The Republic of Rwanda

FY2016 Ex-Post Evaluation of Japanese Grant Aid Project

"The Project for Rural Water Supply" and "The Project for Rural Water Supply (Phase II)"

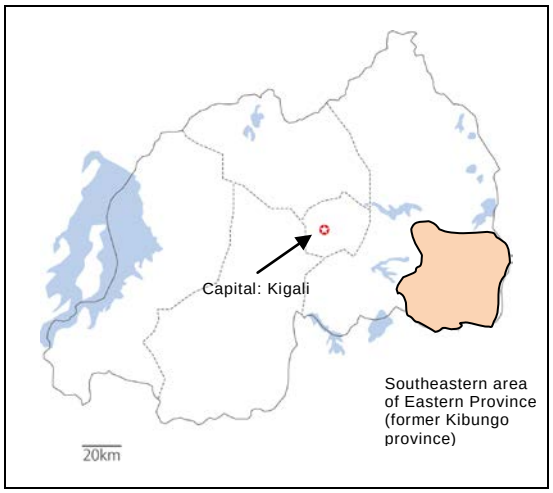
External Evaluator: Koichi Sekita, Chuo Kaihatsu Corporation

0. Summary

The Project was conducted with the aim of enhancing the water supply rate of the Target area and contributing to the improvement of living conditions in the water and sanitization sectors by developing the water supply facilities in the Ngoma, Kirehe, Kayonza and Rwamagana districts in the Eastern Province of the Republic of Rwanda. The Project matched with the Rwandan development policy "to provide all the population access to safe water by 2020" the development needs and the Japanese government aid policy. At the time of ex-post evaluation, a new development policy for the water sector had been set out and the development needs were still strong. Therefore, the relevance of the Project is evaluated as high. While the results of the Project cost were below 100 % of the plan, the Project period was 136 % of the original plan (45 months). Therefore, the efficiency is evaluated as fair. The water served population, an operation indicator, has increased significantly and met the target goals. As for the water supply rate, 100 % was almost achieved in regard to the Project for Rural Water Supply, but 62.9 % in regard to the Project for Rural Water Supply (Phase II). The achievement rate at the low 62.9 % is attributable to the increase of population in the water supply area, which was greater than expected. Within the beneficiary survey undertaken, there were many responses that: 1) the time spent on drawing water was significantly reduced, 2) user were satisfied with the water supply facilities and 3) the water supply was contributing to the children's education. Therefore, the effectiveness of the water supply system of the Project is high, and the impact on the improvement of the community's living conditions is large. Effectiveness and impact are evaluated as high. The districts contract with the Water Service Provider (WSP) on one's own responsibility, to perform the operation and maintenance. Minor repairs and daily operational management are undertaken by the WSP; however, there are financial issues in the case of equipment renewal and large-scale repairs which require high cost against the district's budget implementation system. Therefore, the sustainability is evaluated as fair.

In light of the above, this Project is evaluated to be satisfactory.

1. Project Description



Project Location

Photo: Mukarange Scheme[1] (water sales shop)

1.1 Background

In the policy document known as Vision 2020 and formulated in 2000, the Government of Rwanda stated that the improvement of water supply service rate was indispensable for the economic and social stability of the nation. In the Poverty Reduction Strategy Paper (PRSP) established in 2002, the access to safe water was set out as one of the main strategies, in order to: 1) reduce the water drawing time for women and children, 2) improve the school enrollment rate for girls, and 3) reduce the number of water-borne diseases so that a higher productivity rate can be achieved for the Rwandan citizen. The Target area, the southeast district of the Eastern Province (former Kibungo Province), is located in the southeastern part of Rwandan and its water supply facilities are underdeveloped compared to other districts of the country. Water supply service rate was as low as 31 % (17 % in the Target sector)[2].

Under these circumstances, the Government of Rwanda made a request to the Government of Japan for grant aid consisting of the development of water supply facilities in 64 sites, procurement of operation and maintenance equipment, and the improvement in the operation and maintenance capacity. The Japan International Cooperation Agency (JICA) implemented the basis design study (2005 – 2006) and the rural water supply facility development was planned to be implicated in three stages.

1.2 Project Outline

[1] In Rwanda, "sector" is the next level administrative unit of city and district, and Pipeline water supply facility is called as "scheme". In case of referring to a specific pipeline system water supply facility, it is represented by "sector name + scheme".

[2] Source: Basic Design Study Report

The Project was conducted with the aim to enhance the water supply rate of the Target area and contribute to the improvement of the living conditions in the water and sanitization sectors in the Eastern Province by developing the water supply facilities in Ngoma, Kirehe and Kayonza and Rwamagana districts.

G/A Grant Amount / Actual Grant Amount	(1) The Project for Rural Water Supply (Stage 1/3): 551 million yen / 541 million yen (2) The Project for Rural Water Supply (Stage 2/3): 692 million yen / 33 million yen (fee for consultant contract only) (3) The Project for Rural Water Supply (Phase II): 1,435 million yen / 1,171 million yen
Exchange of Notes Date /Grant Agreement Date	(1) The Project for Rural Water Supply (Stage 1/3): June 2006 / Not applicable (2) The Project for Rural Water Supply (Stage 2/3): June 2007 / Not applicable (3) The Project for Rural Water Supply (Phase II): March 2010 / March 2010
Executing Agency	(1) The Project for Rural Water Supply (Stage 1/3): Ministry of Land, Environment, Forestry, Water and Mines[3] (2) The Project for Rural Water Supply (Stage 2/3): Ministry of Land, Environment, Forestry, Water and Mines[4] (3) The Project for Rural Water Supply (Phase II): Ministry of Infrastructure[5]
Project Completion	(1) The Project for Rural Water Supply (Stage 1/3): February 2008 (2) The Project for Rural Water Supply (Stage 2/3): (Suspended) (3) The Project for Rural Water Supply (Phase II): July 2013
Main Contractors	(1) The Project for Rural Water Supply (Stage 1/3): Shimizu Corporation (2) The Project for Rural Water Supply (Stage 2/3): None (Bidding failure, suspended) (3) The Project for Rural Water Supply (Phase II): Tone Engineering Corporation
Main Consultants	(1) The Project for Rural Water Supply (Stage 1/3): Nippon Koei Co., Ltd. (2) The Project for Rural Water Supply (Stage 2/3): Nippon Koei Co., Ltd. (3) The Project for Rural Water Supply (Phase II): Joint Venture of Earth System Science Co., Ltd. and Nihon Techno Co., Ltd.

[3] In 2009, renamed as the Ministry of National Resources and the Project was transferred to the Ministry of Infrastructure.
[4]Subsequently, the Project was transferred to the Ministry of Infrastructure.
[5]During the Feasibility Study Stage, the agency of responsibility was the Ministry of Infrastructure, with three executing agency district offices (Ngoma, Kirehe, Kayonza). During the Implementation Stage of the Project, from June 2011, the responsible agency shifted to the Energy, Water and Sanitation Authority.

Basic Design	(1) The Project for Rural Water Supply: September 2005 – June 2006 (2) The Project for Rural Water Supply (Phase II): June 2009 – March 2010
Related Projects	<Technical Cooperation Project> ・Improvement of Water Supply and Sanitation in the South Part of Eastern Province (2007 – 2011) ・Project for strengthening operation and maintenance of rural water supply systems in Rwanda (March 2014 – December 2019) <Grant Aid Project> ・Follow up cooperation for of the Project for Rural Water Supply (2013) ・The Project for Rural Water Supply (Phase 3) (2015) (in progress) ・Japan Overseas Cooperation Volunteers (Water Security Action Team) <Related projects of other donor organizations> ・African Development Bank: Lake Victoria Water Supply and Sanitation Program Phase II, 2011-2015

2. Outline of the Evaluation Study

2.1 External Evaluator

Koichi Sekita, Chuo Kaihatsu Corporation

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: September 2016 – January 2018

Duration of the Field Study: January 15, 2017 – February 12, 2017 and May 28, 2017 – June 3, 2017

3. Results of the Evaluation (Overall Rating: B[6])

3.1 Relevance (Rating: ③[7])

3.1.1 Consistency with the Development Plan of the Republic of Rwanda

At the time of planning, it was stated within *Vision 2020* (2000), the national development plan, that access to safe water for the entire population was targeted to be achieved by 2020. Also in *the Economic Development and Poverty Reduction Strategy (2008 – 2012)* formulated in 2007, was targeted to raise the rate of access to safe water from 64 % to 86 % by 2012. The Project aimed at contributing to the improvement of the water supply rate by constructing and repairing water supply facilities for the

[6] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[7] ③: High, ②: Fair, ①: Low

Eastern Province with low rate of water supply. This was consistent with the development policies of the Rwandan Government. Within *the Seven Year Government Programme* formulated in 2010, the target was changed to achieve the access rate of 100 % by 2017. At the time of ex-post evaluation, presented as a priority target in *the National Drinking Water and Sanitation Policies and Strategies* which was formulated in 2016, the new target was designed to: 1) increase the water supply rate in the rural areas from 83.7 % in 2014 to 100 % by 2018, 2) provide appropriate rural water supply service, and 3) maintain sustainable function of the rural water supply facilities.

As can be seen, the Project has high rated consistency with the national development and water sector policies at the time of planning and ex-post evaluation.

3.1.2 Consistency with the Development Needs of the Republic of Rwanda

The country of Rwanda has geographical features that include hilly areas. Villagers live along ridge lines and slopes in a hilly terrain. At the time of planning, the residents of the area without water supply facilities relied on springs, lakes and rivers that exist in valleys for their domestic water requirements. These area residents had to go up and down steep slopes with height differences of more than 100 meters, repeatedly to fetch their daily water requirements. The time women and children spent on water fetching were more than two hours per day. Within the existing water sources, coliform bacteria and general bacteria were also detected even in the case of springs and the occurrence of water-borne diseases was reported. The time consumed by water retrieval was also a hindrance in rural development. The water supply rate was 17 % (2005) in the Target area of the Project for Rural Water Supply. Furthermore, the average water supply rate was 41.6 % in 2008 in the Target area of the Project for Rural Water Supply (Phase II) (11 areas of Kirehe and Ngoma districts in the Eastern Province), slightly over 60 % of the national average of 64 % (2007). There was a significant need to improve the low water supply rate. At the time of ex-post evaluation, the hearing from the Water and Sanitation Cooperation (WASAC), the executing agency, revealed that the water supply rate was 78 % nationwide and 68 % in the Eastern Province. There continues to be a need for developing water supply facilities.

3.1.3 Consistency with Japan's ODA Policy

Rural development was one of the priority areas in Japan's aid for Rwanda at the time of planning (Japan's ODA Data by Country: 2006 and 2010). The "Program for Rural Development in Eastern Province in the Republic of Rwanda" was implemented for this priority area. The program targeted the Eastern Province which had significant needs to reduce poverty compared to other provinces, and the stated goal of the

cooperation policy is on development of life infrastructure such as water supply facilities, and the maintenance and reinforcement of sanitation education. Therefore, the Project was consistent with the Japanese aid policy at the time of planning.

3.1.4 Appropriateness of the Project Plan and Approach

The implementation of the construction for Stage 1/3 of the Project for Rural Water Supply was decided in FY 2006 and was completed in March 2008. Subsequently, the bid for Stage 2/3 of construction ended in failure. This was due to problems in 1) procurement of materials and construction equipment, 2) subcontract and labor matters and 3) geographic situation of the sites which lead to the access problems. Under such circumstances, the construction for Stage 2/3 and onwards of the Project for Rural Water Supply was suspended. Based on the examination by the Japanese Government in 2010, an Implementation Review Study was carried out. Out of 10 schemes in 14 sectors which were the cooperation target in Stages 2/3 and 3/3, the feasible cooperation details were narrowed down and the Project was implemented, which became the Project for Rural Water Supply (Phase II).

In the Implementation Review Study conducted in 2010, five schemes planned in Stage 2/3 – Mushikiri Scheme, Kirehe Scheme, Nyamugari and Mahama Scheme, Kigina Scheme and Gatore Scheme in Kirehe district – were confirmed as feasible according to: 1) water source survey, 2) social conditions survey, 3) water supply planning, 4) facility construction planning, 5) equipment procurement planning, and 6) Project cost estimate. The Rwandan Government had a strong request for early implementation of these five schemes, and it had been also agreed in the Minutes of Discussion (M/D) of the Implementation Review Study to prioritize these Stage 2/3 schemes.

On the other hand, as for the five schemes planned in Stage 3/3 – Gahara Scheme in Kirehe district, Murama Scheme in Kayonza district, Kibungo Scheme, Karembo /Zaza/Mugesera Scheme and Kazo /Mutendeli Scheme in Ngoma district – priority levels were given for the four schemes excluding Gahara Scheme[8]. Based on the field study results, the prioritization was made according to: 1) cost effectiveness, 2) accessibility to the water source, 3) ease of construction, 4) maintenance cost, 5) ease of operation and maintenance by the scheme type, 6) willingness to pay for the water supply service and 7) residents' satisfaction for the current water usage situation. The Murama Scheme and Kibungo Scheme ranked low in the prioritization based on the results of the above evaluation. Therefore, they were excluded from the target of the Project for Rural Water Supply (Phase II). Consequently, two schemes in Stage 3/3 were

[8] Gahara was excluded because of the plan of clustering with a village located outside the Project Target.

selected.

The Implementation Review Study also examined the road access issue[9] which caused the bid failure, as well as the increase of procurement cost and the Target schemes, then it reviewed the plans for the ten schemes in 14 sectors targeted for Stages 2/3 and 3/3. As a result, it was decided that construction for the access issue would be incorporated onto the Japanese side, instead of being borne by the Rwandan side, to realize a smooth operation. As for the Target schemes, seven schemes were selected based on the requests from the Rwandan government side and examining the check items for operational feasibility. This was organized as the Project for Rural Water Supply (Phase II). The review of the Basic Design contributed to enhancing the efficiency and effectiveness of the Project. An appropriate plan for the original Project goal of improving and achieving the water supply rate in the Target four districts was reformulated.

The Project has been highly relevant to the country's development plan and development needs, as well as Japan's ODA policy. Therefore its relevance is evaluated as high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The Project implemented the development (new construction and renovation) of water supply facilities in the southeastern part of the Eastern Province (former Kibungo Province) by executing the Project for Rural Water Supply and the Project for Rural Water Supply (Phase II).

3.2.1.1 The Project for Rural Water Supply

(1) Water supply facility development

In the Basic Design of the Project, the water supply facility development plan was formulated targeting the 16 schemes in four districts. The plan was divided into three stages considering the scale of the construction. While Stage 1/3 (six schemes) was implemented as planned, Stage 2/3 (five schemes) was suspended due to bid failure[10] and Stage 3/3 (five schemes) was not implemented. After an Implementation Review Study, the projects for Stages 2/3 and 3/3 were redesigned. Out of 16 schemes, six

[9] Construction of access road in Stage 1/3 was to be borne by the Rwandan side, but was not carried out sufficiently.

[10] The documents provided by JICA point out the following issues as causes for the bid to be declined and are based on hearings from those who declined the bid and results of analyzing their reasons: 1) procurement of equipment and construction machines, 2) subcontract and labor matters and 3) geographic situation of the sites and access problems (In Stage 1/3 sites, the construction of the access road to the sites, which was to be borne by the Rwandan side, was not sufficient and thereby imposed a load on the constructors.

schemes (two districts) in Stage 1/3 had the water supply facility construction implemented under the Project for Rural Water Supply.

The following table shows the outline of the plan and the stages in the Basic Design.

Table 1: Outline of the Improvement Plan of Each Scheme in the Project for Rural Water Supply and its Selection Status

District	Scheme	Basic Design Stage	Rural Water Supply: Project Selection (Phase II)	Water served population (year 2010)	No. of Deep Wells Equipped with Hand Pumps				No. of Piped Water Supply Facilities				
					New	Renovation	No. of Water Sources	No. of Facilities	Deep Wells (Renovation / Expansion)	Springs		No. of Water Sources	No. of Water Supply Facilities
										New	Renovation/ Expansion		
Rwamagana	Mwulire, Munyaga, Kigabiro	1/3		20,060						1		1	1
Kayonza	Mukarange	1/3		9,639					1			1	1
	Kabarondo	1/3		922	2	1	3	3					
	Rwinkwavu (Gishanda/ Nyankora)※	1/3		6,632					1			1	1
	Rwinkwavu	1/3		3,313	8	2	10	10					
	Murama	3/3	Not Selected	9,132						1		1	1
Ngoma	Kibungo	3/3	Not Selected	8,536						1		1	1
	Murama	1/3		2,718	5	6	11	11					
	Karembo, Zaza, Kibare, Mugesera	3/3	Selected	22,421						1	1	2	1
	Mutendeli, Kazo	3/3	Selected	8,361							1	1	1
Kirehe	Mushikiri	2/3	Selected	11,884						1		1	1
	Kirehe	2/3	Selected	12,000						1	1	2	1
	Nyamugari	2/3	Selected	16,776							2	2	1
	Kigina	2/3	Selected	10,082						1	1	2	1
	Gahara	3/3	Not Selected	13,244						1		1	1
	Gatore	2/3	Selected	4,948						1		1	1
Total				160,668	15	9	24	24	2	9	6	17	13

Source: Drawn from the Basic Design Study Report and the Implementation Review Study Report

* Old sector names and water source names. Sector is administrative division in the district. Color pink has been added in the case where the Stage is 1/3 of the project term.

As shown above, the water supply facilities for Stage 1/3 (six schemes) were developed for the Project for Rural Water Supply. Table 2 below shows the specific details of the facilities developed in Stage 1/3 of the Project, their plans, actual results and the difference between the plan and the actual result.

Table 2: Output (facilities) of Stage 1/3 of the Project: Comparison between Plan and Actual Result

Facility	Plan	Actual	Difference
(1) Rwamagana district (Mwulire, Kigabiro, Munyaga Scheme)			
1) Spring Water Intake Facility	Cut-off wall type, stonemasonry, L=20m, H=2.0m	Cut-off wall type, Reinforced concrete, L=80m, H=2.0m	Change type of structure and increase of Length (+60m)
2) Suction Pit for Pumps	Round type precast concrete, aboveground type, V=100m^3 x 2units	Box type reinforced concrete type, semi-underground type, V= 200m^3 x 1 unit	Change type of structure, type change, change of breakdown of volume (no change in total volume)
3) Transmission Pumping Station	Independent housing for transmission pumps: 3 units	One pump house was integrated with the pump reservoir	Among 3 transmission pump houses, one unit was integrated with the pump reservoir. There is no change in total number of pump facilities.
4) Transmission Pipe	Pipe Length: 15.1km	Pipe Length: 18.0km	Pipe Length (+2.9km)
5) Reservoir	11 sites: (V=25 - 80m^3)	11 sites: (V=25 - 100m^3)	Change of Breakdown of Volume
6) Distribution Pipe	Pipe Length: 53.8km	Pipe Length: 50.1km	Pipe Length (-3.7km)
7) Water Supply Facility	Public Tap Stand: 57 sites	Public Tap Stand: 63 sites	Public Tap Stand (+ 6 sites)
(2) Kayonza district (Mukarange Scheme)			
1)Transmission Pumping facility	Generator for pump (37kVA, 1 unit)	Generator for pump (0unit)	Number of generators -1 unit.
2) Transmission Pipe	Pipe Length: 1.9km	Pipe Length: 1.8km	Pipe Length reduced by 0.1km
3) Reservoir	New 1 site (V=80m^3), rehabilitation 2 sites	New 0 site, rehabilitation 2 sites	Number of new reservoirs -1 site
4) Distribution Pipe	Pipe Length: 3.2km, diameter: 63 - 160mm	Pipe Length: 1.5km, diameter: 75 - 125mm	Pipe Length: -1.7km, change of diameter
5) Water Supply Facility	Public Tap Stand: 6 sites, connection to each house: 10 sites	Public Tap Stand: 0 sites, no other change	Public Tap Stand: -6 sites
(3) Kayonza district (Nyankora Scheme)			
1) Transmission Pipe	Pipe Length: 0.19km	Pipe Length: 0.25km	Pipe Length (+0.06km)
2) Distribution Pipe	Pipe Length: 13.0km	Pipe Length: 9.9km	Pipe Length -3.1km
3) Water supply facility	Public Tap Stand: 15 sites	Public Tap Stand: 14 sites	Public Tap Stand -1 site
(4) Kayonza district (Kabarondo Scheme)			
1) Deep well with hand pump (replacement of hand pump)	Rehabilitation: 1 site	Rehabilitation: 0 site	Hand pump renovation site was reduced.
(5) Kayonza district (Rwinkwavu Scheme)			
1) Deep well with hand pump (replacement of hand pump)	Rehabilitation: 2 sites	Rehabilitation: 1 site	Hand pump renovation -1 site
(6) Ngoma district (Murama Scheme)			
1) Deep well with hand pump (replacement of hand pump)	Rehabilitation: 6 sites	Rehabilitation: 5 sites	Hand pump renovation -1 site

Source: Documents provided by JICA
Note: L: Length, H: Height, V: Volume, kVA: Kilo Volt Amperes

Securing the site and building the access road by the residents were the tasks to be borne by the Rwandan side. The construction of the access road by the Rwandan side was insufficient[11], and the information for these results was unobtainable.

(2) Technical Assistance

The activities for the Technical Assistance (hereinafter referred as Soft Component) of the Project were conducted as planned from April 2007 to February 2008 except for the activities that were inapplicable for the Stage 1/3 Project. In the course of these activities, the privatization program of water supply business began to be promoted in Rwanda at the end of September 2007. In March 2008, the managing entities of all water supply facilities were reorganized into the private sector. Issues caused by these changes in the external circumstances had to be dealt with. For the soft components of the Project for Rural Water Supply (Phase II), activities were implemented to deal with these issues.

The table below shows the output for the soft component which were submitted: evaluation documents of the selecting conditions for water user association members and staff, manuals for operating and maintenance, and administrative supports, training materials and various reports.

Table 3: Output of Stage 1/3 of the Project: Soft Component Product

No.	Product Name
1	Adjustments and on-site minutes report for establishing water user associations
2	Committee selection criteria: evaluation document
3	Staff selection criteria: evaluation document
4	Public application form
5	Operation and maintenance manual
6	Manual for administrative supports
7	Training programs
8	Training materials for administrative supports
9	Training materials for water user associations
10	Reports on results of training for administrative supports
11	Reports on results of training for water user associations

3.2.1.2 The Project for Rural Water Supply (Phase II)

[11] Source: Documents provided by JICA

(1) Construction of Water supply facilities

Feasibility studies were conducted for the ten schemes in Stages 2/3 and 3/3 in the Basic Design Study Report shown in Table 1. As a result, seven schemes were selected for the Project for Rural Water Supply (Phase II).

Table 4: The Project for Rural Water Supply (Phase II) Plan Output (facilities): Comparison between Plan[12] and Actual Result

District	Scheme		Contents of Main Facilities		
			Plan	Actual	Difference
Kirehe	Mushikiri	New	Water intake facility (3 sites), Receiving tank (1 site, 90m^3), Distribution tank (1 site, 120m^3), Conveyance pipe (1.8km), Transmission pipe (2.5km), Distribution pipe (16.0km), Break pressure tank (8 sites), Public Tap stand (19 sites), Maintenance road (3.0km)	Water intake facility (3 sites), Receiving tank (1 site, 90m^3), Distribution tank (1 site, 120m^3), Conveyance pipe (1.7km), Transmission Pipe (2.2km), Distribution Pipe (15.3km), Break pressure tank (7 sites), Public Tap Stand (19 sites), Maintenance road (3.6km).	Length of conveyance pipe (-0.1km), Length of transmission pipe (-0.3km), Length of distribution pipe (-0.7km), Break pressure tank (-1 site), Length of maintenance road (+0.6km).
	Kirehe	Renovation	Water intake facility (1site), Receiving tank (1 site, 30m^3), Distribution tank (70m^3, 4 sites), Conveyance pipe (0.2km), Transmission pipe (2.8km), Distribution pipe (4.7km), Public Tap stand (new 8 sites, Renovation 7 sites), Maintenance road (2.5km).	Water intake facility (1site), Receiving tank (1 site, 30m^3), Distribution tank (2 sites, 70m^3), Conveyance pipe (0.2km), Transmission pipe (2.6km), Distribution pipe (4.5km), Public Tap stand (new 8 sites, Renovation 7 sites), Maintenance road (2.3km).	Distribution tank (-2 sites), Length of transmission pipe (-0.2km), Length of distribution pipe (-0.2km), Length of maintenance road (- 0.2km).
	Nyamugari/ Mahama	Renovation	New distribution tank (1 site, 62.5m^3), Rehabilitation of existing distribution tank (8 sites), Conveyance pipe (0.2km), Transmission Pipe (6.3km), Distribution Pipe (1.7km), Public Tap Stand (new 3 sites and Renovation 30 sites), Maintenance road (1.6km), Rehabilitation of existing water intake weir (2 sites).	New distribution tank (1 site, 80m^3), Rehabilitation of existing distribution tank (6 sites), Conveyance pipe (0.2km), Transmission pipe (6.7km), Distribution pipe (1.7km), Public Tap Stand (new 3 sites, Renovation 30 sites), Maintenance road (1.4km)	Rehabilitation of existing distribution tank (-2 sites), Transmission pipe (+0.4km), Length of maintenance road (-0.2km).
	Kigina	New	Water intake facility (1 site), Receiving tank (1 site, 80m$^{3)}$, Distribution tank (1 site, 120m$^{3)}$, Conveyance pipe (0.05km), Transmission pipe (1.5km), Distribution pipe (12.6km), Break	Water intake facility 1 site), Receiving tank (1 site, 80m^3), Distribution tank (1 site, 120m^3), Conveyance pipe (0.04km), Transmission pipe (1.4km), Distribution pipe (11.9km), Break	Transmission pipe (-0.1km), Length of distribution Pipe (-0.7km).

[12] Plan at time of Feasibility Study

			pressure tank (3 sites), Public Tap stand (17 sites), Maintenance road (2.2km).	pressure tank (3 sites), Public Tap stand (17 sites), Maintenance road (2.2km).	
	Gatore	New	Water intake facility (1 site), Receiving tank (1site, 55m$^{3)}$, Distribution tank (1 site, 80m^3), Conveyance pipe (0.07km), Transmission pipe (1.4km), Distribution pipe (8.3km), Public tap stand (13 sites), Replacement of hand pump of existing well (1 site), Maintenance road (3.0km).	Water intake facility (1 site), Receiving tank (1 site, 55m^3), Distribution tank (1 site, 80m^3), Conveyance pipe (0.07km), Transmission pipe (1.4km), Distribution pipe (7.9km), Break pressure tank (2 sites), Public tap stand (13 sites), Replacement of hand pump of existing well (1 site), Maintenance road (2.1km).	Length of distribution pipe (-0.4km), Break pressure tank (+2 sites), Length of maintenance road (-0.9km).
Ngoma	Karembo/ Zaza/ Mugesera	Renovation	Water intake facility (2 sites), Receiving tank (2 sites, 100m^3 and 30m^3), Distribution tank (2 sites, 120m^3 and 40m^3), Conveyance pipe (1.1km), Transmission pipe (3.4km), Distribution pipe (24.8km), Public tap stand (new 24 sites, Renovation 27sites), Maintenance road (3.6km).	Water intake facility (3 sites), Receiving tank (new 2 sites, 100m^3 and 30m^3, Renovation 1 site), Distribution tank (2 sites, 120m^3 and 40m^3), Conveyance pipe (1.4km), Transmission pipe (3.2km), Distribution pipe (24.5km), Public tap stand (new 24 sites, Renovation 27 sites), Maintenance road (4.0km).	Water intake facility (+1 site), Renovation of receiving tank (+1 site), Length of conveyance pipe (+0.3km), Length of Transmission pipe (-0.2km), Length of Distribution pipe (-0.3km), Extension of maintenance road (+0.4km).
	Kazo/ Mutendeli	Renovation	Water intake facility (1 site), Receiving tank (2 sites, 55m^3 and 100m^3), Distribution tank (new 1 site, 140m^3 and rehabilitation 2 sites), Conveyance pipe (0.05km), Transmission pipe (1.8km), Distribution pipe (17.5km), Public tap stand (new 25 sites, Renovation 27 sites), Maintenance road (2.3km).	Water intake facility (1 site), Receiving tank (2 sites, 55m^3 and 100m^3), Distribution tank (new 1 site= 140m^3 and rehabilitation 2 sites), Conveyance pipe (0.07km), Transmission pipe (1.8km), Distribution pipe (18.2km), Public tap stand (new 25 sites, Renovation 27 sites), Maintenance road (2.2km).	Length of distribution pipe (+0.7km), Extension of maintenance road (-0.1km).

Source: Prepared based on the implementation review study report and document provided by JICA.

(2) Soft Component

The two outputs below were the results of the soft component.

Output 1: The management of the private operators by Ngoma and Kirehe Districts is reinforced.

Output 2: The organization operation of the private operators in fee of operation and management of the water supply facilities developed in the Project is reinforced with the support of districts.

In order to achieve these outputs, the following activities were conducted: 1) drafting

the revised performance evaluation indicator on the private operators, 2) drafting the revised contracts between districts and private operators, 3) improvement of the bidding procedures when selecting private operators, 4) drafting the training manual for capacity building of operation and maintenance on the private operators, 5) training by districts using manuals, 6) reinforcing the monitoring and follow-up system on private operator by districts (1-6 are related to Output 1), 7) drafting the revised rules for organization operation and facility management, 8) improvement of systems necessary for operation and renovation of the water supply facilities, 9) improvement of managerial ability in finance and accounting, 10) organizing the formats of reporting (accountability) made to districts, and 11) organizing public relations with the local residents (7-11 are related to Output 2).

The Table below shows the manuals, collection of formats and various reports in relation to the operation and maintenance submitted as the outputs of soft component activities.

Table 5: The Project for Rural Water Supply (Phase II) Soft Component Product

No.	Product Name
1	Proceedings on promoting the establishment of a Task Force
2	Activity record concerning the promotion of the establishment of a task force
3	Task Force Member List / Task Force Term (draft)
4	Operation and maintenance management performance indicator workshop report on private sector activities
5	Operation and maintenance management performance indicators for the activities of the private sector
6	Operation and maintenance Tender Document (draft)
7	Operation and maintenance contract (draft)
8	Management and maintenance capacity improvement training module
9	Minutes of meeting on the explanatory note on performance indicators
10	Activity report on performance indicators
11	Private operator evaluation report
12	Management and maintenance capacity improvement training report
13	Operation and maintenance manual
14	OJT activity report / participant list
15	Organization chart of private water supply agencies
16	Training and OJT follow-up activity report
17	OJT request formulation summary
18	OJT assessment
19	Monthly report feedback format

20	Public tap stand monitoring format
21	Private water supply assessment format
22	Water sales record table
23	Community awareness activities lecture materials
24	Community awareness activity report

3.2.2 Project Inputs

3.2.2.1 Project Cost

(1) The Project for Rural Water Supply

Table 6 shows the cost borne by the Japanese side on the Project for Rural Water Supply.

Table 6: Japanese side Project Cost Under the Project for Rural Water Supply

Phase	Planned Cost (E/N Grant Limit)	Actual Cost	Difference
Stage 1/3	551 million yen	541 million yen (98% of E/N Grant Limit)	A reduction of 10 million yen. While the extension of the transmission pipe increased by 2.8 km, items that were reduced are a distribution tank, a water distribution pipe extension of 8.5 km, 1 public tap stand and the repair of 3 hand pumps. These scale reductions in facilities seems to be the main reasons for the decrease in actual project cost.
Stage 2/3	692 million yen	33 million yen (5% of E/N Grant Limit)	During the 2/3 Project term, the construction tender bit was unsuccessful. Construction was not implemented. Only the consultant contract sum was expended (the amount was reduced from the initial contract amount). For this reason, the total amount was reduced by 659 million yen.

Source: Documents provided by JICA

For Stage 1/3, the actual Project cost was 541 million yen, 98 % of the planned cost of 551 million yen as per the Exchange of Notes (E/N) and was within the plan. For Stage 2/3, only the consultant contract cost was paid and since the construction of the facilities was not implemented due to bid failure, the actual cost was 5 % of the planned expenditures. The cost to be borne by the Rwandan side were acquisition of site and building the access road, but the information for the cost amount could not be obtained.

(2) The Project for Rural Water Supply (Phase II)

As shown above, the Implementation Review Study was conducted for ten schemes that had been planned for Stages 2/3 and 3/3 of the Project for Rural Water Supply. As a result, seven schemes were selected for the Project for Rural Water Supply (Phase II).

The actual cost borne by the Japanese side for the Project for Rural Water Supply

(Phase II) was 1,171 million yen, which was 82 % of the planned cost and within the planned cost of 1,435 million yen in the E/N and grant agreement (G/A). The results were within the plan. The causes for the difference were that the contractors procured the construction equipment via the economic route of their own and were thereby able to reduce the construction cost tendered for the bid, lowering the bidding price. There was no reduction of the outputs (facilities) themselves. In the plan, the cost to be borne by the Rwandan side was 4 million yen, but no information on the actual cost was obtained.

(3) Total Project cost when evaluating the Project for Rural Water Supply and the Project for Rural Water Supply (Phase II) in an integrated way

In the Project for Rural Water Supply (Phase II), facility construction for seven out of ten schemes that were assumed to be implemented in Stages 2/3 and 3/3 in the Project for Rural Water Supply were carried out. As the construction was supposed to be conducted in the Project for Rural Water Supply, the ex-post evaluation will hereby attempt to compare the plan and actual cost borne by the Japanese side for the Project for Rural Water Supply.

Table 7: Comparison of Japan's side Obligation under the Plan: Planned and Actual Cost

Project	Planned Cost	Actual Cost	Remarks
Stage 1/3	(1) 551 million yen	(4) 541 million yen	6 schemes were implemented.
Stage 2/3	(2) 691 million yen	(5) 33 million yen (Only Consultant Contract)	Not implemented (5 schemes were target)
Stage 3/3	(Not Applicable)	(Not Applicable)	Not implemented (5 schemes were target)
Phase II	(3) 1,435 million yen	(6) 1,171 million yen	7 schemes were implemented.

According to the ex-ante evaluation (Basic Design Study Report) of the Project for Rural Water Supply, the cost to be borne by the Japanese side out of the total Project cost of the Project for Rural Water Supply was 1,828 million yen.

Stages 2/3 and 3/3 in the Project for Rural Water Supply were reexamined after the Implementation Review Study and were carried out as the Project for Rural Water Supply (Phase II). Since the original Stage 2/3 had only the consultation works carried out, the evaluator judged that it was inappropriate to compare the plan (E/N amount) and the actual for Stage 2/3 in the Project for Rural Water Supply. Therefore, to compare the E/N amount and the actual, a comparison of the Project for Rural Water Supply (Stage 1/3) plus the Project for Rural Water Supply (Phase II) was made. The comparison includes the consultation cost for Stage 2/3 as the actual Project cost.

The planned cost to be borne by the Japanese side was an addition of Stage 1/3 E/N

planned cost (1 in Table 7) and the E/N and G/A limit of the Project for Rural Water Supply (Phase II) (3 in Table 7), which was a total of 1,986 million yen (1+3). The actual cost borne by the Japanese side was 1,745 million yen (4+5+6 shown in Table 7), which was 88 % of the plan and thus within the plan. The cause for this difference was that the bidding price for the Project for Rural Water Supply (Phase II) was lower than expected. And Rwandan side contributed in improvement of water quality, supply electricity to the pumping stations, payment of importation taxes and expropriation of lands to construct the facilities, but there was no information obtained for the actual Project cost borne by the Rwandan side.

3.2.2.2 Project Period

(1) The Project for Rural Water Supply

The Project period for Stage 1/3 was estimated as 21 months in the plan, with the starting point as the Detailed Design (consultant contract) up to the completion of the project (counting in the starting month and completion month). The actual Project period calculated from the consultant contract was 20 months from July 2006 (consultant contract) to February 2008 (project completion), which was within the plan (95 %).

While Detailed Design and bidding management had been implemented for Stage 2/3, the period overlapped with Stage 1/3 of the project period. Therefore, it had no influence on the evaluation of efficiency.

(2) The Project for Rural Water Supply (Phase II)

The Project period had been planned as 24 months (including from G/A to project completion) (Source: Implementation Review Study Report). However, it took 41 months from March 2010 (G/A conclusion) to July 2013 (completion ceremony) and exceeded the plan significantly (170 %). The main cause for exceeding the plan was that the estimate had to be reviewed because of the bid failure. The initial bid was conducted as planned (July 2010), but then the bid failed two times, ending successfully on the third attempt (May 2011). It required ten months from the estimate review to the bid completion.

When evaluating Stage 1/3 of the Project for Rural Water Supply integrated with the Project for Rural Water Supply (Phase II), the planned Project period was 45 months (21+24) and the actual Project period was 61 months (20+41) exceeding the plan (136 %).

Although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness[13] (Rating: ③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

3.3.1.1 Operation Indicator

(1) The Project for Rural Water Supply

The operation indicator of the Project for Rural Water Supply was the water served population (benefit population of the Target area) as shown in Table 8. The baseline figure (2005) was 41,476 persons and the target figure (2010) was 160,668 persons. Since the Project for Rural Water Supply was carried out for Stage 1/3 only, the baseline figure (11,174 persons) and target figure (43,284 persons) for the Target area of Stage 1/3 are shown in Table 9 together with the actual figures.

Table 8: Operational Indicator of the Project for Rural Water Supply

Effect Indicator	Baseline (2005)	Target (2010)
Water served population of the target sectors	41,476 persons	160,668 persons
Water supply service rate of the target sectors	17%	64%

Source: Basic Design Study Report

Table 9: Status of achievement of Operation Indicators by the Stage 1/3 of the Project for Rural Water Supply

	Baseline	Target	Actual			
	2005	2010	2008	2010	2015	2016
	Planned Year	2 Years After Completion	Completion Year	2 Years After Completion	7 Years After Completion	8 Years After Completion
Water Served population (persons)	41,476	43,284	---	---	117,300	120,450

Source: Baseline and target figures are the water served population for the Target area of Stage 1/3 in Basic Design Study Report. Actual figures are data obtained from districts.

Note: The actual figures for 2015 and 2016 include the water served population in the Target area of Stage 1/3 in the Project for Rural Water Supply and the water served population of the water supply facilities other than those of Stage 1/3. In the M-K-M Scheme in the Rwamagana district, the water served population of the JICA water supply facility was 38,376 persons (2010 target was 20,060) according to district Inquiry.

(2) The Project for Rural Water Supply (Phase II)

Table 10 shows the planned and actual figures of the operation indicator in the Project for Rural Water Supply (Phase II).

[13] The impact was also considered when determining the effectiveness rating.

Table 10: Status of achievement of Operation Indicators for the Project for Rural Water Supply (Phase II)

Item	Baseline	Target	Actual		
	2008	2014	2014	2015	2016
	Planned Year	2 Years After Completion	2 Years After Completion	3 Years After Completion	4 Years After Completion
Water Served population (persons)	95,000	150,000	---	151,000	157,000

Source: Ex-ante evaluation and interview data from districts

3.3.1.2 Effect indicator

(1) The Project for Rural Water Supply

The table below shows the achievement status of the water supply rate in the Project for Rural Water Supply.

Table 11: Status of achievement of the Project for Rural Water Supply

Item	Baseline	Target	Actual			
	2005	2010	2008	2010	2015	2016
	Planned Year	2 Years After Completion	Completion Year	2 Years After Completion	7 Years After Completion	8 Years After Completion
Water Supply Rate (%)	17%	64%	---	---	65.7%	66.2%

Note: Water supply rate is calculated from the water served population divided by the population in the water supply area. Actual figures for 2015 and 2016 include both the water served population in the Target area of Stage 1/3 in the Project for Rural Water Supply and the water served population of the water supply facilities other than those of Stage 1/3.
Source: Basic Design Report and the hearing from the districts (at the time of ex-post evaluation).

(2) The Project for Rural Water Supply (Phase II)

The table below shows the achievement status of the water supply rate of the Project for Rural Water Supply (Phase II).

Table 12: Status of achievement of the Project for Rural Water Supply (Phase II)

Item	Baseline	Target	Actual		
	2008	2014	2014	2015	2016
	Planned Year	2 Years After Completion	2 Years After Completion	3 Years After Completion	4 Years After Completion
Water Supply Rate (%)	41.6%	57.4%	---	37.9%	36.1%

Source: Implementation Review Study Report and interview data from the districts (at the time of ex-post evaluation)
Note: The water supply rate decreased in 2016 compared to 2015. This is likely due to the fact that the population in the water supply area increased more than expected.

The water served population, an operation indicator, has increased significantly and met the target goals. As for the water supply rate, 100 % was almost achieved in regard to the Project for Rural Water Supply, but 62.9 % in regard to the Project for Rural Water Supply (Phase II). The achievement

rate at the low 62.9 % is attributable to the increase of population in the water supply area, which was greater than expected.

3.3.2 Qualitative Effects (Other Effects)

As for the operation and maintenance, private WSPs, make contracts with their district and operate the water supply business by providing water sales at a revenue to cover the operation and maintenance cost. When signing contracts with WSPs, districts select private companies upon screening their operation and maintenance capability. Districts take responsibility for conducting large renovation and facility replacement. WSPs are in charge of daily maintenance and repairs. By using private companies, daily operation and maintenance are conducted without problems. This outcome is evaluated to be the output of training to private operator for operation and maintenance realized with the soft component activities.

The table below shows the results of the beneficiary survey which addresses the satisfaction level of the water supply service.

Table 13: Overall Satisfaction Rate with the Water Supply Project[14]

Item	Satisfaction Rate (%)
Water quality	90.2
Amount of water	77.3
Reliability (throughout the year)	40.5
Distance	98.5
Latency	64.5
Water fee	72.0
Water company supply agent	90.2
Facility type	95.5
Average satisfaction	78.6

The results of the beneficiary survey revealed that the reliability for the water supply business throughout the year was as low as 40.5 %. The reasons listed were lack of water, cuts in water supply, generator failure and limits on water amount during the dry seasons. What is causing the lack of water and limit of water amount is the demand for water exceeding the capacity of facilities. “Waiting time” has a low degree of satisfaction as well. This is also thought to be of the demand larger than expected in the balance of demand and supply.

3.4 Impacts

3.4.1 Intended Impacts

[14] Total number of beneficiary survey is 132 persons. The details are that “man” is 65 persons, and “women” is 67 persons.

3.4.1.1 Quantitative Effects

(1) Changes in daily water usage amount

The daily amount of water usage before and after Project implementation was asked as part of the beneficiary survey. Table 14 shows the results. The daily water usage amount per capita was 11.2 L/capita/day before Project implementation and has increased to 22.2 L/capita/day at the time of ex-post evaluation (approximately 73 % increase). The Project had been designed to meet 20.0 L/capita/day (unit of water supply amount[15]). Almost all districts have met the target with the average of 19.4 L/capita/day, although some districts slightly missed the target. As for the water usage amount per capita per day, the target of the Project has been nearly achieved.

Table 14: Changes in the Amount of Water Consumed per Resident per Day

Districts	Survey qty. (household)	Before Project Implementation (L /capita / day)	After Project Implementation (L /capita / day)
Rwamagana district	19	8.9	15.7
Kayonza district	23	8.9	16.2
Ngoma district	33	10.3	19.0
Kirehe district	56	13.5	22.2
Average	---	11.2	19.4

Source: Results of the beneficiary survey

The table above shows the calculated amount of daily water usage per capita derived from the average number of water drawings by a Jerry Can (20 L plastic container) per household. The original unit set by the Project was 20 L/capita/day and it is equivalent to the water amount in a Jerry Can. As the table shows, water usage before the Project increased after the Project. While water consumption does not slightly reach the quantity that correspond unit of supply amount, the effect of the Project can be seen.

(2) Changes in the distance to the water supply facilities

A beneficiary survey was carried out on those residents obtaining drinking water from the water supply facilities developed under the Project in the Target area (beneficiary survey[16]). According to the results of the hearing, the data showing the reduction of the distance to the water supply facilities are presented in Table 15.

[15] Daily amount of domestic water usage per capita.

[16] Beneficiary surveys were conducted targeting residents who obtain water for drinking and other use. from water supply facilities in the 13 schemes developed by the Project for Rural Water Supply (Stage 1/3) and the Project for Rural Water Supply (Phase II). (Water drawing labor time and distance, satisfaction for water supply amount and quality, situation of infection of water-borne diseases, effect of life improvement etc.) The total sample size is 132, with 65 males and 67 females. The names of the schemes that were investigated are: Mwulire-Kigabiro-Munyaga in Rwamagana district, Mukarange, Rwinkwavu, Kabarondo, Nyankora in Kayonza district, Murama, Karembo -Zaza-Mugesera, Mutendeli-Kazo in Ngoma district and Mushikiri, Kirehe, Nyamugari, Kigina, Gatore in Kirehe district.

Table 15: Distance to Water Supply Facility

Distance to Water Supply Facility	Before Project Implementation	After Project Implementation
200m or less	2%	68%
201m-500m	15%	27%
501m-1000m	14%	4%
1001m-2000m	31%	1%
2000m or more	37%	0%
Total	100%	100%

Source: Results of the beneficiary survey
Note: Total percentage does not match the sum of the respective breakdown figures due to rounding off.

In Rwanda, it is set as a target in rural water supply to establish a water supply source within 500 meters from each household in order to enhance accessibility to clean water. At the time of planning, the policy was set to keep the maximum access distance to a water supply source at 500 meters one way and 1 kilometer in the case of dispersed rural settlements where maintenance cost would increase too much.

As shown in Table 15, the percentage of residents within 500 meters distance to water supply facilities was 17 % before the Project implementation and rose up to 95 % after Project implementation. This is a significant improvement when compared to the fact that the percentage of residents with 1 kilometer distance one way to water supply facilities was as high as 68 % before the Project implementation.

(3) Change in water fetching time

It is expected that if the distance to water supply facilities becomes shorter, the time required for water fetching would be reduced. In the beneficiary survey, hearings were made to ask the time required for water retrieval before and after Project implementation. The results are shown in Table 16. The percentage of those who required 15 minutes or less for water retrieval was 13 % (2 %+11 %) before Project implementation and 95 % (68 %+27 %) after Project implementation. Comparing with the fact that 45 %, almost a half, of the residents who had required more than an hour to fetch water, most of the water served residents are now able to fetch water in 15 minutes or less after the Project implementation. The effect of a significant reduction of water drawing time is apparent.

Table 16: Water Fetching Time Before and After Project Implementation

Water Fetching Time	Before Project Implementation	After Project Implementation
5 minutes or less	2%	68%
6 minutes-15 minutes or less	11%	27%
16 minutes-30 minutes or less	18%	4%
31minutes-1 hour or less	23%	1%
1 hour or more	45%	0%
Total	100%	100%

Source: Results of the beneficiary survey
Note: Total percentage does not match the sum of the respective breakdown figures due to rounding off.

(4) Other effects

In the beneficiary survey, the majority of the responses showed that access to clean water had effects on their life in general, contribution to the children's education and reduction of water-borne diseases. Comparing the responses between male and female respondents, there was no significant difference; both responded that there were improvements.

Overall, the survey responses showed: Life improved in general [Male: 63, Female: 66], Children's education improved [Male 65, Female 66]. For the improvement of children's education, there were comments as follows: Can save time; Can do homework; More time for concentrating on studies; Can go to school on time.

When asked what kind of welfare it has led to for women and children, the results were: Increase in income [Male: 4, Female: 5], Time to do other jobs [Male: 46, Female: 43], Increase in income and time to do other jobs [Male: 11, Female: 17] and Other reasons [Male: 4, Female: 1]

When asked about impacts of water supply facilities on girls and children, there was no difference in the responses. Both showed that there were improvements in living. It can be understood that reduction of water drawing time is showing effects on the very base of living.

Interviews were carried out from four district health centers on reduction of water-borne diseases. As a result, the number of patients did not clearly change before and after the Project according to the yearly data for the number of patients that health care centers keep. This is related to the fact that the jurisdiction of a health care center is not always equal to the Target area covered by a water supply facility, and patients that come to the health care center are not necessarily the users of the water supply facility. It is also possible that the population increase has exceeded the capacity of water supply facilities;

therefore, it is difficult to measure the impact of the Project with the number of patients of water-borne diseases.

In the interviews with health care centers, there was a comment that during the rainy season there is an increase in the number of residents who use unclean spring water, avoiding the water that costs money, in the areas near wetlands where water is easily available.

3.4.2 Other Positive and Negative Impacts

According to the interviews with WASAC and each district, the responses showed that there were no negative impacts on the environment. Also, there was no resettlement accompany land acquisition for the project sites.

Within the beneficiary survey undertaken, there were many responses that: 1) the time spent on drawing water was significantly reduced, 2) user were satisfied with the water supply facilities and 3) the water supply was contributing to the children's education. Therefore, the impact on the improvement of the community's living conditions is large.

As shown from above, the effects were manifested as planned on the whole by implementing the Project. The effectiveness and impacts are valuated as high.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

After Project completion, the authority of the water supply facilities is to be transferred to the districts so that they take responsibility for the operation and maintenance of the facilities. Actual operation and maintenance activity are taken charge by the private operator that has made contracts with district offices. However, it has been decided that district offices are responsible for large-scale renovation and renewals of water supply facilities and private water supply providers are in charge of small-scale repairs. As such, there is an operation and maintenance system based on clear role-sharing. And then, WASAC is in charge of operation and maintenance of the facilities in the provincial urban areas, while also it is in charge of supporting for districts and WSPs for rural water supply and sanitation. In addition, at the "Project for strengthening operation and maintenance of rural water supply systems in Rwanda" as technical cooperation in operation at the time of ex-post evaluation, activities such as elaboration of contract form for the districts and WSP, and elaboration of manual to clarify the division of roles between the districts and WASAC have been done. There are activities to disseminate contract forms developed by this technical cooperation project and to group together plural WSPs with different technical levels into one organization. Therefore, it is considered that the institutional system is being

strengthened.

3.5.2 Technical Aspects of Operation and Maintenance

Each WSP that is consigned from each district is consisted of staffs with technical skills in the waterworks sector. The district confirms that there is no technical problem before signing the consignment contract. The manuals created for the soft component are stored. According to the hearings, the techniques that are necessary in daily management and written in the manuals are already acquired and put into practice. And then, "Project for strengthening operation and maintenance of rural water supply systems in Rwanda" executes the training for obtaining specialized technique and knowledge related to operation and maintenance for rural water supply and strengthening WASAC's instruction skills to districts and WSP. Additionally activities to strengthen of technic level and to merge plural WSPs with different technical levels to unify the applied techniques are operated.

The maintenance of the water supply facility is carried out on a daily basis and collection of rates is undertaken. Therefore, it is judged that WSP has sufficient techniques for operation and maintenance.

3.5.3 Financial Aspects of Operation and Maintenance

The WSP who has signed a consignment contract with the district collects the water fee. Operation and maintenance of water supply facilities is conducted based on the collected water fees. The rates of water fee settings are decided by the Rwanda Utility Regulation Authority (RURA). The water fee differs according to the power system of the water supply system. The rates are equal regardless of the social environment of users. WSP signs a consignment contract with the manager of a public water tap for the water sales business, and then the manager sells water to users. WSP also collects rates for water supply to each household. The table below shows an example of the breakdown of water fee.

Table 17: Water fee Breakdown (Unit: RWF (Rwanda Franc))

Power System	Water fee per Jerry Can (a)	Public Water Stand Management Fee (b)	Ayateke Star Operation and Maintenance Expenses (c)	Water fee per m^3
1) Gravity type	8	3	5	333
2) Commercial electric power	20	5	15	863
3) Power Generator	25	5	20	1087

Ex: Ayateke Star LTD (consigned by Kirehe district)
Note: Water fee per Jerry Can: (a) = (b) + (c)

WSP manages the water sales amount by the flowmeter installed to the public water

tap. The cost of the manager of the public water tap and WSP's operation and maintenance cost are covered by the revenue of the water fee. In addition, WSP pays 10 %[17] of the water fee revenue to the district and yet, the balance of the WSP is in the black. When a large-scale renovation occurs which cannot be covered by the water fee revenue alone, such cost will be covered by the district. So far the total sum of the water fee revenue has become the budget of the district and is utilized for implementing projects of not only water supply but also projects in other sectors. Since Fiscal Year 2017 opening special account of the water fee revenue is approved by Ministry of Finances. Therefore, revenues from water service management can be utilized as budget, so it is expected that the financial aspects of operation and maintenance will be improved.

As for the operation and maintenance, there are no subsidies allocated to the districts from their counterpart WASAC or the government. Likewise, the districts do not pay out any subsidies to the WSP.

According to interviews with WSP, there are some causes that required a request for costly repairs and renewals of facilities that the districts do not approve the costs. To improve this situation of the approval delays, Kirehe district has adopted a method where WSP submits the estimate for repair cost; the district checks the amount and reimburses the repair cost from payment if it is found to be justifiable.

Large-scale facility renovations are dealt differently from district to district, but each WSP collects water fee and secures the funds necessary for daily maintenance, conducts repairs and manages the water supply business continuously. In sum, the financial aspects of the operation and maintenance through private consignment to WSP reveal that there is no problem in the normal operational management, but there are some issues when large-scale repairs are necessary.

3.5.4 Current Status of Operation and Maintenance

WSP is qualified to undertake water service management. The results of the beneficiary survey showed that people were satisfied in general with WSP and there is no problem in daily maintenance situation. However, the budget allocation is not quick enough to deal with large-scale repairs and costly renewals and facilities end up waiting for the renovation. As a specific example, the Kazo Scheme in Ngoma district is operating its facility with one of its two pumps in failure. It is necessary to build a system to enable large-scale renovation like this that exceeds the responsibility area of the WSPs. Another example, the WSP in Ngoma district procured a generator repair part which was damaged by

[17] Some districts count of 90 % of the total water produced amount as a revenue water charge and 15 % of the sales is paid to the district by the WSP.

a lightning from Japan. The control panel is also in failure and they are searching for its repair part in Uganda since it cannot be procured in Rwanda. WSPs are finding trouble in obtaining the parts which cannot be procured within the country. There are facilities where renovations are left undone.

On the other hand, WASAC, the executing agency of the Project, is making efforts to reduce power cost by adding the commercial power grid to their facilities to operate the pump station. WASAC supports operation and management by building new facilities.

Some minor problems have been observed in terms of the financial aspect and current status of the Project. Therefore, sustainability of the Project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The Project was conducted with the aim of enhancing the water supply rate of the Target area and contributing to the improvement of living conditions in the water and sanitization sectors by developing the water supply facilities in the Ngoma, Kirehe, Kayonza and Rwamagana districts in the Eastern Province of the Republic of Rwanda. The Project matched with the Rwandan development policy “to provide all the population access to safe water by 2020” the development needs and the Japanese government aid policy. At the time of ex-post evaluation, a new development policy for the water sector had been set out and the development needs were still strong. Therefore, the relevance of the Project is evaluated as high. While the results of the Project cost were below 100 % of the plan, the Project period was 136 % of the original plan (45 months). Therefore, the efficiency is evaluated as fair. The water served population, an operation indicator, has increased significantly and met the target goals. As for the water supply rate, 100 % was almost achieved in regard to the Project for Rural Water Supply, but 62.9 % in regard to the Project for Rural Water Supply (Phase II). The achievement rate at the low 62.9 % is attributable to the increase of population in the water supply area, which was greater than expected. Within the beneficiary survey undertaken, there were many responses that: 1) the time spent on drawing water was significantly reduced, 2) user were satisfied with the water supply facilities and 3) the water supply was contributing to the children’s education. Therefore, the effectiveness of the water supply system of the Project is high, and the impact on the improvement of the community’s living conditions is large. Effectiveness and impact are evaluated as high. The districts contract with the Water Service Provider (WSP) on one's own responsibility, to perform the operation and maintenance. Minor repairs and daily operational management are undertaken by the WSP; however, there are financial issues in the case of equipment renewal and large-scale repairs which require high cost against the district’s budget implementation system. Therefore, the sustainability is evaluated as

fair.

In light of the above, this Project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Recommendation to district offices

Districts bear the responsibility of operating and managing the water supply facilities. Water fee incomes used to entere to the common account of the district office and were added together with other types of income. But since Fiscal Year 2017, opening exclusive account for the water fee revenue is approved by Ministry of Finance. This leads to the feasibility in securing budgets to repair and exchange costly equipment. In future, it is necessary to improve the capacity for effective utilization of water fee income. As it is conducted in Kirehe district, the system could be more effective where the WSP estimates the repair cost, the district screens and approves it, and the payment to the district from the water fee income is allotted to the repair cost.

It is recommended that each district make effective use of budget by considering the priority for equipment replacement and repairs that are necessary in the operation and management of the water supply project.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

There is a facility where one of the two transmission pumps is broken and is operated only with the remaining one pump. Also there is some equipment without prospects to be repaired. Even if the operation is handled with the remaining equipment, there is a high risk that these facilities will fail to be operating without any repair parts. Procuring parts unavailable in the country from Japan or other third countries involves big risks when it is urgent. To prevent such issues and to conduct a stable water supply business, it is important to select the equipment which the aided country is able to carry out renewal of water supply facility equipment or the procurement of repair parts with ease. This is an issue in enhancing the sustainability of projects. It is also essential to confirm of the creation of a framework on the aid recipient country’s side to secure funds that enable large-scale repairs.