Federal Democratic Republic of Ethiopia

Ex-Post Evaluation of Technical Cooperation Project

"The Water Sector Capacity Development Project in Southern Nations, Nationalities and People's Region"

External Evaluator: Makoto Tanaka, ICONS Inc.

0. Summary

This project was implemented in the Southern Nations, Nationalities and People's Regional State (hereinafter referred to as "SNNPRS") for the purpose of building sustainable water supply systems and developing their organizational and human resources capacity. The activities of this project were consistent with the improvement of the water supply rate and the water scheme functionality rate that were priorities of Ethiopia's national development policy, Ethiopia's development needs such as access to safe water, and Japan's assistance policy, which prioritized the development of the ability to supply safe water and maintain water facilities. However, problems in the planning and approach prevented the project from having the expected effects. Therefore, its relevance is fair. The Project Purpose and the Overall Goal have not been achieved and it cannot be said that a sustainable water supply management system has been built. The expression of the Outputs and the Project Purpose from its completion to the time of the ex-post evaluation is not sufficient as well. Therefore, its effectiveness and impact are low. Both the project cost and the project period exceeded the plan. Therefore, its efficiency is fair. There are problems left in the organizational aspects of the implementing agencies, such as cooperation between the region, zones and woredas[1], the supply of equipment and spare parts that are necessary for maintaining water facilities, the technical skills of the Woreda Water, Mining and Energy Offices (hereinafter referred to as "WWMEO"), and the bearing of costs by the users of water facilities, etc. The outlook for their resolution is not bright. There are slight problems in related policy and institutional aspects. Therefore, its sustainability is low.

In light of the above, this project is evaluated to be unsatisfactory.

[1] Ethiopia's administrative districts are classified into regions, zones, woredas (counties), and kebeles (villages) in order of level. Each level of administrative entity has a department in charge of water resources: the Water Resources Bureau (WRB) in regions, Zonal Water, Mining and Energy Departments (ZWMED) in zones, and Woreda Water, Mining and Energy Offices (WWMEO) in woredas.

1. Project Description

Project Location

Household rope pump installed in the Project[2]

1.1 Background

At the time of the project planning, the accessibility to safe water in Ethiopia was 24%, which was significantly lower than the average among Sub-Sahara African countries (54%)[3]. An increased rate of access to a supply of water is particularly urgent in rural areas, where 85% of the population live. There was also a pressing need for each regional government, which was responsible for the water supply, to train its technicians and to build water supply facilities so that they promote their own water supply work, since the budget allocation and human resource development at local administration organizations were delayed. In addition, many existing water supply facilities were left out of order. Accordingly, it was quite important to develop human resources and systems on the operation, maintenance and repair of water supply facilities in order to achieve the Universal Access Plan (hereinafter referred to as "UAP") in the water sector. In rural areas, it was a key to the sustainable operation and maintenance of water supply facilities to standardize hand pumps and to establish spare parts supply chains, since it was difficult to purchase spare parts.

SNNPRS is located in the south and southwest of Ethiopia. Its population was about 14 million, 93% of which was in its rural areas. The water supply rate was 34.1% in 2004, which is below 35%, the average of Ethiopia. It was said that about 30% of the existing water supply facilities in the region were left out of order and were unusable. It was then necessary to develop the capacities of Water Sanitation and Hygiene Committees (hereinafter referred

[2] A rope pump is a kind of pumps that are intended for shallow wells. It is believed that rural inhabitants can bear the initial cost of installation and maintain rope pumps by themselves, the users can pump water with simple operation, and they can save time for household work. The structure and the principal of rope pumps are shown in Figures A1 and A2 at the end of this document, respectively.

[3] Source: Data from the year 2002 by the United Nations Development Program (UNDP).

to as "WASHCO")[4] at community levels, which are responsible for the sustainable operation of such facilities and the activities for improving sanitation and hygiene. It was also important to strengthen the function of the Water Resources Bureau of the regional state (hereinafter referred to as "WRB"), which is in charge of the development of their capacities. Against this backdrop, the Government of Ethiopia has requested that the Japanese Government provide a technical cooperation program with the goal of building a sustainable water supply management mechanism and developing the capacities of concerned organizations and human resources with the WRB of SNNPRS as its counterpart (C/P).

1.2 Project Outline[5]

This project dealt with household rope pumps and public hand pumps. As for the former, there were 60 household rope pumps installed in 6 woredas[6] and users and WWMEOs connected to the project were taught maintenance techniques. As for the latter, 205 pumps were installed in woredas in SNNPRS including these 6, and WASHCOs were established involving the users of the installed pumps, in a preceding grant aid named "The project for water supply in Southern Nations, Nationalities and People's Regional State" (1st phase: fiscal year (FY) 2005 and 2nd phase: FY 2006, hereinafter referred to as "the preceding grant aid"). This project selected 21 WASHCOs from these that are located in 6 targeted woredas[7], and assisted those in charge of the maintenance of these WASHCOs and WWMEO personnel that have jurisdiction over them through trainings, etc. In addition, the project invited spare parts outlets to places accessible from each woreda, in order to establish a system to supply spare parts for rope pumps and hand pumps. The communication system in the project activities is shown in Figure 1.

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[4] A WASHCO is a self-administering organization consisting of the users of water supply facilities.

[5] The Project Design Matrix (PDM) of this project was revised four times in June 2008, June 2009, December 2009 and May 2011. The project outline described here depends on PDM4 revised in May 2011.

[6] The project invited inhabitants in each woreda to install household rope pumps on the condition of paying 2,000 Birr as a share of the expenses. The WWMEO personnel installed pumps at 60 residences that agreed with this condition, as part of their on-the-job trainings (OJT) under the instruction of project experts. Birr is the currency of Ethiopia: 1 Birr = about 5.9 Japanese Yen as of the end of 2014.

[7] According to the results of the baseline survey implemented in 2008, 6 target woredas were selected among the 78 (then), and among WASHCOs in those 6 woredas, 21 were selected based on the results of several investigations (Source: documents provided by JICA).

Overall Goal		Sustainability on water supply system is improved in SNNPRS.
Project Purpose		Organizational capacity in implementation, operation and maintenance of water supply system is improved in SNNPRS.
Output(s)	Output 1	Rural Water Supply Scheme Development / O&M Plan is formulated in each of the 6 Target Woredas[8]
	Output 2	Rope Pump Dissemination System is established in the 6 Target Woredas[9]
	Output 3	Operation and Maintenance of Water Schemes are improved in 6 Target Woredas.
Total cost (Japanese Side)		467 million yen
Period of Cooperation		December, 2007 – December, 2011
Implementing Agency		Water Resources Bureau, Southern Nations, Nationalities and People's Region
Other Relevant Agencies / Organizations		Related Zonal Water, Mining and Energy Department (ZWMED), Relate Woreda Water, Mining and Energy Office (WWMEO)
Supporting Agency / Organization in Japan		Japan Techno Co., Ltd. and Kokusai Kogyo Co., Ltd. (JV)
Related Projects		<Technical Cooperation Projects> "The Groundwater Development and Water Supply Training Project" (1998-2003) "The Groundwater Development and Water Supply Training Project – Phase II" (Water Technology Center) (EWTEC2, 2005-2008) "The Ethiopian Water Technology Center Project Phase-3" (2009-2014) "Project for Rural Water Supply, Sanitation and Livelihood Improvement through Dissemination of Rope Pumps (RPs) for Drinking Water" (WAS-RoPSS, 2013-2016) <Grant Aid> "The Project for Water Supply in Southern Nations, Nationalities and People's Regional State" (FY 2005) "The Project for Water Supply in Southern Nations, Nationalities and People's Regional State" (Phase 2, FY 2006) <The World Bank (WB)> "Ethiopia Water Supply and Sanitation Project (2004-2013)" "Ethiopia Water Supply, Sanitation and Hygiene Project (2014-2019)" <United Nations Children's Fund (UNICEF)> "Projects on Rural Water Supply Facilities"

[8] 6 woredas in 6 zones: Angacha Woreda in Kembata Tembaro Zone, Arba Minch Zuria Woreda in Gamo Gofa Zone, Boloso Sore Woreda in Wolayita Zone, Hula Woreda in Sidama Zone, Loma Woreda in Dawuro Zone and Silti Woreda in Silte Zone.

[9] Rope pumps were not installed in Loma Woreda among the above mentioned 6 woredas, where it was judged that there were no wells applicable to rope pumps, but were installed in Chencha Woreda, Gamo Gofa Zone instead (Source: documents provided by JICA).

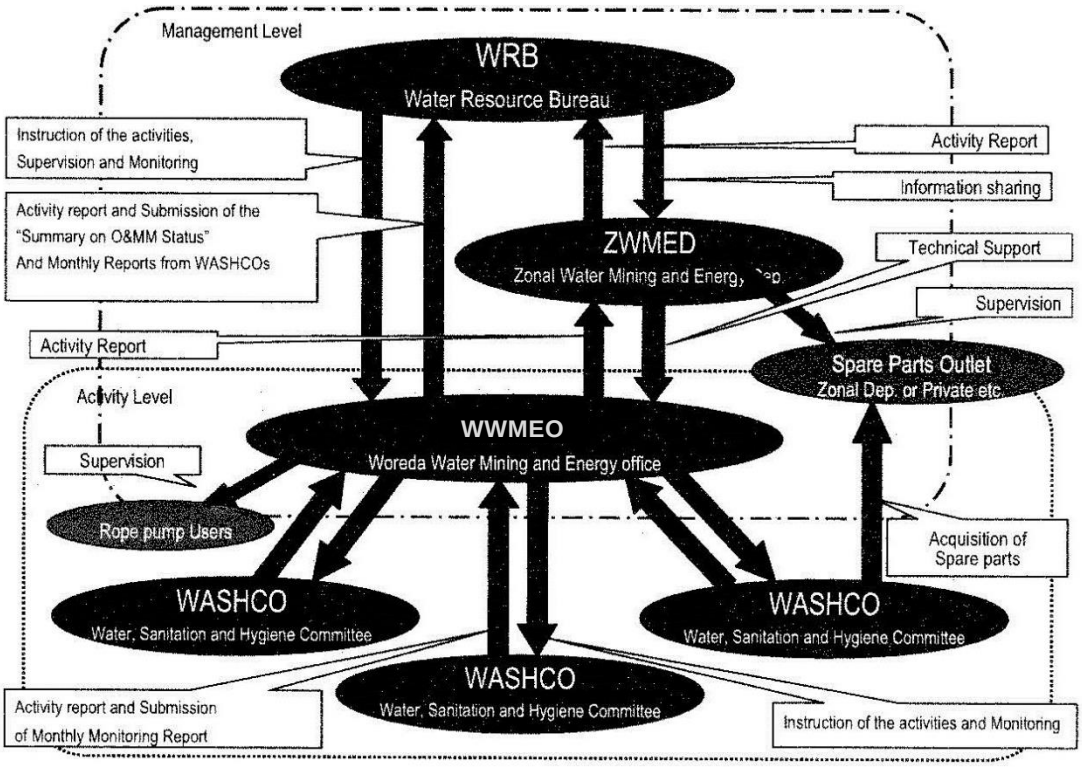

Figure 1. Communication System in the Project Activities

(Source: documents provided by JICA)

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement Status of Project Purpose at the time of the Terminal Evaluation

The Project resulted in the development of models of WASHCO, Preventive/Curative O&M, and the dissemination of rope pumps and spare parts supply chains. Thus the Project Purpose was expected to be achieved by the end of the Project period.

1.3.2 Achievement Status of Overall Goal at the time of the Terminal Evaluation

The Terminal Evaluation Team confirmed that the target woredas and zones had been ready for the implementation of preventive O&M and the dissemination of rope pumps in spite of their limited budget and other limitations. Thus it was expected that the Overall Goal would be achieved.

1.3.3 Recommendations at the time of the Terminal Evaluation

The following recommendations were made for the short-term perspective before the end of the Project.

(1) For the dissemination of the project effect, the WRB of SNNPRS should develop a detailed implementation plan in cooperation with JICA experts by the completion of the project.

(2) In order to promote the aggressive participation of the C/P in the project, the project activities should be described in the "performance evaluation sheet" from July 2011 when Ethiopia's fiscal year starts[10].

(3) Personnel from the Planning, Monitoring and Evaluation Office of the WRB should participate in regular meetings and site investigations for the purpose of increasing the quality of the implementation of the project such as promoting the aggressive participation of the C/P and ensuring the sustainability of the WRB of SNNPRS.

(4) Dissemination of rope pumps is the official policy of the country. The WRB ought to assist WWMEOs in developing a detailed implementation plan. In this regard, the WRB should form a specific unit and assign key persons therein.

The following recommendations are made for the long-term perspective.

(5) An appropriate budget should be allocated for maintenance. The WRB should make efforts to find potential financial sources from donors and international agencies, etc. so that it can ensure external sources of funds to support WWMEOs, which do not have a large enough budget, means of transportation, or maintenance equipment.

2. Outline of the Evaluation Study

2.1 External Evaluator

Makoto Tanaka, ICONS Inc.

2.2 Duration of the Evaluation Study

Duration of the Study: August, 2014 – August, 2015

Duration of the Field Study: November 13, 2014 – December 9, 2014 and February 24, 2015 – March 4, 2015

2.3 Constraints during the Evaluation Study

This project installed 60 household rope pumps in 6 target woredas and technically assisted 21 WASHCOs that use part of the hand pumps supplied in the preceding grant aid to maintain them. However, the evaluator could not check all the hand pumps in the ex-post evaluation due to the constraints on field survey periods and budget. In addition, the

[10] Ethiopia's fiscal year starts in the eleventh month of the Ethiopian calendar and ends in the tenth month. July 8th, 2011 in the European calendar is the first day of the eleventh month of the year 2003 in the Ethiopian calendar.

evaluator could not directly interview part of the users of household rope pumps and WASHCOs and interviewed them by telephone instead[11].

It should be noted that for items at the completion of the project that cannot be directly checked, the evaluator estimated the situation at that time from the situation at the time of the ex-post evaluation by taking into account additional information obtained from interviews.

3. Results of the Evaluation (Overall Rating: D[12])

3.1 Relevance (Rating: ②[13])

3.1.1 Relevance to the Development Plan of Ethiopia

At the time of the project planning, the water sector, particularly water supply and sanitation, was one of the important issues in Ethiopia's five-year plan, i.e. the "Plan for Accelerated and Sustained Development to End Poverty" (2005-2009). In Ethiopia, not only the "Millennium Development Goals" (MDG)[14] aimed to improve the water supply rate to 100% by 2012, but also the UAP that is the mid- and long-term plan of the water sector. To achieve the goal in this plan, it designated as main strategies the development of human resources and capacities at WWMEOs, the aggressive adoption of low-cost technologies and the repair of non-functioning water facilities, etc. In addition, the WRB of SNNPRS formulated a regional strategy for developing the water sector in March 2004 to establish a sustainable water supply system.

At the completion of the project, the "Growth and Transformation Plan" announced in 2010, the five-year plan succeeding the "Plan for Accelerated and Sustained Development to End Poverty," mentioned the goal of improving the water supply rate to 98.5% by 2015. The UAP2, which started in 2011 as a revised version of the UAP, clearly specifies the goal of improving the accessibility to safe water[15] up to 98% and reducing the rate of non-functionality to 10% by 2015. In that strategy, developing human resources and capacities in the water sector at all levels, and introducing water supply facilities that can be operated and maintained on a small budget are regarded as important. From the above, this project, which aims to develop water supply systems and to strengthen the capacities for their maintenance in SNNPRS, is highly consistent with Ethiopia's development policy.

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[11] Interviews by telephone are limited to residences with members who have telephone services and understand Amharic (the official language of Ethiopia) or English.

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

[13] ③: High, ② Fair, ① Low

[14] The MDG declared that the water supply rate should reach 63% by 2015.

[15] The definition of access is Ethiopia specific: in rural areas, that is provided access to water of 15 ℓ per capita per day within 1.5 km of water supply points, and in urban areas, that is provided access to improved water of 20 ℓ per capita per day from domestic / household water consumptions (Source: Report on Inventory of Water Supply and Sanitation Facilities in SNNPR as part of The National WaSH Inventory (2011), pp. 46-47).

3.1.2 Relevance to the Development Needs of Ethiopia

At the time of the project planning, the accessibility to safe water was extremely bad among Ethiopia's development indices and securing domestic water was of high priority. The development of rural water supply systems, the rehabilitation of non-functioning water facilities, and the strengthening of maintenance capacities, at which the project aimed, were directly connected to development needs such as access to safe water and management of domestic water. Still, even at the completion of the project, there was a need to strengthen the maintenance capacity of existing water supply facilities for access to safe water. According to the summary by the World Bank (WB)[16], the overall water supply rate in rural areas of Ethiopia was 31.9% and 39.3% in 2007 and 2011 respectively. After "The National Water, Sanitation and Hygiene Inventory" of Ethiopia, the rate of population supplied with water in SNNPRS was 44.29% in 2011, and the functionality rate of water supply facilities was 72.95% (the non-functionality rate was 27.05%) in the same year[17]. From these things, it is clear that access to safe water and the strengthening of the capacity of the maintenance of water supply facilities in SNNPRS were highly needed.

3.1.3 Relevance to Japan's ODA Policy

This project was consistent with Japan's assistance policy for Ethiopia at the time of the project planning, since Japan's "Country Assistance Policy for Ethiopia" at that time pointed out the shortage of safe water supply and noted the need to "assist the strengthening of the capacity to supply safe water through the coupled implementation of water supply projects in rural areas, develop human resources in the water sector, and provide assistance to groundwater investigation" in the section of "agriculture and rural development".

3.1.4 Appropriateness of the Planning and Approach of the Project

The basic direction of this project, that is, to promote the installation of rope pumps as a mean corresponding with the above-mentioned development need, was consistent with Ethiopia's development policy. However, the following problems existed in its planning and approach.

As described in 3.2.1, it is judged that the Project Purpose (interpreted as the improvement of organizational capacity in implementation, operation, and maintenance of water supply systems in the 6 target woredas) has not been achieved. The Overall Goal (targeting the whole SNNPRS) has not been achieved either as described in 3.2.2, and the Sustainability

[16] Improved water source, rural (% of rural population with access), WB Databank, http://data.worldbank.org/indicator/SH.H2O.SAFE.RU.ZS

[17] Source: Report on Inventory of Water Supply and Sanitation Facilities in SNNPR as part of The National WaSH Inventory (2011), p. 4 and p. 6

(described in 3.4) is also low. These are likely caused by the lack of discussions on the planning of the system for disseminating rope pumps and improving the maintenance system of water supply facilities and the approach to them. These factors are summarized as follows.

- Dissemination of rope pumps: While this project installed 60 household rope pumps in 6 woredas, it did not show the way to disseminate rope pumps to all SNNPRS. As described in 3.2.2.1, the dissemination of rope pumps is one of the conditions for achieving the Overall Goal. Not having shown the way to disseminate means that the activities and outputs necessary for achieving the Overall Goal were not included in the framework of the project planning.
- Sustainability of spare parts outlets: It is necessary for the maintenance of water supply facilities that spare parts supply chains are established and spare parts can be purchased there with prices that users can afford. However, the spare parts outlets the project invited withdrew for reasons of profit and the difficulty in acquiring wholesale spare parts. In other words, the factors that govern whether or not the sustainable maintenance of water supply facilities would be possible were not included in this project, that is, a killer assumption[18] existed in the very framework. Such a project plan is not sufficient for ensuring sustainability. However, it could not be verified from the documents and information obtained in this ex-post evaluation whether the sustainability of spare parts outlets was studied in this project.
- Installation of rope pumps: The interviews of household rope pump users showed that there were some cases where the installation works were not appropriate or the groundwater level was not sufficiently confirmed. As described in 3.4.4, the users of such pumps testified that they lost their willingness to pay their share of the expenses as a result of the rope pumps becoming unusable because of disorders due to such inappropriate installation[19].

In light of the above, this project was highly relevant to Ethiopia's development plan and development needs, as well as Japan's ODA policy. On the other hand, there were some problems in the appropriateness of the planning and approach of the project. Therefore, its relevance is fair.

[18] A killer assumption is an Important Assumption that would kill the project. An Important Assumption is a condition that is important for the project being successful but cannot be controlled by the project and uncertain to be satisfied.

[19] Inhabitants who wanted to have rope pumps installed agreed to pay the share of the expenses of 2,000 Birr that is half of the installation cost per pump, passed the examination of their ability to pay by financial institutions, and signed on the installation contracts with WWMEOs. Nevertheless, there appeared some users who lost their willingness or ability to pay afterwards.

3.2 Effectiveness and Impact[20] (Rating: ①)

3.2.1 Effectiveness

During the implementation of this project, the following factors severely affected the expression of the project effects.

(1) Significant modifications to the implementation system after the start of the project

From September 2008, after the start of the project, to June 2009, administrative reform named Business Process Re-Engineering (hereinafter referred to as "BPR")[21] was implemented on all public organizations in Ethiopia. The plan had to be revised many times, since the pressure of business to the C/P, large-scale turnovers, etc. due to the BPR after September 2008 greatly affected the implementation of this project[22]. A situation occurred where the head of the WRB was changed, the main department in charge of this project in the WRB was abolished, and the C/P became absent except for one person[23]. These affected the expression of the project effects.

(2) Framework of the project planning

Although the target areas have been narrowed down to 6 woredas in 6 zones, the statement "in SNNPRS" in the Project Purpose and the Overall Goal was not changed and only the Indicator to the Project Purpose was revised as targeted to these 6 woredas. At the discussion in the Mid-term Review in December 2009, it was a precondition that the Project Purpose and the Overall Goal would not be changed[24]. Although this precondition was not satisfied when the target areas were narrowed down to 6 woredas in 6 zones, the Indicator to the Project Purpose and the actual areas of the activities were narrowed without changing the Project Purpose or the Overall Goal. This caused an estrangement between the Project Purpose and its Indicator and an illogical gap between the Outputs and the Project Purpose[25]. As a result, the activities and outputs necessary for achieving the Overall Goal were not involved in the framework of the project planning as described in 3.1.4.

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[20] Sub-rating for Effectiveness is to be put with consideration of Impact.

[21] The Business Process Re-Engineering (BPR) was implemented from September 2008, after the start of the project, to June 2009 in all Ethiopia, as one of the greatest governmental projects. Along with this, the department in charge of this project in the WRB was abolished, the C/P became absent except for one person due to large-scale turnovers, and many of the personnel members of zones and woredas who had been involved in this project were convened to the regional government (Source: Joint Mid-term Review Report (in Japanese), p. 3-3 and documents provided by JICA).

[22] Source: Joint Mid-term Review Report (in Japanese), p. 4-2

[23] Source: documents provided by JICA

[24] Source: Joint Mid-term Review Report (in Japanese), p. 7-1

[25] All the statements of the three Outputs described on the PDM after December 2009 say "in the 6 target woredas". If the statement "in SNNPRS" in the Project Purpose is interpreted as in all the region, the achievement of the Outputs in the 6 target woredas would cause the achievement of the Project Purpose in all SNNPRS. It should be said that there is an illogical gap between the Outputs and the Project Purpose in such a situation.

3.2.1.1 Project Output

This project aimed to strengthen the development and maintenance capacities of water supply facilities. It formulated "Rural Water Supply Scheme Development / O&M Plan" (Output 1) and prepared the circumstances necessary for the activities on sites[26]. Then Output 1 was achieved. Under these circumstances, the project focused on two goals, to establish a system for the dissemination of rope pumps (Output 2) and to improve the system of operation and maintenance of water supply facilities (Output 3). As the activities on Output 2, personnel members of WWMEOs installed 60 household rope pumps, which had been supplied to the WRB in a preceding technical cooperation project[27] but had not been installed, as part of their on-the-job training (OJT). The project monitored them and developed a model for disseminating rope pumps[28]. As a result, a system for the dissemination of rope pumps was established, and then Output 2 was achieved. As for the activities on Output 3, the project formulated a manual on the maintenance of rope pumps, performed trainings for the maintenance of rope pumps, established spare parts supply chains, and prepared a system for maintenance involving inhabitants. However, it was delayed in distributing the guidelines for spare parts supply chains to WWMEOs, and the system for the operation and maintenance of water supply facilities was not improved in some WASHCOs because of the difficulties in the saving of maintenance costs and the storage of spare parts for hand pumps. Then Output 3 was not achieved.

The achievement of each indicator to the Outputs is shown in Table A1 at the end of this document.

3.2.1.2 Achievement of the Project Purpose

(1) Components of the Project Purpose

Although the Project Purpose is "Organizational capacity in implementation, operation and maintenance of water supply system is improved in SNNPRS," this project practically aimed at "the improvement of organizational capacity in implementation, operation and maintenance of water supply systems" not in all SNNPRS but in 6 woredas. From the

[26] In this plan, a GIS database was prepared and the personnel members of the WRB, ZWMEDs and WWMEOs learned how to use it. GIS stands for Geographic Information System.

[27] "The Groundwater Development and Water Supply Training Project – Phase II (Water Technology Center)" (2005 – 2008)

[28] The federal government and the government of SNNPRS declared a policy of disseminating rope pumps to rural areas. The model for disseminating rope pumps is a model that consists of activities such as the implementation of actual installation trainings and follow-up trainings for technicians who have been trained in the Water Technology Center, trainings on the quality management of rope pumps for the personnel members of the regional and zonal governments, etc.

interpretation of the Project Purpose in the Mid-term Review[29], it is understood that the Project Purpose consists of the components listed in Table 1.

Table 1. Components of the Project Purpose

	Component	Remarks
Component 1	Improvement of organizational capacity in implementation of water supply systems in 6 woredas (Angacha, Arba Minch Zuria, Boloso Sore, Hula, Chencha and Silti)	Of the 6 target woredas (Angacha, Arba Minch Zuria, Boloso Sore, Hula, Chencha and Silti), no rope pumps were installed in Loma Woreda in this project but in Chencha Woreda.
Component 2	Ability to purchase spare parts for rope pumps in 6 woredas (Angacha, Arba Minch Zuria, Boloso Sore, Hula, Chencha and Silti)	
Component 3	Establishment of the ability of the target 21 WASHCOs to repair hand pumps (including technical assistance by WWMEOs)	The WASHCOs which are targeted in this project are located in the 6 target woredas (2 in Angacha Woreda, 2 in Arba Minch Zuria Woreda, 5 in Boloso Sore Woreda, 2 in Hula Woreda, 5 in Loma Woreda and 5 in Silti Woreda).
Component 4	Establishment of the ability of the target 21 WASHCOs to bear the cost of operating and maintaining hand pumps	

Components 1 and 2 are related to rope pumps, while Components 3 and 4 are related to hand pumps. Component 1 corresponds to "Organizational capacity in the implementation of water supply systems" and the other three correspond to "organizational capacity in the operation and maintenance of water supply systems" in the Project Purpose[30].

(2) About the Indicator to the Project Purpose

In PDM4, which is the final version of the PDM, the Indicator to the Project Purpose is stated as "OJT target Woredas achieve the objective of rate of access running rate (utilization) of rural water supply system by December 2011." However, the evaluator believes that this Indicator is not sufficient for directly measuring the strengthening of the above-mentioned capacity of "implementation" since the rope pumps dealt with in this project were installed under the instruction of project experts and the hand pumps were installed by the Japanese side in the framework of the preceding grant aid, and not sufficient for directly measuring that of "operation and maintenance" since the increase in access running rate is only a result of the strengthening of organizational capacities. Consequently, from the viewpoint of "the increase in capacity," two indicators are assumed in addition to

[29] It was proposed to revise the plan of the project, having divided the Project Purpose into two sub-purposes, ① the improvement of organizational capacity in the implementation of water supply systems and ② the improvement of organizational capacity in the operation and maintenance of water supply systems (Source: Joint Mid-term Review Report (in Japanese), p. 7-1).

[30] This project did not deal with the improvement of the organizational capacity in the implementation of public hand pumps.

the Indicator in PDM4 and the achievement of Output 3 is used as an indicator to the Project Purpose[31]. These are listed in Table 2.

Table 2. Indicators for the Project Purpose in the Ex-post Evaluation[32]

	Indicator	Reasons
Additional Indicator A1	The number of WWMEOs that can install rope pumps with just their own personnel in the 6 target woredas (target: 4 WWMEOs or more[33]).	The indicator to measure the capacity to develop rope pumps is included in the water supply system.
Additional Indicator A2	The rate of the beneficiaries in the 6 target woredas who answered that they can easily purchase spare parts from the spare parts supply chain established in the project (target: 60%[34]).	The capacity to operate and maintain both rope pumps and hand pumps included in the water supply systems.
Output 3	Operation and Maintenance of Water Schemes are improved in 6 Target Woredas.	Hint for judging the capacity itself to operate and maintain hand pumps.
Indicator in PDM4	OJT target Woredas achieve the objective of rate of access Running rate (utilization) of rural water supply systems by December 2011.	Collateral evidence supporting the above 3 indicators.

[31] It is thought that for hand pumps, this project aimed only to increase the capacity of operation and maintenance, not implementation. Therefore, "the implementation of organizational capacity in the operation and maintenance of water supply systems" is focused. This is judged directly by the achievement of Output 3.

[32] Additional Indicators A1 and A2 are assumed and the achievement of Output 3 is added because the capacities in installation and technical support by WWMEOs and the capacities in operation and maintenance by WASHCOs are focused, since household rope pumps and public hand pumps are operated and maintained respectively by the beneficiaries and WASHCOs that represent the beneficiaries under their own costs and responsibilities, while WWMEOs are to install and technically support the beneficiaries. Additional Indicator A1 mainly measures the capacities in the implementation of rope pumps, while Additional Indicator A2 measures the capacities in operation and maintenance of water supply system (the ability to purchase spare parts for rope pumps and WASHCOs' ability to repair and bear the cost including the support provided by WWMEOs).

[33] The majority of the 6 woredas is assumed to be the goal of the achievement, since this project practically aimed at "the improvement of organizational capacity in the implementation, operation and maintenance of water supply systems" in 6 woredas, as described in 3.2.1.2(1).

[34] It is assumed to be the goal of the achievement that 60% of the beneficiaries can easily purchase spare parts, considering that this indicator reflects answers from randomly selected samples.

(3) Achievement of the Project Purpose

The achievement of the Project Purpose is shown in Table 3.

Table 3. Achievement of the Project Purpose

Project Purpose	Indicator[35]	Actual
Organizational capacity in implementation, operation and maintenance of water supply system is improved in SNNPRS.	[Indicator in PDM4] OJT target Woredas achieve the objective of rate of access Running rate (utilization) of rural water supply system by December 2011.	The Indicator in PDM4 was not fully achieved at the completion of the project. The running rates in October 2011 were 81% in Angacha Woreda (target: 88%), 87% in Arba Minch Zuria (target: 87%), 77% in Boloso Sore Woreda (target: 82%), 80% in Hula Woreda (target: 85%), 91% in Loma Woreda (target: 92%) and 87% in Silti Woreda (target: 88%) and 96% for the rope pumps installed in the project (target: 80%).
	[Additional Indicator A1] The number of WWMEOs that can install rope pumps with just their own personnel in the 6 target woredas (target: 4 WWMEOs or more).	Additional Indicator A1 was achieved at the completion of the project. At the completion of the project, 4 WWMEOs (Angacha, Arba Minch Zuria, Boloso Sore and Chencha) could install rope pumps with their own personnel acting alone. This capacity is unknown for Hula and Silti WWMEOs.
	[Additional Indicator A2] The rate of the beneficiaries in the 6 target woredas who answered that they can easily purchase spare parts from the spare parts supply chain established in the project (target: 60%).	Additional Indicator A2 was not achieved at the completion of the project. At the completion of the project, this indicator was achieved in 3 woredas (Angacha, Arba Minch Zuria and Hula) and not achieved in 3 woredas (Boloso Sore, Chencha and Silti). It is judged that this indicator was not achieved throughout the 6 woredas[36].
	[Output 3] Operation and Maintenance of Water Schemes are improved in 6 Target Woredas.	Output 3 was not achieved at the completion of the project (see Table A1).

(Source: documents provided by JICA and the results of site surveys)

It should be noted that for items at the completion of the project that cannot be directly checked, the evaluator estimated the situation at that time from the situation at the time of the ex-post evaluation clarified by site visits and interviews with beneficiaries, by taking

[35] It is desirable that all the Indicators to the Project Purpose would be achieved by 100% for the achievement of the Overall Goal after that of the Project Purpose. However, the evaluator assumed 60% i.e. the majority, as criteria of achievement.

[36] These actual results are summarized from the following interviews.

- Direct interviews by the evaluator to 29 households that have rope pumps installed (11 households in Angacha Woreda, 9 in Arba Minch Zuria Woreda and 9 in Boloso Sore Woreda) – 29 answers
- Direct interviews by the evaluator to 4 WWMEOs (Angacha, Arba Minch Zuria, Boloso Sore and Silti) – 4 answers
- Interviews by local assistants to 31 households that have rope pumps installed (5 households in Chencha Woreda, 14 in Hula Woreda and 12 in Silti Woreda) – 31 answers
- Interviews by local assistants to 2 WWMEOs (Chencha and Hula) – 2 answers

There were no interviewees who gave different answers on the easiness of purchasing spare parts in the same woreda.

into account additional information obtained from interviews with the WRB, ZWMEDs and WWMEOs.

The Indicator to the Project Purpose in PDM4 was not fully achieved. In October 2011, just before the completion of the project, the access running rate of the rural water supply system was achieved in Arba Minch Zuria Woreda and for rope pumps which were installed during the project, but it did just miss the target in 3 woredas (Hula, Loma and Silti) and was over 5 points below each target in 2 woredas (Angacha and Boloso Sore). From the above, this indicator is judged not to be fully achieved.

Additional Indicator A1 was achieved. Although the situation at the completion of this project is not clear, it was confirmed through the field survey in the ex-post evaluation that the 2 WWMEOs of Arba Minch Zuria and Chencha can install rope pumps with their personnel alone while the 4 WWMEOs of Angacha, Boloso Sore, Hula and Silti cannot. It is estimated that the former two, Arba Minch Zuria and Chencha had already obtained their capacities by the completion of the project, since no intervention has been made in the personnel of the two WWMEOs from outside for further strengthening. On the other hand, it was confirmed in the field survey of this ex-post evaluation that among the 4 WWMEOs that answered in the negative, there used to be one person who could install pumps at the completion of the project, who then went away, in each Angacha and Boloso Sore. Thus it is estimated that Indicator A1 was achieved at the completion of the project in these two woredas[37]. The situation is unknown in Hula and Silti Woredas.

Additional Indicator A2 was not achieved. Since it was impossible to know the situation at the completion of the project due to the lack of survey on the beneficiaries, it was estimated from the answers by inhabitants[38] at the time of the ex-post evaluation. It can be said that this indicator was achieved at the completion of the project in Angacha and Hula Woredas: according to documents provided by JICA, there existed inventories of spare parts in spare parts outlets in Durame Town, Kembata Tembaro Zone and Aleta Wendo Town, Sidama Zone (Angacha and Hula Woredas are inside Kembata Tembaro and Sidama Zones respectively)[39]. In addition, the results of interviews with beneficiaries living in Arba Minch Zuria Woreda show that spare parts had been already available for purchase in Arba Minch Town inside the woreda before the completion of the project. In Boloso Sore, Chencha and

[37] According to the interviews with the two WWMEOs, personnel left due to retirement (Angacha Woreda) and turnover (Boloso Sore Woreda) and those vacancies were not filled afterward.
[38] See Footnote 36.
[39] Durame Town is located 29km from the central part of Angacha Woreda, and Aleta Wendo Town is located 30km from the central part of Hula Woreda. In these 2 woredas, spare parts could be purchased at the completion of the project. It should be noted, however, that these are judged from the viewpoint of the implementation side. Since it is very difficult for inhabitants in these woredas to go to spare parts outlets within a day, they are forced to ask other inhabitants who have the means of transportation to purchase spare parts.

Silti Woredas, there was no spare parts outlet opened at the completion even though there were plans to invite outlets. The above situation is summarized as follows.

- There was a spare parts outlet in the same woreda: 1 woreda (Arba Minch Zuria)
- There was a spare parts outlet within a day trip: 2 woredas (Angacha and Hula)
- There were no spare parts outlets even though there were plans to invite them: 3 woredas (Boloso Sore, Chencha and Silti)

Thus, spare parts can be easily purchased in 3 woredas of the 6 (50%), below 4.

From the above, Additional Indicator A1 was achieved, while Additional Indicator A2 was not achieved and the indicator to the Project Purpose in PDM4 was not fully achieved except in some part. Output 3 was not achieved as described beforehand. Generally judging from the above, the project did not achieve its purpose.

3.2.2 Impact

3.2.2.1 Achievement of the Overall Goal

(1) Definitions of terms of the Overall Goal

The Overall Goal continues to be "Sustainability on water supply system is improved in SNNPRS." from the initial planning to the completion. It is focused on "sustainability" while the Project Purpose aims at "organizational capacity in implementation, operation and maintenance." The Overall Goal is supposed to be achieved by both the achievement of the Project Purpose and other factors. In the case of this project, while the achievement of the Project Purpose reflects, as it is, the state at the moment of the completion of the project, the achievement of the Overall Goal does not mean the state at a certain moment but a continuous state after the completion of the project. Then this "sustainability" should be defined as "the ability to continue the implementation, operation and maintenance of water supply systems by the self-help of the Ethiopian side."

(2) About the interpretation of the target area of the Overall Goal

In PDM4, which is the final version of the PDM, the Indicator to the Overall Goal is stated as "Scale up activities to strengthen WASHCO, disseminate Rope Pumps and implement preventive O&M are being conducted in the 6 targeted zones and woredas." However, in this ex-post evaluation, the evaluator believes that the target area of the Overall Goal is not the 6 target woredas but all SNNPRS. This is because it is clear that the project aimed to disseminate rope pumps to all SNNPRS, since the Joint Terminal Evaluation often referred to the dissemination of rope pumps to SNNPRS and other regions[40], and the then head of the WRB declared in the 6th JCC held in November 28, 2011 that "All the components of the

[40] e. g. Joint Terminal Evaluation Report (in Japanese), pp. 3-4 - 3-6, pp. 4-3 - 4-4, p. 7-2, etc.

project activities should be distributed to the woredas in the region. The WRB will promote the dissemination activities all over the region."[41]

From the above discussion, it is thought that the achievement of the Project Purpose would contribute to the achievement of the Overall Goal if the project effects (the strengthening of implementation, operation and maintenance of water supply systems) had been disseminated to other areas in the region together with sustainability.

(3) About the Indicator to the Overall Goal

It is thought that the Indicator to the Overall Goal in PDM4 "Scale up activities to strengthen WASHCO, disseminate Rope Pumps and implement preventive O&M are being conducted in the 6 targeted zones and woredas" is activities or conditions for achieving the Overall Goal, rather than an indicator, and does not directly measure the "Sustainability" in the Overall Goal. In the case of this project, the sustainability is thought to greatly depend on whether the techniques necessary for maintaining water supply facilities are kept and spare parts can be continuously and easily purchased. Thus, in this ex-post evaluation, the following indicators are assumed in addition to the Indicator in PDM4:

- Additional Indicator ①: The users themselves, personnel of WWMEOs that have jurisdiction or other related persons learn techniques for repairing household rope pumps.
- Additional Indicator ②: A supply chain of spare parts for hand pumps is built.

as conditions for maintaining water supply systems, and,

- Additional Indicator ③: A functionality rate of water supply facilities in the woredas

as a condition reflecting the sustainability of water supply systems.

(4) Achievement of the Overall Goal

The achievement of the Overall Goal is shown in Table 4.

[41] Source: documents provided by JICA

Table 4. Achievement of the Overall Goal

Overall Goal	Indicator	Actual
Sustainability on water supply system is improved in SNNPRS.	[Indicator in PDM4] Scale up activities to strengthen WASHCO, disseminate Rope Pumps and implement preventive O&M are being conducted in the 6 targeted zones and woredas	According to the WWMEOs that have jurisdiction over the target 21 WASHCOs, the activities are not implemented in 3 woredas (Angacha, Boloso Sore and Silti) and unknown in 3 woredas (Loma, Arba Minch Zuria and Hula) out of the 6 target woredas.
	[Additional Indicator ①] The users themselves, personnel of WWMEOs having jurisdiction or other related persons learn the techniques for repairing household rope pumps.	According to the results of interviews with users and each WWMEO, this is achieved in 2 woredas (Loma and Angacha), almost achieved in 1 woreda (Silti), partly achieved in 1 woreda (Arba Minch Zuria) and not achieved in 1 woreda (Boloso Sore) and unknown in 1 woreda (Hula).
	[Additional Indicator ②] A supply chain of spare parts for hand pumps is built.	According to the results of interviews with users and each WWMEO, this is achieved in 1 woreda (Loma), partly achieved in 1 woreda (Arba Minch Zuria) and not achieved in 3 woredas (Silti, Angacha and Boloso Sore) and unknown in 1 woreda (Hula).
	[Additional Indicator ③] Functionality rate of water supply facilities in the woredas	According to each WWMEO, the functionality rate in September 2014 was unknown in Angacha Woreda (the goal in the Indicator to the Project Purpose: 88%), 100% in Arba Minch Zuria Woreda (goal: 87%), 84% in Boloso Sore Woreda (goal: 82%), 84% in Hula Woreda (goal: 85%), 28.8% in Loma Woreda (goal: 92%) and 61% in Silti Woreda (goal: 88%).

The achievement of each Indicator is summarized in Table 5.

Table 5. Achievement of each indicator for the Overall Goal

Woreda	Indicator in PDM4	Additional Indicator ①	Additional Indicator ②	Additional Indicator ③
Angacha	Not implemented	Achieved [1)]	Not achieved [2)]	Unknown
Arba Minch Zuria	Unknown	Partly achieved	Partly achieved [3)]	Achieved
Boloso Sore	Not implemented	Not achieved	Not achieved	Achieved
Hula	Unknown	Unknown	Unknown	Almost achieved
Loma	Unknown	Achieved	Achieved	Not achieved
Silti	Not implemented	Almost achieved	Not achieved [4)]	Not achieved

1) Trainings were effectively implemented for WASHCOs.

2) There is no spare parts outlet in the woreda and the users have to take a bus on a regular route to Hawassa, the capital of the region, which is situated 100km from there*.

3) Both Additional Indicators ① and ② are achieved in some kebeles and not achieved in others (there is only one spare parts outlet inside the woreda and the users in some kebeles have to walk or take donkey carts for 40km each way).

4) A spare parts outlet had opened once, but it withdrew because of the duty to issue receipts for the strengthened collection of value-added tax. Currently the users have to take a bus on a regular route to a town named Hossaina which is situated 30km from there*.

* Both in Silti and Angacha Woredas, the pumps may continue not to be working for some time since spare parts are purchased after the pumps break down.

From the above, among the 6 target woredas, none of the woredas achieved all 4 indicators, i.e. the Indicator in PDM4 and Additional Indicators ①, ② and ③. Even for the two indicators that directly measure the achievement of the Overall Goal, i.e. Additional Indicators ① and ②, these were achieved in Loma Woreda, partly achieved in Arba Minch Zuria Woreda and both or one of these were not achieved in the other 4 woredas (Angacha, Boloso Sore, Hula and Silti).

In addition, there is no sign on the dissemination of the project effects expressed in the 6 target woredas to other areas. Although the regional government has shown its intention to disseminate the project effects to other woredas, the plan has not been concretized because it is difficult to continuously develop personnel due to limitations of budget and human resources (turnover etc.). There are many limitations due to natural conditions as well[42]. Therefore, it should be said that both the two factors, the dissemination to other areas and the sustainability, have not materialized and do not even seem to have materialized, which contributes to the achievement of the Overall Goal after the achievement of the Project Purpose as described in "(2) About the interpretation of the target area of the Overall Goal."

(5) Functionality status of household rope pumps installed in this project

Since it is only natural that the "water supply system" in the Overall Goal includes the 60 rope pumps installed in this project, whether they maintain their functionality is collateral evidence supporting the "Sustainability" of the Overall Goal. On the other hand, the regional government regards the dissemination of rope pumps as one of the most important means to improve access to safe water. Their functionality status is useful information for the regional government to promote its policy of disseminating rope pumps, since the installation of rope pumps in this project is thought to be a preceding case for the policy.

The functionality status is shown in Table 6. Only 27 pumps (45%) of the 60 are still functioning, while 33 pumps (55%) are not. This is much worse than 96%, the functionality rate at the completion of the project (see Table 3). According to interviews with users, the main reason for their non-functionality is difficulties in purchasing spare parts, and no parts have been replaced in many of the functioning pumps.

[42] The WRB points out as natural conditions making the dissemination of the effects difficult that the groundwater is polluted with fluorine, iron and manganese, etc., and many villages become difficult to be accessed in rainy seasons due to road conditions.

Table 6. Functionality status of household rope pumps installed in the project

Woreda	No. of pumps installed	No. of pumps in operation	Operating rate
Arba Minch Zuria	9	7	78%
Angacha	11	6	55%
Boloso Sore	9	1	11%
Chencha	5	4	80%
Hula	14	5	36%
Silti	12	4	33%
Total	60	27	45%

(Source: investigation by the evaluator)

Generally judging from the above, the Overall Goal has not been achieved.

3.2.2.2 Other Impacts

This project did not have any impact on the natural environment, or on resettlement or land acquisition. According to the results of interviews with WRB, it is reported from each woreda to the regional government that the number of cases of water-caused disease decreased in the 6 target woredas, especially in Hula Woreda, and people who defecate or urinate on streets and in public squares disappeared so that sanitation was improved in Gara Godo Kebele, Boloso Sore Woreda. These can be said to be indirect effects of this project. At public hand pump sites in this kebele and Sile Sira Kebele in Arba Minch Zuria Woreda, the upper limit of monthly water quantity, the charge and the order of pumping and water collection were decided in meetings at each WASHCO, so that the order in pumping was established (see Photo. 1). Through the fact that the inhabitants share the common work of pumping at public hand pump sites, local order is established and the connection between the inhabitants is strengthened.

Photo. 1 Scene of water pumping
at a public hand pump site
(Gara Godo Kebele, Boloso Sore Woreda)
(Photo by the evaluator)

In rural areas, where the habit of hand washing was not popular, the habit has been going to be spread. This is thought to be because of the multiplication of two factors: ① it became easier to enlighten inhabitants on hand washing and ② it became possible to use water not only for drinking but also for hand washing due to increased water supply facilities in rural areas represented by the ones installed in this project (knowledge dissemination and the supply of opportunities for implementation).

From the above, the sustainability of organizational capacity in implementation, operation, and maintenance of water supply systems has not been improved enough, and the dissemination to other areas does not seem to have materialized, although some indirect positive impacts can be seen. Thus the expression of the effects of this project is limited compared to its plan. Therefore, the effectiveness and impact of the project are low.

3.3 Efficiency (Rating: ②)

3.3.1 Inputs

The planned and actual Inputs are shown in Table 7. In the original plan, the first 6 months were designated as Stage 1 for investigations such as baseline investigations, etc. and then the detailed plan for the remaining 3 years (Stage 2, including PDM and PO) was to be established depending on the results of those investigations. Hence there is not enough information on the Inputs at the time of the planning. Therefore, it is difficult to compare the plans on the Inputs between the time of the ex-ante and the ex-post, and it cannot be judged if the actual Inputs increased from what was planned.

Table 7. Planned and actual Inputs

Inputs	Plan	Actual
(1) Experts	Dispatched as the need arises in 6 fields (no descriptions on number and MM*)	0 Lond-Term 12 Short-Term[43] (104.26MM)
(2) Trainees received	No descriptions	None
(3) Equipment	Descripted only as "Required equipment will be decided in Stage 1"	1 4WD, 1 copying machine, 6 motorcycles, etc.
(4) Others	No descriptions	109 million yen Domestic training: 182 times, 4,211 trainees in total
Japanese side Total Project Cost	379 million yen in total	467 million yen in total
Ethiopian side Operational Expenses	No descriptions	0 million yen in total

* MM stands for man month.
(Source: documents provided by JICA)

The postponement of the start of this project can be judged to be relevant according to the weather conditions[44] and the preparations made by the Ethiopian side. However, the project

[43] The chief advisor was replaced in the first half of 2010. The total number of experts is 13 if the chief advisor is counted as 2.
[44] Ethiopia has the following seasons: small rainy season from March to May, large rainy season from June to September and dry season from October to February.

period of 3 years and 6 months or 4 years was too short compared to the number of woredas in all SNNPRS, in consideration of the time necessary for the access to the sites. This caused the overhaul of the succeeding activities.

In the original plan, general trainings and OJT were to be implemented for the personnel of 78 woredas in 13 zones in SNNPRS. Due to the results of various investigations performed from the start of the project to June 2008, the target areas were narrowed down to 6 woredas in 6 zones when the PDM was revised in June 2008[45]. Although it is unknown if the original plan considered narrowing the target areas because of the lack of reference materials, it should be said that the original plan was not feasible as a result.

3.3.1.1 Elements of Inputs

In the original plan, experts in 6 fields were considered: Chief Advisor, Training Planning, Water Supply Planning / Management / Civil Engineering, GIS / Remote Sensing / Hydrological Geography, Social Development, Supply of Hand Pump Spare Parts, and additional experts in other fields were to be dispatched if necessary. The experts who were actually dispatched were for 12 subjects: Chief Advisor / Water Supply Planning (Groundwater Development), Deputy Advisor / Water Supply Planning (Facility Improvement), Water Supply Planning (Facility Operation and Maintenance), Water Supply Planning (Electrical / Mechanical), Water Supply Planning (Rope Pump / HDW[46]), Water Supply Planning (Rope Pump), Social Economy, Social Development / Rural Sanitation and Hygiene (1)(2), GIS / Information Management, and Project Coordination / Training Management. The total actual Inputs were 3,073 man-days (including 142 man-days that were at their own expense) for the field activities and 55 man-days for the activities in Japan.

The project judged that it was necessary to introduce GIS for access to the sites selected as targets, since all of them are in rural areas with insufficient maps. Then the project added the introduction of GIS and the dispatch of experts for it. In addition, since some of the sites are situated on steep slopes and there are roads that become impassable in rainy seasons as shown in Photo. 2, off-road type motorcycles as shown in Photo. 3 as well as 4WD vehicles were required. Such motorcycles were added to the equipment list of the project and supplied in 2011 together with maintenance tools.

[45] According to the interviews with the assistant project manager of the WRB, the reason the target areas were narrowed down was problems of cost and access.
[46] HDW stands for hand-dug wells.

Photo. 2. A bad road over which it is difficult to travel with 4WD vehicles (Boloso Sore Woreda, Wolayita Zone)
(Photo by the evaluator)

Photo. 3. An example of an off-road type motorcycle[47] (Suzuki TS185 owned by Wolayita ZWMED)
(Photo by the evaluator)

3.3.1.2 Project Cost

According to documents provided by JICA, the planned project cost was 379 million yen, while the actual was 467 million yen, which was higher than planned (123%). It cannot be judged whether the project cost exceeded the plan in consideration of the expression of its effects, since the evidence to calculate the planned project cost is not described in the references.

3.3.1.3 Period of Cooperation

The start of this project was initially planned as April 2007, but was postponed until December 2007. The Summary of Ex-ante Evaluation Results says that the planned period of cooperation was 3 years and 6 months, while the actual period was 4 years, which was longer than planned (114%). Due to these factors, the completion of this project was delayed by more than a year until December 2011 from the planned date of September 2010. However, it cannot be judged whether the project period exceeded the plan in consideration of the expression of its effects, since the evidence to calculate the planned project period is not described in the references.

From above, both the project cost and project period exceeded the plan. Therefore, the efficiency of the project is fair.

3.4 Sustainability (Rating: ①)

3.4.1 Related Policy and Institutional Aspects for the Sustainability of Project Effects

The expected effects of this project were the improvement of organizational capacity in implementation, operation and maintenance of water supply systems. The policies of the government of Ethiopia are in agreement with these.

[47] The motorcycle in Photo. 3 was not supplied in this project, but is shown here as an example.

The UAP still continues to be a national policy, where the access to safe water is designated as one of the most important issues. The regional government regards the dissemination of rope pumps as one of the most important means to tackle the issue. According to Sidama ZWMED and some WWMEOs, although the regional government orders woredas through zones to promote the dissemination of rope pumps[48], the zones and the woredas are fully responsible for concretizing the dissemination methods. It cannot be said that the support by the regional government is enough for zones and woredas to sustain the effects by this project[49].

From the above, the policies of Ethiopia are in agreement with the direction of this project, while the institutional aspects necessary to implement them in water supply systems contain problems. Thus the related policy and institutional aspects for the sustainability of the project effects are fair.

3.4.2 Organizational Aspects of the Implementing Agency for the Sustainability of Project Effects

It is public entities at each administrative level i.e. the WRB, ZWMEDs and WWMEOs that are in charge of "organizational capacity in implementation, operation and maintenance of water supply systems." The roles of each administrative level on water supply systems are as follows.

- Regional government (WRB): collects data such as the functionality rate of existing water supply facilities and the access rate, and plays a role in disseminating rope pumps as its policy. It also declares the orders of data collection and the dissemination of rope pumps to woredas through zones[50].
- Zone (ZWMED): transfers the orders from the regional government to woredas under its jurisdiction, and collects reports from woredas on the functionality rate of water supply facilities, the access rate, and activities on the dissemination of rope pumps and summarizes them to transfer to the region. The zones also support woredas in the

[48] The regional government ordered all 135 woredas in 13 zones and 5 special woredas (woredas that do not belong to zones) to install 10,000 rope pumps by the end of FY 2006 in the Ethiopian calendar (July 7, 2015 in the European calendar) and 28,802 pumps in FY 2007 in the Ethiopian calendar (from July 8, 2015 to July 7, 2016 in the European calendar). In the former, the number of installations is allocated to each woreda and special woreda corresponding to the water supply rate as of 2005 in the Ethiopian calendar (2012 in the European calendar). In the latter, the goals of the allocated numbers are calculated under the assumption that 20% of the planned rope pump water supply population is targeted in that FY and one rope pump will be installed for each 50 persons. Since the planned rope pump water supply population in the region is 7,200,539, the goal of the total number in all SNNPRS is 7,200,539 × (20/100) ÷ 50 = 28,802 (Source: documents provided by WRB).

[49] Wolayita ZWMED, which is ordered to promote the dissemination, expressed an opinion: "It is good indeed to advertise rope pumps as tools with simple technologies and low costs. But we do not want the WRB to automatically assume the goal is the number of installations without considering local conditions such as seasonal variation of groundwater levels and water pollution.

[50] Source: results of interviews to the deputy head of the WRB and the head of Sidama ZWMED

operation and maintenance of water supply facilities technically. They do not support woredas financially[51].

- Woreda (WWMEO): receives the orders from the region through zones, investigates and reports the functionality rate of water supply facilities existing inside it and access rate, etc. The woredas disseminate rope pumps within their borders. They also accept consultations from inhabitants for technical assistance with maintaining water supply facilities[52].

Cooperation between these organizations is necessary for the sustainability of the effects of the project. However, this cooperation is prevented by the lack of participation in regular meetings and field surveys after project completion by the "Office of Development Plan Preparation, Monitoring, Evaluation and Feedback Supportive Process" of the WRB personnel.

The shortage of manpower in these organizations, especially WWMEOs, is serious. After the implementation of BPR in September 2008, the number of personnel in ZWMEDs and WWMEOs who have technical skills in the operation and maintenance of water supply facilities actually decreased rather than increased. Personnel who have technical skills in operation and maintenance retired from Boloso Sore WWMEO for reasons of turnover and from Angacha Woreda for reasons of starting higher education. The posts in these two WWMEOs were not filled, resulting in a lack of personnel. Each WWMEO does not have enough manpower to visit all water supply facilities with sufficient frequency, some of which require a long time to visit: some woredas have sites that are located 30 – 40km from their WWMEOs and there is no means of access except moving slowly by off-road type motorcycles as shown in the above-mentioned Photo. 3 or donkey carts as shown in Photo. 4. ZWMEDs, which are to technically support WWMEOs under their jurisdiction, do not sufficiently support WWMEOs since the zonal side does not have enough manpower either.

It is generally judged that the technical transfers are limited, since transfers of the activities of this project are sometimes insufficient during turnovers of executive members of the WRB, ZWMEDs and WWMEOs after the terminal evaluation.

In addition, there was a case of mutual distrust due to the lack of technical know-how in Boloso Sore WWMEO[53] (see Photo. 5).

[51] Source: results of interviews to the head of Gamo Gofa ZWMED
[52] Source: results of interviews to each WWMEO
[53] The installed rope pump became nonfunctional because the rope was cut 5 months after the installation. The user consulted the WWMEO but it could not keep up with it due to a lack of technical know-how. The user felt unsatisfied and refused the payment of his revolving fund. Then the WWMEO removed a part of the pump as shown in Photo. 5 to make it unusable because of an installation agreement violation.

Photo. 4. A donkey cart loaded with a generator traveling over a bad road (Boloso Sore Woreda, Wolayita Zone)
(Photo by the evaluator)

Photo. 5. The wheel of a rope pump that is not working because it has had its bolt removed (Boloso Sore Woreda, Wolayita Zone)
(Photo by the evaluator)

Since the regional government constructed public simple water supply systems[54] in some parts of Lante Kebele, Arba Minch Zuria Woreda, the rope pumps installed in this project became less significant. In other woredas, the operation and maintenance of the rope pumps installed in this project are generally insufficient. It can be easily estimated that the functioning rope pumps will be nonfunctioning within several years if the operation and maintenance are not sufficient. This is because WWMEOs that have jurisdiction do not have sufficient manpower for the operation and maintenance and because the spare parts supply chain disappeared.

Before the start of this project, the WRB and WWMEOs supplied spare parts for hand pumps to users free of charge. This project invited spare parts outlets to each woreda in order to build spare parts supply chains for existing hand pumps and newly installed rope pumps, and lobbied to stop these free supplies for the WRB, WWMEOs, other donors and NGOs etc. in order to promote their use and to promote the independence of the WASHCOs to be able to maintain their pumps by themselves. Many WASHCOs are thought to have become independent. On the other hand, some spare parts outlets withdrew their business after the completion of this project for reasons of profit and the difficulty in acquiring wholesale spare parts[55]. The inhabitants of woredas where spare parts outlets withdrew must travel a long distance to purchase spare parts. Since most of the inhabitants who use water supply facilities targeted in this project make a living by agriculture or stock farming, they do not have sufficient time to purchase spare parts. There are also many inhabitants who do not have their own cars. Such people have limited transportation options, including public buses,

[54] This type of simple system uses gravity to supply water to each household through water pipes from a large tank constructed on a tower at the center of the community. The tap water is supplied from other areas by tank trucks.

[55] Among spare parts, a part called a piston (see Figures A1 and A2 and Photo. A1 at the end of this document) is difficult to purchase domestically in Ethiopia, partly because such a part has no use except for rope pumps (Source: results of interviews to Boloso Sore WWMEO and beneficiaries living in Boloso Sore Woreda).

walking, and donkey carts. According to Angacha WWMEO, a plan was submitted that representative inhabitants would go to purchase parts, which disappeared due to the lack of the candidates for the representatives. The ease of purchasing spare parts for hand pumps and rope pumps at the time of the ex-post evaluation is shown in Table 8.

Table 8. Ease of purchasing spare parts for hand pumps and rope pumps

Woreda	Easiness	Situation
Angacha	Not easy	The users have to take a bus on a regular route to the nearest spare parts outlet, which is situated 100km from there.
Arba Minch Zuria	Partly not easy	There is one spare parts outlet inside the woreda, which is situated about 40km from some of the kebeles.
Boloso Sore	Not easy	Spare parts can be purchased at a shop in Wolayita Zone to which the woreda belongs, although there is no spare parts outlet inside the woreda. However, it is not easy. The users do not know where they can purchase some kinds of parts.
Chencha	Unknown	Unknown
Hula	Not easy	It is not easy to purchase spare parts. The zone sometimes purchases them and assists the users financially, instead of the woreda.
Loma	Unknown	Unknown
Silti	Not easy	After the spare parts dealer that used to be located in the woreda withdrew, the nearest shop was located in a town named Hossaina, about 30km from there. Sometimes they cannot purchase spare parts even at that shop.

(Source: results of interviews to each WWMEO)

In all woredas that answered the interview questions, it was not easy to purchase spare parts, and the price of parts is rising. It can be said that it is difficult for the inhabitants to purchase spare parts by themselves.

From the above, problems remain unsolved in the cooperation between organizations at each administrative level, the manpower, and the spare parts supply chains. Thus the organizational aspects for the sustainability of the project effects are low.

3.4.3 Technical Aspects of the Implementing Agency for the Sustainability of Project Effects

For the operation and maintenance of existing hand pumps and rope pumps that will be installed, the manuals in English and Amharic prepared in this project are distributed to related entities. However, although the activities of this project are transferred from the preceding executive members to their successors at each administrative level of the region, zones and woredas, the transfers are sometimes sufficient and sometimes insufficient. It cannot be said that the technical transfer is sufficiently done among general personnel of WWMEOs who actually implement technical support to inhabitants: when personnel of WWMEOs who acquired the technical skill to some level move to other posts or retire, no

successors would fill their positions or no applicants would apply for the job[56]. For these reasons, there are cases where personnel members of WWMEOs cannot install a rope pump by themselves or they cannot sufficiently implement technical support to the users who maintain rope pumps and hand pumps.

Some cases were seen where inhabitants did not trust the technical skills of the WWMEOs[57]: some of the users of the household rope pumps joined technical workshops on repairing rope pumps held by NGOs, some requested repairs on their rope pumps from NGOs or private companies. Information as shown in Table 9 was obtained on the technical skills of WWMEO personnel on rope pumps and hand pumps.

[56] The followings are the reasons no applicants would apply (Source: results of interviews to Angacha WWMEO).

- Job invitations are limited to bulletin papers in woreda offices and advertisement in newspapers, which are not noticeable for many people.
- The salaries of local public workers are low (actually some of them have other sources of income to make a living).
- There are few people who understand Amharic, the official language, in rural areas in SNNPRS. People who do not understand the language do not apply for the job since it is quite clear that such people will not be employed as local public workers.

[57] WWMEOs have direct jurisdiction over the water supply facilities installed in this project. ZWMEDs receive reports from WWMEOs and sometimes support them technically, but they do not deal directly with inhabitants.

Table 9. Technical skills of WWMEO personnel members

Woreda	On rope pumps	On hand pumps
Angacha	A PVC pipe, a part of a rope pump installed in this project was broken. The user consulted the WWMEO but it refused to keep up with it for reasons that this project was completed and there is no stock of PVC pipes.	The WWMEO takes no technical action against the disorder of pumps and implements no technical support for inhabitants.
Arba Minch Zuria	The WWMEO's technicians have skills for repairing pumps*.	The WWMEO's technicians give advices for repairing pumps*.
Boloso Sore	One of the household rope pumps became nonfunctioning. A technician of the WWMEO's who received communication from the user tried to repair it but could not. One of the household rope pumps (other than the above) became nonfunctioning. The WWMEO received communication from the user, but could not keep up with it due to a lack of technical know-how.	The WWMEO takes no technical action against the disorder of pumps and implements no technical support for inhabitants.
Chencha	WWMEO's technicians have general skills for repairing rope pumps.	(Not targeted)
Hula	The WWMEO takes no technical action against the disorder of pumps and implements no technical support for inhabitants.	The WWMEO takes no technical action against the disorder of pumps and implements no technical support for inhabitants.
Loma	(Not targeted)	Unknown
Silti	The WWMEO's technicians do not know how to purchase pump parts.	Regarding pumps for deep wells, the WWMEO's technicians have skills for repairing, but currently they are not able to repair because both the WASHCOs and the WWMEO do not have a tool (a tripod) that is necessary for repairing. A tripod is so expensive that it cannot be purchased with just the WWMEO's budget. Regarding pumps for shallow wells, pumps are repaired by the WASHCOs themselves. The WWMEO's technicians advise them if necessary.

* The WWMEO can receive technical support from Gamo Gofa ZWMED if it cannot keep up with the disorder of hand pumps (note: this technical support is available because the ZWMED is located near the WWMEO).
(Source: results of interviews to the users)

The manual and guidelines for spare parts supply chains are only prepared in Loma Woreda among the 6 target woredas. Many repair techniques depend on very simple manuals. On the other hand, GIS inventories that are important for the operation and maintenance plan were revised, but there was no confirmed example of a clear strategy having been established for revising them.

From the above, there are some cases where transfers at turnovers or technical transfers are not sufficient, and technical skills of some WWMEOs have problems. Thus the technical aspects for the sustainability of the project effects are fair.

3.4.4 Financial Aspects of the Implementing Agency for the Sustainability of Project Effects

As described in 3.4.1, the government of SNNPRS orders woredas to promote the dissemination of rope pumps and allocates the budgets for that purpose corresponding to the goal of the numbers of installation in each woreda. Hence it is thought that there is no financial prevention for installing rope pumps in the region.

The users of household rope pumps received an explanation about 2,000 Birr of the shares of the expenses and agreed to their payment in revolving funds. However, there were many cases in which payments were stopped. Among the users of all 60 household rope pumps in 6 woredas, those of 29 pumps in 3 woredas were interviewed[58]. 10 of them answered: 2 users pay as promised in the agreements, 7 users do not pay or stopped the payment of the revolving funds (5 users among the 7 became unwilling to pay), and 1 user is unclear if they will continue the payment[59]. As described in 3.2.1.2, household rope pumps are installed by WWMEOs and maintained by users under their cost and responsibilities. On the contrary, it is often difficult to pay 2,000 Birr of the shares of the expenses for many users. They also have to bear the maintenance costs by themselves. It is expected in such a situation that the non-functionality of installed pumps would affect their willingness to pay. It was confirmed in interviews that there are users who became unwilling to pay. Although the number of samples is no more than 10, there were 5 answers among the 10 that they became unwilling

[58] The targets of the interviews were the users of household rope pumps in Angacha Woreda (11 installed and 6 functional), Arba Minch Zuria Woreda (9 and 7) and Boloso Sore Woreda (9 and 1). For the reason not all the users of the 60 pumps were interviewed, see 2.3.

[59] Some of the answers were as follows.

- Functional at the time of the ex-post evaluation (14 pumps, of which 4 answered)
  - I have already paid 500 Birr. I am not sure if I will pay the rest.
  - The fixtures of the rope pump are pretty bad. I fear the pump is broken, and I cannot repair it by myself. I have already paid 300 Birr but I do not want to pay the rest in such a situation.
- Non-functional at the time of the ex-post evaluation (15 pumps, of which 6 answered)
  - I will never pay because the pump is non-functional from the beginning and I am disappointed.
  - I will not pay because I am dissatisfied that the pump was broken after the installation and the WWMEO has taken no action even though I made a request.
  - The pump became non-functional 2 years after the installation. I would like to continue to use it if it can be repaired, but I do not have ability to pay anymore.
  - The pump became non-functional 5 months after the installation. I can never pay for this non-functional pump while I am in poverty.

The reason why the number of answers was only 10 of 29 households was: there were many cases where the interview was done when the person who manages the family budget (e.g. the head of the family) is absent for reasons of agricultural work, grazing, and taking care of the domestic animals, etc.; it took a long time to interview due to multiple interpretation between English – Amharic (Ethiopia's official language) – local languages (Wolayita language etc.) and the interviewees should have returned to their work.

to pay, 50%. Since it is not WWMEOs but users that are responsible for the operation and maintenance of household rope pumps, they are not repaired and the effects do not continue unless the users bear the costs. In addition, there is no way but to request funds for repairing household rope pumps from the regional government[60], since WWMEOs do not ensure sufficient budgets for repairing household rope pumps and they cannot collect repair costs from the users. However, the budget of the regional government is not sufficient at the time of the ex-post evaluation. The evaluator believes that the appearance of users who became unwilling to pay is a great problem that affects the plan of rope pump dissemination by the regional government.

On the other hand, WASHCOs are responsible for the maintenance costs of hand pumps that are managed by WASHCOs. WWMEOs are to support WASHCOs through consultations, etc. Thus, the budgets of WWMEOs do not include the direct costs for the maintenance of water supply facilities managed by WASHCOs but include the costs for purchasing vehicles and fuel that are necessary for supporting WASHCOs. The budgets for these purposes, being granted by the regional government, are not sufficient at the time of the ex-post evaluation, although an increase has been planned. For example, a tripod, which is necessary to repair hand pumps for deep wells, is as expensive as 40,000 Birr and cannot be purchased with just the WASHCO's financial capacity. There was a case where a WASHCO consulted a WWMEO about purchasing a tripod and the cost could not be borne even by that WWMEO's budgets[61].

For public hand pumps, orderly utilization continues through the efforts of WASHCOs that have been strengthened in this project, and the users keep agreeing to the payment of the charge, e.g. 0.50 Birr per 20ℓ. However, the prospects are gloomy, since the prices of spare parts for hand pumps keep rising year by year, and it is difficult to ask the users to raise the charges for the purpose of purchasing more expensive spare parts.

The evaluator questioned 25 inhabitants who benefited from this project about the charges for public hand pumps. The results are shown in Table 10.

- Number of persons surveyed: 25
- Number of sites: 8 sites in 4 woredas (designated in Table 10)
- Occupations of the persons surveyed: 18 farmers and stock farmers, 5 public workers, 1 employee and 1 other
- Sexes: all male

[60] In Ethiopia's local administrative system, zones are not to financially support WWMEOs (Source: results of interviews to Gamo Gofa ZWMED and Kembata Tembaro ZWMED).

[61] Considering such situations, the regional government decided to distribute a tripod to each WWMEO and will implement from 2016 (Source: results of interviews to Silti WWMEO and Asano WASHCO in the woreda). If this is realized, the sustainability of hand pumps for deep wells will greatly increase. On the other hand, it cannot be judged if WASHCOs have enough capacity for repair, since they have not experienced repairing pumps by using tripods except in trainings.

- Ages: all unknown

Table 10. Results of questionnaire survey on the rate for public hand pumps to the beneficiaries

Woreda	Site	No. of answers	Rate*	Feeling for burdens
Arba Minch Zuria	Sile Sira	6	5 Birr/month	Too expensive: 1 Appropriate: 5
Silti	Agode	1	1 Birr/month	Appropriate: 1
		1	0.1 Birr/25ℓ	Appropriate: 1
	4-Bari	3	1 Birr/month	Appropriate: 3
Loma	Elea Bacho	3	2.5 Birr/month	Appropriate: 1 No answer: 2
	Lala	3	3 Birr/month	Cheap: 3
	Gessa Egidat	4	7 – 18 Birr/month	Too expensive: 1 Appropriate: 3
	Zima	3	1 Birr/month	Cheap: 3
Hula	Loya	1	0.1 Birr/25ℓ	Too expensive: 1

* Most of the WASHCOs declare the upper limit of water supply from public hand pumps as 20 – 25ℓ per household per day.
(Source: answers to the questionnaire to the beneficiaries)

From these results, it is understood that there are a variety of feeling among the users. Assuming that the price of water from public hand pumps is 0.1 Birr per 25ℓ and the quantity of water supplied is 10m^3 per pump per day, the income is about 1,200 Birr per month. This amount of money will be allotted for spare parts and maintenance costs.

For the operation and maintenance of public hand pumps, the evaluator interviewed two WASHCOs among the target 21 WASHCOs: Asano WASHCO in Silti Woreda which manages a hand pump for a deep well and Sabola WASHCO in Silti Woreda which manages one for a shallow well. Answers were obtained from the two: the former answered that the WASHCO cannot repair the pump because it cannot bear the cost of purchasing a tool that is necessary for repairs, and the latter answered that it is currently possible for the WASHCO to maintain the pump but it might be impossible to raise the charges in order to keep up with the prices of spare parts that are currently rising[62]. From the answers, it was found that Asano

[62] The 2 WASHCOs answered as follows respectively.
- Asano WASHCO: This WASHCO manages a hand pump installed on a well 69m in depth. 2 years ago, a bolt that was used in an important part fell into the pumping pipe, and since then the pump has become non-functioning. A tripod, which is necessary for repairing it, is so expensive that the WASHCO cannot purchase one even with the WWMEO's budget. Because of this, the WASHCO cannot repair it. The users have water shared from other wells in the vicinity, but it takes a long time to get water. They are at a loss.
- Sabola WASHCO: This WASHCO manages a hand pump installed on a shallow well. The WASHCO could save the costs for the moment for the maintenance of the pump by collecting charges from the users. But the saved money is not sufficient in consideration of the prices of parts that are currently rising. The WASHCO is planning to hold a general meeting to discuss a bill of doubling the charges. The bill can be passed with a majority of the households that are supplied with water from the pump. The repair itself is relatively easy and the WASHCO itself can deal with it.

The leader of Sabola WASHCO stated the idea that the WASHCO collects raised charges only from the supporters and persuades the opponents, since some of the users are against the bill of raising the charge. The

WASHCO, which manages a deep well, cannot repair the pump managed because the WASHCO and even the WWMEO cannot bear the cost for purchasing a tripod necessary for repairing, and on the contrary, Sabola WASHCO, which manages a shallow well, does not currently have such a problem. However, the prospects are gloomy on whether the inhabitants can bear the increased expenditure due to the rising prices. Although such a situation cannot be generalized only with these 2 answers, it is certain that the management of pumps installed on deep wells faces certain financial difficulty.

Comparing household rope pumps and public hand pumps, it can be said that it is difficult to use the former continuously due to heavy personal bearing, while the latter is sustainable due to light personal bearing if WASHCOs save sufficient funds for their maintenance. However, the prices of spare parts for public hand pumps are rising, and the finances of the WASHCOs that manage the pumps depend on the unhopeful prospect of users agreeing to pay increasing higher charges.

From the above, there is a serious problem, that is, the users of household rope pumps became unwilling to pay their shares of the expenses, which would affect the sustainability of the project effects and further the success of the dissemination of rope pumps, in addition to other problems: the prospects are gloomy on whether the users can bear the increased costs due to the rising prices of spare parts of public hand pumps; WASHCOs that manage deep wells and WWMEOs that support them do not have the financial ability to purchase tools that are necessary for repairing pumps; the budgets of the regional government for the operation and maintenance of pumps are not currently sufficient. Thus the financial aspects for the sustainability of the project effects are low.

From the above, major problems have been observed in terms of the organizational aspects of the implementing agency and financial aspects of the beneficiaries, and some minor problems have been observed in terms of the policy background and technical aspects of the implementing agency. Therefore, the sustainability of the project effects is low.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was implemented in the Southern Nations, Nationalities and People's Regional State (SNNPRS) for the purpose of building sustainable water supply systems and developing their organizational and human resources capacity. The activities of this project were consistent with the improvement of the water supply rate and the water scheme functionality rate that were priorities of Ethiopia's national development policy, Ethiopia's

prospects are gloomy on whether the WASHCO can collect double the current charge from all the users, since the opponents are poorer than the other users.

development needs such as access to safe water, and Japan's assistance policy, which prioritized the development of the ability to supply safe water and maintain water facilities. However, problems in the planning and approach prevented the project from having the expected effects. Therefore, its relevance is fair. The Project Purpose and the Overall Goal have not been achieved and it cannot be said that a sustainable water supply management system has been built. The expression of the Outputs and the Project Purpose from its completion to the time of the ex-post evaluation is not sufficient as well. Therefore, its effectiveness and impact are low. Both the project cost and the project period exceeded the plan. Therefore, its efficiency is fair. There are problems left in the organizational aspects of the implementing agencies, such as cooperation between the region, zones and woredas, the supply of equipment and spare parts that are necessary for maintaining water facilities, the technical skills of the Woreda Water, Mining and Energy Offices (WWMEO), and the bearing of costs by the users of water facilities, etc. The outlook for their resolution is not bright. There are slight problems in related policy and institutional aspects. Therefore, its sustainability is low.

In light of the above, this project is evaluated to be unsatisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

The evaluator recommends as follows to the WRB, the Implementing Agency, and the related agencies, the ZWMEDs and WWMEOs.

The regional government declares the policy of disseminating rope pumps to SNNPRS and other regions under a hierarchical structure consisting of the regional government (the WRB), zones (ZWMEDs) and woredas (WWMEOs). In this project, problems have been brought out such as bad fixtures of rope pumps themselves, the withdrawal of outlets that carry spare parts supply chains, nonpayment of the shares of the rope pump expenses by the beneficiaries (users becoming unwilling or unable to pay), lack of trust in the relationship between inhabitants and WWMEOs, and the existence of wells that are unsuitable for installing rope pumps, etc. Promoting the installation of rope pumps without solving these problems is likely to cause similar problems and to make rope pumps unreliable. On the contrary, if measures are taken to solve these problems and successful cases were established, it is expected that rope pumps would be recognized as a really inexpensive and simple means to improve rural water supply and evoke the interest of inhabitants. To that end, information should be shared among the regional government and zones that are to promote the policy and woredas that are at the forefront of installation of rope pumps and consultation to beneficiaries, by discussing measures. They are recommended to tackle the problems together.

In the case of the lack of manpower at woreda sides, flexible utilization of human resources is necessary, such as the short-term transfer of personnel who have technical skills to install from the regions or zones to woredas that want manpower, since unilateral orders on installing rope pumps to woredas never advance the situation.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

Measures against preventing factors before the start

In the case of this project, there is no denying the fact that the greater part of C/P members moved to other positions due to the BPR just after the start, affected the sustainability of organizational aspects, as described in 3.4.2. This possibly fell under the Important Assumptions "There is no significant turnover in the WRB and WWMEOs" that is clearly stated in successive PDMs. Under these circumstances, it should be considered that there was an option of terminating the project. In addition, as described in 3.1.4, the project effects are not expressed; it is impossible to maintain pumps unless spare parts supply chains are established and parts are sold there at prices that the users can bear.

In general, there are several conditions for projects to express their effects. The effects cannot be expressed unless all of them are satisfied. It is recommended to examine successful and failed examples of cooperation projects that aimed to improve rural water supply in Ethiopia and other countries (regardless of cooperative agencies: JICA, other donors or NGOs), not only for this project, and to analyze to what the successful ones paid attention and what the preventing factors were in the failed ones[63]. It is necessary to take resolute

[63] Examples of similar projects are described below.

In the preceding grant aid, that is, "The project for water supply in Southern Nations, Nationalities and People's Regional State" (Phase 1: FY 2005, Phase II: FY 2006), there were problems that the allocation at each WWMEO is hardly sufficient to monitor water supply facilities in their jurisdiction, WWMEOs' capacity to implement training for WASHCOs has room for further reinforcement and improvement, and some WASHCOs did not keep financial books or did not save money in their bank accounts. The sustainability of the project was evaluated as fair (Source: Ex-post Evaluation Report on "The project for water supply in Southern Nations, Nationalities and People's Regional State"). In the Grant Aid "The Project for Water Supply in Amhara National Regional State" (August 2005 – October 2008), which was implemented before this project in Ethiopia, there were some factors that lowered the sustainability: Amhara Water Works Construction Enterprise, which is in charge of the management of water supply facilities, does not have sufficient technical skills, and there are difficulties in purchasing spare parts. A lesson learned is stated: "It is thought that the project effects would have been higher if the original plan had covered necessary spare parts" (Source: Ex-post Evaluation Report (internal evaluation) on the project).

In the Technical Cooperation Project "The Project on Rural Water Supply Technology in the Central Dry Zone" in Myanmar (November 2006 – October 2009), two factors contributed to heightening the sustainability: institutions and technical aspects were established where organizations by inhabitants were in charge of the daily maintenance and slight repair of well facilities and the personnel of the governmental organizations or local administrative entities were dispatched if more difficult repair jobs were necessary, and the charges collected from inhabitants and the grant from public budgets were well allocated (Source: Ex-post

steps against those factors; preventing factors should be dealt with if they can be solved, and if they cannot be solved, the project implementation should be postponed or stopped in worse cases.

Necessity of discussion on the feasibility of the operational model

The rope pumps introduced in this project consist of inexpensive and easily purchased parts such as bicycle wheels, reinforcing rods, used tires, PVC pipes and ropes, etc. It was thus expected that the project could not only introduce but also maintain them with low costs, and easily repair them as well. However, a part called a "piston" (see Photo. A1) among their parts does not have any other use, and is difficult to purchase without spare parts supply chains. On the other hand, rope pumps have not been widely distributed yet. Spare parts outlets are skeptical about their profitability and some of them actually withdrew after they launched. Though this project invited spare parts outlets, it was unable to ensure that these outlets would continue operation and thus the loss of spare parts supply chains was a result of many outlets leaving. The evaluator believes that a number of aspects of the feasibility should have been examined more thoroughly before the start of the project. These include in which households pumps would be installed, whether users would pay their share of the expenses, whether WWMEOs would provide technical support for operation and maintenance, the establishment and sustainability of spare parts supply chains, and the possibility of charging for the free supply of parts from WWMEOs instead of inviting outlets. This is the same for public hand pumps, the costs for the operation and maintenance of which are borne by collecting charges from the users. Efforts should be concentrated on learning from failures, e.g. "The sustainability is unexpected if the conditions for projects to express their effects greatly depend on Important Assumptions, and there is not a good possibility that those Important Assumptions are satisfied in the future". Those who plan future projects

Evaluation Report (internal evaluation) on the project). On the other hand, in the Grant Aid "The Project for Rural Drinking Water Supply in Memot District of Kampong Cham Province" in Cambodia (July 2009 – February 2011), the fact that spare parts could only be purchased in the capital was a problem for the management of facilities in rural areas and it lowered the sustainability. There were also some confirmed cases where the organizations run by inhabitants could not bear the cost of purchasing spare parts. It was then recommended that the governmental organization should consider the conditions of the organizations run by inhabitants and support them if necessary (Source: Ex-post Evaluation Report (internal evaluation) on the project). In addition, in the Technical Cooperation Project "Project on the Safe Water and the Support on Community Activities" in Senegal (January 2003 – January 2006), since the sustainability in organizational and financial aspects decreased in the case where the organizations run by inhabitants have to revise pumps and engines by themselves, support from the government was required. It was also pointed out that "it should have evaluated the feasibility of the continuous operation of existing facilities before the implementation of the project". There was obtained a lesson learned "it was necessary to confirm if the conditions to continuously operate water management committees by grasping the functionality of equipment and the population supplied with water and estimating the income, and necessary measures should have been taken unless such conditions were not satisfied" (Source: Ex-post Evaluation Report on the project).

From the above, it is thought that the success of the activities by the organizations run by inhabitants is affected by the fact that the public organizations such as the government and local administrative entities prepare institutional and financial conditions and intervened in them if necessary.

should examine the followings before their implementation. Starting projects without considering these things may affect the expression of project effects during and after the implementation.

- Do those who should bear the costs (beneficiaries in the case of this project) have the financial ability and willingness to bear the costs?
- In the case that the expression of the project effects depends on the behavior of persons other than those who are related to the projects (spare parts outlets in this project), are those persons likely to behave so that the expression of project effect will be enhanced?
    - In the case that the above possibilities are not strong (spare parts outlets are not likely to continue their business in this project), can the project activities establish sustainable systems that are not affected by external factors?
- In the case that the capacity of the personnel of the implementing agencies or the equivalent (the WRB, ZWMEDs and WWMEOs in the case of this project) are to be strengthened, and those members change or go away due to retirement or turnover, are transfers available? Who transfers technical communication at what time in such transfers?

Sufficient investigation on natural conditions

Ethiopia has both dry and rainy seasons. The groundwater level varies by season. In order to pump groundwater from wells with pumps, it is necessary to maintain the distance between the groundwater surface to the bottom of the well. In order to guarantee the ability to pump groundwater throughout the year, wells should be designed based on the annual lowest groundwater level. This project was to install 60 rope pumps during the period of cooperation. In the project, existing wells were used and groundwater levels were investigated in dry seasons. However, it is not clear whether the annual lowest levels were obtained. There were some cases where the required distances were not ensured in some seasons. The evaluator believes that it should have been examined based on the annual lowest levels whether additional excavations were necessary or not, since the required distances in the case of drawing with well buckets differ from those in the case of pumping.

In cases where projects are planned in which seasonally varying natural conditions such as air temperature, frequency and degree of rainfall, the existence of snowfall, flowrate in rivers, groundwater level, tide level, direction and velocity of wind and daylight hours, etc. (groundwater levels in the case of this project), not only momentary data of these natural conditions but also their degree of variation should be grasped and involved in the plan beforehand.

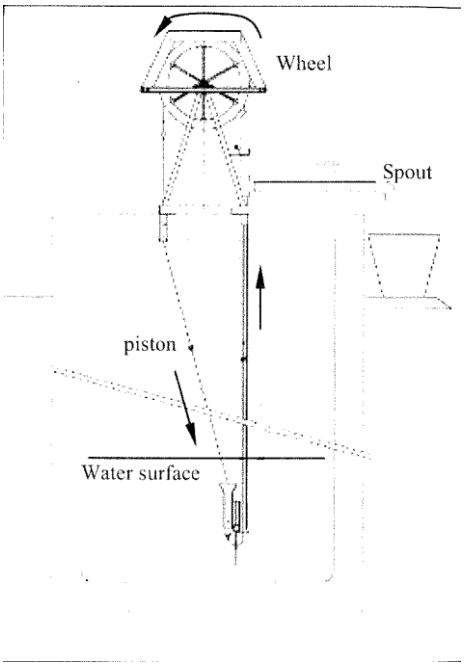

Figure A1. Structure of rope pumps

(Source: The Rope Pump, Textbook for Comprehensive Rope Pump Training, WAS-CAP, Oct. 2011, p. 2)

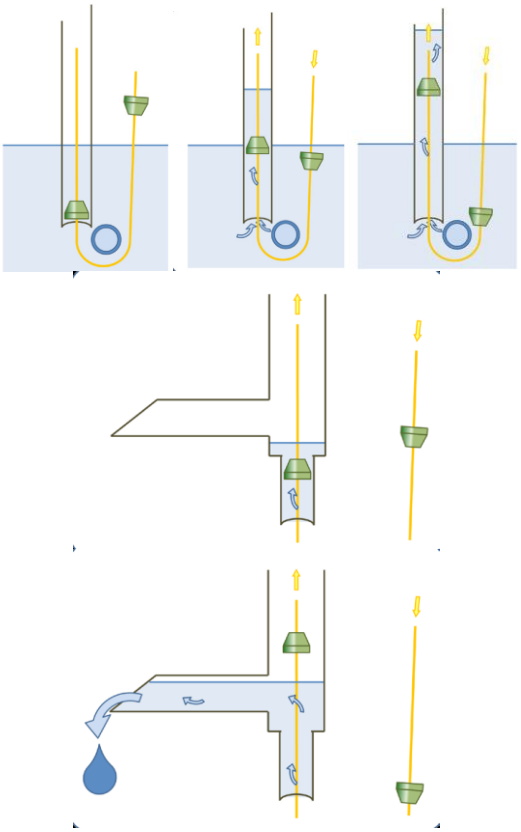

Figure A2. Principal of rope pumps

(Source: Rope Pump Manual, Technical Training Handbook on Rope Pump Production, Installation and Maintenance, Third Edition, August 2011, Practica Foundation, p. 3)

Photo. A1. Piston

(Photo by the evaluator)

Table A1. Achievement of the Outputs

Output	Indicator	Actual
Output 1: Rural Water Supply Scheme Development / O&M Plan is formulated in each of the 6 Target Woredas	[Indicator 1] Rural Water Supply Scheme Development / O&M Plan on the basis of thematic maps is formulated in each of the 6 Target Woredas. 2003 in Ethiopian Calendar (2010 in European Calendar) year's version by October 2010 and 2004 in Ethiopian Calendar (2011 in European Calendar) year's version by May 2011.	Indicator 1 had been already achieved by the completion of the project. The plans of the 2010 and 2011 editions were completed by June 2010 (goal: October 2010) and May 2011 (goal: May 2011) respectively.
Output 2: Rope Pump Dissemination System is established in the 6 Target Woredas	[Indicator 2.1] The collection rate of monthly information from users in O&M monitoring system for rope pumps, which are installed by the Project, is 80% by the end of the Project.	Indicator 2.1 had been already achieved by the completion of the project. The mean collection rate of monthly information from users in 5 woredas, the target woredas except Loma Woreda, was 96.8% in October 2011.
	[Indicator 2.2] The rate of awareness of rope pump in each rope pump installation site is 70% by the end of the Project.	Indicator 2.2 had been already achieved by the completion of the project. The mean rate of awareness of rope pumps in 5 woredas, the woredas where rope pumps were installed except Chencha Woreda, was 91% in December 2011.
Output 3: Operation and Maintenance of Water Schemes are improved in 6 Target Woredas.	[Indicator 3.1] The defined numbers of staffs in each WWMEO score over 70 points in exam of repair / O&M Training by the end of the Project.	Indicator 3.1 had been already achieved by the completion of the project. The examination results in the repair / O&M Training was 85.6% in December 2011.
	[Indicator 3.2] Caretakers of WASHCO in 21 target water schemes implement preventive maintenance (regular maintenance) according to the established frequencies in the different water schemes after repair / O&M training by the end of the Project (goal: all 21 schemes).	Indicator 3.2 had been almost achieved by the completion of the project. Regular maintenance was implemented in 18 water schemes of the 20, the target water schemes except one out of order, in December 2011.
	[Indicator 3.3] All the WASHCO of the target water schemes save the established cost for O&M by the end of 2003 in Ethiopian Calendar (August 2011 in European Calendar) (goal: all 21 schemes).	Indicator 3.3 had not been achieved by the completion of the project. The cost for O&M was saved in 13 water schemes of the 16, the target water schemes except 5 in Silti Woreda where the reports were not collected due to large-scale turnovers, in December 2011.
	[Indicator 3.4] 9 target WASHCOs which monitor Afridev Hand Pumps regularly keep its hand pump spare parts for half a year O&M by the end of the Project (goal: all 9 WASHCOs).	Indicator 3.4 had not been achieved by the completion of the project. Spare parts were kept in 2 water schemes of the 9, the 9 WASHCOs which monitor Afridev Hand Pumps, in December 2011.
	[Indicator 3.5] A Guideline for spare parts supply chains is prepared and distributed in the region by the end of the Project.	Indicator 3.5 had not been achieved by the completion of the project. The Guideline was prepared at the completion of this project, but not distributed. However, it was distributed in Loma Woreda by 2012 just after the completion.

Source: the Evaluator, making reference to documents provided by JICA