WSD’s water services. In this sense, at present, there is no incentive to either operate the water supply facilities efficiently or improve the water fee collection rate.

At the hearings of executing agencies, attendees pointed out that in compiling its budget, the Ministry of Finance usually gives priority to large investment projects, not to the operation and maintenance of projects and small, everyday investment projects. Consequently, as is clearly stated in its Project Completion Report (PCR), the ministry does not provide sufficient funding necessary for the operation and maintenance.

After FWA is established, water services will be operated on a self-paying basis, although water rates have not been raised over the past ten years. What is more, the Fijian government has already decided on a policy of not raising water rates for at least three years after the establishment of FWA. Furthermore, as described earlier, it is stated in the FWA charter that, in the first three years after the establishment of FWA, it will continue to be supported by funds drawn from the government. Consequently, for the time being, the operation and maintenance of water services will be carried out within the current level of budget.

Though varying from one year to the next, over the past several years, an annual budget of about 2 million Fiji dollars has been granted to the Nadi-Lautoka Regional Water Supply Project (including the part outside the scope of the project). This budget was used to carry out the project's operation and maintenance as well as investment (pipe replacement, etc.). Although this too varies from one year to the next, in 2005, the operation and maintenance expense amounted to about 900,000 Fiji dollars, while the investment cost was around 950,000 Fiji dollars. Given that residents of the target areas are still without stable supply of water due to problems related to the water supply network outside the scope of this project, the budget allocated for minor repairs and improvements is just not enough to carry out major improvements.

2.5.2 Operation and maintenance status

In the PCR prepared by the Fijian government (2005), the former JBIC's SAPS (2007) and the field survey (hearing with the executing agency) conducted for this ex-post evaluation, it is confirmed that all facilities and equipment targeted by this project are operating without problems. Additionally, in the field survey, it is confirmed that among the facilities provided by this project (the Japan's ODA loan portion), the following are running properly: three water treatment plants, eight reservoirs and one water meter inspection/repair plant.

While the facilities and equipment provided by the project may be running satisfactorily, until improvements are made on the financial front, as noted in 2.5.1.2 and 2.5.1.3, there is a risk that the lack of skilled staff may adversely influence the operation and maintenance of those facilities and equipment.

3. Conclusion, Lessons Learned and Recommendations

3.1 Conclusion

From the foregoing, this project can be evaluated as "B".

3.2 Lessons Learned

The project assumed responsibility for the improvement and expansion of one segment (intermediate stage) of the water supply process, and if one limits the evaluation to only that

segment, one can say that the project achieved a certain level of success. However, the factors brought about by processes outside the scope of the project (leakage caused by deteriorating distribution pipes, sharp increases in demand for water, the delay in reorganising WSD into a public corporation, etc.) are having an adverse impact on the project's effectiveness. In implementing similar projects (projects that assume responsibility for some stages of a given process) going forward, the following should be adopted: (i) project formation that brings into view the effect of the overall process; and (ii) project management that brings into view the securing of the effect of the entire process.

Moreover, in this project, objectives were set that were beyond the scope a project should directly assume responsibility for, and this led to selection of inappropriate performance indicators and target values. Performance indicators and target values that are suitable for each project should be established by raising the degree of precision when creating log frames and the like at the project formation stage.

3.3 Recommendations

From the perspective of ensuring the effectiveness of the Nadi-Lautoka Regional Water Supply Project in its entirety, it was necessary to have a broad and flexible view of the project at the formulation stage of the Master Plan, on which the implementation of this project was based. Specifically, it should have been possible to make more appropriate judgments than were made regarding the assumptions made in the Master Plan, in particular, the amount of water in the existing water source and the focus areas (from water treatment plants to reservoirs). Similarly, at the planning stage of the project, it should have been possible to focus more on water sources and water supply networks than was the case. As the Fijian government itself acknowledges in its Strategic Development Plan 2007–2011, the present state of water services reflects the emphasis it places on expansion and new construction rather than on updating existing infrastructure.

The several years of delay in the establishment of FWA is having an influence on the project's operation and maintenance budget, its ability to secure human resources, and so on. Additionally, from the perspective of the regional water services as a whole, the delay in the establishment of FWA is impacting efforts to secure not only the necessary investment budget and human resources but also customer satisfaction. Hence the said delay should be dealt with immediately.

As noted above, the project faces two important problems: (i) the situation of the water service process other than the project's scope is having an impact on securing the project's effectiveness; and (ii) the delay in establishing FWA has led to a lack of human resources (in terms of number and skills) and financial resources, both essential for operation and maintenance. To solve these problems, the executing agency should adopt the following measures:

- Once again clarify the current state of the process of turning WSD into FWA and the schedule for its completion, and push forward the process by adhering to that schedule.
- Begin revising the Master Plan immediately by taking into consideration the importance of securing the effectiveness of the project in its entirety in the target areas.

Furthermore, in conducting this ex-post evaluation, the external evaluator faced the following two problems. Any measures to tackle these problems should be added as recommendations to the executing agency not only for operation and maintenance of this project but also for the appropriate administration and management in future.

- The quality of document management depends on the personnel in charge and the control by organisational response is weak (i.e. Whereabouts of the data and documents related to the project become unclear after the personnel changes and retirements.)
- The understanding about importance of policy evaluations (i.e. performance measurement and project evaluation) is lacking.

Comparison of Original and Actual Scope

Item	Planned	Actual
(1) Output	[Civil works] ・ Ongoing operations (Fiji funds) ・ Special urgent operations (Fiji funds) ・ Urgent operations (urgent components) (Japan's ODA loan) ・ Urgent operations (2005 target components) (Japan's ODA loan) [Consulting services] ・ Water leakage prevention plan ・ Project management unit (PMU) support ・ Consulting service for water service engineering ・ Sewerage system survey	[Civil works] Nearly as planned As planned Nearly as planned Nearly as planned [Consulting services] Apparently as planned Apparently as planned Apparently as planned Not yet implemented
(2) Project Period	February 1998 – December 2002 (59 months)	February 1998 – April 2004 (75 months)
(3) Project Cost Foreign currency Local currency Total Japan's ODA loan portion Exchange rate	 2,284 million yen 1,177 million yen (1,323 million Fiji dollars) 3,461 million yen 2,287 million yen 1 Fiji dollar = 89 yen (As of May 1997)	 Unknown Unknown 4,170 million yen 2,244 million yen 1 Fiji dollar = 57 yen (As of April 2004)